



**Report of the
Steering Committee on Fintech Related Issues**

2019

Department of Economic Affairs

Ministry of Finance

Government of India

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Acknowledgements

The mandate of the Steering Committee was to take stock of developments in the fintech space globally and in India, study the regulatory climate in various geographies, identify application areas and use cases in Governance and financial services, suggest institutional regulatory upgrades enabling fintech innovations. India has distinctive comparative strengths in areas like Financial Inclusion, Digital Payments, etc., with roll out of the India Stack and there is potential of sharing experience with other Emerging and developing economies. The Committee therefore delved into potential opportunities for cross-learning and deepening of such initiatives.

All the major stakeholders were members of the Committee; these comprised of Secretary, Ministry of Electronics and Information Technology (MEITY); Secretary, Department of Financial Services (DFS); Secretary, Ministry of Micro, Small and Medium Enterprises (MSME); Chairperson, Central Board of Indirect Taxes and Customs (CBIC); CEO, Unique Identification Authority of India (UIDAI); Deputy Governor, Reserve Bank of India (RBI); Chairman, Securities and Exchange Board of India (SEBI); CEO, Invest India; and Additional Secretary (Investment), Department of Economic Affairs (DEA) as Convener of the Committee.

The Committee specifically acknowledges the inputs and suggestions received from Mr. Ram Mohan Mishra, AS (MSME), Mr. S.K. Panda, Member (IT), CBIC, Mr. Narendra Bhooshan, DDG (UIDAI), Mr. Dhananjaya Tambe of SBI, Mr. Sankarson Banerjee of NSE, Mr. Kashinath Katakdhond of RXIL, Mr. Sharad Sharma of iSPIRT Foundation, Ms. Smita Aggarwal of Omidyar Network, Ms. Sujatha Mohan of RBL Bank, Mr. Nikhil Sahni of YES Bank, and Mr. Alok Mittal of Digital Lenders Association of India (DLAI).

The Committee met three times since its inception. The Working Group formed under the chair of Member (IT), CBIC based on the decision taken in the first Steering Committee meeting, met two times since its inception and concluded its observations that have been incorporated in the report. In addition, Additional Secretary (Investments) met and interacted with a variety of stakeholders including banks, exchanges, payment service providers (PSPs), and fintech lenders in Agri and

SME spaces. The Committee's research secretariat conducted two consultations involving industry participants and the Committee also acknowledges their contributions (See: Annexure B). The Committee was ably supported by the research work of the Macro/Finance Policy team at the National Institute of Public Finance and Policy (NIPFP) comprising Anirudh Burman, Bhavyaa Sharma, Jai Vipra, Nelson Chaudhuri, Radhika Pandey, Raghunath Sheshadri, Renuka Sane, Rishab Bailey, Shivangi Tyagi, Smriti Parsheera, Sumant Prashant and Suyash Rai. I appreciate and acknowledge their contributions to this report. This task would not have been completed without the help of a dedicated team in the Investment Division of Department of Economic Affairs, led by Additional Secretary, K. Rajaraman and earlier by former Joint Secretary Govind Mohan, and comprising of Akhilesh Kumar Mishra, Pradeep Purohit, Pawan Kumar, Akshata Kalloor, Amandeep Singh and Rahul Goel.

The Committee studied the domestic and international scenario including the various initiatives taken by other governments and regulators, and analysed reasons impacting its growth in understanding the trajectory of development in fintech industry. The task of putting together the key issues, global experiences, challenges faced by the industry and policy options thereon, developing the rationale for the final recommendations would not have been possible without the efforts of the members of the Committee and those who enriched the discussions. I acknowledge valuable suggestions and insights provided by all those who participated in the Steering Committee discussions and stakeholder consultations.

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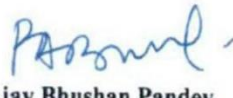
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Additional Secretary, Department of Economic Affairs

Convener

Chapter 1

Measures Required for Expanding Fintech Services

1.1 The fintech landscape

The growth of fintech, or the designing and provisioning of financial services by using new technological innovations, is one of the most significant developments in the financial sector in the past decade. Fintech has the potential to play a big role in increasing access to finance, and in promoting the growth of MSMEs in the country. However, the broader fintech landscape all over the world comprises of a variety of day-to-day financial services enhanced by technology. Mobile payments, cryptocurrency, investment advisory, insurance aggregators, peer-to-peer lending and some more services which traditionally required human capital, now form the fintech landscape. fintech comprises of technology-based businesses that compete against, enable and/or collaborate with financial institutions.¹

FinTech activity in India may be measured by VC/PE deals. In 2016 and 2017 there were around 103 private equity or venture capital investments in the fintech sector in India amounting to USD 2.39 billion. The biggest investment in 2017 was USD 1.4 billion in Paytm by the Japanese conglomerate SoftBank. Others who received funding include insurance-marketplace PolicyBazaar (USD 77 million), SME lending platform Capital Float (USD 45 million) and payments firms Mswipe Technologies (USD 31 million) and Razorpay (USD 20 million). *However, in comparison to Global fintech investments of a record USD 57.9 billion in about 875 VC or PE or M&A deals in first half year of calendar year 2018, fintech investments in India of 54 deals worth USD 640 million (1.2% of world levels) appear to be relatively small.*

¹ KPMG, *Fintech in India - A global growth story*, 2016, URL: <https://assets.kpmg.com/content/dam/kpmg/pdf/2016/06/FinTech-new.pdf> (visited on 05/17/2018).

According to a report by the World Economic Forum, fintech enterprises have set the foundation for disrupting incumbent financial institutions both now and in the future.² India has made progress in the growth of fintech products and services:

(i) *Payments*: Fintech has significantly permeated the payments landscape. Companies like PayTM, MobiKwik, Citrus and PayU are taking advantage of the rapid increase in the use of smartphones, internet connectivity and online shopping to integrate payment processing into web applications. Fintech has huge potential in the emerging landscape of payment banks.³ Through the Payment Bank licenses, the fintech players in this sector are applying a hybrid model where mobile services interact with banking services. Besides, the introduction of Unified Payment Interface (UPI) has provided a boost to the payments sector in India. *Box 1.1* discusses the role of UPI in easing payments transactions.

Box 1.1: The UPI Revolution

UPI was launched on August 25, 2016 to give a boost to mobile banking. It has been developed by the National Payments Corporation of India (NPCI). UPI allows users to send and receive money using a single identifier which will act as a virtual address. The address could be an Aadhaar number, a mobile number or a virtual payment address linked to a bank account. This eliminates the need to exchange sensitive information such as bank account numbers during a financial transaction. Since its launch two years ago, the value of transactions on UPI has been growing rapidly, reaching INR 54212 crore in August 2018.

Before the advent of UPI, the payment system architecture was not seamlessly interoperable. The transfer of funds between two mobile wallets involved a convoluted payments chain, often involving transfer through sender's bank to the receiver's bank. The biggest advantage of UPI is its interoperability among various banking platforms. This system has considerably eased retail payment transactions at a time when the use of mobile banking is picking up. In August 2018, NPCI launched the UPI 2.0. The additional feature UPI 2.0 is that customers can link their overdraft account to UPI. UPI 2.0 thus serves as a digital channel to access overdraft account.

² World Economic Forum, *Beyond Fintech: A Pragmatic Assessment of Disruptive Potential in Financial Services*, 2017, url: [http://www3.weforum.org/docs/Beyond Fintech - A Pragmatic Assessment of Disruptive Potential in Financial Services . pdf](http://www3.weforum.org/docs/Beyond_Fintech_-_A_Pragmatic_Assessment_of_Disruptive_Potential_in_Financial_Services.pdf) (visited on 05/17/2018)

³ Payment banks are like other banks but perform a limited set of functions. They can't advance loan or issue a credit card but carry out most banking functions i.e. accepting demand deposits (up to Rs. 1 lakh), offer remittance services, mobile payments/transfers, net banking and third-party transfers. The main objective of setting up payment banks is to further financial inclusion by providing financial services to small businesses, low-income households, migrant labour workforce in secured technology driven environment. In 2015, RBI in-principle granted approval to eleven entities to set up payment banks.

(ii) *Lending and investment*: Fintech solutions have the potential to transform the lending landscape. One way is through crowdfunding, which entails raising external finance from a large group of investors. The investors can interact with the investees and view their ideas on a crowdfunding platform.⁴ The financing can be received in the form of reward or donations, debt or equity. Debt crowdfunding is closer to peer-to-peer lending. This form of alternative lending is at a very nascent stage in India.⁵ Peer-to-peer lending has the potential to improve access to finance for small and medium enterprises who are otherwise declined credit from banks. It is a form of debt financing that allows individuals as well as businesses to borrow money online from peers, without balance sheet-based intermediation by a financial institution. The RBI issued Master Direction on peer-to-peer lending platforms in October 2017.⁶

(iii) *Trade Finance*: Invoice trading is another nascent area of fintech application in India. It assists MSMEs that often struggle with working capital and cash flows due to delayed payments. Recently emerged fintech companies are providing platforms to such MSMEs to sell their invoice or other receivables at a discount for working capital. In December 2014, RBI issued guidelines on TReDS, which is an online mechanism for facilitating the financing of MSMEs through multiple financiers.⁷ These were updated in July 2018.⁸ It enables discounting of invoices of MSME sellers raised against corporate or other buyers, allowing them to reduce working capital needs. For TReDS platform, RBI has given license to three entities and they are governed by the Payments and Settlement Systems Act. Receivable Exchange of India (RXIL), which is a joint venture between National Stock Exchange (NSE) and Small Industries Development Bank of India (SIDBI); was the first one to go live on January 9th, 2017.

(iv) *Insurance and advisory services*: Fintech firms are providing platforms to consumers to save, invest, manage their wealth and compare costs and returns for a range of financial products. Positioning themselves as financial product aggregators, fintech firms like Paisabazaar.com help

4 Kickstarter, Indiegogo, RocketHub are some examples of crowdfunding platforms.

5 Securities and Exchange Board of India, *Consultation Paper on Crowdfunding in India*, tech. rep. June 17, 2014.

6 Reserve Bank of India, *Master Direction – Non-Banking Financial Company – Peer to Peer Lending Platform (Reserve Bank) Directions, 2017*, (visited on 04/03/2018).

7 Reserve Bank of India, *Guidelines for setting up of and operating the Trade Receivables Discounting System (TReDS)*.

8 Reserve Bank of India, *Guidelines for the Trade Receivable Discounting System (TReDS)*.

their customers choose from a spectrum of financial products across categories such as personal loans, home loans, credit cards, saving accounts and mutual funds. Such portals provide customized financial advice on a range of financial products that aids in fostering financial inclusion. Robo-advisory solutions are also emerging in the market. SEBI guidelines on investment advisors apply to robo-advisors. Banks are entering this alternative distribution channel as this is more efficient and less costly.

(v) *Pensions*: Fintech-enabled technologies such as robo-advise can make financial planning more accessible, and digital disclosures can reduce compliance costs. An OECD report on Pensions and Technology finds that fintech applications are increasing the accessibility of investing in pension products to a broader consumer base; fintech is increasing the efficiency of the operation of pension schemes through risk management applications, automation of investment processes and facilitation of regulatory compliance.⁹ There is scope for adopting these and other global practices in Indian pension landscape.

(vi) *Account aggregator services*: Account aggregator services have been present in developed economies since mid-2000s. These services aggregate financial data of a customer from different financial services providers and leverage this data to build analytics and insights to help consumers manage their financial commitments and goals such as bill payments, spending, budgeting, retirement planning. In 2016, RBI released guidelines for NBFCs that intend to function as account aggregators.

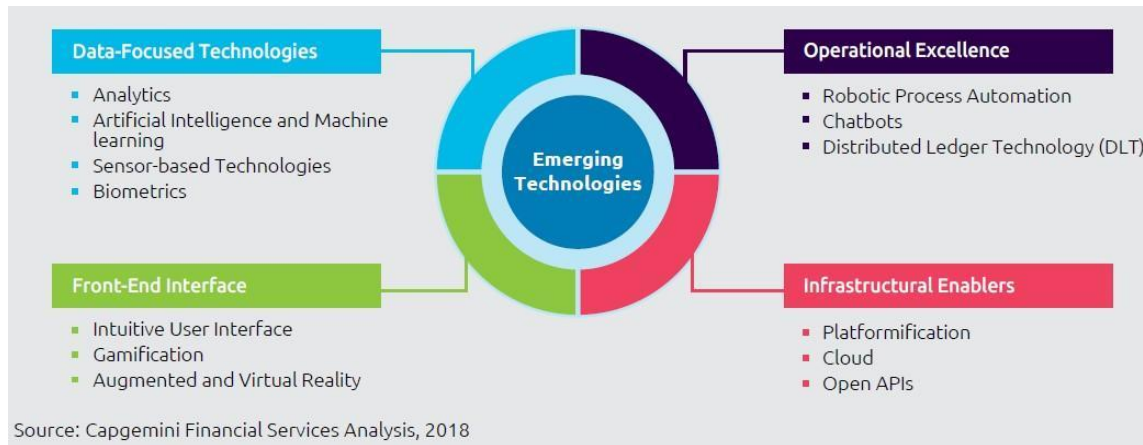
1.2 Technology enablers for fintech

At the core of the rapid growth of fintech are new technologies that have revolutionised ways in which financial products and services are created, provided and managed. Some of these technological developments enable creation of entirely new products. Some of the key developments in technology underpinning in fintech are:

⁹ See details, OECD, *Technology and pensions: The potential for FinTech to transform the way pensions operate and how governments are supporting its development, 2017*.

(a) *Data focused technologies* such as analytics, sensor-based technologies, Biometrics, Artificial Intelligence or Machine Learning, etc., provide insights on customers making it relevant through personalized offerings.

Figure 1.1 Emerging technologies



(b) *Infrastructure-based technology*, through platformification and open APIs, is reshaping the future of the financial services industry,

(c) *Operational excellence* aspects of RPA, chatbots, and DLT are enabling greater agility, efficiency and accuracy.

(d) *Front-end Interfaces*: Design-based thinking and simple-to-follow user-interfaces are making the customer journey quick, convenient, and seamless. Augmented and virtual reality and gamification are helping customers interact with their firms in innovative ways.

1.2.1 Encryption and cryptography

Cryptography refers to the writing of codes that allow information to be kept secret. *Encryption* is the process by which information is made unreadable for unauthorized users using algorithmic tools. Developments in encryption and cryptography have enabled a wide variety of financial

services to disrupt existing service delivery methods in recent years. Encryption has become a best practice in securing private data for financial service providers. These two developments allow for increased security in the provisioning of financial services and enable developments of new services.

Cryptography, as an instrument for fintech, has four key benefits for financial firms: (a) confidentiality, (b) privacy, (c) non-repudiation, and (d) integrity. Financial services companies are deploying encryption as an industry standard, as well as a best practice. The Payment Card Industry Security Standards (PCSS) for example, require the protection of cardholder payment data be done by encrypting “transmission of cardholder data across open, public networks”.

Cryptography also forms the backbone of DLT and blockchain based systems such as Virtual Currencies. Blockchain Technology uses cryptography to protect identities, and to secure information about transactions. Financial firms have invested in blockchain-based systems for reducing transaction costs, providing better information security and privacy. For example, leading financial firms in South-east Asia have recently developed the first proof-of-concept for a KYC blockchain. This has the potential to improve KYC and AML systems, increase standardization and updation of KYC information, and reduce the costs of completing and maintaining KYC information.¹⁰ In a survey, fifteen percent of banks questioned were expected to have blockchains in commercial production by 2017.¹¹ Society for Worldwide Interbank Financial Telecommunication (SWIFT) has entered into an agreement with seven central depositories to use blockchain in post-trade processes such as proxy voting.¹²

1.2.2 Blockchain and distributed ledgers

Developments in encryption and cryptography have enabled the creation of *distributed ledgers* that in turn make the market in *virtual currencies* like Bitcoin possible. But *Distributed Ledger*

10 Anthony Payton, OCBC Bank, HSBC and MUFG in KYC blockchain breakthrough, FinTech Futures.

11 IBM Institute for Business Value, “Leading the pack in blockchain banking”, p. 20.

12 Michael del Castillo, Swift Signs Agreement With 7 CSDs to Explore Blockchain for Post-Trade, 16th January 2018.

Technology (DLT) has potential applications beyond the realm of cryptocurrencies.¹³ DLT is being explored to facilitate tamper-proof, decentralized records of flow of commodities and assets across a supply chain by using trusted validation mechanisms. DLT is being explored to build digital identity systems. Its applicability is also being explored in the field of cross-border payments and remittances. The application of DLT has the potential to enhance efficiency and resilience and reduce transaction costs in a number of financial and non-financial sector applications. Blockchain is a type of DLT which enables a community of users to record transactions in a distributed (without a central repository) and a decentralized (without a central authority) manner. The transaction records are visible to all the participants of the blockchain network, while being immutable at the same time. Blockchains rely heavily on cryptographic primitives.

The tamper-evident and the tamper-resilient nature of blockchains, as well as the participant-dependent consensus algorithm for validation of transactions does away the need for a third-party intermediary to validate a transaction, as well the risk of duplication or malicious change in a trail of records. The distributed nature of the ledger ensures that the transaction settlement information is relayed simultaneously with the payment message. The consensus system improves the transparency of decisions and trust among all stakeholders. However, the technology is still evolving and needs further pilots and evaluation.¹⁴

Some of the major fintech applications where blockchain is being deployed are:

(i) *Cross-border payments*: Under the current structure of cross-border payments using SWIFT between two countries, a single cross-border payment has to go through multiple corresponding banks involved in receiving, collating and netting payment messages, which increases the settlement time and the costs associated at every level of payment message transmission. This requires the presence of a trusted third-party. In addition, routing through multiple banks in each country could also create a variation in the form and structure of messages transmitted.¹⁵The high

13 See, World Bank Group, Distributed Ledger Technology (DLT) and Blockchain, FinTech Note No.1, 2017.

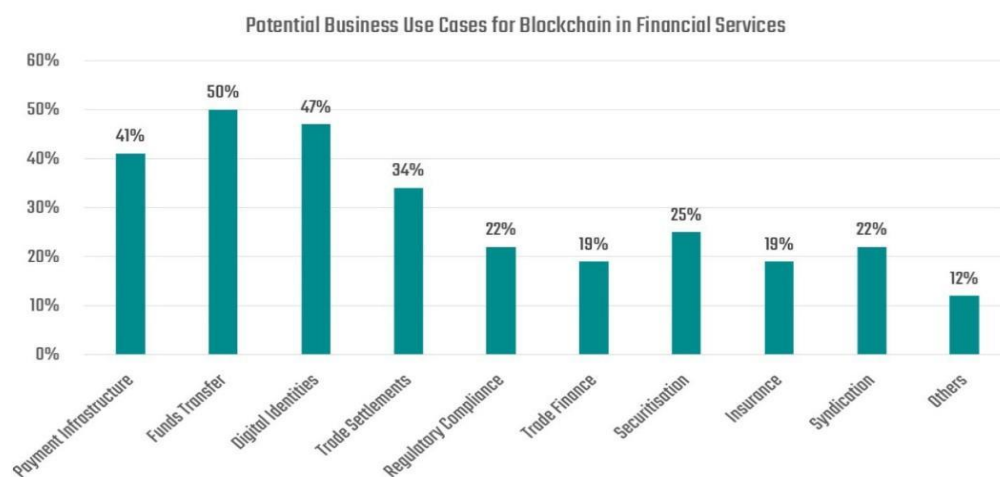
14 Mike Orcutt, "How secure is blockchain really?", in: MIT Technology Review (25th April 2018).

15 Ravishankar Achanta, Cross-border money transfer using blockchain – Enabled by Big Data, tech. rep., 2017.

costs and sluggish nature of the current structure make the formal system biased towards high-value transactions. A blockchain-based solution to the associated issues with cross-border payments could encompass the following features:

- (a) Exclusion of intermediaries and direct transaction between parties.
- (b) Intra-day liquidity need not be ensured with central banks as all stakeholders will hold a copy of balances and transactions of every participant.
- (c) Encryption will nearly eliminate the possibility of modification of data and will maintain an immutable audit trail.
- (d) Private or permissioned blockchains, only limited to stakeholders, will address data protection and privacy concerns.
- (e) Consensus-based validation of transactions will allow for immediate updation of transaction trail.
- (f) Use of digital tokens resolve the issue of multiple currencies, improves liquidity and capital compliance costs, allows for micro-payments and expedites the payment process, which further eliminates liquidity risks.

Figure 1.2 Potential business use cases for applications of Blockchain in financial services



Source: <https://www.technologyreview.com/s/610836/how-secure-is-blockchain-really/>

As a part of the R3 consortium, 22 banks are experimenting with distributed ledger systems on a global network. This shared infrastructure creates a representation of fiat currencies on a ledger to enable efficient cross-border payments.¹⁶

(ii) Settlement of securities: In the existing framework of settlement, the presence of multiple intermediaries and the updation of ledgers based on exchanged messages introduces delays in transaction settlement and final settlement. Any updation requires the history of transactions to be updated in the ledgers of every involved party. Blockchain will allow for distributed and decentralized records. The associated immutability will be useful for permanent traceability of securities records and transactions. In a privately arranged blockchain, system will store and facilitate KYC data across all nodes. Securities can be directly issued to all the parties, with automated servicing process. Secure, real-time transaction matching across all nodes can be available, which when settled will be irrevocable. Moreover, the history of payments and transactions maintained on the ledger will enable more transparent supervision for auditory and regulatory authorities.

(iii) Trade finance: There are multiple issues associated with trade and receivable financing, which include falsified receivables, multiple invoices secured against the same collateral, payment and delivery details, and the effort required for counterparty due diligence. Under the current framework, Letters of Credit (LCs) allow bank facilitation of trade flow and settlement process. Since they are evaluated on the basis of trade documents and not actual deliveries. The features associate with blockchain can increase visibility into asset status, which can increase transaction transparency, security as well as allow for real time merchant tracking.

(iv) Smart Contracts: Smart contracts are a collection of code and data deployed on a blockchain, which automatically execute a contract once a specified kind of information is provided by the user. Since the code is on blockchain, it is immutable, and can be used as a trusted third party for financial transactions (including but not limited to transfer of funds). An example of web smart

¹⁶ R3, “R3 and 22 banks build real-time international payments solution on Corda DLT platform”, 2017, url: <https://www.r3.com/news/r3-and-22-banks-build-real-time-international-payments-solution-on-corda-dlt-platform/> (visited on 31/10/2017)

contract integration can be supply chain financing, where smart contracts can ensure that invoices are generated, and the payment occurs only when the delivery of good or services are actually made. Goods and services are tracked in real-time using web-based geo-tracking APIs. Letters of credits can also be modelled as smart contracts on blockchain. They will enable automated compliance verification with contract terms, faster payments to sellers, and prevent disputes resulting from ambiguities in the interpretation of the contract.

1.2.3 Digital currencies and tokens

Global interest in cryptocurrency surged in 2017 as the price of Bitcoin soared to new heights. Cryptocurrencies are decentralized peer-to-peer payment networks. Cryptocurrencies rely on cryptography to facilitate and record transactions on a set of electronic ledgers.¹⁷ This arrangement obviates the need for a centralized authority to oversee the transactions. This enables the confirmation of transactions and maintains a database of records of transactions. This database is distributed across multiple nodes of a computer network. In 2014 there were 500 cryptocurrencies in existence, as of September 25, 2018, coinmarketcap.com identified 1993 cryptocurrencies. Table 1.1 lists top 5 cryptocurrencies by market capitalization.

Table 1.1 Top 5 cryptocurrencies by market capitalization as on 25th September 2018

<i>Cryptocurrency</i>	<i>Market capitalization (in USD Billion)</i>	<i>USD price</i>
Bitcoin	112.205	6490.78
Ethereum	22.61	221.35
Ripple	18.48	0.46
Bitcoin Cash	7.84	451.59
EOS	4.88	5.39

17 Aaron Kumar and Christie Smith, Cryptocurrencies- An introduction to not-so- funny moneys, tech. rep., Nov. 2017, URL: <https://www.rbnz.govt.nz/-/media/ReserveBank/Files/Publications/Analytical%20notes/2017/an2017-07.pdf>

The mechanisms surrounding cryptocurrencies, particularly the Blockchain and Initial Coin Offerings (ICOs), are revolutionising the global fintech landscape. The issue of initial coin offerings has emerged as an innovative way of capital raising by fintech businesses. The Cryptocurrency ICO Stats for 2018 show a total number of 790 ICOs issued as on September 25, 2018. The total funds raised through ICOs amounted to USD 20 billion as of September 25th, 2018.¹⁸ ICOs generally operate as blockchain-based funding process that enables the issuance of virtual coins or tokens in exchange for fiat currency or cryptocurrency payment. The issue of virtual coins has emerged as an alternative to traditional forms of start-up financing. The issuance of ICO is generally preceded by the company issuing a white paper on its technology and explaining the objective for raising funds. These tokens can be transferred across the network and can be traded on cryptocurrency exchanges. They can serve multiple functions from granting investors access to a service to entitling to a share of the start-up company's dividend.

The regulation of coins or tokens depend on the characteristics and the purpose for which they are being issued. Depending on the objective of issue, tokens can be grouped into two categories:

(a) Utility tokens: Utility tokens entitle future access to a company's product or service. These utility tokens can be understood as digital coupons for the service it is developing. For example, tokens issued by a hotel service provider in exchange for deposits or investments.

(b) Security tokens: Some issuance of digital tokens has the attribute of a security. In the United States SEC vs. Howey established the guidelines for whether a financial arrangement involved an investment contract and was subject to securities regulations. The test states that the issue of tokens would classify as securities when:

- (i) There is an investment of money
- (ii) There is an expectation of profits
- (iii) The investment of money is in a common enterprise
- (iv) Any profit comes from the efforts of a promoter or third party

¹⁸ Cryptocurrency ICO Stats 2018 by CoinSchedule, available at <https://www.coinschedule.com/stats.html>

1.2.4 Smartphones

The evolution of smartphones has acted as a big catalyst for the fintech industry. Smartphones are now equipped with technologies that enable tokenisation of card details, a measure that can go a long way towards reducing fraud; biometric enabled multi-factor authentication, which can enable ease of access; Near-Field Communication capable readers at merchant stores, which make carrying cash unnecessary.

The combination of a growing smartphone market and increasing penetration has given consumers a superior end-to-end experience, leading to more people using apps like Paytm to make payments on a day-to-day basis. The quality of smartphones is a major factor in the overall digital payments experience. Payment apps are increasingly relying on technologies like biometric enabled multi-factor authentication (to do away the need of typing password over and over again), barcode scanners and other payment friendly technology to expand their business and making the customer reliant on the application, resulting in an expansion of the mobile payments industry.

Global banks are tapping technology that uses the geo-location capabilities of mobile phones to determine whether payment cards are being used fraudulently. Geo-location helps validate that the card and the mobile phone are in the same location, fraud alerts can be triggered by activities as innocuous as vacations or higher-than-typical spending. The opt-in technology is integrated into bank's mobile apps, enabling the location of a card transaction to be matched to the location of the user's mobile phone.

1.2.5 Artificial intelligence

Artificial intelligence is the ability of computer systems to process information and outcomes similar to the human thought process i.e. learning, decision-making, and coming up with solutions for specific challenges.

Artificial Intelligence (AI) is expected to have a major impact on diverse fields ranging from health services to business analytics and financial services.¹⁹ In the context of financial services, AI is expected to transform the manner in delivery of such services. A prominent area where AI is already making a difference is in the delivery of customer services by financial institutions:

(i) Virtual Assistants or Chatbots: Chatbots or transactional bots are being increasingly used to offer financial advice or coaching services to customers. Improvements in customer engagement have been noted through the use of such chatbots.²⁰ Chatbots provide round the clock services to clients at no additional cost while resolving customer queries instantly. This reduces costs for financial institutions in terms of hiring personnel.²¹ Further, customers also benefit as routine queries can be addressed without the need for engaging advisors thus reducing time and costs.²² Natural Language Processing (NLP) is being used to increase the quality of services offered by the chatbots. NLP is a form of machine learning which can understand human language and process data accordingly.²³ As a result, recommendations respecting choice of financial products or services can be generated in a more naturalistic manner.²⁴ For instance, Swedbank is said to be using its NINA chatbot, equipped with NLP, to handle the approximately 2 million transactional calls received by its call centres each year.²⁵ Similarly, Sun Life through its virtual assistant Ela aids customers in handling their insurance plans.²⁶ Bank of America, through its chatbot Erica, is providing financial guidance services to clients with the help of text and voice messages.²⁷

(ii) Credit Rating services: Reliable credit scores for individuals are a prerequisite for driving efforts towards financial inclusion. In this context, AI affords an opportunity to serve those

19 Falguni Desai, 'The Age of Artificial Intelligence in Fintech', Forbes (30 Jun 2016) available at <https://www.forbes.com/sites/falgunidesai/2016/06/30/the-age-of-artificial-intelligence-in-fintech/#ea7a55d50281> accessed 24 Jan 2019

20 Timothy Clayton, 'AI and Machine Learning in Fintech. Five areas which artificial intelligence will change for good', Netguru (19 Jun 2018) available at <https://www.netguru.com/blog/ai-and-machine-learning-in-fintech.-five-areas-which-artificial-intelligence-will-change-for-good> accessed 24 Jan 2019

21 Ibid

22 Sameer Maskey, 'How Artificial Intelligence is helping Financial Institutions', Forbes (5 Dec 2018) available at <https://www.forbes.com/sites/forbestechcouncil/2018/12/05/how-artificial-intelligence-is-helping-financial-institutions/#614e71f0460a> accessed 24 Jan 2019

23 Corbin Hudson, 'Ten applications of AI to Fintech', Towards Data Science (28 Nov 2018) available at <https://towardsdatascience.com/ten-applications-of-ai-to-fintech-22d626c2fdac> accessed 24 Jan 2019

24 Clayton (n 2)

25 Ibid

26 Hudson (n 5)

27 Maskey (n 4)

individuals who are outside the financial system due to lack of credible credit history. Companies rely on alternative sources of information in order to build a credit score for an individual without any credit history.²⁸ Data from social media usage, web browser history and psychometric tests among others are used to build the customer's profile.²⁹ Fintech companies are actively developing alternate-data based lending programs. In the Indian context, there are many players who are looking to serve a vast majority of Indians who have no prior credit score. Cashe, a Mumbai based fintech company, is in the business of providing personal loans to salaried individuals who have newly entered the workforce.³⁰ The company poses questions including the conduct of a psychometric test to determine the credit score of an individual.³¹ A Social Loan Quotient is created and AI is leveraged to verify the information furnished by applicants.³² Similarly, Shriram City Union Finance has entered into an arrangement with Credit Mantri to develop ScoreBuilder.³³ Through ScoreBuilder, personal loans can be extended to the companies' customers based on alternative data-based scores.³⁴ CreditVidya and Aye Finance are some of the other fintech players active in the sphere of building credit scores for individuals without credit history.³⁵ AI allows these companies to tap into information available on myriad mediums and create a holistic profile based on this. Furthermore, AI can be leveraged to gain insights on customer behaviour which aids in accurate determination of creditworthiness.³⁶

(iii) Regulatory compliance: Financial reporting has become more numerous and complex. This has placed upon companies an increased burden vis-a-vis compliance cost. It has been noted in many quarters that AI could be harnessed to automate compliance processes which would enable saving of costs and time.³⁷ Consequently, RegTech or Regulation Technology is a fast-growing field dedicated to easing compliance processes. Among the factors complicating ease of compliance is

28 Clayton (n 2)

29 Ibid

30 Priyanka Pani, 'Fintech players rely on AI to build credit scores for disbursement of loans', The Hindu BusinessLine (10 May 2018) available at <https://www.thehindubusinessline.com/money-and-banking/fintech-players-rely-on-ai-to-build-credit-scores-for-disbursement-of-loans/article23739768.ece> accessed 24 Jan 2019

31 Ibid

32 Ibid

33 Ibid

34 Ibid

35 Ibid

36 'Fintech and Artificial Intelligence', the RDS Blog (8 May) available at <http://www.recoverydecisionscience.com/fintech-and-artificial-intelligence/> accessed 24 Jan 2019

37 FinTech Futures, 'How Technology and AI are set to transform compliance', Banking Technology (7 Dec 2018) available at <https://www.bankingtech.com/2018/12/how-technology-and-ai-are-set-to-transform-compliance/> accessed 24 Jan 2019

the need for processing vast amounts of data. AI can be suitably employed to process this large volume of data into dashboards.³⁸ Dashboards aid companies in better understanding and decision making while enabling regulators to maintain closer oversight at lesser cost.³⁹ Identification of suspicious transactions is easier and this contributes to better compliance with the anti-money laundering and terror financing regulations.⁴⁰

The Financial Conduct Authority (FCA) in the United Kingdom along with the Bank of England and other financial institutions have commenced the Digital Regulatory Reporting (DRR) project.⁴¹ The DRR project has been designed to test, on a pilot basis, technology which would enable companies to meet compliance requirements with minimum human interface.⁴² As a result, the FCA is not only looking at reducing the number of regulatory reports to be filed but also aiming to reduce time and costs associated with such filing.⁴³ The FCA is experimenting with machine readable regulations thereby providing an impetus to the automation of compliance processes.⁴⁴ In the above context, it may be pertinent to note the advances being made in the design of a semantic web. A semantic web page is similar to the current structure of the World Wide Web. However, data and information in a semantic web page are arranged in a manner which enables machines to process them easily.⁴⁵ AI can be harnessed to construct this semantic web system.⁴⁶ This would reduce the need for human intervention in compliance processes thus increasing the efficiency of the system.

(iv) Efficiency in business processes: AI has the potential to transform business processes with a thrust on efficiency. Insurance companies are using AI to automate their claims processes with resultant benefits for both the company and claimant.⁴⁷ Errors are also reduced significantly

38 Innovation and Trends, 'The rise of RegTechs: Can AI really make compliance less risky, boring and expensive?' EOS Matrix DOOEL (17 Jul 2018) available at <https://mk.eos-solutions.com/en/magazine/RegTechs.html> accessed 24 Jan 2019

39 Ibid

40 Ibid

41 FinTech Futures (n 19)

42 Ibid

43 Ibid

44 Lawrence Wintermeyer, 'A Regulation Revolution in Financial Services', Forbes (2 Dec 2018) available at <https://www.forbes.com/sites/lawrencewintermeyer/2018/12/02/a-regulation-revolution-in-financial-services/#71deec894fb1> accessed 24 Jan 2019

45 Fintech Futures (n 19)

46 Ibid

47 Hudson (n 5)

through the reliance on technology. Similarly, AI can be gainfully employed to increase efficiency in the performance of repetitive tasks. Optical Character Recognition (OCR) technology combined with NLP and business logic are being used to automate the process of contract analysis.⁴⁸ JP Morgan through its program Contract Intelligence (COIN) has drastically managed to reduce the time required for document review.⁴⁹ It has also significantly reduced the number of errors in contract interpretation resulting in massive savings, both time and money.

(v) Better wealth management practices: AI helps in understanding customers' needs and risk-taking appetite which aids in the delivery of customized products.⁵⁰ Wealth advisors benefit from using AI based technology as identification of market trends is easier and more credible. Robo-advisors is another notable example of AI being used in wealth management services.⁵¹ Robo-advisors are available for longer durations at lesser costs and help in optimizing investment portfolios.

(vi) Improvement in cyber-security architecture: With the rising number of cases of fraud and cyber-attacks, AI could be leveraged by financial institutions including fintech firms to efficiently respond to the same. Tools, systems and algorithms are being designed to detect cases of fraud or potentially fraudulent activities.⁵² AI enables companies to track historical data of individuals through which any suspicious or outlier activity can be captured.⁵³ The Citi group is a prominent example of a financial institution leveraging AI to combat fraudulent and criminal activities.⁵⁴ Generative Adversarial Networks (GAN) are also being increasingly used to combat fraud and detect early cases of suspicious transactions and cyber-attacks. GAN are AI algorithms which are typically used in a manner where two neural networks face-off against each other.⁵⁵ One of the

48 Ibid

49 Dom Galeon, 'An AI completed 360,000 hours of Finance work in just seconds', Futurism (8 Mar 2017) available at <https://futurism.com/an-ai-completed-360000-hours-of-finance-work-in-just-seconds> accessed 24 Jan 2019

50 Olga Ezzheva, 'Moving beyond the hype: Six real-life applications of AI in FinTech', Datanami (21 December 2018) available at <https://futurism.com/an-ai-completed-360000-hours-of-finance-work-in-just-seconds> accessed 24 Jan 2019

51 Ibid

52 Ibid

53 Ibid

54 Tom Groenfeldt, 'Citi Ventures deploys Machine Learning and Artificial Intelligence with people', Forbes (31 Oct 2016) available at <https://www.forbes.com/sites/tomgroenfeldt/2016/10/31/citi-ventures-deploys-machine-learning-and-artificial-intelligence-with-people/#7671c4c55268> accessed 24 Jan 2019

55 'A Beginner's Guide to Generative Adversarial Networks (GANs)', Skymind, available at <https://skymind.ai/wiki/generative-adversarial-network-gan> accessed 24 Jan 2019

neural networks acts as a generator whereby new data instances are generated. The other neural network performs the role of a discriminator whose main task is to verify the authenticity of the data generated by the generator. GAN has been illustrated as a game of cat and mouse between a counterfeiter and a cop.⁵⁶ One of the neural networks, for instance, tries to pass fake notes as original while the other network performing the function of a cop learns to distinguish original and fake notes.⁵⁷ Resultantly, GAN could potentially address cases of fraud in an extremely efficient manner and therefore beef cyber-security.

AI adoption in Indian banking system is still in its nascent stages, and a lot more needs to be done to realise its full potential. A high degree of manual processing in financial services is costly and slow, and it can lead to inconsistent results and a high error rate. Applications of AI include *chatbots* for personalizing services for individual customers, *robotic process automation (RPA)* that allow data to be handled automatically between multiple applications - for instance, receiving email containing an invoice, extracting the data, and then transferring that into a bookkeeping system. This will have tremendous speed and cost implications.

1.2.6 Open APIs

An *Application Program Interface (API)* is code that allows software programs to communicate with each other. APIs, when used to pull or push data, are an effective way to share data in a usable format. They are platform-agnostic and can facilitate real-time information exchange. They are a scalable and standardised way of sharing information with security in-built as only the information that the API is open for can be shared. APIs may be of different types. APIs can be private, which means that they are used only within an organisation to share information and functionalities between programs. They can be partner APIs, which means that they are released only to partners under certain conditions – sometimes payments. Finally, APIs can be open, which means that anybody can use the API to pull or push data or use a functionality. For example, open web APIs allow exchange of information with a website for all developers.

⁵⁶Ibid

⁵⁷Ibid

Box 1.2: Open APIs in Government

Many use cases of open APIs in government can be considered. On the government's Open Data Portal, 4015 APIs have already been created. The India-Stack set of APIs, which include Aadhaar, e-KYC, e-sign, and DigiLocker, are digital infrastructure created by the government. They have facilitated the mushrooming of many fintech solutions using this data. APIs can also be used to share real-time information on corporate direct tax and GST payments with both corporations and the government, eliminating the need to maintain separate accounts for tax purposes.

Open banking is another example where open APIs are used. The open banking regulations in the UK mandate sharing of data by the largest banks. This sharing is done through open APIs, such that any company looking to provide a fintech solution can easily pull this data using the API.

When governments mandate the use of open APIs, they generally mandate setting up an agency to set standards for those APIs. For example, the Competition and Markets Authority (CMA) in UK set up the *Open Banking Implementation Entity (OBIE)* to deliver open banking. The OBIE is governed by the CMA and funded by the banks required to do open banking. One of the OBIE's function is to design specifications for APIs for open banking to ensure standardization and security of data. It also comes up with standards for the process of deciding those specifications. Overall, when open APIs are used, it is important for these standards to be transparent and to ensure collective decision-making with respect to APIs. Open APIs can spur a rush of new and innovative businesses based on data.

1.2.7 IoT, Big data and Predictive analytics

Internet of Things (IoT) has made possible use of sensors connected to the internet to collect personalised data for a variety of uses. For example, insurance companies can affix GPS tagged speed sensors in insured cars to track driving behaviour. Such applications have resulted in explosion of data availability calling for a higher order of computation and storage capacities.

Big data analytics involves processing and analysing large amounts of complex data. The aim of analysis is to find out hidden patterns, correlation between data and other useful insights. With the

onset of Big Data and analytics, financial firms have now realised that analysis of data generated during the course of their operations can add significant value.

Data analytics is especially critical for fintech companies. Since fintech companies operate almost exclusively on the internet, they generate large volumes of financial information and user data. Fintech companies are increasingly analysing this data to get insights into their operations. Analysis is also used to enable development of new products, increase efficiency and access to consumers. Predictive data analytics by application of AI and ML to IoT or consumer behaviour data is being used to predict consumer behaviour.

Big Data combined with analytics have helped with recalculating risk portfolios, analysing customer habits, identifying fraudulent behaviour, determining causes of failures in businesses or processes, its defects and issues, and spotting business trends. Big Data is helping fintech companies in detecting patterns which help in providing in-depth knowledge about customer behaviour, so that consumers are offered relevant products and services, and fintech companies spend less resources in finding interested consumers. Fintech companies can get insights for immediate decisions. This ability to analyse faster gives fintech companies a competitive edge over traditional financial service providers. Some use cases are:

(i) *Trading*: Using Big Data, artificial intelligence is being used to provide investment advice.⁵⁸ Analytics is also being used to provide services related to determining potential tax liabilities and monitoring performance of brokers.

(ii) *Credit*: Big Data and analytics is being used for credit assessment of first-time borrowers who do not have a credit bureau score. With data available on phone and web usage, transactions history, utilities payments, etc., fintech lenders can assess the creditworthiness of borrowers and thus facilitate formal loans to those who do not have documentary proof of their income. Fintech lenders such as Indifi, NeoGrowth and LendingKart use transactions data and digital trails to provide loans to small businesses without any credit bureau scores.

⁵⁸ Ibid.

(iii) *Insurance*: In case of insurance, Big Data and data analytics is being used to price insurance premiums and provide products suited to individual needs. With the data generated from smartphones and internet of things, insurers are also able to conduct better risk analyses by using geolocation and telemetry data.⁵⁹

(iv) *Payments*: In case of payments, conduct of real-time transactions is crucial. Apart from ensuring faster transactions on payments systems, payment service providers are using big data and analytics to monitor market trends and spending profiles, which are then used to market their products better in a more personalised manner.⁶⁰

(v) *Securities*: Firms are using data behavioural analytics, algorithms and artificial intelligence to prevent and detect fraud with accuracy. Historical data is being used to flag activities which are usually an indication of fraud.⁶¹

With the rise in the number of fintech companies, the amount of information received by the regulators is increasing. Big Data and data analytics are being used by regulators in compliance.⁶² With the introduction of new technologies like AI, deep learning, regulatory functions like market supervision, consumer protection and prudential regulation have the possibility of being automated.⁶³

The information being produced and reported by the financial services industry can be used by regulators to assist in monitoring and analysis. Similarly, Government agencies could use analytics for:

59 Financial Stability Board, Artificial intelligence and machine learning in financial services, tech. rep., 2017, URL: <http://www.fsb.org/2017/06/financial-stability-implications-from-fintech/> .

60 Deloitte and IAMAI, FinTech in India Ready for Breakout, 2017, URL: <https://www2.deloitte.com/content/dam/Deloitte/in/Documents/financial-services/in-fs-fintech-india-ready-for-breakout-noexp.pdf> visited on 05/15/2018).

61 Ibid.

62 Douglas W Arner, Janos Barberis, and Ross P Buckley, “FinTech, RegTech and the Reconceptualization of Financial Regulation”, in: Northwestern Journal of Inter-national Law and Business.

63 Basel Committee on Banking Supervision, Implications of fintech developments for banks and bank supervisors, 2018, URL: <https://www.bis.org/bcbs/publ/d431.pdf> (visited on 05/15/2018).

(a) Citizen behaviour in utilisation of benefits say in Ayushman Bharat or Agency behaviour in expenditure, procurement, etc., in managing cash flows or borrowings

(b) Importer/exporter shipping patterns to manage foreign exchange flows.

Based on such information, government agencies can predict what is likely to occur and make more informed decisions. Measurements can be put in place to quantify program effectiveness. Data analytics can even help alleviate pain points such as staff shortages and preventing fraud, waste, and abuse. In the future, predictive analytics is expected to become an important basis of regulating competition, underpinning innovation, increasing consumer base surplus and growth.

1.3 Potential of fintech

The Committee consulted with different stakeholders on the potential benefits of fintech to such sections of society. The Committee's consultations with external stakeholders as well as its internal deliberations highlighted the gaps in the financial system, and the potential benefits fintech could afford in areas of financial inclusion and access, MSMEs, larger businesses, agriculture, etc.

1.3.1 Fintech for financial inclusion and access

Globally, there is a growing realisation that while considerable progress has been made in the field of financial inclusion, digital technology can play an effective role in plugging the remaining gaps. In this backdrop the *G20 High Level Principles for Digital Financial Inclusions* are intended to inform country to promote financial inclusion using digital technologies (See Box 1.3).

Box 1.3: G20 High Level Principles for Digital Financial Inclusion

(i) *Promote a digital approach to financial inclusion:* The first principle lays emphasis on promoting digital financial services as a priority to drive financial inclusion.

(ii) *Balance Innovation and Risk to achieve Digital Financial Inclusion:* Policy makers should encourage innovation in digital financial ecosystem to harness its benefits for financially excluded. At the same time, they need to assess the risk arising from bundling of products across multiple service providers, low levels of financial literacy, money-laundering and financial terrorism concerns etc.

(iii) *Provide an Enabling and Proportionate Legal and Regulatory Framework for Digital Financial Inclusion:* Establish proportionate legal and regulatory framework that recognises the benefits and addresses the risks from digital financial technology.

(iv) *Expand the Digital Financial Services Infrastructure Ecosystem:* Expand the access of digital financial services ecosystem to all geographical areas including the underserved rural areas.

(v) *Establish Responsible Digital Financial Practises to Protect Consumers:* The principle lays emphasis on consumer and data protection while promoting digital financial services.

(vi) *Strengthen Digital Financial Literacy and Awareness:* Support measures towards enhancing digital and financial literacy to make the users aware of the unique characteristics, advantages and risks of digital financial services.

(vii) *Facilitate Consumer Identification for Digital Financial Services:* This principle aims to promote access to digital financial services through unique consumer identity systems.

(viii) *Track Digital Financial Inclusion Progress:* This principle encourages the participating countries to develop robust frameworks to track digital financial inclusion as well as assess the impact of key reforms measures.

1.3.2 Fintech in MSME sector

MSMEs contribute nearly 8 percent of the country's GDP, 45 percent of the manufacturing output, 40 percent of exports and provide the largest share of employment after agriculture. MSMEs have been underserved or unserved by the traditional financial institutions. Out of the total outstanding non-food credit of scheduled commercial banks, the share of MSMEs was a meagre 6 percent in

2017-18. Small businesses have limited financial history and might not have detailed documentation of credit history which makes disbursement of loans by banks challenging.⁶⁴

Some fintech firms have designated their business models to cater to this unserved section. Based on innovative methods of credit scoring, risk assessment and disbursement, the fintech firms have the potential to meet the needs of start-up SMEs. Peer-to-peer lending and crowd funding have the potential to improve access to finance to small and medium enterprises who are otherwise declined credit from banks due to their risk portfolio. Invoice trading, as discussed in 1.1, can assist MSMEs that often struggle with working capital and cash flows due to delayed payments. It also enables discounting of invoices of MSME sellers raised against large corporate, allowing them to reduce working capital needs. *Flow based unsecured lending* by fintech companies can help meet the working capital requirements of small businesses. There are various product innovations such as merchant cash advance with flexible repayment schedules, purchase finance integrated with supplier portals, card-based working capital limits being offered through use of digital payments and technology that are included in this category.

In the area of *trade financing*, government initiatives can enable the fintech sector while also increasing access to finance for MSMEs. While fintech firms can fill the lending gap for MSMEs through the use of data analytics and technology, the problems of validation of documentation remain. These can be solved in multiple ways:

- (a) One way is the *integration of the GSTN and TReDS* to facilitate lending to MSMEs. Another way is to promote digital lending through a blockchain. The existence of paper-based documentation, fraud through forgery, and bifurcated information are major problems for MSMEs.
- (b) *Blockchain as public infrastructure* could solve these problems simultaneously. MSMEs, financiers and insurers would all sign on to such a blockchain network. Identities may be digitally verified. These players would then design transactions through mutual consent, based on their requirements. For example, a small supplier could request financing for a

⁶⁴ The potential of Fintech firms in providing access to credit to small businesses is acknowledged globally. The U.K Fintech Sector Strategy states that: “Fintech firms have been particularly effective at generating new lending for small businesses, supplying the vitally important capital that fuels economic growth across the UK.”

purchase order from a bank on the network. The bank would be certain of the supplier's identity and would have access to the digital purchase order and the buyer's identity. The buyers, supplier and the bank could then jointly decide the logic and terms of a transaction where the bank would finance the supplier. Examples being Populous in the UK and the Hive Project in Slovenia, used to ascertain the legitimacy of an invoice, find out whether the invoice has already been discounted, make available immutable contract information securely to all stakeholders, thus ensuring transparency, etc.

- (c) The logic could be carried out through *smart contracts* based on the consent of all the players involved. Similar *smart contracts* can be built for sale invoice discounting. Contractual ambiguities would be reduced, and authentication would be automated. There are benefits to such a network being built by the government. It could achieve economies of scale. It would also make regulatory governance and oversight easier, as the data cannot be altered, and information would be in one place.

Some other *potential use cases for fintech* that could be adopted for benefit of MSMEs in India:

- (i) Various data points can be used for credit scoring potential borrowers, helping MSMEs access credit. With appropriate safeguards and regulations including user content, demographic, geographic, financial and social information can be used for *credit scoring* to potentially reduce credit risk.
- (ii) The use of *online underwriting processes*, automation and statistical modelling software can reduce the costs and time associated with underwriting. Traditional and alternative sources of data can be used together to lend to MSMEs, just as human and automated risk assessment can be used together.
- (iii) Financial institutions are now using technology to help MSMEs with better *financial management*, while at the same time generating data to improve risk assessment.
- (iv) The continuing digitisation of payments means that invoices are now electronic, making it easier to sell accounts receivable to financiers. This is helping MSMEs acquire working capital loans in an easier manner and value-chain financing has become more efficient.
- (v) Blockchain technology in supply chain management and financing can help *reduce fraud, duplication* and scattered information. Digitally verified identities on a single blockchain network

would provide the trust necessary for financing MSMEs. Blockchain has been successfully used for de-duplication in TReDS in India, as explained in Box 1.4.

Box 1.4: Fintech for trade finance

TReDS formalizes a part of the trade finance based on invoices. Blockchain technology is helping solve the problems of double discounting and transparency of invoices in trade finance through TReDS, thereby reducing the cost of credit, as well as transactions on the ledger are verified and transparent. The approved TReDS platforms (RXIL, A.TREDS and Mynd) have already implemented a blockchain based solution to check double financing of the same invoice. The positive externalities created by this infrastructure can benefit MSMEs as well as fintech companies.

1.3.3 Agriculture: lending and insurance

A significant portion of the agricultural households rely on non-institutional sources of funding. NSSO reported that for the period July 2012 to June 2013, nearly 52% of the agricultural households in India are indebted. The survey revealed high levels of dependence on non-institutional channels. Nearly 40% of all loans came from informal sources with 26% advanced by moneylenders. Only 15% of households with marginal land holding get credit from institutional sources such as the government, cooperatives and banks.⁶⁵

In the agricultural sector, fintech companies are primarily working in two areas:

(i) *Credit*: Fintech firms and technology led NBFCs are playing a crucial role in providing access to finance for small and marginal farmers. The key areas where fintech firms are innovating or bringing efficiencies in the system are:

- (a) *Customer discovery and onboarding*: Fintech firms have pioneered partnership models to discover customers. Fintech firms work with organisations with rural presence such as Farmer Producer Organisations, cooperatives, micro-finance institutions and other aggregators.

⁶⁵ <http://mail.mospi.gov.in/index.php/catalog/158/study-description>

- (b) *Credit underwriting models*: Fintech firms are moving away from the collateralised lending model to extending credit based on flow data such as sale of produce, cash flows and history of business dealings. This enables extension of credit to tenant farmers. Fintech firms are also using innovative collection mechanisms such as deduction at source and escrow accounts and leveraging the India Stack (eNach).⁶⁶
- (c) *Monitoring*: Post-sanction monitoring by lenders is further improved by the use of weather data, crop specific advisories and digital imaging of sown crops.
- (ii) *Insurance*: Fintech firms can potentially play a crucial role in increasing the penetration of crop insurance and other forms of rural insurance. Some early steps in this direction are outlined below:
- (a) *Customer discovery and enrolment*: Fintech firms are using partnership models with organisations with rural presence to discover and enrol non-loanee farmers for crop insurance under the Pradhan Mantri Fasal Bima Yojana (PMFBY). Also, fintech firms are working with farmers and agri-ecosystem players such as seed and agro-chemical companies to design customised insurance products for requirements that are not covered under the PMFBY.
- (b) *Crop monitoring, insurance claim monitoring and settlement*: Fintech firms are using drones for crop monitoring. Similarly, fintech firms are using weather and yield datasets that enable better monitoring for insurance claims and settlement to farmers.
- (c) *Collection of premium*: Many policy forms, although submitted, do not actually get activated due to non-collection of premiums. The cheques collected from farmers are banked after a time lag, by which time there is often not adequate balance in their accounts. This results in the cheques for premiums bouncing. Fintech companies have come up with mobile based apps with a digital payment option integrated (QR code based, NEFT, etc.) that enables quick collection and reconciliation of premium and activation of policy.
- (d) *Product design*: Fintech companies are working with farmers and ecosystem players such as seed and agro-chemical companies to design customised insurance products for additional crops such as horticulture. These are based on agri-risk models which combine

⁶⁶ eNACH is the electronic process of helping the banks, financial institutions and other government bodies to provide automated payment services. It assists in the issuance and confirmation of mandate (standard instruction provided to bank and other institutions to automatically debit the instructed amount from the account of the customer) by the customers through alternate channels to paper based mandate.

various data points such as climate risk, weather forecast, cropping intensity and farmer progressiveness.

- (e) *Claim settlement*: To enable fast and accurate claims settlement, fintech firms are using a combination of satellite imaging and drones for crop monitoring along with weather and yield data sets.

1.3.4 Regulation technology for financial institutions

Increasingly, regulators around the world are relying on technology to monitor regulated entities. As banks and financial firms', themselves start using algorithms for their own functions, regulators can find it easier to supervise them using real-time data and predictive technology for risk-based regulatory action. Speed is not the only advantage of using technology in regulation. Globally, the annual cost to the financial services industry of regulatory compliance is estimated to be USD 100 billion. The use of RegTech reduces this cost as some compliance becomes automatic. Besides reporting and compliance, other areas of the use of RegTech have been identified:

- (a) *Identity management and control*: technologies that improve KYC mechanisms and reduce fraud are also part of RegTech.
- (b) *Risk management*: includes the use of technology to identify, organise and analyse risk data to better manage risk within financial institutions.
- (c) *Transactions monitoring*: allows regulators to observe in real time the transactions that are taking place, in order to control fraudulent activities.
- (d) *Trading in financial markets*: includes automation in financial market activities such as calculating margins, choosing central counterparties and trading venues, etc.

It is recommended that regulators take necessary steps to digitise reporting processes and bring together Big Data and predictive analytics to identify irregularities and industry trends. Modernising financial supervision will make it easier for new, user friendly solutions to reach consumers faster and will also reduce the cost of compliance for the sector overall as well as for new age fintech firms.

1.3.5 Dematerialisation of financial instruments

A large portion of household savings is allocated to bank FDs. Presently, the FDs are largely issued in physical form by the banks. Even when issued in electronic mode, these FDs are not usable for being used collateral for taking loans or providing a guarantee for other purposes without banks' specific charge being recorded on a physical FD. Allowing bank FDs to be dematerialised can lead to the many benefits such as: (a) banks can easily raise FDs from new-to-bank customers without the need to do a separate KYC, (b) banks can mobilise FDs even in locations where it does not have a branch, since no servicing will be required, which can be done by the Depository Participant, (c) in the case of dematerialised FDs, it will no longer be necessary to issue physical receipts and investors will not have to bother about safe-keeping of the FD receipts, (d) keeping track of all the fixed deposits becomes easy for the investors. Dematerialisation will also lead to the development of a healthy secondary market for these instruments. Currently, there is no database of FDs and it is not possible to aggregate FDs of a person in a single account. *Dematerialization of FDs* will work like other investments held in a demat account, building on features specific to such FDs. Currently, Regulation 28 of the SEBI (Depositories and Participants) Regulations, 1996 does not allow bank FDs to be held in demat account while allowing CDs to be so held.

Many types of other financial instruments such as Sovereign Gold bonds, savings certificates, Gold deposit certificates, post office deposits, deposits under small saving schemes and deposits made under Government schemes such as Sukanya Samriddhi Yojana, etc., are almost entirely in physical form making possible dematerialisation. This will be eminently poor friendly and create disaster resilience as these instruments are recoverable quickly by using identifiers such as mobile number.

1.3.6 Virtual banking

A virtual bank is a bank which delivers retail banking services through the internet or other forms of electronic channels instead of physical bank branches. Virtual banks can fast-track the customer

on-boarding process through the use of innovative new generation technologies. Since virtual banks can leverage new-age technologies efficiently, it can offer faster and cheaper services to consumers and provide higher interest rate on deposits compared to the conventional banks.

Recently, the Hong Kong Monetary Authority (HKMA) has issued guidelines for authorization of virtual banks. The guideline has the following components⁶⁷:

(a) Ownership structure: Virtual banks need to be locally incorporated entities. The parent company of the virtual bank may be a bank or a financial institution. In case the parent company is not a bank or a financial institution, the holding company is subject to all the supervisory conditions including requirements of capital adequacy, liquidity, large exposures, intra-group exposures and charges over assets, group structure, activities undertaken, risk management, fitness and propriety of directors and senior management and the submission of financial and other information to the HKMA.

(b) Ongoing supervision structure: Virtual banks are subject to the same level of supervisory requirements which are applicable to conventional banks. Some of the requirements are tuned to suit the business model of the virtual banks under a risk-based and technology-neutral approach.

(c) Physical presence: Virtual banks need to maintain physical presence (through one or more offices) to interface with the HKMA and with customers to deal with their enquiries or complaints.

(d) Technology risk: Virtual banks need to have appropriate levels of security and technology related controls in place to facilitate its functions. The virtual bank also needs to submit an independent assessment report to the HKMA certifying its planned IT governance and systems.

(e) Risk management: Virtual banks should have risk management systems like conventional banks in terms of understanding the type of risks it is exposed to and put in place systems to

67 For more details, please see https://www.hkma.gov.hk/media/eng/doc/key-information/guidelines-and-circular/guideline/guideline_eng_virtual_bank_20180608.pdf

identify, measure, monitor and control these risks. Virtual banks must consider eight basic types of risks (such as credit risk, interest rate risk, market risk, liquidity risk, operational risk, reputational risk, legal risk and strategic risk) identified in the risk-based supervisory framework of the HKMA.

(f) Business plan: Virtual banks must have a credible and viable business plan with appropriate balance between the desire to build market share and the need to earn a reasonable return on assets and equity.

(g) Exit plan: Virtual bank must have an exit plan in case the business model becomes unsuccessful. The purpose of a viable business plan is to ensure that virtual bank's business can be unwound without causing disruption to the consumer and/or creating negative implications for the overall financial system.

(h) Consumer protection: Virtual banks should adhere to the "Treat Customers Fairly Charter" and also stick to the standards contained in the "Code of Banking Practice" issued by the Hong Kong Association of Banks and DTC Association.

(i) Outsourcing: All material outsourcing operations should be prior discussed with HKMA and after approval such outsourcing may be carried out.

(j) Capital requirement: Virtual banks must maintain adequate capital in accordance with the nature of operations and banking risks which are undertaken.

1.4 Fintech related regulation in the financial sector

Fintech has seen major growth in India in the payments and lending sector. RBI has released the *Report of the Working Group on FinTech and Digital Banking*, which has highlighted that innovations in the payments sector are targeted broadly at improving the speed and efficiency of

payment systems. The payment ecosystem in India is largely bank centric. Only bank-led Payment Service Providers (PSPs) have direct access to payment systems, while non-bank PSPs have to depend on member banks. The Real Time Gross Settlement (RTGS) system and the National Electronic Funds Transfer (NEFT) are operated by the RBI, while the Immediate Payment Service (IMPS) is operated by NPCI, which is owned solely by banks. NPCI also operates the BHIM application which runs on its UPI platform and also facilitates inter-bank payments, making NPCI both the platform operator and service provider.

The regulations on prepaid payment instruments provide for high net worth requirements for banks and non-banks alike. This acts as entry barrier to small players and consequently limits the choice for consumers. Further, PPI regulations only allow banks to issue open system PPIs after full KYC, while non-bank PPI issuers are not allowed to offer open system PPIs under any circumstances. Broadly, there is a non-level playing field between banks and non-banks due to high net worth requirements. In order to reform the payment systems in India, the *Inter-Ministerial Committee for Finalisation of Amendments of the Payment and Settlement Systems Act, 2007* has sought to implement the recommendations of the Watal Committee. The Committee had recommended amending the current PSS Act to include explicit mandates for competition and innovation, open access and interoperability, consumer protection, regulations on systemic risk and data protection and security. The Inter-Ministerial Committee has also recommended creation of a new payments regulator, *the Payments Regulatory Board*, which has not been notified by the Government of India yet, but has been announced in the Finance Bill 2017.

The high net-worth requirements are also present in the P2P lending regulations issued by the RBI. *P2P (peer-to-peer) lending* is a form of crowd funding used to raise loans for people who need to borrow, from lenders who want to invest. The business model is such that it does not require the platform to lend off of its balance sheet. However, the RBI regulations have requirements for P2P lenders to have a minimum net-owned fund of INR 2 crores. Further, there are restrictions related to exposure of a single borrower to a lender which increase costs for the business.

Insurance is another sector where fintech has shown some development. One development is fintech as policy aggregators, which help their customers choose from a wide variety of products.

In the area of auto insurance, AI and big data can be used for better damage assessment and consequently reduce fraudulent claims. Damage assessment can also be done in the agricultural sector through drones, and risk assessment for individuals can be carried out for individuals using wearables. The Insurance Regulatory and Development Authority (IRDA) has also constituted a Working Group in 2017 to examine '*Innovations in Insurance Involving Wearable/Portable Devices*'. However, the Committee was informed that there are numerous instances where fintech service providers face a different and heavier regulatory burden compared to traditional insurance providers. For example, IRDA regulations have imposed restrictions on web aggregators, not allowing them to advertise. Further, there are restrictions on customer reviews as well. The insurance sector has seen development of a microinsurance sub-sector that offers different kinds of insurance, including accident, health and life insurance. A Swedish company Milvik AB, operating as BIMA, has demonstrated a model of microinsurance that works through mobile phones. Payments for these microinsurance schemes are made through prepaid mobile plans or post-paid mobile bills. The turnaround time for claims is 72 hours.

In the *pensions sector*, pension funds can collaborate with fintech service providers to create APIs to share data on pricing options. Data can also be used to create more personalised pension schemes. Pensioner dashboards can be set up to help subscribers to see all their pension details in one place.

Robo-advisors have also come up in India across the retail investing space. Robo-advisors are online portfolio manager that invest client assets by automating client advisory. Many new entrants and traditional broking firms have launched robo-advisor services in India. Some examples are Aditya Birla Money's MyUniverse, BigDecision, Scripbox, Arthayantra, FundsIndia and 5nance. Although there are no separate regulations for robo-advisors, a consultation paper issued by SEBI states that under the current Investment Advisor regulations, there is no express prohibition for use of automated advice tools by SEBI registered investment advisors.

1.5 Working of the Steering Committee on Fintech Issues

In the Budget Speech 2018 (para 75), the Hon'ble Finance Minister announced:

“Use of fintech in financing space will help growth of MSMEs. A group in the Ministry of Finance is examining the policy and institutional development measures needed for creating right environment for FinTech companies to grow in India.”

The Government constituted a *Steering Committee on Fintech related issues* under the Chairmanship of Shri Subhash Chandra Garg, Secretary, Department of Economic Affairs, Ministry of Finance. Members of the committee include; Secretary, Ministry of Electronics and Information Technology (MeitY), Secretary, Financial Services, Secretary, Ministry of Micro, Small and Medium Enterprises (MSME), Chairperson, Central Board of Excise and Customs (CBEC). Besides, the Deputy Governor of RBI, Executive Director of SEBI, CEO of the Unique Identification Authority of India and CEO of Invest India are part of this panel. Additional Secretary (Investment) in Economic Affairs Department is the convener of the panel.

The Committee's *terms of reference (Annexure A)* were to consider various issues related to the development of fintech space in India with a view to make fintech related regulations more flexible and generate enhanced entrepreneurship in areas where India has comparative advantage vis-a-vis other emerging economies. The Steering Committee was also mandated to focus on how fintech can be leveraged to enhance financial inclusion of MSMEs.

The *first meeting of the Steering Committee* was held on March 10, 2018 in which the current fintech landscape was discussed and the concept of flow-based lending explored. Constitution of a Working Group was decided as the way forward after the first Committee meeting. The Working Group was constituted on flow-based lending using the GST system, with a view to create a repository of trusted invoices to be made available to lenders through an Open API system.

The *first meeting of the Working Group* was held on April 5, 2018 at North Block, New Delhi. The group was headed by Member (IT), CBEC and comprises representatives of RBI, MSME, NSE, MEITY, DFS and DEA. The Working Group discussed in detail flow-based lending using the GST system and the concept of trusted invoice and suggested the representatives to present it to the Group of Ministers (GoM) or GST council so that appropriate action could be taken from their side as well.

The *second meeting of the Steering Committee* under the chairmanship of SEA was held on April 25, 2018. The representative apprised the Committee about the decisions of the first meeting of the sub-group on flow-based lending (held on April 5, 2018), and the subsequent decisions taken in the meeting of Group of Ministers (GoM) on information technology (IT) related GST issues, which was held on April 17, 2018. The Committee also took cognizance of the potential developments that can take place using fintech in various sectors (i.e. agriculture, open banking, MSMEs, etc.).

The *second meeting of the Working Group* was held on May 25, 2018 where the finer details to implement the concept of flow-based lending were discussed. It was decided to follow a phase-wise approach. In the first phase, initially e-way bills could be used to authenticate invoices for the purpose of lending. Thereafter, once the new GST returns are introduced all firms (including those providing services) would be eligible to get their invoices authenticated to be able to use flow-based lending.

The Committee, therefore, decided to organize its work and recommendations in the following broad classes:

- (a) Measures required for expanding fintech services.
- (b) General policy, technology and databases related actions required for creating right environment and base for expansion of fintech and gov-tech services.
- (c) Measures required for expanding gov-tech services which would have implications for expansion of fintech services.

- (d) Organizational and administrative measures in Government of India for promoting and monitoring expansion of fintech and gov-tech.

Several rounds of interaction with fintech industry focused on SMEs, Agriculture, with regulators, etc. were organised to get sharper insights.

The *third and last meeting of the Steering Committee* was held on January 22, 2019 after sharing the draft version of the report with all members. RBI, SEBI, MEITY, DFS and other members gave very useful suggestions in improving the report and recommendations. These have since been suitably incorporated in the report.

1.6 Recommendations

1.6.1 Removing discriminatory regulatory barriers in the digital payments infrastructure sector: The Committee has noted the recommendations of successive government committees for the promotion of digital payments in India. It notes that while the digital payments have grown rapidly in India, still there is a lot of cash payments in the system. Digital payments have the potential to expand enormously. To realise the full potential, a level playing field needs to be created amongst banks and non-bank players. The NPCI may provide non-discriminatory access to fintech firms and other financial firms that are not currently shareholders of the NPCI. Restrictions on non-bank' access to payments infrastructures such as AEPS needs to be re-evaluated and appropriate steps need to be taken. RBI may also take necessary measures and if and when Payment and Settlement Board comes into existence, the calibrated liberalisation may be continued by the Payment and Settlement Systems Board to achieve the goal of bringing in financial inclusion, make digital payments as the primary mode of payment and usher in competition amongst various service providers. *The Committee is of the view that non-discriminatory access must be the norm unless the respective regulator clearly provides reasons for a separate treatment to a specified category of financial firms. The Committee also urges Government and RBI to take necessary steps to eliminate discrimination in access to payments infrastructure to non-banks vis-à-vis with a view to enhancing competition and innovation.*

1.6.2 Fintech for cybersecurity: Exposing financial performance information, in addition to the concerns surrounding account access, is understandably worrisome for any business. In addition, frauds impose significant financial losses and reputational costs on financial sector firms. Investing in technologies and talent that support banks' confidence in their ability to make such assurances is a logical parallel step. Indeed, some of the most promising fintech innovations today are emerging in cyber-security, enabling protection from lending frauds, as well as handle threats related to money laundering and cyber-attacks. *The Committee, guided by success stories elsewhere in the world, recommends the use of fintech, especially by PSE financial service companies to bolster cybersecurity, fraud control and money laundering. The Committee also recommends that fintech firm specialising in this field should be encouraged to set up their businesses in India and provided necessary regulatory approvals for expanding their services in the country.*

1.6.3 Expanding agricultural credit guarantee schemes: The Committee was informed that NBFCs' extending credit facilities to retail traders, educational institutions and agricultural activities are currently excluded from availing the 'Credit Guarantee Funds Scheme' provided by the SFAC. There is a need to attract more sources of institutional lending. *The Committee recommends that, since NBFCs have made significant progress in leveraging Fintech to increase their outreach, such NBFCs may be incentivised to work in the agricultural space by including them in credit guarantee schemes.*

1.6.4 Flow-based lending for MSMEs: In order to increase MSMEs' access to financing, the trusted invoice infrastructure must be urgently established in India. TReDS and GSTN should jointly provide the backbone of a trusted e-invoice system, as announced in the Budget for 2018-19. The Committee recommends that GSTN data integrated with TReDS exchanges could form the basis of a flow-based lending system for MSMEs by banks and NBFCs. However, *cash flow-based lending* will need superior fintech based systems to track the borrower for providing early warning signals given that there is no collateral backup (available in normal asset-based loans). There is need to promote greater participation of financial institutions, buyers, sellers on the TReDS platform and fine-tune the guidelines to enable the system to gain acceptance. *The Committee recommends that necessary open API MSME stack based on TReDS data validated by*

GSTN for use by the fintech companies can be developed by DFS, MeitY, DoR/CBIC/GSTN. It is also recommended RBI may evolve master directions for “cash flow-based” financing of MSMEs by financial services companies, using a standardised and trusted e-invoice infrastructure designed around TREDS-GSTN integration. The Committee notes that the Factoring Act, 2011 restricts participation on TReDS platform to those NBFCs that are licensed as NBFC-Factors. It is recommended that, in order to promote greater participation of NBFCs on TReDS platform, this legal barrier be examined by the Government.

1.6.5 Reforming P2P markets and creating a marketplace model for debt financing: Many restrictions distort the level-playing field between fintech companies and traditional insurers, block significant revenue streams, prevent cost efficiencies for both financial services companies as well as fintech firms, thus precluding both innovation and competition. In India, a modest beginning has been made for P2P platforms by permitting specialised NBFCs to undertake this activity. The credit needs of MSMEs, households and individuals can be taken care of by creating a marketplace model of debt financing where savers, non-banks and banks are all permitted to lend. Participants of P2P platform include an individual, a body of individuals, an HUF, a firm, a society or any artificial body, whether incorporated or not. This means that it spans across savers, banks, non-banks and other potential lenders. *The Committee recommends that the Ministry of Finance may develop a marketplace model of debt financing in India by reforming the present model of P2P lending platforms. Potential hindrance in terms of restrictions on overall and individual exposure limits may be reviewed and options like allowing Mudra Bank to directly fund or co-fund SMEs and MSMEs through P2P platforms may also be examined as an alternative credit delivery channel.*

1.6.6 Virtual banking: The Committee notes that The Hong Kong Monetary Authority (HKMA) has recently issued guidelines for setting up virtual banks and is examining applications for virtual banking licenses. Banks are increasingly moving towards virtualisation of services. *The Committee recommends that DFS and RBI may examine the suitability of ‘virtual banking system’ in the Indian context, costs and benefits regarding allowing virtual banks and prepare for a possible future scenario where banks do not need to set up branches and yet deliver the full scale retail*

banking services ranging from extending loans, savings accounts, issuing cards and offering payment services through their app or website.

1.6.7 Dematerialisation of financial instruments: Dematerialisation of financial instruments is customer-friendly given wide reach of mobile technologies. It also leads to disaster resilience and speedy recovery. *The Committee recommends that suitable regulatory and legislative changes be made to enable FDs and other financial instruments to be issued in dematerialised form and allow their frictionless use as collateral. The Committee recommends that the Government undertake a campaign to convert all financial assets held, especially by entities under its control like Post Offices, in demat form as far as possible but certainly in electronic form. Necessary suitable amendments to enable dematerialisation of financial instruments such as FDs and other deposits of the Post Offices, other forms of small savings certificates issued, Gold Deposit Certificates issued under GMS, Sovereign Gold Bonds, etc. may be undertaken. Similarly, deposits made under schemes like Sukanya Samriddhi Yojana in the name of individual beneficiaries should also be dematerialised. Additionally, all necessary administrative action to convert the existing stock of such deposits and certificates may also be taken in a time bound manner. Pending changes in laws and regulations that may be required to enable depositories to store all financial assets, the information pertaining to the assets may be stored in repositories, so that consumers can access this information through a single window.*

1.6.8 Reform of Pre-paid instruments (PPI) system: PPI system is quite convenient for making routine payments and its use is getting increasingly popular. However, there are quite a number of restrictions which hinders expansion of PPI system in the country, especially with respect to the rural areas. PPI issuing firms have many strict requirements regarding KYC norms that substantially increase their operational costs. For example, the maximum outstanding amount in a PPI account (even if it is a full KYC account) is Rs. 1 lakh. This limits consumer benefits from such accounts and reduces the ability of PPI issuing firms to onboard customers. As deposits in PPI do not earn any interest, any apprehension that these might replace the banking system may not be well founded. Only those persons will hold amount higher than Rs. 1 lakh in the PPI account that have genuine payment needs. UPI, linked to bank accounts, has no such restrictions. There is a case for substantially revising this limit upwards. *The Committee recommends a*

thorough review of the PPI system with a view of considerably liberalising its use with adequate non-monetary limits safeguards to enable expansion of fintech.

1.6.9 Reformed KYC process in the light of the recent Supreme Court judgement on Aadhaar:

The implications of the judgement of the Hon'ble Supreme Court of India in the Aadhaar case needs to be assessed by Government, especially by DEA, DFS and MEITY, and adequate steps need to be taken to remove uncertainties in business processes of the fintech players. Fintech firms seem to have got adversely affected by the Judgment on account of legal infirmity in the Aadhaar law about online KYC not being permissible on a voluntary basis. The online KYC and authentication using Aadhaar was a sound system with considerable efficiency and convenience. Given the judgement by the Hon'ble Supreme Court, there is need to explore several alternatives such as Original Seen and Verified (OSV) to be done by banking correspondents for physical KYC, e-Sign, non-face to face on-boarding, including offline authentication modes prescribed by the UIDAI. The Committee notes that Ministries of the Government have issued interim alternative authentication procedures, while a bill is under consideration of Parliament to amend these acts to enable voluntary use of Aadhaar and Aadhaar authentication. *The Committee recommends that various options including possibility of Video-based KYC, making available validated electronic versions of KYC related documents through DigiLocker, making these available for verification by service providers with prior customer consent, etc.*

1.6.10 Using unconventional data sources for better credit scoring and increasing access to credit:

The Committee notes that the poor and the unbanked are often unable to access credit due to the lack of formal credit history and non-availability of other relevant documents. Fintech companies focus on a number of unconventional sources of data and advanced data analytics to create better credit profiles of such individuals. These fintech companies collect information pertaining to social media behaviour, financial transaction behaviour, product purchase behaviour etc. These kinds of information are not captured by CICs. Fintech companies collect these kinds of information from the mobile phones of consumers with prior consent. *In order to increase access to credit and to stabilise the growth of such practices in view of the recommendations of the*

Justice Srikrishna Committee, this Committee recommends that MeitY and TRAI may formulate a policy to enable such practices through a formal, consent-based mechanism.

Chapter 2

General Policy, Technology and Databases Related Actions for the Promotion of Fintech

In the Committee's view, there are many actions that Government, regulators and public sector firms can take to enable growth of fintech in India, and its optimal use to solve problems. These actions span general government policies, financial regulations, technology policy, government databases, and other areas where government has the ability to act directly. There are things that public sector financial firms can do to foster development of fintech in their respective domains, to improve their own business and also to provide examples for other firms to emulate. Government departments and agencies thereunder can take certain steps, such as making data available and offering open APIs, to enable development of fintech. Financial sector regulators can reform their regulatory frameworks to enable development of fintech.

2.1 Fintech adoption by public sector financial firms

Fintech has the promise to transform the delivery of financial services. Fintech companies offer unbundled services and through innovation increase value to the customer. Delivery of services through the digital medium accompanied by an improved customer experience makes fintech firms' offerings attractive to the younger generation. For instance, Moneytree is a popular Japanese personal finance management app.⁶⁸ It aids customers in managing corporate expenses and personal assets through their mobiles while also providing a sleek and welcoming interface. Similarly, chatbots are used to help customers interact directly with banks through messaging apps.⁶⁹

Innovation would be critical to navigating the waves of digital disruption for the public sector financial services companies. Public Sector Banks (PSBs) and other public sector financial sector

68 Amy Neale, 'How Fintech Startups are transforming banking and finance', Mastercard (10 April 2017) available at <https://newsroom.mastercard.com/2017/04/10/how-fintech-startups-are-transforming-retail-banking-and-finance/> (accessed on 3rd January 2019).

69 Ibid.

entities like insurance companies have not been very proactive on adoption of fintech in their operations. They need to in case they have to protect their businesses and stay relevant in the fast-changing world. A well-defined team focused on innovation can serve as a visible, centralized point of initial contact for fintech. PSBs and other financial sector entities were slow earlier in catching with adoption of IT in their work, but they eventually did so. These entities need to be far more proactive and innovative in remaining ahead in the use of fintech in delivering all their services. Innovations in fintech reduces complexity and allows banks to coordinate effectively among different functional areas to vet and test new solutions. Furthermore, these create the flexibility and agility needed to experiment with cutting-edge technologies and have the authority to move forward with promising prospects.

The RBI's Working Group Report on Fintech and Digital Banking has also noted the increased salience of a positive customer experience.⁷⁰ The Report states that leadership in financial services was earlier determined by the range of services offered and the cost of the same. However, the Report believes that in coming times leadership would be determined by 'experience' which in turn would require customer centric innovation.

Many global financial institutions incubate innovative ideas internally through their innovation labs.⁷¹ Traditional financial institutions are also looking to add value to customers, and compete with fintech firms, by leveraging emerging technology. For instance, JP Morgan constituted a new team for automation of legal work in 2017.⁷² Through a program called Contract Intelligence, hours of contract and agreement reading could be completed in seconds with fewer errors. Similarly, Wells Fargo also established an Artificial Intelligence team in 2017 with a view to providing personalized services.⁷³ In the Indian context, banks, primarily private, have announced tie-ups with fintech firms to explore options in blockchain and payments technology among

70 'Report of the Working Group on FinTech and Digital Banking', Reserve Bank of India (November 2017) available at <https://rbidocs.rbi.org.in/rdocs/PublicationReport/Pdfs/WGFR68AA1890D7334D8F8F72CC2399A27F4A.PDF> (accessed 3rd January 2019).

71 'Innovation in Banking: Killer ideas ? Or idea killers ?', The Financial Brand (26 February 2018) available at <https://thefinancialbrand.com/70631/innovation-ideas-banking-culture-trends/> (accessed on 3rd January 2019).

72 Deena Zaidi, 'Why banks need to collaborate (not compete) with Fintech startups', Digitalist Magazine (3 January 2018) available at <https://www.digitalistmag.com/finance/2018/01/03/banks-need-to-collaborate-not-compete-with-fintech-startups-05682519> (accessed 3rd January 2019).

73 Ibid.

others.⁷⁴ Public sector financial services institutions however appear to be lagging in embracing fintech solutions. Establishment of innovation teams could stimulate adoption of fintech solutions by these entities. The RBI Working Group Report has also made similar proposal in terms of establishing an innovation unit with dedicated resources. This would also aid the public sector financial institutions in welcoming talented individuals to develop solutions to problems plaguing the sector. *It is recommended that public sector bank establish innovation teams within their organization.*⁷⁵ This would provide a clear direction and encouragement for innovative thoughts and processes within the organization. Establishment of innovation teams would also aid in knowledge building exercises and attract the right ideas and talent to the organization.

2.1.1 Artificial intelligence for back-end processes

The uses of Artificial Intelligence in fintech were discussed in Chapter 1. Using advanced cognitive technology and machine learning models, AI based processes can monitor voice interactions to produce a risk score based on speech, behavioural and human emotional tendencies. A joint venture of Royal Bank of Scotland and Vocalink in the UK is creating a machine learning system to scan transactions by small and large business customers to identify and circumvent false invoices and potential instances of fraud (operational risk). Studies have shown that non-parametric machine learning models involving deep learning outperform traditional benchmark models in terms of prediction accuracy as well as in proposing practical hedging measures to cover credit risks. Applications of machine learning include the automatic reading and interpretation of the implications of regulatory/contractual documentation using natural language processing as a means of reducing compliance risk.

It is recommended that Department of Financial Services (DFS) and PSU banks may work together to explore significant opportunities that exist to increase the levels of automation using Artificial Intelligence (AI), cognitive analytics & machine learning in back-end processes of PSU

74 Aparajita Choudhury, 'Banks lag in fintech, startup acquisitions will make them relevant', Yourstory (4 September 2017) available at <https://yourstory.com/2017/09/banks-fintech-startup-acquisitions-axis-bank-freecharge/> accessed on 3rd January 2019.

75 'Unleashing the potential of FinTech in Banking', Ernst and Young (2017) available at [https://www.ey.com/Publication/vwLUAssets/ey-unleashing-the-potential-of-fin-tech-in-banking/\\$File/ey-unleashing-the-potential-of-fin-tech-in-banking.pdf](https://www.ey.com/Publication/vwLUAssets/ey-unleashing-the-potential-of-fin-tech-in-banking/$File/ey-unleashing-the-potential-of-fin-tech-in-banking.pdf) (accessed on 3rd January 2019).

banks, especially Risk Management, Compliance management and Fraud Control, and make a roadmap to implement the strategy in time bound manner. Implementing such technology automated systems will bring in more efficiency to their work and reduce fraud and security risks.

2.1.2 Public sector blockchain-based trade finance

As discussed in Chapter 1, invoice trading is another nascent area of fintech application in India. It assists MSMEs that often struggle with working capital and cash flows due to delayed payments. Recently emerged fintech companies are providing platforms to such MSMEs to sell their invoice or other receivables at a discount for working capital. Fintech can be in 3 ways:

- (a) Artificial Intelligence and machine learning for strengthening fraud prevention, surveillance and security;
- (b) Distributed Ledger Technology and pattern recognition to reduce intermediaries and transaction costs, spur transaction speeds and enhance regulatory compliance; and
- (c) Technologies like fingerprinting validation and end-to-end encryption to strengthen cyber resilience.

Box 2.1: Blockchain for de-duplication in TReDS

TREDS formalises a part of trade finance based on invoices. Blockchain technology is helping solve the problems of double discounting and transparency of invoices in trade finance through TReDS, thereby reducing the cost of credit, as all transactions on the ledger are verified and transparent.

All three platforms, RXIL, Invoicemart (A.TREDS) and Mynd have implemented a blockchain based solution (provided by Montago) to check double financing of same invoice. Certain parameters of the invoice, viz., invoice number, seller / buyer GSTN, amount, etc. are extracted, hashed and stored. No platform is able to access data of any other platform and data confidentiality is maintained.

2.2 Enabling policies by government departments

Several government departments can create enabling policy frameworks that could catalyse the growth and development of fintech in India. These policies can take various forms. Some may

enable new technologies, such as drones, to develop. Some others may allow government databases to be opened up, with appropriate checks and balances, to fintech firms. Some government departments and agencies can help create new databases, such as digital land records, that can be enabling for fintech development. NITI Aayog has issued a Discussion paper on National Strategy for Artificial Intelligence⁷⁶ which highlights use cases and applications of AI in healthcare, education, agriculture, etc.

2.2.1 Remote sensing and drone technology for credit and insurance

Discrepancies in self-reported cropping patterns and crop cutting experiment processes can be resolved using drones and other remote sensing technologies that will enable more efficient delivery of both credit and insurance products. A drone policy has been announced by Ministry of Civil Aviation which has come into effect from December 1, 2018. PMFBY guidelines also provide for innovation in various aspects of the scheme, including crop cutting experiments. RBI has mandated banks to ensure end use of crop loans especially where benefits of subvention and priority sector are being availed. However, cases of misuse are widely reported.

It is recommended that Insurance Companies and Lending agencies in Agriculture sector should be encouraged to use drone and remote sensing technology directly or those provided by fintech companies to assess discrepancies in self-reported cropping patterns and crop cutting experiment processes, enabling more efficient delivery of both credit and insurance products and reduce credit/insurance risks.

2.2.2 Digitisation of land records

Bank credit for agricultural sector is largely based on land ownership. *The Digital India - Land Records Modernisation Program (DI-LRMP)*, previously the National Land Records Modernisation Program (NLRMP), aims to digitise all land records across the country in order to

⁷⁶ NITI Aayog, *National Strategy for Artificial Intelligence*, June 2018

http://niti.gov.in/writereaddata/files/document_publication/NationalStrategy-for-AI-Discussion-Paper.pdf

provide conclusive titles.⁷⁷ This digitisation will help the growth of fintech, as with digital land data, loans and other financial products can be provided more easily. This data will include characteristics of the land, mortgages, encumbrances, ownership and other rights, etc., enabling financial services companies to make informed decisions about lending while also giving underbanked populations access to financial services at lower cost. National integration of these records will help fintech companies that rely on advanced data analytics tools to assess credit risks. Such fintech based credit delivery would also be very inexpensive and save considerable cost and time for farmers.

RBI's *Committee on Medium-term Path on Financial Inclusion* (Chairman: Shri Deepak Mohanty) had recommended that in order to increase formal credit supply to all agrarian segments, the digitisation of land records should be taken up by the states on a priority basis. An interface should be provided to banks to view and update charge creation on a real-time basis to avoid multiple loans with charge on the same piece of land.

For fintech to deliver this credit, farmers land records need to be digitised at the least. Lot of efforts are being done in the country to digitise the land records. However, results have been mixed and in some states the progress has been very tardy. Though most states have implemented digitization of land records, online land records are not yet available in some states. The farmers whose land records are not updated find it difficult to access formal credit and delays in sanctions of crop loans. Present Digital Land Record Modernisation Programme requires a close review and reform. The country needs a dedicated National Digital Land Records Mission based on a common National Land Records Standards which should deliver common standards-based land record data within a 3-year deadline. DOLR may collaborate with DFS, MEITY, Ministry of Agriculture & Farmers Welfare and State Governments, so as to put in place a robust land records management with real-time access to digital land records data through open APIs for all financial service providers.

77 See: <http://dilrmp.nic.in/>

2.2.3 Re-engineering legal processes for the digital world

Prevalence of e-signature on documents is restricted because authorities insist on wet signatures on physical loan agreements for filing of loan recovery suits in courts. To achieve the goal of paperless economy such requirements are unwanted and prove the use of technology futile. Insistence on wet signatures on physical loan agreements for filing of loan recovery suits in courts need to be replaced by paperless legal alternatives as these can enable cutting costs and time in access to finance, repayment, recovery, etc., for businesses and financial service companies.

The Committee recommends review by Department of Legal Affairs of all such legal processes that have a bearing on financial services and consider amendments permitting digital alternatives in cases such as power-of-attorney, trust deeds, wills, negotiable instrument, other than a cheque, any other testamentary disposition, any contract for the sale or conveyance of immovable property or any interest in such property, etc., (where IT Act is not applicable), compatible with electronic service delivery by financial service providers.

2.2.4 Open APIs and expanding open government data

Many fintech solutions are built based on data on customers, markets and the economy. Making more data available, with guarding against misuses of the data, will ensure that more, and better, fintech solutions can be built. Many use cases of open APIs in government can be considered. On the government's Open Data portal, 4,015 APIs have already been created. The India Stack set of APIs and have facilitated the mushrooming of many fintech solutions using this data. APIs can also be used to share real-time information on corporate direct tax and GST payments with both corporations and the government, eliminating the need to maintain separate accounts for tax purposes. In order to enable Account Aggregators (AA), the Reserve Bank is facilitating standardization of APIs for information retrieval from the financial institutions and making them available to information users working in the AA ecosystem.

The Committee believes that APIs of relevant datasets be created such that fintech solutions can be built using them. These APIs must be open, to ensure equal access to all those wishing to build on this data, and anonymised, or, where identifiable, shared with the person's consent, to ensure the privacy of the people and built on the lines of IndiaStack. An *India AgriStack* can be built, such that lenders can evaluate the creditworthiness of agricultural borrowers. This stack can include a farmer's borrowing history, land ownership data, cropping pattern, and income data, among other information.

An *India MSME Stack* can also be built, where data on MSMEs can be pulled through APIs to facilitate trade financing, flow-based lending, insurance and bill factoring. The *India MSME Stack* may be a collection of APIs for MSME financing, including⁷⁸: A unified database of all MSMEs

- (a) Expansion of DigiLocker to include small companies to enable cloud storage of data
- (b) Single unified invoice financing platform with GST integration for smoother payments and tax collection
- (c) Policy changes and regulations to be available as APIs to enable one touch access
- (d) Building on the TREDIS platform to create a single invoicing platform for all vendors and suppliers.

Additional APIs to facilitate research and the creation of applications may include: Government departments and local government bodies unified stack; land registry and state land records; ownership/buy/sell/insurance/permits/taxes/fitness/loan/mortgage/enforcement records to provide transparency to transactions; delivery of government and private schemes and services to eligible citizens; automated query management; Government transit and commute systems; and so on.

The Committee recommends that MEITY coordinate the process of identification of the datasets that can be shared through open APIs, setting targets for the creation of such APIs by the relevant Ministries while enabling and supporting Central, State and Local governments to create relevant open APIs.

78 Yes Bank, India FinTech Opportunities Review, 2018, URL: <http://www.yesfintech.com/data/cms/ifor-report-2018.pdf>

The Ministry of Science and Technology has formulated the National Data Sharing and Accessibility Policy (NDSAP), while MEITY is the nodal Ministry to implement the policy. The Committee notes the power of open Government data in spawning new businesses and improving business models, subject to privacy laws. The Committee recommends that NDSAP needs wider acceptance and implementation, making way for sharing of data generated by Government agencies (including Ministries of Union Government, Autonomous bodies, State Government and Local Governments) in real-time through Open APIs.

2.3 Creating a financial regulatory framework for fintech

Perhaps the most important factor in the growth and development of fintech is how the financial sector regulators respond to these innovations. There is a lot that the regulators can do to enable optimal development of fintech in India.

2.3.1 Support for new business models

There are quite a few restrictions presently which may require reconsideration in the New Economy being built on digital infrastructure. Take the example of the insurance sector. Customers who searched for insurance traditionally relied on agents. In the last few years, digital channel is becoming the preferred mode for research on insurance policy and design. Positioning themselves as financial product aggregators, fintech firms like policybazaar.com help their customers choose from a spectrum of insurance products such as life insurance, health insurance, motor insurance and travel insurance.

Auto-insurance claims can be made smarter as well with the use of AI and big data by use of image-based assessment smart insurance system. Such imaging can accurately identify required repairs by scanning images of the accident vehicle and calculate claimed amount by tapping on a database of vehicle model(s) and part(s). The damage assessment system is also able to reduce frauds by differentiating between new and old damage on the vehicle. This technology allows

same day claims settlement and significant reduction in frauds of claims thereby reducing the auto insurance loss rate by up to 8% to 10%.

Further, various insurers have also raised demands to link wearables and portable devices to their product design. In this backdrop, the Insurance Regulatory and Development Authority (IRDA) constituted a Working Group in 2017 to examine 'Innovations in insurance involving wearable/portable devices' to examine the various technological advancements in the context of risk assessment, risk improvement, product design and pricing. The Working Group has acknowledged that insurers are keen on investing in technology as they perceive the risk of disruption if they do not.⁷⁹

A study by PwC has identified some of the potential areas of innovation or disruption for InsurTech⁸⁰:

(i) Since insurance is an industry which relies heavily on user data, fintech can help traditional insurers *leverage existing data* to generate deeper risk insights, to increase the speed of servicing, to lower costs, and to open the way for ever greater product precision and customization.

(ii) *Internet of Things (IoT)* can also prove to be efficient in this area. Some concrete examples are telematics and real-time weather observation that include sensors analysis of the gathered data can identify unsafe driving, industrial equipment failure, impending health problems, and more.

(iii) *Usage-based insurance (UBI) models* are emerging in response to customer demands for personalized insurance solutions. Inputs from sensor data could be an important indicator in prevention. Furthermore, behavioural analytics and advanced data analysis capabilities can help insurance companies gain a deeper understanding of behavioural trends, customary aspects and habits of individuals, allowing for the development and creation of customized solutions.

⁷⁹ InsurTech - Working Group Findings and Recommendations, URL:

<https://www.irdai.gov.in/ADMINCMS/cms/frmGeneralLayout.aspx?page=PageNo3519&flag=1>

⁸⁰ Opportunities Await: How InsurTech is reshaping insurance, June 2016, URL:

[https://www.pwc.ru/ru/industries/insurance/FinTech-report InsurTach.pdf](https://www.pwc.ru/ru/industries/insurance/FinTech-report%20InsurTech.pdf).

(iv) With the *use of drones*, claims assessment and compensation process could take a lot less time.

(v) With more *real time data* being available, such as equipment malfunction, a *shift from protection to prevention* will be observed.

(vi) Technology is enabling insurers to use mobile and other digital channels to *reach customers and provide quicker service*, particularly to younger customers.

(vii) The peculiarities of the sharing economy need to be examined by insurers. *Risk patterns and hazards shift* when resources are shared, such as in ride sharing apps.

Box 2.2: Micro Insurance - the Plug and Play Model - BIMA - Sweden

The insurance sector is learning from the microfinance sector, which made credit easily available to India's multitudes. A Swedish company Milvik AB, operating as Bima, has demonstrated a model of microinsurance that works through mobile phones. It offers different kinds of insurance, including accident, health and life insurance. Payments are made through prepaid mobile plans or postpaid mobile bills, and their turnaround time on claims is 72 hours. Bima has reached 24 million customers across 16 countries, a large majority of them first time users of insurance.

During its interactions, the Committee was informed that there are numerous instances where fintech service providers face a different and heavier regulatory burden compared to traditional insurance providers. Some of the issues faced by fintech companies operating in the insurance sector are:

(i) *Restrictions on advertisements*: As per IRDA Regulations, web aggregators and online platforms offering services in the insurance sector are not allowed to advertise.⁸¹ While there is a genuine concern regarding conflicted remuneration, regulation can be more narrowly tailored to prevent cases of genuine conflicts. This will provide another source of revenue stream for online

81 Insurance Regulatory and Development Authority of India, Insurance Regulatory and Development Authority of India (Insurance Web Aggregators) Regulations, 2017, (visited on 09/06/2018), Schedule VIII.

insurance distributors and ensure that their business models are sustainable, which will lead to innovation in the marketplace, resulting in better services to the consumer.

(ii) Restriction on outsourcing activities: Fintech companies operating in the insurance sector can perform outsourcing services, such as sending reminder of premium payments.⁸² However, they can offer such services only if the policy has been sourced from their platform. They are not allowed to perform such activities independently for any insurer, despite having the expertise to do so. Such restrictions limit source of revenues for online insurance distributors. Such revenue can be used to innovate and provide value added services to the consumer.

(iii) Restrictions on business activity: IRDA regulations do not allow fintech companies to offer any other services apart from insurance. Companies offering insurance products through traditional channels can open offices to provide all types of services to meet consumer's needs in a holistic manner. This restriction reduces competition between the traditional insurers and fintech companies. There is a need to examine similar regulations across the financial sector, and create a level playing field to ensure that consumers can choose the best product possible.⁸³

(iv) Restrictions on genuine reviews: Genuine customer reviews should be allowed to be displayed.⁸⁴ Customers using digital platforms of fintech companies to buy insurance products are not allowed to give their opinion or rate the products. This measure restricts the scope of feedback from consumers which raises consumer protection concerns and limits the way, insurance companies can improve their products.

(v) Outdated regulatory requirements: Transactions entered online which are paid through KYC verified accounts can be used for insurance purposes as well. Fintech companies operating in the fintech space should be allowed to not duplicate the KYC process.

82 Ibid., Regulation 30(b)(iv).

83 Ibid., Regulation 3(a)(ii).

84 Insurance Regulatory and Development Authority of India, IRDA (Web Aggregators) Regulations 2013 Exposure Draft, (visited on 04/13/2018), Regulation 13(C).

In addition, online service providers and fintech firms in the insurance sector face much higher restrictions than most advanced jurisdictions in the world. The box below highlights this.

Box 2.3: Global benchmarking of regulations applicable to fintech firms in insurance

Rules	India	UK	US	Netherlands	France	Germany	Japan
Advertising	Banned	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed
Cost per Lead	Banned	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed
Reviews	Banned	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed
Ratings	Banned	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed
Non-insurance products	Banned	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed
Dealing directly with other intermediaries	Banned	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed
Insurers allowed to invest	Banned	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed

Some of the stakeholders who interacted with the Committee were of the view that the P2P lending models should not be restricted in the way they have been in terms of exposure limits, because they involve sophisticated lenders operating with much better information and taking decisions about how they want to deploy their money. Platform-based lending models are different from the traditional lending models. They seek to overcome the information asymmetry problem not by taking lending decisions, but by helping consumers take their own lending decisions. Applying the lens of traditional lending to these models may stifle their growth. Similarly, for the providers of prepaid payment instruments, some of the stakeholders expressed the view that the capital requirements are probably not in line with the risks that these providers assume.

The Committee, therefore, recommends that Regulators should consider permitting new or innovative business models that can reduce costs, enable choices for consumers, subject to non-conflicts.

2.3.2 Competitive ‘neutrality’ in regulation

Regulators should focus on addressing the market failures that are identified in a given market, instead of trying to preserve the existing institution types. The regulatory stance should be pro innovation, which, above all, means being open to significant changes in the institutional landscape in the interest of improved efficiency and quality.

A regulatory approach that could help strike this balance is a “functional view” of the financial system. Here, the regulator focuses on achieving regulatory objectives for functions of the financial system, instead of focusing on firm types or activities. The functions of the financial system remain stable over time, even though the institutions performing those functions may change. A functional perspective enables being neutral to institution-types, which will allow innovative institutions to thrive.

The basic functions of the financial system are the following:

- (a) To provide ways of clearing and settling payments to facilitate trade.
- (b) To provide a mechanism for the pooling of resources and subdividing shares in various enterprises.
- (c) To provide ways to transfer economic resources through time, across borders, and among industries.
- (d) To provide ways of managing risk.
- (e) To provide price information to help coordinate decentralized decision-making in various sectors of the economy.
- (f) To provide ways of dealing with the incentive problems created when one party to a transaction has information that the other party does not or when one party acts as agent for another.

At present, these functions are performed through certain institutions and activities but may undergo transformations. For instance, the function of pooling resources is mainly performed by banks and investment firms. Banks do this by undertaking certain activities: accepting deposits, evaluating loan applications, making loans, monitoring loans, invoking security or guarantees in

situations of default, and so on. If P2P lending models scale up, they may perform a similar function but with very different institutional mechanism and activities. Taking a functional view in practice would mean analysing emerging business models on their own terms, instead of applying existing regulations on them. Platform-based lending models are different from the traditional lending models. They seek to overcome the information asymmetry problem not by taking lending decisions, but by helping consumers take their own lending decisions. Applying the lens of traditional lending to these models may stifle their growth.

The new business models may need very different institution-types. For instance, the traditional definitions of banks and NBFCs need not apply to platform-based business models, whose form is probably closer to technology companies than to finance companies. If regulators try to fit these models into existing institutional forms, they will limit the possibility of innovations. A functional perspective demands adopting form to function, and not the other way.

Regulators should take a functional approach to regulation, which means that they should be neutral to the institutional forms and activities that are performing the functions of the financial system. Regulations must promote competition and a fair, and open, level playing field for digital financial inclusion by ensuring that providers of similar digital financial services have similar rights and responsibilities regardless of their institutional type and the technology used. Financial sector. *This framework also should ensure that similar risks are regulated in a similar manner and that an appropriate risk-based approach to supervision is developed. Regulators may approach fintech keeping 'competitive neutrality' with a view to enhancing competition while making regulations.*

2.3.3 Regulatory sandboxes

Regulators need to develop regulatory mechanisms that can help support new business models and give effect to a functional perspective of financial regulation. Since these are early stages of innovation, instead of full-fledged regulations, regulators should focus on documenting and understanding the market failures, and carefully evaluating potential regulatory responses. An

innovation may be tried at a small scale, then at a moderate scale in the market, and then taken to scale. Typically, regulators do not intervene in small scale pilots. The true nature of the innovation and its risks can be properly understood only when it is launched in a market situation. Allowing controlled testing of innovations can help the regulators learn from the industry and co-creating regulatory responses.

The Committee was apprised that there are four broad categories of regulatory barriers:

- (a) Compliance with legacy regulations which are not designed for financial products that are delivered through technology.
- (b) Cumbersome and drawn-out consultation process for new guidelines.
- (c) Ambiguity in interpretation of some regulations, especially for products that fall under multiple regulatory jurisdictions.
- (d) Regulatory compliance at scale i.e. the uncertainty that the regulator might impose regulations which can adversely affect their business models as the company scales.

One mechanism that can help overcome these barriers is that of a regulatory sandbox. The regulatory sandbox allows firms to test innovative products, services, and business models in a live market environment, while ensuring the appropriate safeguards are in place.⁸⁵ Regulatory sandbox may be defined as “*A framework set up by a financial sector regulator to allow small-scale, live testing of innovations by private firms in a controlled environment (operating under a special exemption, allowance, or other limited, time-bound exception) under the regulator’s supervision.*”

A regulatory sandbox can shorten the time needed to see the efficiency of innovative products and services, or to extend a service or product within the existing authorization for experiments not consistent with current regulatory regime. This allows the business to adequately prepare the procedures to comply with prevailing regulatory requirements.⁸⁶ At the same time, it assists the regulatory authorities to frame guidelines for the vastly developing technologies and their recent

85 Financial Conduct Authority, “Regulatory sandbox lessons learned report”, October 2017, available at <https://www.fca.org.uk/publication/research-and-data/regulatory-sandbox-lessons-learned-report.pdf> (accessed on 5th January, 2018).

86 DeNederlandscheBank, “More room for innovation in the financial sector”, December 2016, available at https://www.dnb.nl/en/binaries/More-room-for-innovation-in-the-financial%20sector_tcm47-361364.pdf (accessed on 7th January, 2018).

updates, while safeguarding consumer interests. This reduces the regulatory uncertainty as the regulator can closely monitor the new technologies, thus enabling the regulators to collaborate with fintech firms and consumers.

Some of the possible steps for operationalizing the regulatory sandbox may include⁸⁷:

- (a) Regulator develops broad guidelines and expectations from target companies, followed by inviting applications through a public notification.
- (b) The eligibility criterion requires the innovation to be genuine and capable of providing direct benefits to the consumers, while maintaining systemic stability. The innovation should also be ready to be tested.
- (c) Once applications are received, they are evaluated on the aforementioned eligibility criteria, along with the business model and product offerings.
- (d) The companies or products selected post evaluation are required to closely work with the regulator to assess the viability of their products and services, while being provided with tools that include⁸⁸:
 - i. restricted authorization,
 - ii. rule waivers,
 - iii. individual guidance,
 - iv. no enforcement action letter to conduct the tests
- (e) After a successful exit from the sandbox, the company is required to submit a report. For it to become a market player, it has to then comply with all the applicable regulations.

For a regulatory sandbox to be operational and productive for the financial system, the institutional arrangement must have the following⁸⁹:

- (a) Proper application screening procedures,
- (b) Proper articulation of regulatory concerns associated with a given project,
- (c) Robust design of minimal guard rails required for a test rollout,

87 Deloitte and CII, “Regulatory Sandbox Making India a Global Fintech Hub”, July 2017, available at <https://www2.deloitte.com/content/dam/Deloitte/in/Documents/technology-media-telecommunications/in-tmt-fintech-regulatory-sandbox-web.pdf> (accessed on 8th January, 2018).

88 Renuka Sane and Ajay Shah, “Experimentation that fosters fintech innovation in India”, 18th March 2018, available at <https://blog.theleapjournal.org/2018/03/experimentation-that-fosters-fintech.html> (accessed on 20th March, 2018).

89 Ibid.

- (d) Robust design of a set of tests that will answer the concerns, and set the threshold for approval,
- (e) Controlled roll-out of innovation and audit of the captured data,
- (f) Extrapolation from sandbox to practical deployment,
- (g) Sound documentation associated with each experiment,
- (h) Execution conforming to the existing legal and regulatory structure,
- (i) Feedback channels of insights from each sand box experiment into regulation-making process.

Financial services firms in the private sector have identified *multiple use-cases for regulatory sandboxes* such as a *Portfolio management services for the poor*. Currently, the minimum investment limit for customized wealth management services for investors is INR 2.5 million. This presents a barrier to customization of wealth management products for informal sector financial consumers. There is a case for testing customized wealth management for informal sector participants in a sandboxed environment by relaxing the minimum investible amount requirement.

Report of the *Working Group on FinTech and Digital Banking* has recommended introduction of an appropriate framework for a Regulatory Sandbox within a well-defined space and duration where financial sector regulators in India will provide the requisite regulatory support. The report also recommends a collaboration with Institute for Development and Research in Banking Technology (IDRBT) to create and maintain the sandbox to enable innovators to experiment with banking or payments solution for eventual adoption.⁹⁰

In August 2017, SEBI set up a *Committee on Financial and Regulatory technologies (CFRT)*. The Committee is advising SEBI on ways to reap the opportunities provided by fintech, while also dealing with the relevant risk and challenges. CFRT is advising on trends in fintech developments in securities market worldwide; opportunities and challenges from new fintech solutions and its impact on Indian Securities Market; fintech solutions for further widening and deepening of Indian securities market; approach framework for regulatory sandbox in Indian

90 Reserve Bank of India, "Report of the Working Group on FinTech and Digital Banking", November 2017, available at <https://rbidocs.rbi.org.in/rdocs/PublicationReport/Pdfs/WGFR68AA1890D7334D8F8F72CC2399A27F4A.PDF> (accessed on 9th March 2018).

market conditions; preparing Indian securities market and regulatory framework to adopt to new fintech solutions; assessing technological solutions for regulatory functions of SEBI ; technology capacity building by Indian securities market in general and SEBI in particular; cyber security at system level for the Securities Market and suggesting the creation of cyber security standards; Technology Risk Management Framework for market participants and for the Securities Market; and other issues.

SEBI, under the guidance of the CFRT, will soon issue the detailed guidelines on both the sandboxes. SEBI is in the process of implementing two sandboxes under the guidance of the CFRT:

- (a) **Regulatory sandbox** for limited purpose testing of innovative fintech products and business models in a live test environment on real customers
- (b) **Industry sandbox** where fintech firms can test their solutions isolated from the live market. The purpose of industry sandbox is to provide a collaborative space accessible to all the fintech participants including the regulators. SEBI envisages the Industry Sandbox Framework as a platform of shared knowledge and data developed, operated and maintained by the industry wherein fintech firms can test their innovations before rolling out into the live market or approach regulatory sandbox.

In addition, sandboxes developed by individual regulators, an inter-regulatory sandbox is essential for the development and promotion of hybrid financial products that are regulated by multiple regulators. Suitable legislative changes may be required in order to create an inter-regulatory sandbox, and to allow regulatory coordination for the purposes of operationalizing the same. For the regulatory sandbox to be successful in its objective, the following points would be critical:

- (a) The sandbox should be work closely with regulators through representation at the governing council as well as the executive council. The organization should be managed by professional staff. The inter-regulatory sandbox may be established under the purview of the FSDC.
- (b) The sandbox initiative should be guided by senior leadership in each regulator.
- (c) The CEO of the sandbox should be a seasoned professional equivalent to an Executive Director at the regulator, with a strong background of working in the fintech for financial

services industry; deep experience of working with regulators and policy makers; and clear understanding of the dynamics of addressing lower-income and other excluded segments.

Introduction of regulatory sandboxes could help regulators and industry participants work together under the regulator's leadership to develop suitable regulations. The Committee notes that many economies across the world (UK, Singapore, Canada, Thailand etc.) have set up regulatory sandboxes as early as 2015 enabling financial sector innovations. A detailed blueprint of RBI's regulatory sandbox in India is provided in the Report of the Household Finance Committee, while other regulators have carried out similar studies. The Committee recommends that regulators should without further delay introduce mechanisms, such as regulatory sandboxes and laboratories, that enable learning and adaptation of regulatory responses can play an important role.

2.3.4 Planning for high impact fintech scenario

Technological transformations to the financial system bring both benefits and new types of risks. For example, while establishment of SWIFT in 1973 connected payment systems across countries, the collapse of Herstatt Bank in 1974 highlighted the risks of increasing international financial interlinkages, especially through the new payments system technology.⁹¹ International agreements on robust payments systems and related regulation then developed in response. The latest wave of technologies may similarly create new risks, some of which the regulators may need to address.

Based on experience of fintech models so far, one can envisage certain scenarios unfolding over medium to long term with each requiring a different kind of regulatory response. In each sector of the financial system, a different scenario, or a mix of scenarios, may emerge. For instance, the Basel Committee for Bank Supervision has identified five scenarios for how banks may change due to fintech.⁹² The table below describes these potential scenarios in brief.

91 Douglas W Arner, Janos Barberis, and Ross P Buckley, "The evolution of Fintech: A new post-crisis paradigm", in: *Geo. J. Int'l L.* 47 (2015), p. 1271.

92 Basel Committee on Banking Supervision.

Table 2.1: Potential scenarios on evolution of fintech space

S.I.	Medium to long term scenarios for fintech evolution	Scenarios for Banks identified by Basel Committee for Bank Supervision
1.	<p>Low impact scenario: Here, fintech innovations will be largely deployed by existing firms to improve their businesses, and there will be no significant change in their position in the financial system. This scenario is already playing out in all the sectors of the financial system in India. For example, securities trading platforms use fintech extensively.</p>	<p>Better bank: This scenario involves modernisation and digitisation of incumbent players. Banks retain the customer relationship and core banking services, leveraging enabling technologies to change their current business models.</p> <p>New bank: Incumbent leaders of the sector are replaced by challenger banks who can leverage technology to improve efficiency and quality of services, and gain market share.</p>
2.	<p>Medium or moderate impact: Here, the business of finance will be unbundled. The role and bargaining power of traditional firms will be substantially curtailed, so much so, the regulators may not be able to necessarily treat them as principals in the financial system. For example, the mandatory opening of banking data through Open Banking regulations in UK⁹³ could change the banking landscape in a manner that redefines the role of traditional banks. If banks become utilities that are accessed by fintech firms to create and offer products, they can no longer be called</p>	<p>Distributed bank: Financial services are fragmented among specialised fintech firms and incumbent banks, but banks continue to have a niche that allows them to survive. The banks and fintech firms operate as partners on equal footing.</p> <p>Relegated bank: This is a variation of the moderate impact scenario. The incumbent banks become commoditized service providers and customer relationships are owned by new fintech intermediaries. Banks continue to exist but have little bargaining power. Open banking could lead to such a scenario.</p>

93 Competition and United Kingdom Markets Authority, Retail banking market investigation, 2016, URL: <https://www.gov.uk/cma-cases/review-of-banking-for-small-and-medium-sized-businesses-smes-in-the-uk>

S.I.	Medium to long term scenarios for fintech evolution	Scenarios for Banks identified by Basel Committee for Bank Supervision
	the principals in the banking sector.	
3.	<p>High impact:</p> <p>Here, the traditional firm-types will be substantially or completely disintermediated by fintech firms, who perform the same functions but in very different ways. For instance, social media, which may potentially create new ways to overcome problems of information asymmetry, be used to disintermediate traditional lending and payment models with the traditional firms suffering creative destruction.</p>	<p>Disintermediated bank:</p> <p>Banks become irrelevant as customers get the services from individual fintech firms, who facilitate very different business models. Banks are replaced from customer financial transactions by platforms and technologies, which ensure a direct matching of final consumers depending on their financial needs (borrowing, making a payment, raising capital etc). P2P lending platforms could take away a large part of banking business, which is based on their ability to match those with savings and those who need funds.</p>

Suitable regulatory responses will depend on how fintech changes the financial system. For the low impact scenario, the regulators primarily need to place additional regulatory requirements for the new risks generated by use of fintech, while modifying existing ones to recognise the improvements in risk management brought about by fintech. New risks may include systemic risk from failure of systemically important technology service providers or operational risks from greater outsourcing to third parties. In most sectors however, regulators are already grappling with these issues, and have issued regulations to address these risks. For instance, in insurance and banking, there are extensive regulations placing obligations on banks and insurance firms to manage risks associated with distributors and aggregators.

The use of fintech could also reduce certain risks or make it easier for financial firms to manage risks. If, for instance, banks are able to improve their credit risk management because of availability of better information, this could reduce the problem of adverse selection. This should help lower the credit risk. If fintech changes the sources of competitive advantages for firms, some

firms that are unable to keep up may fail. They will need to be resolved. While this may increase the burden on the resolution regime, it will not require fundamental changes to the bankruptcy regime as such.

In the moderate impact scenario, prudential regulation will need to respond to the changed reality where the business of finance is unbundled. It would then become important to rethink the unit of regulation as the traditional financial firms will cease to be principals in their respective sectors. It will therefore not be possible to focus on them and hold them responsible for what their agents do. The implementation of bankruptcy resolution could become more complicated, because unbundling would lead to several interconnected firms jointly performing a function that was earlier performed by one. The resolution system will have to modify its monitoring mechanisms and redesign the resolution tools to meet this challenge. The scope of the resolution regime will probably have to be expanded to include some of the fintech firms that are systemically important because of scale, interconnectedness and/or the criticality of the function they are performing.

In the high impact scenario, fintech will disintermediate certain traditional business models. For instance, if peer-to-peer models disintermediate banks, it will not just be about applying the banking regulations on different firms, but also about designing regulations suitable for these radically different business models. For example, when the increase in availability of information about borrowers and investees reduces the role of intermediaries in overcoming problems of information asymmetry, the nature of regulatory problem changes. It is no longer about supervising banks to ensure that they are safe but primarily one of maintaining the integrity of the platforms. So, the operational risks may increase, but other risks will be distributed directly to the consumers.

From a macro-prudential perspective, regulators will need to develop new methods of stress-testing for the fintech models. Interconnectedness and network economies will become much more important than the balance sheet size of the firms. The problem of bankruptcy resolution will also change in this scenario. If, for instance, more platform-based models take scale and replace balance sheet-based intermediation, the bankruptcy resolution of the platform would be little more than transferring the databases to another firm that is able to continue running the platform. An

important challenge for both prudential regulation and resolution in this scenario is of cross-border situations. Fintech may enable consumers in India to get information-based services from firms located anywhere in the world. This may in turn raise questions of regulatory jurisdiction over such service providers to protect the consumers in India.

Thus, both prudential regulation and bankruptcy resolution regimes need to be redesigned to respond to fintech. If the moderate impact or high impact scenarios emerge, regulators need to make substantial changes to prudential regulations, and issue new regulations. These scenarios may also witness significant creative destruction of incumbent firms, and bankruptcy resolution regime may need to gear up for such a situation. Since at present, we are mostly in the low impact scenario, the regulators should focus on investing in research on the suitable regulatory responses as other scenarios begin taking shape.

In the Committee's view, Regulators should establish prudential regulations for fintech to enable the moderate and high impact scenarios of fintech development to emerge. At present, India can be said to be in the low impact scenario, and the regulators should focus on investing in research and enhancements to the regulatory regime to enable adoption of fintech and related risk management systems. In due course, the moderate impact or high impact scenarios could evolve leading to creative destruction of incumbent firms, and regulators need to anticipate and prepare for bankruptcies and resolution regimes for existing financial service companies that fail to gear up.

2.3.5 Open data for enhancing competition

All financial sector regulators may study the potential of open data access among their respective regulated entities, for enabling competition in the provision of financial services. To start with, the Committee recommends that RBI may consider making it mandatory for financial service companies to encourage banks to make available databases of rejected credit applications (referral pools) available on a consent-basis to a neutral marketplace of alternate lenders. For increasing access to credit in rural areas, access to PSU bank rejection data would be especially helpful to alternate lenders.

As seen from the example of Open Data Regulations in the UK banking sector, opening up customer data with consent safeguards can help promote competition in financial services and unlock greater efficiency (See Box below). Taking note of this, the Committee recommends that RBI may consider making available bank data (such as transaction and account history data) to fintech firms (based on consumer consent and with other appropriate safeguards) through APIs. It also recommends that all financial sector regulators study the potential of open data access among their respective regulated entities, for enhancing competition in the provision of financial services.

Box 2.4: Open Banking in the United Kingdom

The Competition and Markets Authority (CMA) in the United Kingdom noted in a report on the retail banking market that smaller and newer banks were unable to compete with the established banks due to paucity of customer data. Open Banking has been suggested as a solution in this regard whereby current account information of customers and small and medium sized businesses can be shared with third party providers. The sharing of information upon obtaining the consent of the concerned individual/business would enable the creation of innovative financial products. The CMA has established Open Banking Implementation Entity (OBIE) to oversee the rollout of Open Banking in the United Kingdom. Among the responsibilities of OBIE are the specifications of APIs that banks and others would use to provide Open Banking in a safe manner. Participants in the Open Banking System would be expected to adhere to the guidelines prescribed by the OBIE. Easy facilitation of the functions of money management, obtaining loan and payments by customers is another significant attraction of Open Banking.

2.3.6 Reforming KYC regulation

There is an urgent need to reduce the costs of KYC to promote financial inclusion among the weaker sections. In recent years, a large portion of the KYC process has moved online. The KYC process has become relatively simpler, especially for companies operating primarily online. Launch of the Central KYC Registry by CERSAI has made possible sharing of KYC data by all financial sector companies. A notification was issued in December 2015 authorizing the Central Registry of Securitization Asset Reconstruction and Security Interest of India (CERSAI) as the C-KYC registry for the entire financial sector.

Currently, the financial institutions need to pay an advanced fee to CERSAI for using the C-KYC platform.⁹⁴ The requisite fee is deducted from this advanced payment depending on the usage. The fee structure of various kinds of transactions are is provided below⁹⁵:For uploads: the charge is Rs. 0.80 per case

- (i) For downloads: the charge is Rs. 1.10 per case
- (ii) For updating the existing record: the charge is Rs. 1.15 per case.

94 For more details, about the applicability of the fees, please see <https://www.cersai.org.in/CERSAI/JSP/IBACRCharges.jsp>.

95 For more details, please see <https://www.pwc.in/assets/pdfs/financial-service/central-kyc.pdf>.

Box 2.5: Central KYC Registry

Central KYC Registry is a centralized repository of KYC records of customers in the financial sector with uniform KYC norms and inter-usability of the KYC records across the sector with an objective to reduce the burden of producing KYC documents and getting those verified every time when the customer creates a new relationship with a financial entity. Central KYC Registry has the below salient features:

- (i) User friendly web portal
- (ii) Unique KYC identifier linked with independent ID proofs
- (iii) KYC data and documents stored in a digitally secure electronic format
- (iv) Secure and advanced user authentication mechanisms for system access
- (v) Data de-duplication to ensure single KYC identifier per applicant
- (vi) ID authentication with issuing authorities like Aadhaar/PAN etc.
- (vii) Substantial cost reduction by avoiding multiplicity of registration and data upkeep
- (viii) Regulatory reports to monitor compliance

Central KYC application can be accessed by authorized institutions or other notified institutions under the Prevention of Money Laundering Act or rules framed by the Government of India or any Regulator (RBI, SEBI, IRDA, and PFRDA) there under.

While large financial institutions can afford to pay for uploads, this may not be affordable for small players. The cost of on-boarding a customer is an expensive proposition and, in this way, the new banks are at a serious disadvantage. The Committee recommends that there should be no charge for uploading KYC data, while every download can be priced up based on the user pays principle. This will enable CKYC to take off early.

Further, in light of representations made by multiple stakeholders, the Committee is of the opinion that e-KYC has the potential to reduce customer on-boarding and servicing costs significantly. It therefore recommends that all financial sector regulators fix deadlines for on boarding existing KYC data to the Central KYC registry and make CKYC fully operational and make KYC a digital and paperless process. At least the KYC data from the time the concept of Officially Valid Documents was introduced vide PML rules should be uploaded. In respect of legacy accounts, data could be uploaded by banks during the process of re-KYC.

2.3.7 Consumer protection framework

Reliance on technology can create new risks, such as concerns over data protection and data security, and consumer protection issues relating to suitability of services and products offered. Regulation must achieve a balance between two objectives viz., encouraging the development of fintech-enabled solutions for consumers benefit, and ensuring adequate protection against potential risks to consumers.

While consumer protection measures prevent abuse and ensure full and effective participation by consumers in markets, regulation ensures consumers remain protected from market failures such as information asymmetry and negative externalities. However, breakdown of consumer protections may occur. The Bernie Madoff scam in the US, the Payment Protection Scandal in the UK and the Saradha chit fund scam in India are such examples. The entry of fintech raises further concerns over its implications on consumer protection. The Ezubao P2P scam in China involving misdirected funds and the GainBitcoin scam in India are examples of such possibilities. Further, different regulatory requirements by multiple sectoral financial regulators lead to regulatory gaps and consequently, to suboptimal regulation and opportunities for regulatory arbitrage.

The three broad causes for consumer protection breakdowns are:

- (a) *Information asymmetry*: Typically, consumers of financial products don't have sufficient knowledge to evaluate the products. For example, the returns on several insurance products, when translated into IRR, amount only to around 3-4% far less than that advertised. However, the fact that the returns will be as per IRR is not easily accessible to customers.
- (b) *Time-lag*: There is no immediate feedback to the consumer on the quality of the financial product; the consumer only realizes its true features over several years. For example, mutual funds are usually 3 to 5-year products, insurance products have maturities between 10 to 20 years and the outcome of a pension investment is realized only at retirement.
- (c) *Incentive alignment*: The sale of financial products happens through intermediaries who are remunerated by the product manufacturers, not the customers, through what is known as the 'distributor model'. This is akin to a pharmaceutical company paying the doctor and

not the patient. Distributors, therefore, work in the interest of the financial firm and not the customer, leading to misaligned incentives between the distributor and the customer.

Consumer protection problems can be addressed through regulation as follows:

- (a) *Ex-ante regulations*: which include regulating the sale process in order to facilitate informed decision making by the customer. The tools of regulation include demanding clear disclosures and caps on commissions (such as, allowing trail commissions as opposed to front-loaded commissions) to bring greater incentive alignment between the distributor and customer's interests.
- (b) *Ex-post regulations*: which includes establishing redressal for consumer grievances against sales. Enforcement against errant product manufacturers or sellers would be integral to such system.

The *Report of the Financial Sector Legislative Reforms Commission (FSLRC)* and the accompanying *draft India Financial Code (IFC)* offer useful suggestions on creating regulatory framework that fosters consumer protection. The draft IFC envisages the following rights for all consumers of financial services:

- (a) Right to professional diligence from financial service providers;
- (b) Protection against unfair contract terms and unfair conduct;
- (c) Right to maintenance by the financial service providers of confidentiality of consumer's information;
- (d) Right to fair disclosure from the financial service providers; and
- (e) Right to a dispute settlement system that must be maintained by the financial service provider.

The draft IFC also provides additional legal protection to small and unsophisticated consumers, called the retail consumers. It may be noted that the Hon'ble Finance Minister's announcement in his Budget announcement in 2015, a Task Force was set up to establish a sector-neutral financial redress agency as a one stop forum for speedy and convenient settlement of complaints of retail consumers. The report of the Task Force has been submitted to the Ministry of Finance.

The advent of fintech could exacerbate the existing challenges to consumer protection in the Indian financial markets. One cannot therefore introduce safeguards for entry of fintech without also addressing adequate consumer protection in the larger retail financial environment.

Accordingly, the regulatory gaps and arbitrage opportunities would need to be closed, and laws and regulations implemented consistently. This would be especially important in the case of fintech as technology transcends regulatory definitions and cuts across different products. Further, a non-sectoral law would also be able to keep up with technological changes as new business models are invented or multiple activities undertaken under one umbrella.

Box 2.6: Impetus to digital literacy in rural areas

Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDSA)⁹⁶

The PMGDSA is touted to be among the largest digital literacy programmes in the world. It aims to make six crore rural Indians digitally literate. The PMGDSA will cover 40 percent of the rural households by providing digital training to at least one individual in every eligible household by 31 March 2019.

The training would consist of equipping individuals with the ability to send and receive emails, browse internet, access government services among other skills. In keeping with the government's emphasis on conduct of cashless transactions through mobile phones, training would be imparted to individuals to enable usage of Mobile Banking, Digital Wallets, Aadhaar enabled payment services among others.

The Ministry of Electronics and Information Technology has been tasked with the overall supervision of PMGDSA. States and Union Territories will also actively collaborate through the concerned State Implementing Agencies, District e-Governance Society among others.

There is need for legal framework to redress grievances of consumers in the financial sector, especially digital services. The legal framework needs to address risks specific to the digital environment, ensure consumers of digital financial services have meaningful choice and control over their personal data - including through informed consent, require that data not be used in an

⁹⁶ 'Cabinet approves 'Pradhan Mantri Gramin Digital Saksharta Abhiyan' for covering 6 crore rural households', Press Information Bureau (8th February 2017) available at <http://pib.nic.in/newsite/PrintRelease.aspx?relid=158292> (accessed on 4th January 2019).

unfair discriminatory manner in relation to digital financial services, confusing user interfaces that raise the risk of mistaken transactions; inadequate security of systems; irresponsible lending through digital channels; online frauds, system downtime that prevents access to funds; unclear or limited recourse systems; potential misuse of AI/ML, etc. It is recommended that a legal framework for consumer protection be put in place keeping mind the rise of fintech and digital services. It further recommends enacting such a law early keeping the rise of financial technologies in view.

2.3.8 Regulatory and supervisory technology

The rapid pace of innovations in the fintech sphere has the potential to transform the way firms respond to regulatory challenges. The Financial Conduct Authority in the United Kingdom has characterised RegTech as the “adoption of new technologies to facilitate the delivery of regulatory requirements”.⁹⁷

Adoption of RegTech will yield both short-term and long-term benefits. In the short-term, RegTech can reduce the cost of compliance through automation of compliance processes.⁹⁸ This will reduce the risks by eliminating the need for manual checks and aid in the ease of doing business. Solutions in the RegTech sphere also aid in firms’ enjoying flexibility as the risk management systems can be constantly updated in accordance with growth requirements. Advanced data analytics can be leveraged to aid firms identify potential risks and take suitable mitigating measures. In the longer run, using RegTech would yield tangible benefits such as improved stability in operations and effective corporate governance.⁹⁹ Regulatory reporting would be much easier benefiting both the firms and the regulators.

Financial institutions across the world have already begun leveraging the opportunities that RegTech provides. For instance, financial institutions like BBVA UK, Taiwan Business Bank,

⁹⁷ Ernst and Young, “Innovating with RegTech: Turning regulatory compliance into a competitive advantage”, 2016, available at [https://www.ey.com/Publication/vwLUAssets/EY-Innovating-with-RegTech/\\$FILE/EY-Innovating-with-RegTech.pdf](https://www.ey.com/Publication/vwLUAssets/EY-Innovating-with-RegTech/$FILE/EY-Innovating-with-RegTech.pdf) (accessed on 5th January 2019).

⁹⁸ Ibid.

⁹⁹ Ibid.

Sberbank and Banco Santander among others have adopted regulatory reporting software OneSumX.¹⁰⁰ The Paris branch of the State Bank of India has also adopted OneSumX to help it prepare regulatory reports for the French and European authorities.¹⁰¹ The OneSumX software solution developed by Wolters Kluwers essentially aids financial institutions in the regulatory and liquidity risk reporting.

Firms that adopt RegTech and sectors with SupTech implementation can be subject to lesser compliance burden. The Committee notes that the RBI Working Group on fintech and Digital Banking (November 2017) has recommended that regulatory actions may vary from “Disclosure” to “Light-Touch Regulation & Supervision” to a “Tight Regulation and Full-Fledged Supervision”, depending on the risk implications. Hence, the Committee recommends that all financial sector regulators must consider regulations proportionate to risks and factoring in use of tech-enabled systems by regulated entities.

A key area of interest for adoption of RegTech by financial institutions lies in fraud and risk management. RegTech solutions can help financial institutions understand the optimum exposure limits while also honing their forecasting capabilities.¹⁰² Similarly, screening for anti-money laundering (AML), improved Know Your Customer (KYC) processes and real-time fraud and compliance monitoring are some of the other key value additions of RegTech in the functioning of financial institutions.¹⁰³ RegTech could also be used to counter terrorist financing. Currently, it is difficult for financial institutions to identify suspicious cross-border transactions due to the absence of any single fixed global standard.¹⁰⁴ The communication gap that exists between the various systems can be bridged by solutions available in the RegTech sphere thus enabling a clampdown on terrorist funding.

100 Elena Mesropyán, ‘How European Banks are using RegTech Solutions’, Medici (6 June 2018) available at <https://gomedici.com/how-european-banks-are-using-regtech-solutions/> (accessed on 5th January 2018).

101 ‘State Bank of India Paris selects Wolters Kluwer’s OneSumX for regulatory reporting’, IBS Intelligence (3rd November 2015) available at <https://ibsintelligence.com/ibs-journal/ibs-news/state-bank-of-india-paris-selects-wolters-kluwers-onesumx-for-regulatory-reporting/> (accessed on 5th January 2018).

102 Arun Suresh, ‘RegTech: A new disruption in the financial services space’, PricewaterhouseCoopers, available at <https://www.pwc.in/consulting/financial-services/fintech/fintech-insights/regtech-a-new-disruption-in-the-financial-services-space.html> (accessed on 5th January 2015).

103 Ibid.

104 John Rampton, ‘Everything you need to know about RegTech - the new FinTech’, Due (21 September 2016) available at <https://due.com/blog/everything-need-regtech-new-fintech/> (accessed on 5th January 2018).

Innovations in RegTech such as the Regulatory Sandbox and RegTech as a Service (RaaS) are driving greater engagement between regulators and financial institutions. This would enable faster, safer and easier regulatory compliance for financial institutions thus contributing to ease in conducting financial activities.

The Committee notes that RegTech is still evolving and innovations may lie ahead. Much of the effort in development thus far has focused on digitization of manual processes, but the larger objective is to meet increasingly strict know-your-customer (KYC), anti-money laundering (AML) and counter-terrorist financing (CTF) requirements. AI applications, especially, have the potential to help firms detect compliance risks and make better-informed decisions about how to mitigate them. RegTech can reduce firm-level compliance risks and also reduce supervisory risks. The Committee recommends that the financial sector regulators (RBI, SEBI, IRDAI, and PFRDA) must develop standards and use-cases for RegTech by financial sector service providers to make compliance with regulations easier, quicker and more automated for regulated entities.

Technology can also aid the supervisory function of regulators. The use of supervisory technology, or SupTech, is currently seen in two activities i.e. data collection and data analytics. The use of data and analytics in this manner makes regulation forward looking and proactive. Some of the ways in which SupTech can help regulators carry out their functions better are:

- (a) SupTech improves data quality and enables its use in new ways. It makes it possible to collect much more granular data at a lower cost, and from many different sources apart from reporting entities. It marks a shift from collecting report templates to collect primary data.
- (b) SupTech grants real-time, as required access to data rather than have reporting entities process the data. In this way it reduces compliance costs for the regulated entity and processing costs for the regulator.

Together with RegTech, SupTech can ensure a seamless data collection and organization mechanism. SupTech allows the regulator to gather intelligence from unstructured data in a way that report templates do not.

SupTech applications can be found in data collection, data reporting, data management and virtual assistance. Within data analytics, SupTech could work in four key areas: market surveillance, misconduct analysis, micro-prudential and macro-prudential supervision. SupTech can reduce costs of both compliance and supervision. The Committee recommends that each financial sector regulator must study the applications of SupTech, or supervisory technology efforts and evolve an institutional framework for developing use-cases, testing, deployment, monitoring and evaluation of SupTech.

2.4 Recommendations

2.4.1 Dedicated innovation teams in Public Sector Financial Services companies: A well-defined team focused on innovation can serve as a visible, centralized point of initial contact for fintech. PSBs and other financial sector entities need to be far more proactive and innovative in remaining ahead in the use of fintech in delivering all their services. *The Committee recommends that Public Sector financial service companies establish innovation teams and sandboxes with bright talent (from inside and outside the PSEs) to experiment with cutting edge technology and evolve promising fintech solutions. Public Sector Financial Sector Enterprises may also be encouraged to create a common knowledge sharing platform for cross-learning and rapid deployment of innovative solutions.*

2.4.2 Artificial Intelligence for back-end processes: Applications of machine learning include the automatic reading and interpretation of the implications of regulatory/contractual documentation using natural language processing as a means of reducing compliance risk. *The Committee recommends that Department of Financial Services (DFS) and PSU banks may work together to explore significant opportunities that exist to increase the levels of automation using Artificial Intelligence (AI), cognitive analytics & machine learning in back-end processes of PSU banks, especially Risk Management, Compliance management and Fraud Control, and make a roadmap to implement the strategy in time bound manner. Implementing such technology automated systems will bring in more efficiency to their work and reduce fraud and security risks.*

2.4.3 Public sector block chain-based trade finance: The Committee feels that digitising the supply chain can remove the inefficiencies and lower risks in trade finance in India, by solving the issues of authentication of identity of companies, authorisation of signatories, validity of documents, ownership validation and payments. A few IT solutions companies and private sector banks have already offered solutions. *The Committee accordingly recommends that the Ministry of MSME should work with DFS and RBI for testing and implementing block-chain solutions in trade finance for MSMEs in public sector banks as well.*

2.4.4 Remote Sensing & Drone Tech for Credit & Insurance: A drone policy has been announced by Ministry of Civil Aviation which has come into effect from December 1, 2018. PMFBY guidelines also provide for innovation in various aspects of the scheme, including crop cutting experiments. *The Committee recommends that Insurance Companies and Lending agencies in Agri sector should be encouraged to use drone and remote sensing technology directly or those provided by fintech companies to assess discrepancies in self-reported cropping patterns and crop cutting experiment processes, enabling more efficient delivery of both credit and insurance products and reduce credit/insurance risks.*

2.4.5 Digitisation of Land Records: The country needs a dedicated National Digital Land Records Mission based on a common National Land Records Standards which should deliver common standards-based land record data within a 3-year deadline. DOLR may collaborate with DFS, MEITY, Ministry of Agriculture & Farmers Welfare and State Governments, so as to put in place a robust land records management with real-time access to digital land records data through open APIs for all financial service providers. *The Committee recommends that the Government takes up modernisation and standardisation of land records in the country on a war footing with a deadline to complete such a system in the country in a period of three years. For this purpose, a steering committee comprising of Department of Economic Affairs, Department of Financial Services, Ministry of Agriculture, Ministry of Rural Development, Department of Land Resources and MEITY should be constituted to draw up a blueprint for doing so.*

2.4.6 Re-engineering Legal Processes for the Digital world: Insistence on wet signatures on physical loan agreements for filing of loan recovery suits in courts need to be replaced by

paperless legal alternatives as these can enable cutting costs and time in access to finance, repayment, recovery, etc., for businesses and financial service companies. *The Committee recommends review by Department of Legal Affairs of all such legal processes that have a bearing on financial services and consider amendments permitting digital alternatives in cases such as power-of-attorney, trust deeds, wills, negotiable instrument, other than a cheque, any other testamentary disposition, any contract for the sale or conveyance of immovable property or any interest in such property, etc., (where IT Act is not applicable), compatible with electronic service delivery by financial service providers.*

2.4.7 Open APIs: The Committee believes that APIs of relevant datasets be created such that fintech solutions can be built using them. These APIs must be open, to ensure equal access to all those wishing to build on this data, and anonymised, or, where identifiable, shared with the person's consent, to ensure the privacy of the people and built on the lines of IndiaStack. An *India AgriStack* can be built, such that lenders can evaluate the creditworthiness of agricultural borrowers. This stack can include a farmer's borrowing history, land ownership data, cropping pattern, and income data, among other information. An *India MSME Stack* can also be built, where data on MSMEs can be pulled through APIs to facilitate trade financing, flow-based lending, insurance and bill factoring. *The Committee recommends that MEITY coordinate the process of identification of the datasets that can be shared through open APIs, setting targets for the creation of such APIs by the relevant Ministries while enabling and supporting Central, State and Local governments to create relevant open APIs.*

2.4.8 Expanding Open Government Data: The Ministry of Science and Technology has formulated the National Data Sharing and Accessibility Policy (NDSAP), while MEITY is the nodal Ministry to implement the policy. The Committee notes the power of open Government data in spawning new businesses and improving business models, subject to privacy laws. *The Committee recommends that NDSAP needs wider acceptance and implementation, making way for sharing of data generated by Government agencies (including Ministries of Union Government, Autonomous bodies, State Government and Local Governments) in real-time through Open APIs.*

2.4.9 Support for new business models: There are quite a few restrictions presently which may require reconsideration in the New Economy being built on digital infrastructure. For example, remuneration from advertisements on platforms pertaining to web aggregators and online platforms offering services in the insurance sector are barred. Similarly, financial services companies are restricted from outsourcing activities to Fin-tech companies in the insurance sector, as well as restrictions on offering any other services apart from insurance. *The Committee recommends that Regulators should consider permitting new or innovative business models that can reduce costs, enable choices for consumers, subject addressing to non-conflicts.*

2.4.10 Competitive ‘neutrality’ in regulation: *Regulators should take a functional approach to regulation, which means that they should be neutral to the institutional forms and activities that are performing the functions of the financial system.* Regulations must promote competition and a fair, and open, level playing field for digital financial inclusion by ensuring that providers of similar digital financial services have similar rights and responsibilities regardless of their institutional type and the technology used. This framework also should ensure that similar risks are regulated in a similar manner and that an appropriate risk-based approach to supervision is developed. Regulators may approach fintech keeping ‘competitive neutrality’ with a view to enhancing competition while making regulations.

2.4.11 Regulatory Sandboxes: The Committee notes that many economies across the world (UK, Singapore, Canada, Thailand etc.) have set up regulatory sandboxes as early as 2015 enabling financial sector innovations. A detailed blueprint of RBI’s regulatory sandbox in India is provided in the Report of the Household Finance Committee, while other regulators have carried out similar studies. *The Committee recommends that regulators should without further delay introduce mechanisms, such as regulatory sandboxes and laboratories, that enable learning and adaptation of regulatory responses can play an important role.*

2.4.12 Planning for high impact fintech scenario: Fintech could have low, moderate, or high impact. Regulators should establish prudential regulations for fintech to enable the moderate and high impact scenarios of fintech development to emerge. At present, India can be said to be in the low impact scenario, and the regulators should focus on investing in research and enhancements to

the regulatory regime to enable adoption of fintech and related risk management systems. *In due course, the moderate impact or high impact scenarios could evolve leading to creative destruction of incumbent firms, and regulators need to anticipate and prepare for bankruptcies and resolution regimes for existing financial service companies that fail to gear up.*

2.4.13 Open Data for enhancing competition: All financial sector regulators may study the potential of open data access among their respective regulated entities, for enabling competition in the provision of financial services. To start with, the Committee recommends that RBI may consider making it mandatory for financial service companies to encourage banks to make available databases of rejected credit applications (referral pools) available on a consent-basis to a neutral marketplace of alternate lenders. For increasing access to credit in rural areas, access to PSU bank rejection data would be especially helpful to alternate lenders. As seen from the example of Open Data Regulations in the UK banking sector, opening up customer data with consent safeguards can help promote competition in financial services and unlock greater efficiency. *Taking note of this, the Committee recommends that RBI may consider making available bank data (such as transaction and account history data) to fintech firms (based on consumer consent and with other appropriate safeguards) through APIs. It also recommends that all financial sector regulators study the potential of open data access among their respective regulated entities, for enhancing competition in the provision of financial services.*

2.4.14 Eliminating costs of on-boarding KYC data on eKYC Depository: There is an urgent need to reduce the costs of KYC to promote financial inclusion among the weaker sections. The Central KYC (CKYC) Registry has commenced work and the legacy KYC data are being uploaded by service providers. While large financial institutions can afford to pay for uploads, this may not be affordable for small players. The cost of onboarding a customer is an expensive proposition and, in this way, the new banks are at a serious disadvantage. *The Committee recommends that there should be no charge for uploading KYC data, while every download can be priced up based on the user pays principle. This will enable CKYC to take off early.*

2.4.15 Mandatory use of C-KYC Registry: In light of representations made by multiple stakeholders, the Committee is of the opinion that e-KYC has the potential to reduce customer on-

boarding and servicing costs significantly. *It therefore recommends that all financial sector regulators fix deadlines for on boarding existing KYC data to the Central KYC registry and make CKYC fully operational and make KYC a digital and paperless process. At least the KYC data from the time the concept of Officially Valid Documents was introduced vide PML rules should be uploaded. In respect of legacy accounts, data may be uploaded by banks during the process of Re-KYC.*

2.4.16 Consumer Protection framework: Fintech while offering myriad opportunities, also poses threats – arising out of illiteracy, ignorance of risks, etc. The PM Gramin Digital Saksharata Abhiyaan (PMDISHA) has been launched to enhance digital and financial literacy of 6 crores rural persons on characteristics, advantages, and risks of digital financial services and channels. Nevertheless, there is need for legal framework to redress grievances of consumers in the financial sector, especially digital services. The legal framework needs to address risks specific to the digital environment, ensure consumers of digital financial services have meaningful choice and control over their personal data—including through informed consent, require that data not be used in an unfair discriminatory manner in relation to digital financial services, confusing user interfaces that raise the risk of mistaken transactions; inadequate security of systems; irresponsible lending through digital channels; online frauds, system downtime that prevents access to funds; unclear or limited recourse systems; potential misuse of AI/ML, etc. *The Committee recommends that a legal framework for consumer protection be put in place keeping mind the rise of fintech and digital services. It further recommends enacting such a law early keeping the rise of financial technologies in view.*

2.4.17 Tech-enabled calibration of regulatory burden: Fintech may reduce the need for regulations by enabling better third-party monitoring and by enabling better risk management by the financial firms. Firms that adopt RegTech and sectors with SupTech implementation can be subject to lesser compliance burden. The Committee notes that the RBI Working Group on Fintech and Digital Banking (Nov 2017) has recommended that regulatory actions may vary from “Disclosure” to “Light-Touch Regulation & Supervision” to a “Tight Regulation and Full-Fledged Supervision”, depending on the risk implications. *Hence, the Committee recommends that all*

financial sector regulators must consider regulations proportionate to risks and factoring in use of tech-enabled systems by regulated entities.

2.4.18 Regulation Technology (RegTech): The Committee notes that RegTech is still evolving and innovations may lie ahead. Much of the effort in development thus far has focused on digitization of manual processes, but the larger objective is to meet increasingly strict know-your-customer (KYC), anti-money laundering (AML) and counter-terrorist financing (CTF) requirements. AI applications, especially, have the potential to help firms detect compliance risks and make better-informed decisions about how to mitigate them. RegTech can reduce firm-level compliance risks and also reduce supervisory risks. *The Committee recommends that the financial sector regulators (RBI, SEBI, IRDAI, and PFRDA) must develop standards and use-cases for RegTech by financial sector service providers to make compliance with regulations easier, quicker and more automated for regulated entities.*

2.4.19 Supervisory Technology (SupTech) for Regulators: SupTech applications can be found in data collection, data reporting, data management and virtual assistance. Within data analytics, SupTech could work in four key areas: market surveillance, misconduct analysis, micro-prudential and macro-prudential supervision. SupTech can reduce costs of both compliance and supervision. *The Committee recommends that each financial sector regulator must study the applications of SupTech, or supervisory technology efforts and evolve an institutional framework for developing use-cases, testing, deployment, monitoring and evaluation of SupTech.*

Chapter 3

Fintech for Financial Inclusion

Among the main potential advantages of fintech is the promise of financial inclusion. Many individuals and firms are outside the financial system and cannot access formal financing. Some of the key obstacles in financial inclusion can be partially or fully overcome by using fintech innovations. For instance, one of the key obstacles in accessing formal finance is often the lack of credit scores of the individual. In the absence of credit scores, financial institutions are wary of lending. In the agriculture sector, lack of credit scores or ratings forces the farmer to access funding through informal channels at high rates of interest. Fintech applications could potentially resolve some of the aforementioned issues and spur greater inclusion.

3.1 Fintech for lending by cooperatives and other financial institutions

Lending to those who presently rely on information sources of credit remains a major challenge. For instance, a significant proportion of agricultural households and MSMEs significantly rely on non-institutional sources of funding. There is an opportunity for fintech to improve the funding landscape for such segments in India. Fintech firms and technology led Non-Banking Financial Companies (NBFCs) are starting to play a crucial role in providing access to finance for small and marginal farmers. Fintech/ NBF credit to agriculture stands at Rs. 346 billion for the financial year 2016-17. The following are the key areas where fintech firms are innovating or bringing efficiencies in the system:

- (i) Customer discovery and onboarding: Fintech firms have pioneered partnership models to discover customers. Fintech firms work with organisations with rural presence such as Farmer Producer Organizations, Cooperatives, Microfinance Institutions and other aggregators. Similarly, fintech firms are leveraging India stack component for customer on-boarding, example eKYC.
- (ii) Credit underwriting models: Fintech firms are moving away from the collateralised lending model to extending credit based on flow data such as sale of produce, cash flows and history of business dealings. This enables extension of credit to tenant farmers. Fintech firms are also

using innovative collection mechanisms such as deduction at source and escrow accounts and leveraging the India stack (eNach).

- (iii) Monitoring: Post sanction monitoring by lenders is further improved by the use of weather data, crop specific advisories and digital imaging of sown crops.

It has been often noted that information pertaining to individuals is scattered across different databases. This makes it difficult to ascertain the risk factor behind lending to an individual as the said individual could have borrowed money from multiple sources. Creation of credit bureaus has been advanced as a solution to the above issue.¹⁰⁵ Innovations in the fintech sphere could drive the creation of such credit bureaus where the risk profiles of individuals can be better documented. For instance, it has been noted that mobile phone call data records were useful in determining default behaviour in Rwanda.¹⁰⁶

Similarly, fintech companies are increasingly relying on alternative data sources to assign credit scores or ratings to individuals with little or no formal credit history. Transaction records, satellite imagery of the farms, weather forecasts and records, agronomic surveys and demographic features are among some of the alternative data sources that could be used by fintech companies.¹⁰⁷ For instance, Farm Drive which is a Kenyan fintech start-up uses satellite, local economic and agronomic data alongside revenue and expense information furnished by farmers to generate credit scores.¹⁰⁸ Similarly, Chinese agricultural fintech company Nongfenqi generates credit scores through interactions with customers' business partners, fellow customers and villagers.¹⁰⁹ The results of such a model of credit score generation are impressive as the default rate witnessed was just 0.1 percent.

105 Craig McIntosh, Caio Scuarcialupi Mansini, 'The use of financial technology in agriculture sector', Asian Development Bank Institute Working Paper Series No. 872 (September 2018) available at <https://www.adb.org/sites/default/files/publication/455116/adbi-wp872.pdf> (accessed on 3rd January 2019).

106 Ibid.

107 'Digital Credit Scoring in Agriculture: Best practices of assessing credit risks in value chains', SAFIRA, available at http://exchange.growasia.org/system/files/GA_Digital%20Scoring%20Guide_Double.pdf

108 <https://agfundernews.com/agtech-startups-fintech.html>

109 'Innovation in Financial inclusion', Ernst and Young (2017) available at <https://www.ey.com/Publication/vwLUAssets/EY-innovation-in-financial-inclusion/%24FILE/EY-innovation-in-financial-inclusion.pdf> accessed 3 January 2019

In India, fintech firms such as RML Agtech and Stellapps to name a few are active in providing technology solutions to farmers.¹¹⁰ The solutions offered range from, among others, providing information on commodity prices, weather and crop data. However, it has been noted that fintech firms in the agricultural sector have focused on reducing farmers' cost of operations. Activities pertaining to financial inclusion are limited and part of the reason for the same is speculated to be the lack of adequate customer data.¹¹¹ Most of the data pertaining to the farming sector is scattered across banks, cooperatives and other small lending institutions. Collation of this data into a centralized database would enable fintech firms assist financial institutions, including cooperatives, in better disbursement of credit.

Box 3.1: Samunnati – fintech at the bottom of the pyramid

Samunnati is a fintech platform that aims to fill the gap between the demand and supply of rural credit by providing credit to small farmers at the right time and at low rates. Banks and NBFCs lend to Samunnati, which lends to its customers. Samunnati issues a Pay card, which allows a customer to place a disbursement request through a QR code. The card works only with select merchants, allowing for limitations in use purpose. These merchants are farmer producer organizations, cooperative societies and input suppliers, who are paid directly from the loan account through the use of the card. Samunnati is regulated as an NBFC and uses the eKYC and e-Sign infrastructure to onboard customers.

Source: Samunnati (<http://samfin.in/>)

The Committee noted that currently, the credit bureau records for farmer loans or Kisan Credit Card Schemes, largely given by the Cooperative Sector although commercial banks share is also significant in terms of total exposure, are not collected in any central registry. This leads to a situation of non-availability for credit history for small and marginal farmers leading to denial of credit to them and possible over-leveraging. The Committee notes that some fintech companies, Credit Mantri, CreditVidya, Samunnati, to name a few, are using Artificial Intelligence (AI) and Machine Learning (ML) to create alternate lending data score, a vital requirement for fulfilling the financial inclusion agenda. Government of India in 2017-18 Budget provided an allocation of Rs. 1,900 crore over three years support to NABARD for computerisation and integration of all 63,000

110 'Digital Credit Scoring in Agriculture' (n 12)

111 Agamoni Ghosh, 'Have Fintech companies failed India's farming community', Entrepreneur India (1 December 2017) available at <https://www.entrepreneur.com/article/305564> accessed 3 January 2019

functional PACS with the Core Banking System of District Central Cooperative Banks. This presents a great opportunity to infuse fintech.

The Committee recommends that NABARD should take immediate steps to create a credit registry for farmers with special thrust for use of fintech along with core banking solutions (CBS) by agri-financial institutions, especially cooperative financial institutions, for credit scoring, default analytics, predictive crop analytics, repayment monitoring fraud control and improving efficiency in credit services.

3.2 Leveraging fintech in agricultural insurance or PMFBY

As discussed in Chapter 1, fintech solutions can potentially play a crucial role in increasing the penetration of crop insurance and other forms of rural insurance. They help in customer discovery and enrolment; crop monitoring, insurance claim monitoring and settlement; collection of premium; product design; and claim settlement.

Box 3.2: Pradhan Mantri Fasal Bima Yojana

Launched in 2016, PMFBY aims at supporting agricultural production by providing financial support to farmers suffering crop loss or damage arising out of unforeseen circumstances. The scheme provides comprehensive risk coverage from pre-sowing to post-harvest losses. All farmers including sharecroppers and tenant farmers growing the notified crops are eligible for coverage. However, farmers should have insurable interest for the notified or insured crops. PMFBY charges a low and uniform premium of 2% for all Kharif crops, 1.5% for all Rabi crops and 5 percent for commercial or horticulture crops. The difference between the premium paid by the farmer and the actuarially fair premium (APR) is subsidised by the government (shared by central and state governments on 50:50 basis). All farmers availing seasonal agricultural operations loans from financial institutions (loanee farmers) for the notified crops are covered compulsorily. The insurance incept the moment crop credit is approved. Banks also finance the premium component. The non-loanee farmers are required to submit necessary documentary evidence of land records. While the loanee farmers are covered under the scheme through their banks, the challenge is to improve the coverage of this scheme for non-loanee farmers.

Despite a potentially significant role for fintech companies in improving the state of the agriculture finance in India, they face several challenges that could inhibit their role. Based on consultations with the fintech companies working in the field, some of the issues are highlighted below.

- (i) Fintech companies are not part of the government schemes. For example, as per the current PMFBY guidelines, insurance premium collection has been allowed for commercial banks, regional rural banks, and nodal banks. Consequently, fintech firms that have lent Seasonal Agricultural Operations loans are forced to cover their farmers as non-loanee farmers. There is an urgent need to extend the concept of loanee farmers to include credit advanced by fintech firms/ NBFC lenders.
- (ii) Fintech firms are excluded from availing the Credit Guarantee Funds Scheme provided by the Small Farmers Agri-Business Consortium (SFAC). SFAC is pioneering the growth of Farmer Producer Organisations/ Farmer Producer Companies to make them viable in the long run. SFAC offers credit guarantee fund scheme to Farmer Producer Companies to improve the availability of credit. Under this scheme eligible lending institutions that have provided loans to Farmers Producer Companies are provided a guarantee cover. While scheduled commercial banks, RRBs, National Bank for Agriculture and Rural Development (NABARD) are eligible lending institutions under this scheme, fintech firms do not qualify as eligible lending institutions.
- (iii) Credit bureau records for farmer loans/Kisan Credit Card schemes are not uploaded in a timely manner, especially for small and marginal farmers. This leads to the lack of generation of a credit history for such persons, and possible over-leveraging in some cases.
- (iv) Digitisation of land records, timely updation and providing access to the information through open APIs will enable fintech firms to enrol and deliver insurance products to the farmers in a seamless manner. It would also enable fintech firms to supplement their credit underwriting models and extend higher credits to firms.

The Government is also encouraging geotagging technologies. The assets created under Rashtriya Krishi Vikas Yojana (RKVY) can be monitored by geo tagging them using BHUVAN, a geo-platform of the National Remote Sensing Centre (NRSC) of ISRO. This would allow monitoring

of creation of infrastructure as well as execution of projects under various schemes of the Government and will enable additional developmental works on existing assets.

The Committee recommends that fintech firms may be provided with a supportive regulatory climate to participate in agri-credit & insurance markets effectively, given that the demand for agri-credit and insurance far outstrips the existing supply. Insurance premium payments (for national as well as private insurers) should be accepted through mobile and other digital modes to enable speedy and hassle-free coverage especially during short cultivation seasons.

3.3 Fintech in micro-insurance and micro-pension

The context within which the emerging markets work is often characterised by limited availability of data, mostly lower income consumers, large unbanked/underbanked populations, and challenges with respect to reach in rural areas. This requires new methods of distribution and more cost-effective ways of doing business. Mobile micro-insurance is a good example of InsurTech. Mobile micro-insurance addresses existing challenges by leveraging mobile channels for communication, registration, payment of premiums via airtime deduction or mobile money, claims submission, and claims payouts.

The current trend in long-term finance is that most fintech firms aim to take the place of brokers and advisors. Also, many of the new age fintech firms work on creating a marketplace for financial products, while the actual products are still provided by the incumbent players.

There are three prominent government schemes pertaining to micro-insurance and micro-pension. These are the following:

- (i) Pradhan Mantri Jeevan Jyoti Bima Yojana (PMJJBY): Under this scheme, any person with a savings bank account can avail a one-year life insurance scheme of Rs. 2 lakh covering death for any reason, renewable every year, at a premium of Rs. 330 per annum.

- (ii) Pradhan Mantri Suraksha Bima Yojana (PMSBY): Under this scheme, any person with a savings bank account can avail risk coverage for accidental death and permanent disability of up to Rs. 2 lakh at a premium of Rs. 12 per annum.
- (iii) Atal Pension Yojana (APY): Under this scheme, any person with a savings bank account can avail fixed minimum pension depending on their contributions and the age of joining the scheme. The minimum pension is guaranteed by the Government. This scheme is aimed at workers in the informal and unorganized sectors.

Further, EPFO is the Statutory workers' pension fund in India which manages employees provident fund of about 4.66 crore contributing members out of a valid 5.24 crores subscribers.

Currently, more than 5 crore people have enrolled in PMJJBY, 13.5 crore in PMSBY, 1.1 crore people have subscribed to APY and 5.24 crores in EPF. Compared to the potential coverage of at least 50 crore individuals, this is just a tip of the iceberg. Fintech solutions can be leveraged to vastly expand the reach of these social security schemes. Huge opportunities lie in auto enrolment, subscriber option management, subscriber information services, fund management, fund administration cost management, claims management, etc.

Given that overall insurance coverage itself remains quite low in India and that between 2001 and 2017, it rose by just one percentage point, from 2.7% to 3.7% (Assocham-APAS), a transformatory approach is required in altering the cost structure of insurance companies, effective marketing and enhancing consumer confidence in deepening the insurance sector, especially the micro-insurance sector. Bundling of the coverage under PMJDY has enabled significant increase in micro-insurance coverage to nearly 32 crore individuals. Even after this effort, there would a substantial percentage of non-poor still to be reached.

The Committee recommends that deployment of fintech in micro-insurance enrolment, claims management, subscriber information etc. will enable cost reduction and exponential growth in coverage. The Committee recommends that ESIC, EPFO and PSE Insurance Companies must deploy fintech in the front-end and back-end processes to reduce risks, widen coverage, enhance subscriber confidence and support seamless claims management.

Box 3.3: Smart Pension in UK

Smart Pension is a fintech firm that has taken advantage of UK law on pensions. The law requires that workplace pension schemes should be opt-out rather than opt-in, making employers responsible for automatic enrolment of their employees into pension schemes. Smart Pension is a platform that provides this automatic enrolment service. Employers can use Smart Pension for free, and in 2017 it was named Fintech Innovation of the Year.

Source: For more details about this, please see <https://www.autoenrolment.co.uk/>

The Committee notes that only 7.4 percent of the working age population in India is covered under a pension program. That compares with 65 percent for Germany and 31 percent for Brazil, another major emerging market economy. The Committee recommends that use of fintech in micro-pension schemes such as the Atal Pension Yojana, EPF and other retail schemes can enable reduction of administrative costs, create greater customer traction and make way for significantly higher enrolment levels and competition. Harnessing fintech would enable monthly contributions to be paid in several instalments over each month, making it possible for daily wage earners. Even for non-micro-pension subscribers, fintech can help in personalisation through a dashboard, investment options, integration with other rewards platforms and advanced analytics.

The Committee recommends creating a common digital platform for all micro-pension schemes and EPF schemes through which pension subscribers can subscribe to specific schemes seamlessly and the platform should allow payments through various modes such as Jan Dhan Yojana accounts, debit card, credit card, internet banking, mobile wallets etc.

3.4 Fintech adoption in MUDRA

Micro Units Development and Refinance Agency Limited (MUDRA) scheme provides loans up to Rs. 10 lakhs to the non-corporate, non-farm small and micro enterprises. These loans are classified

as MUDRA loans under the PMMY. These loans are provided by the following eligible lending institutions¹¹²:

- (i) Commercial banks,
- (ii) Regional rural banks,
- (iii) Small finance banks,
- (iv) Cooperative banks,
- (v) Micro-finance institutions, and
- (vi) NBFCs.

MUDRA has adopted detailed eligibility norms with respect to various categories of banks for the partner lending institutions. For digital lenders, which are primarily categorized as NBFCs, the set of criteria for availing the MUDRA scheme differ based on the size of the NBFC. For smaller NBFCs, which have an asset size less than Rs. 500 Crore, the criteria are the following:

- (a) The NBFC should be registered with the RBI as Asset Finance Company (AFC) or loan company. For these companies, a CA certificate is required highlighting that loans are given for income generating activities and 60% of the income comes from productive assets.
- (b) The NBFC must be in business for 5 years (relaxable up to 3 years) and earned net profits for last 3 years. Preferences are given to NBFCs which have well conducted credit facilities from scheduled commercial banks.
- (c) Minimum net owned fund is Rs. 15 crore and minimum asset size is 25 crore.
- (d) The NBFC has done business of at least 20 crore during the immediate preceding financial year.
- (e) Capital adequacy ratio must be at least 15%.
- (f) Recovery rate must not be less than 90% and Gross NPA not exceeding 7% for NBFCs rated A and above and recovery not less than 95% and Gross NPA not exceeding 5% for NBFCs rated below A.
- (g) External rating range of BB- and above. The external rating should not be more than 6 months old.

112 For more details about the MUDRA scheme, please visit <https://www.mudra.org.in/offerings>.

For many new-age start-up fintech companies (who are registered with RBI as an NBFC) the above conditions are too stringent. During the various stakeholders' consultations of the Committee, the digital lenders highlighted that such conditions (mentioned above) are too cumbersome and require a re-examination from the sectoral regulator.

Revising the refinancing criteria for digital lenders at competitive rates through MUDRA (revising margin caps for small ticket MSME loans) and SIDBI (relaxation of profitability requirements) needs to be considered. The Committee recommends that the MUDRA program needs to open credit supply channels through non-banking fintech credit companies, besides mandating use of fintech by all players to enable ease of delivery of services such as AI/ML based credit scoring system for applicants leading to reduced risks and costs of lending.

3.5 Common fintech platform for small savings schemes

Small saving instruments serve the dual purpose of resource mobilisation and provision of social security. Multiple small saving instruments have been created with the objective of meeting the varied needs of investors. Small savings instruments are typically categorized into postal deposits, savings certificates and social security schemes.¹¹³ Instruments under the postal deposit category consist of savings account, recurring deposit, time deposits with different dates for maturity and monthly income scheme.¹¹⁴ Savings certificate instruments include the National Small Savings Certificate (NSC) and the Kisan Vikas Patra (KVP).¹¹⁵ Social Security schemes cover the Public Provident Fund (PPF) and the Senior Citizens Savings Schemes.¹¹⁶

Small Savings schemes, as 8 products, are being distributed through a large network of distribution agencies, i.e. 1,54,000 Post Office spread all over the country, nearly 8,000 branches of the Nationalised Banks. Among the small saving certificates, NSC and KVP certificates are not

113 'Report of the Committee on Comprehensive Review of National Small Savings Fund', Ministry of Finance, Government of India (June 2011) available at https://www.finmin.nic.in/sites/default/files/Report_Committee_Comprehensive_Review_NSSF.pdf (accessed on 3rd January 2019).

114 Ibid.

115 Ibid.

116 Ibid.

available in the pre-printed form. Rather, two alternative models have been prescribed for issuing NSC and KVP certificates.¹¹⁷ These models are exclusive e-mode and passbook mode where the e-mode format is printed or recorded in a passbook. Similarly, the PPF facility is also available through the online mode but limited to select branches or outlets.¹¹⁸

It may be noted that small saving certificates are available in an electronic form but not universally so. In the absence of the same, customers bear the risk of keeping the certificates safe till the date of maturity. Certificates in physical form also give rise to other risks such as forgery while increasing transaction costs. Dematerialisation is a potentially useful solution to address the above risks and concerns. The small saving certificates can be held in electronic form which mitigates the risks of safekeeping, fraud while reducing transaction costs. Fintech firms could leverage their expertise in creating a common platform for maintaining these records. This would stimulate demand for small saving certificates while also facilitating ease in conducting transactions. For vulnerable groups and weaker sections who are neither digitally and financially literate, a combination of both human interface and technological application may be effective. For example, a competent Banking Correspondent can enrol the customer digitally based on her/his consent, to avail a Small Saving Product.

In order to expand the reach of small savings schemes, provide ease of access and transactions to consumers, reduce risk of frauds, enable trading in secondary markets, etc., the Committee also recommends that all Small Savings Products, which are neither accessible online and available in demat form, should be brought on a common online platform in demat form.

117 'Office Memorandum - Revision of interest rates for Small Savings Schemes - discontinuation of physical pre-printed NSC and KVP certificates - regarding', Ministry of Finance, Government of India (13 May 2016) available at https://dea.gov.in/sites/default/files/Discontinue_Phy_preprint_NSC_KVP_Cert13052016_1.pdf (accessed on 3rd January 2019).

118 'How to open PPF account online', Economic Times (23 April 2018) available at <https://economictimes.indiatimes.com/wealth/invest/how-to-open-ppf-account-online/articleshow/63854944.cms> (accessed on 3rd January 2019).

3.6 Fintech in PSB education loans

Education Loan disbursements climbed 9.25% in FY18 to touch a portfolio size of Rs 82,600 crore as of March 2018, with share of commercial banks declining from 90% to 83% and NPAs rising to 8.15%. NBFCs aided by fintech have begun to play a small but increasing role. The Vidyalakshmi portal has enabled a single window electronic platform for students to access information and make application for educational loans provided by banks and government scholarship. Firstly, the applicant needs to register and login to his/her vidya lakshmi account. Secondly, the applicant needs to fill up the Common education loan application form (CELAF) by providing certain details and uploading certain documents. After filling the application form, the applicant can choose from a list of education loans and apply as per his/her needs, eligibility and convenience. From one account an applicant can register to a maximum of 3 banks. The portal also provides linkages to National Scholarship Portal.

There are various advantages of the portal as it is a unique platform to have streamlined the process of application from a single point to multiple banks. It has reduced the process flow for the student and given a chance to choose and apply to multiple banks (3 banks) from a single portal without the hassle of paperwork. Further, the application results from these selected banks can directly be uploaded by the banks on the vidya lakshmi portal. However, loan disbursement happened through bank only, outside the portal.¹¹⁹

According to a report by PIB, banks follow Indian Banks' Association (IBA) guidelines in this regard which stipulates that the loan should be processed within 15 days of receipt of duly completed application form with supporting documents and sanction/rejection should be communicated to the applicant.¹²⁰

While Vidya lakshmi portal has been instrumental in streamlining the process of education loan application, it has been also been observed that the process at the bank's end are prone to delays

119 <https://timesofindia.indiatimes.com/home/education/news/education-loan-apply-to-multiple-banks-with-just-one-vidya-lakshmi-form/articleshow/64577421.cms>

120 http://www.iba.org.in/pdf/education/Model_Edu_loan.pdf

and inefficiencies. This bottleneck can be reduced with the with the use of fintech by public sector commercial banks to enhance their credit scoring, follow up repayments, predictive analysis etc.

The Committee recommends use of fintech by Public sector commercial banks to enhance credit scoring, follow up of repayments, predictive analytics, etc., reduce NPAs in this space.

3.7 Recommendations

3.7.1 Fintech for lending by Cooperatives and other financial institutions: The Committee noted that currently, the credit bureau records for farmer loans or Kisan Credit Card Schemes, largely given by the Cooperative Sector although commercial banks share is also significant in terms of total exposure, are not collected in any central registry. This leads to a situation of non-availability for credit history for small and marginal farmers leading to denial of credit to them and possible over-leveraging. The Committee notes that some fintech companies, Credit Mantri, CreditVidya, Samunnati, to name a few, are using Artificial Intelligence (AI) and Machine Learning (ML) to create alternate lending data score, a vital requirement for fulfilling the financial inclusion agenda. Government of India in 2017-18 Budget provided an allocation of Rs. 1,900 crore over three years support NABARD for computerisation and integration of all 63,000 functional PACS with the Core Banking System of District Central Cooperative Banks. This presents a great opportunity to infuse fintech. *The Committee recommends that NABARD should take immediate steps to create a credit registry for farmers with special thrust for use of fintech along with core banking solutions (CBS) by agri-financial institutions, especially cooperative financial institutions, for credit scoring, default analytics, predictive crop analytics, repayment monitoring fraud control and improving efficiency in credit services.*

3.7.2 Leveraging Fintech in Agri-insurance/PMFBY: As per the current PMFBY guidelines, only Financial Institutions like Commercial Banks, Co-operative Banks, and Regional Rural Banks are eligible as Implementing Agencies to cover borrowers under PMFBY. The guidelines also state that for the loanee farmers will be covered only through Banks/Financial Institutions whereas non-loanee farmers shall be covered through banks and/or insurance intermediaries. This keeps NBFC lenders, most of which leverage on fintech, outside the claim settlement process, enhancing risk of default by borrowers. Consequently, NBFC firms that have lent seasonal

Agricultural Operations loans are forced to cover their farmers as non-loanee farmers and need an IRDAI license to become an insurance intermediary. There is need to extend the concept of loanee farmers to include credit advanced by fintech-based NBFC lenders. *The Committee recommends that fintech firms may be provided with a supportive regulatory climate to participate in agri-credit & insurance markets effectively, given that the demand for agri-credit and insurance far outstrips the existing supply. Insurance premium payments (for national as well as private insurers) should be accepted through mobile and other digital modes to enable speedy and hassle-free coverage especially during short cultivation seasons.*

3.7.3 Fintech in micro-Insurance and Employees Insurance: *The Committee recommends that deployment of fintech in micro-insurance enrolment, claims management, subscriber information etc. will enable cost reduction and exponential growth in coverage. The Committee recommends that ESIC, EPFO and PSE Insurance Companies must deploy fintech in the front-end and back-end processes to reduce risks, widen coverage, enhance subscriber confidence and support seamless claims management.*

3.7.4 Fintech in micro-Pension & EPFO: The Committee notes that only 7.4 percent of the working age population in India is covered under a pension program. That compares with 65 percent for Germany and 31 percent for Brazil, another major emerging market economy. The Committee recommends that use of fintech in micro-pension schemes such as the Atal Pension Yojana, EPF and other retail schemes can enable reduction of administrative costs, create greater customer traction and make way for significantly higher enrolment levels and competition. Harnessing fintech would enable monthly contributions to be paid in several instalments over each month, making it possible for daily wage earners. Even for non-micro-pension subscribers, fintech can help in personalisation through a dashboard, investment options, integration with other rewards platforms and advanced analytics. *The Committee recommends creating a common digital platform for all micro-pension schemes and EPF schemes through which pension subscribers can subscribe to specific schemes seamlessly and the platform should allow payments through various modes such as Jan Dhan Yojana accounts, debit card, credit card, internet banking, mobile wallets etc.*

3.7.5 Fintech adoption in MUDRA: Revising the refinancing criteria for digital lenders at competitive rates through MUDRA (revising margin caps for small ticket MSME loans) and SIDBI (relaxation of profitability requirements) are required to be considered. Currently, Commercial Banks, Regional Rural Banks and Scheduled Cooperative Banks are eligible to avail of refinance support from MUDRA for financing micro enterprise activities. *The Committee recommends that the MUDRA program needs to open up credit supply channels through non-banking fintech credit companies, besides mandating use of fintech by all players to enable ease of delivery of services such as AI/ML based credit scoring system for applicants leading to reduced risks and costs of lending.*

3.7.6 Common fintech platform for small saving schemes: Small Savings schemes, as 8 products, are being distributed through a large network of distribution agencies, i.e. 1,54,000 Post Office spread all over the country, nearly 8,000 branches of the Nationalised Banks. *In order to expand the reach of small savings schemes, provide ease of access and transactions to consumers, reduce risk of frauds, enable trading in secondary markets, etc., the Committee also recommends that all Small Savings Products, which are neither accessible online nor available in demat form, should be brought on a common online platform in demat form. For vulnerable groups and weaker sections who are neither digitally and financially literate, a combination of both human interface and technological application may be effective.*

3.7.7 Fintech in PS Bank Education Loans: Education Loan disbursements climbed 9.25% in FY18 to touch a portfolio size of Rs 82,600 crore as of March 2018, with share of commercial banks declining from 90% to 83% and NPAs rising to 8.15%. NBFCs aided by fintech have begun to play a small but increasing role. The Vidyalakshmi portal has enabled a single window electronic platform integrating access to Educational Loans from all commercial banks. *The Committee recommends use of fintech by Public sector commercial banks to enhance credit scoring, follow up of repayments, predictive analytics, etc., and reduce NPAs in this space.*

Chapter 4

Organizational and Administrative Measures in Government of India for Promoting and Monitoring Expansion of Fintech and GovTech

Fintech can potentially have a transformative impact on the conduct and supervision of activities in the financial sector. The Government of India and the various sectoral regulators have an important role to play in harnessing this transformative potential of fintech. This chapter details some of the organizational and administrative measures that the Government and concerned regulators could adopt to facilitate activities in the fintech sphere.

Fintech is a relatively nascent sphere characterized by rapid innovations in products and service models. For the Government and regulators to keep abreast of these developments, it is essential that they interact regularly with stakeholders from industry, academics and consumers. This would enable a dynamic regulatory architecture responsive to the latest developments thus facilitating innovation and ease in conducting business. Institutional arrangements established at the concerned regulator and Ministry levels can drive this engagement process. Similar institutional arrangements can aid inter-Ministerial coordination on issues concerning fintech. This would reduce the scope for ambiguities in policy making and legal frameworks. Furthermore, international best practices can be adopted through greater bilateral and multilateral cooperation.

4.1 Advisory council for regulators

As fintech is a dynamic and evolving field, regulations need to be constantly updated in light of technological developments. This requires constant interaction between the regulators and industry stakeholders. In this regard, regulators around the world are increasingly turning to the idea of setting up a fintech advisory committee or group.

These fintech advisory committees or groups typically consist of representatives from industry, consumers and academic experts. For instance, the Securities and Futures Commission in Hong

Kong has established a fintech advisory group.¹²¹ This group's remit consists of, among others, tracking the latest trends in the fintech space, collecting stakeholder inputs on specific issues and identifying potential risks and opportunities.

Similarly, the ASIC has established a Digital Finance Advisory Committee.¹²² This committee examines mechanisms to simplify the regulatory processes in order to facilitate innovative business models in the fintech sphere. Common application processes, varying license terms and waivers from law are some of the mechanisms that the committee explores with a view to stimulating activity in fintech. United Kingdom, Singapore and Canada are some of the other developed economies which have established mechanisms to tap industry and academic expertise to guide regulation making.¹²³

In India, financial sector regulators could explore options for setting up fintech advisory groups or councils. Participation from industry and academic experts should be welcomed in identifying ways to modernize the regulatory architecture. Regulators could also benefit from industry and academia inputs in designing risk management systems, sharing innovation and consumer protection standards. In this regard it may be worth noting that the BoE in United Kingdom has established a Fintech Accelerator.¹²⁴ This accelerator provides a medium for Proof of Concepts (PoC) in respect of use cases relevant to the efficient and effective functioning of the BoE. Similarly, a fintech and Innovation Group has been set up by the Monetary Authority of Singapore (MAS) which collaborates with industry in testing infrastructure solutions.¹²⁵ Establishing fintech advisory councils would therefore assist financial sector regulators in tapping industry expertise in developing use-cases for RegTech and SupTech. It would also aid in responsiveness of regulations to emerging industry concerns.

121 'Fintech Advisory Group', Securities and Futures Commission (26 October 2018) available at <https://www.sfc.hk/web/EN/sfc-fintech-contact-point/fintech-advisory-committee/> accessed 24 December 2018.

122 Deborah Ralston, 'How should we regulate Fintech?', World Economic Forum (7 August 2015) available at <https://www.weforum.org/agenda/2015/08/how-should-we-regulate-fintech/> accessed 24 December 2018.

123 Ana Badour, Arie van Wijngaarden, 'Transatlantic Policy Working Group releases future of RegTech Report', McCarthy Tetrault (16 October 2017) available at <https://www.mccarthy.ca/en/insights/blogs/snippets/transatlantic-policy-working-group-releases-future-regtech-report> accessed 24 December 2018.

124 'Frequently Asked Questions on the Bank of England Accelerator', Bank of England, available at <https://www.bankofengland.co.uk/-/media/boe/files/fintech/fintech-accelerator-faqs> accessed 24 December 2018

125 'MAS sets up new Fintech and Innovation Group', Monetary Authority of Singapore (27 July 2015) available at <http://www.mas.gov.sg/news-and-publications/media-releases/2015/mas-sets-up-new-fintech-and-innovation-group.aspx> accessed 24 December 2018.

4.2 Inter-ministerial group for monitoring fintech adoption

The technology underpinning the services offered by fintech companies has application across various sectors. The government can utilize some of these technologies as an aid in the discharge of some its functions. However, this utilization of technology would be dispersed across various departments and ministries. The rate of adoption of technology and manner of regulation could therefore differ across the various levels of government. This could lead to ambiguities and lack of clarity in the policy and regulatory architecture affecting the development of the fintech sector in the country. To avoid such a scenario, some of the countries round the world are adopting a uniform governmental approach. This entails devising mechanisms institutionalizing intra-governmental coordination and cooperation in order to provide a consistent direction to industry.

Singapore has adopted a whole-of-government approach to developing a fintech ecosystem in their country.¹²⁶ A fintech Office has been established by the MAS and the National Research Foundation (NRF) in the Prime Minister's Office in 2016. The fintech Office is expected to deal with all issues concerning fintech thus providing a consistent direction. Among the objectives of the fintech office are the review, alignment and enhancement of fintech related funding schemes across all government agencies.¹²⁷

Similarly, Ireland has launched IFS2020 which is a five-year strategy for International Financial Services in Ireland. A key part of this strategy is to scale up the fintech industry and establish Ireland as a fintech hub. The implementation of this strategy is premised on a whole-of-government approach. A public sector High Level Implementation Committee (HLIC) has been constituted to implement the IFS2020 strategy which also is an annual action plan.¹²⁸ The composition of the HLIC is inter-ministerial in nature with representatives from various departments including Finance, Jobs, Enterprise and Innovation, Foreign Affairs and Trade,

126 Sai Fan PEI, 'Singapore approach to develop and regulate FinTech', Singapore Management University (2018) available at https://ink.library.smu.edu.sg/cgi/viewcontent.cgi?article=6910&context=lkcsb_research accessed 24 December 2018.

127 Ibid.

128 'IFS International Messaging November 2018', Department of Finance, Government of Ireland (November 2018) available at <https://www.finance.gov.ie/what-we-do/international-financial-services/#IFS2020IMP> accessed 24 December 2018.

Education and Skills. The HLIC also includes a member from Irish Central Bank and the Chief Executive Officers of Enterprise Ireland and IDA. Ensuring a coordinated and strategic approach to development of IFS is a key responsibility of the HLIC.

The Irish and Singapore models are particularly worth examining in the context of fintech adoption in India. For instance, API's can be leveraged by government in performing a whole host of activities. These activities range, among others, from law enforcement, traffic and transportation management to monitoring electricity grids, oil pipelines and reservoirs.¹²⁹

Similarly, governments around the world are exploring the possibility of utilizing DLT for securing property rights.¹³⁰ Public agencies around the world also collect a huge amount of data. Big data analytics can aid the government and its agencies in varied areas. These include detecting frauds and maximizing tax collection to applications in national security, healthcare, education and better delivery of citizen services.¹³¹

The potential application of these technologies would be spread across various government departments and agencies. In order to ensure that these technologies are harnessed where applicable, an inter-ministerial group on fintech technologies can be established at MEITY. This group would be equipped to recommend the adoption of relevant technology by concerned ministries and departments based on inter-ministerial inputs and deliberations. This would supplement the work of the fintech working groups established at the Ministry level. Additionally, the inter-ministerial group can review the functioning of adopted technology systems and suggest improvement in processes where required. Furthermore, the constitution of such a group would signal a consistent approach towards fintech adoption across all government ministries. This

129 Alan Glickhouse, Shirley Abbott, Roger Tobias, 'Identifying API use cases: Government', IBM White Paper (October 2016) available at [https://www01.ibm.com/events/wwe/grp/grp309.nsf/vLookupPDFs/White%20paper%202016%2009%20Identifying%20API%20use%20cases%20Government/\\$file/White%20paper%202016%2009%20Identifying%20API%20use%20cases%20Government.pdf](https://www01.ibm.com/events/wwe/grp/grp309.nsf/vLookupPDFs/White%20paper%202016%2009%20Identifying%20API%20use%20cases%20Government/$file/White%20paper%202016%2009%20Identifying%20API%20use%20cases%20Government.pdf) accessed 24 December 2018.

130 Meghna Bal, 'Securing property rights in India through distributed ledger technology', Observer Research Foundation (5th January 2017) available at <https://www.orfonline.org/research/securing-property-rights-india-through-distributed-ledger-technology/> accessed 24 December 2018.

131 Ashish Sukhadeve, 'How analytics can transform the public sector in India', Yourstory (10th August 2017) available at <https://yourstory.com/mystory/4600861fba-how-analytics-can-tran> accessed 24 December 2018.

would provide further impetus in the development of a fintech ecosystem in the country and be in line with good international practice.

4.3 Fintech working groups

The fast pace of innovations in the fintech sphere contribute to its increased application across diverse sectors. Govtech or public sector software is another fast-growing area of development. A solution designed for use by government institutions is referred to as Govtech. Applications for Govtech range from improvement in procurement systems to efficient public transportation among others.¹³² An institutional mechanism, within government, to leverage the potential benefits accruing from innovations in fintech and Govtech would be extremely useful. As these innovations occur in diverse sectors, the use cases would have to be determined accordingly by the relevant competent authority.

Among the great attractions of fintech is the promise of achieving financial inclusion. A large mass of individuals in the country do not have access to formal finance. Reasons for this vary from geographical inaccessibility to lack of adequate credit history.¹³³ Fintech offers avenues for including this mass of individuals in the formal financial system. Fintech companies are actively developing alternative frameworks for decisions regarding credit disbursal.

The SME sector along with agriculture form the backbone for the Indian economy especially in terms of the number of people working in these sectors. In addition to using alternative data sources to measure creditworthiness, new models of lending such as the P2P model have been developed to provide services to these segments.¹³⁴ Risks in agricultural lending have been sought

132 'Gov.Tech - The power to transform public services in the UK', PricewaterhouseCoopers (September 2016) available at <https://www.pwc.com/gx/en/psrc/united-kingdom/assets/govtech-report.pdf> accessed 31 December 2018

133 'FinTech innovations to drive financial inclusion', Confederation of Indian Industry (2017), available at <https://www.ciiblog.in/fintech-innovations-to-drive-financial-inclusion/> accessed 24 December 2018.

134 'Fintech India - The changing landscape of SME lending', MAPE Advisory Group, available at <http://mapegroup.com/pdf/fintech-india-changing-landscape-sme-lending.pdf> accessed 24 December 2018.

to be minimized by leveraging technology applications to assess viability and profitability of agricultural operations.¹³⁵

Similarly, fintech companies have achieved notable success in the payments and remittance spheres. This success has also been aided by the underlying infrastructure such as the UPI. The grant of licenses to payments banks opens up opportunities for fintech companies in offering financial services and thereby reduces financial exclusion. Innovations in fintech can also drive better services offerings with respect to savings, insurance and investment. Pre-instructed scheduled savings product and purchase of insurance or mutual fund products through smartphones are possible through innovations in the fintech sphere.¹³⁶

Innovations in fintech could also have beneficial applications in the real estate sphere. Blockchain based smart contracts and P2P lending are being used by fintech companies to serve individuals excluded from accessing finance through traditional modes.¹³⁷ Securing property records and stamping of documents through blockchain are also being considered in a bid towards efficiency and ease of doing business.

There is a wide range of innovation continuously taking place in the fintech space with applications across varied sectors. Considering some of the far-reaching implications of these developments, the relevant Ministries and/or Departments could constitute fintech working groups to oversee this process. The fintech working groups could collaborate with industry stakeholders in testing the use cases for innovation carried out by the fintech companies. This would enable the identification and scaling up of relevant innovative processes and products with resultant benefits to all concerned stakeholders. The working groups could also examine the various Govtech applications and their suitability for adoption by the relevant department/ministry.

135 Nikhat Hetavkar, 'Banks fund agricultural technology companies for rural lending', Business Standard (9th June 2018) available at https://www.business-standard.com/article/finance/banks-fund-agricultural-technology-companies-for-rural-lending-118060900031_1.html accessed 24 December 2018.

136 Ajit Ranade, 'Role of 'Fintech' in Financial Inclusion and new business models', Economic and Political Weekly VOL LII NO 12 (25 March 2017) available at [https://www.epw-in.ezproxy.nujs.ac.in/system/files/pdf/2017_52/12/SA_LII_12_25032017_M_and_B_Ajit_Ranade.pdf](https://www.epw.in.ezproxy.nujs.ac.in/system/files/pdf/2017_52/12/SA_LII_12_25032017_M_and_B_Ajit_Ranade.pdf) accessed 24 December 2018.

137 Roger Aitken, 'Could Fintech and Blockchain lending further drive the housing market boom?', Forbes (24 July 2018) available at <https://www.forbes.com/sites/rogeraitken/2018/07/24/could-fintech-blockchain-lending-further-drive-the-housing-market-boom/#12b041b33d14> accessed 24 December 2018.

4.4 Data protection related issues

Protection of personal data in the financial sector is critical in view of the sensitivity of personal financial information and the impact that misuse of such data may have on consumers. Personal data of various kinds has long been used in the financial sector, for instance to design better products and services and provide customised solutions. The emergence and growth of the fintech industry throws up additional privacy and data security challenges not least due to the industry's access to and heavy reliance on data about users, their behaviour, preferences and transaction records as well as the use of new technological tools such as artificial intelligence, machine learning, and predictive analysis. Putting in place appropriate frameworks and norms for data protection is essential to enable businesses to take advantage of new forms of data analysis available to them, while also promoting consumer privacy, confidence and trust.

In the context of privacy in fintech, it has been recommended that fintech initiatives should take into account a comprehensive view of privacy impacts, including impacts on human rights such as equality, non-discriminatory and economic, social and cultural rights.¹³⁸ Data privacy has also formed one of the key pillars of the principles for the protection of financial consumers, including in the *High-level Principles on Financial Consumer Protection* endorsed by the G20 Finance Ministers and Central Bank Governors in 2011. These principles state that:¹³⁹

“Consumers’ financial and personal information should be protected through appropriate control and protection mechanisms. These mechanisms should define the purposes for which the data may be collected, processed, held, used and disclosed (especially to third parties). The mechanisms should also acknowledge the rights of consumers to be informed about data-sharing, to access data and to obtain the prompt correction and/or deletion of accurate, or unlawfully collected or processed data.”

138 Privacy International, *Fintech: Privacy and Identity in the New Data-Intensive Financial Sector*, November 2017, <https://privacyinternational.org/sites/default/files/2017-12/Fintech%20report.pdf>

139 Organization for Economic Co-operation and Development, *G20 High-level Principles on Financial Consumer Protection*, October 2011, <https://www.oecd.org/daf/fin/financial-markets/48892010.pdf>.

The Government of India had constituted an expert body under the Chairmanship of Justice B.N. Srikrishna to formulate a draft data protection law for the country.¹⁴⁰ The report of the Justice Srikrishna Commission provides a holistic statutory framework for the collection, storage and processing of personal information. This is likely to provide clarity to financial firms who collect personal information for the purposes of providing financial products and services, as well as for regulatory purposes such as prevention of money-laundering and national security. The report also mandated end-to-end payment system-related data storage only in India in respect of domestic payment transactions.

4.4.1 Existing regulatory framework

The financial sector is required to follow both generic privacy norms under legislation such as the Information Technology Act, 2000 (IT Act) as well as sector specific norms.

4.4.1.1 General regulations

The IT Act and rules issued thereunder, notably, the Information Technology (Reasonable security practices and procedures and sensitive personal data or information) Rules, 2011, (Security Rules) provide the basic framework for data protection in India. The IT Act contains various provisions that punish unauthorised access to computer resources or data stored therein (refer Section 43, IT Act). Further, Section 43A of the IT Act penalises body corporates who collect, process or store ‘sensitive personal data’, for being ‘negligent in implementation and maintaining reasonable security practices and procedures’ and thereby causing wrongful loss or wrongful gain to any person. The compensation payable under this section can be extended to five crore rupees.

¹⁴⁰ Ministry of Electronics and Information Technology, Government of India, Office Memorandum of July 31, 2017, http://meity.gov.in/writereaddata/files/MeitY_constitution_Expert_Committee_31.07.2017.pdf.

4.4.1.2 Financial sector regulation

The Credit Information Companies (Regulation) Act, 2005, the Credit Information Companies Rules, 2006 and the Credit Information Companies Regulations, 2006, attempt to regulate the activities of credit information companies and those notified as specified users of credit information. They contain provisions pertaining to:

- (a) the collection and furnishing/disclosure/transmission of information by and between credit information companies, as well as disclosure norms for employees of such institutions;
- (b) permissible uses of credit information which range from making effective credit decisions to evaluate customer risk, judging creditworthiness;
- (c) accuracy and security of credit information;
- (d) privacy principles applicable to credit information companies including norms concerning collection limitation, for solicitation of personal data from an individual, data retention, etc.

Various RBI circulars govern the data protection obligations of financial institutions, notably:

- (a) Master Direction on KYC Direction, February 25, 2016, puts in place norms to inter alia identify customers and monitor transactions.
- (b) RBI Master Circular on Customer Services, 2009 and Code of Bank's Commitment to Customers, 2014, which inter alia contains provisions pertaining to customer identification procedures.
- (c) RBI Master Circular on Credit Card, Debit Card, and Rupee Denominated Co-branded Prepaid Card Operations of Banks, 2014, which inter alia contains provisions pertaining to confidentiality of customer data and consent requirements for collecting and sharing certain types of customer data.

Similarly, certain other financial sector regulators such as SEBI and IRDA also prescribe various privacy related norms for regulated entities to follow. For instance, SEBI regulates personal information collected through mandating the use of specific KYC forms.¹⁴¹ SEBI also prescribes

¹⁴¹ See for instance, SEBI Circulars on Dealings between a client and stock broker – trading members included, of December 3, 2009 and Circular on Simplification and Rationalization of Trading Account Opening Process of August 22, 2011.

various obligations of stock brokers, sub-brokers and clients, which contains requirements for stock brokers to ensure that all information pertaining to the client is kept confidential and not disclosed except with the express consent of the client or in accordance with legal or regulatory requirements.¹⁴² Clients may invoke a grievance redressal mechanism in respect of violations of this right. Similar obligations are cast on mutual funds, asset management entities, depositories and credit rating agencies.¹⁴³ The IRDA also prescribes various privacy related norms to be followed by entities under its supervisory authority, for instance, requiring insurers to maintain confidentiality of customer information (except in so far as disclosures may be mandated by law¹⁴⁴), publish privacy policies on their websites, etc.¹⁴⁵ The Outsourcing of Activities by Insurers Regulation, 2017, put in place checks to ensure that user information is kept confidential including through requirements for the insurers to conduct certain processing activities in house and include data confidentiality clauses in agreements with service providers.

Certain other statutes such as the Bankers Book Evidence Act, 1891, the Prevention of Money Laundering Act, 2002, and the Income Tax Act, 1961 also have provisions pertaining to data privacy.

4.4.2 Justice Srikrishna Commission and the draft Data Protection Bill

The draft Personal Data Protection Bill, 2018 (“Bill”) proposed by the Justice Srikrishna Committee provides for a consent-based framework for the protection of personal information. The draft Bill has the following key components:

142 Annexure 4 to the Circular on Simplification and Rationalization of Trading Account Opening Process of August 22, 2011.

143 The Master Circular for Mutual funds, September 2016, requires depositories/ asset management companies/ mutual fund RTAs to ensure confidentiality of information shared to prepare a customers Consolidated Account Statement (CAS) and restricts usage of information for any purpose other than creating the CAS. The Master Circular also mandates that data confidentiality agreements must be entered into between such parties and external vendors (for instance where printing of CAS is required). Similar requirements pertaining to maintenance of confidentiality of customer information and usage of data confidentiality contracts in case of outsourcing of operation can be found in the Master Circular for Credit Rating Agencies of May 2, 2018. Also refer to the Master Circular for Stock Brokers of June 1, 2018.

144 Insurance Regulatory and Development Authority of India (Protection of Policyholders’ Interests) Regulation, 2017.

145 Insurance Regulatory and Development Authority (Insurance Advertisements and Disclosure) Regulations, 2000.

4.4.2.1 Personal and sensitive personal data

The draft Bill defines “data” as any “representation of information, facts, concepts, opinions, or instructions ..for communication, interpretation or processing by humans or by automated means.”¹⁴⁶

“Personal data” is defined as any data “about or relating to a natural person who is directly or indirectly identifiable, having regard to any characteristic, trait attribute or any other feature of identity of such natural persons...”¹⁴⁷

The draft Bill provides higher requirements for the collection, storage and processing of “sensitive personal data”, which is defined to include – passwords, financial data, health data, official identifier, information about sexual orientation, associational information, etc.¹⁴⁸

The rights and obligations related to each of these definitions has consequences for the provisioning of financial products and services within India. The draft Bill defines a person who stores or processes personal data as a “data fiduciary”. This includes “any person, including the State, a company, any juristic entity or any individual who alone or in conjunction with other determines the purpose and means of processing of personal data.”¹⁴⁹

4.4.2.2 Obligations for protecting data

Any person who processes personal data owes an obligation to the data principle to process such data in a fair and reasonable manner that protects the privacy of such individual.¹⁵⁰ Personal data can only be used for clear, specific and lawful purposes, and only for the purposes for which it was collected.¹⁵¹ The draft Bill sets out clear grounds on which personal data can be processed, and

146 Section 3(12) of the draft Bill.

147 Section 3(29) of the draft Bill.

148 Section 3(35) of the draft Bill.

149 Section 3(13) of the draft Bill.

150 Section 4 of the draft Bill.

151 Section 5 of the draft Bill.

further limits the grounds on which sensitive personal data can be processed.¹⁵² Additionally, the draft Bill sets out a clear requirement for providing a clear notice for the collection of personal information to the data principle. The data fiduciary has the responsibility for ensuring the quality of personal data and can only store such data till it is reasonably necessary to satisfy the purpose for which it is processed.¹⁵³

4.4.2.3 Grounds for processing of personal data

Personal data may be processed based on consent, but such consent must be free, informed, specific, clear and meaningful. Consent should also be capable of being withdrawn.¹⁵⁴ Exemptions are provided for use by the State for “the provision of any service or benefit to the data principle from the State; or the issuance of any certification, license or permit for any action or activity...”¹⁵⁵

Sensitive personal data may be processed only on the basis of explicit consent, for certain functions of the State, in compliance with law or any order of a court or tribunal, and for certain situations requiring prompt action. Consent will be considered explicit only if it is informed, clear and specific.¹⁵⁶ The proposed Data Protection Authority can specify further grounds of sensitive personal information.¹⁵⁷

4.4.2.4 Rights of data principles

The data principle shall have a right to obtain confirmation on processing of personal data, to receive a brief summary of personal data being processed or that has been processed, and a brief summary of processing activities undertaken by the data fiduciary. The principle will also have the

152 Section 7 of the draft Bill.

153 Section 9 and 10 of the draft Bill.

154 Section 12 of the draft Bill.

155 Section 13(2) of the draft Bill.

156 Section 18-21 of the draft Bill.

157 Section 22 of the draft Bill.

right to request corrections.¹⁵⁸ In addition, data principles shall have the right to data portability, and to be forgotten.¹⁵⁹ Data fiduciaries shall have the right to charge fees for any of these services.

4.4.2.5 Other obligations on data fiduciaries

In addition, data fiduciaries shall have to comply with other requirements relating to:

- (i) Privacy by design – organisational and management requirements
- (ii) Transparency requirements
- (iii) Security safeguards
- (iv) Notification of any personal data breach
- (v) Data protection impact assessment
- (vi) Record keeping
- (vii) Data audits
- (viii) Creating grievance redress systems

4.4.2.6 Data localisation

Section 40 of the draft Bill imposes restrictions on cross-border transfer of personal data. A copy of personal data must be kept at a server of data centre in India. Besides, critical personal data, as determined by the Central Government, shall only be processed in India. However, certain categories of personal data may be exempted from localisation requirement. Under Section 41 of the draft Bill, data other than that covered in Section 40 of the draft Bill, may be transferred outside India but after meeting certain conditions like consent of data principle or under contractual obligations/ intra-group schemes prescribed by the Authority or countries/ sectors prescribed by Central Government with concurrence of the Authority or in a situation of necessity. Separately, a Sub-Group of SEBI's Technical Advisory Committee (TAC) comprising of Prof. Ashok Jhunjhunwala (IIT Chennai) and Prof. Hanumantha Krishnamurthy (Ex-Principal Research

¹⁵⁸ Section 24 and 25 of the draft Bill.

¹⁵⁹ Section 26 and 27 of the draft Bill.

Scientist, IISc Bangalore) is currently deliberating on the data localization framework for SEBI registered intermediaries.

4.4.2.7 Data protection authority

The draft Bill proposes the establishment of a Data Protection Authority, with wide jurisdictions over data processing activities throughout the economy. The powers of the Data Protection Authority include:

(i) Monitoring and enforcement of the Act, taking prompt action of data security breach, examining data audit reports of data fiduciaries, monitoring data transfers outside country, awareness generation, conducting inquiries on data fiduciaries.¹⁶⁰

(ii) Issuing “codes of practice” to promote good practices and facilitate compliance under the Act.¹⁶¹

(iii) Issuing directions to data fiduciaries and data processors, and ensuring their compliance, calling for information from data fiduciaries or data processors.¹⁶²

(iv) Power to conduct inquiry where Authority reasonably believes that activities of data fiduciary or data processor are detrimental to interests of data principals or where the former has violated provisions of the Act.¹⁶³

(v) Pursuant to the inquiry, the Authority can take actions like issuing warnings, mandating business modifications, suspending or cancelling any registration etc.¹⁶⁴

(vi) Conducting search and seizure.¹⁶⁵

4.4.3 Coordination with financial sector regulators

It is worth noting that the scope of the applicability of the proposed data protection is wide and will apply to all economic activity. The Bill proposes the establishment of the Data Protection

¹⁶⁰ Section 60 of the draft Bill.

¹⁶¹ Section 61 of the draft Bill.

¹⁶² Section 62 and 63 of the draft Bill.

¹⁶³ Section 63 of the draft Bill.

¹⁶⁴ Section 65 of the draft Bill.

¹⁶⁵ Section 66 of the draft Bill.

Authority which shall have the power to draft regulations regarding informed consent, data processing, data audits, data retention policies, etc. The Committee is of the view that regulators such as the RBI, SEBI, IRDA and PFRDA identify the potential impact of such regulations on their jurisdictions at an early stage.

The Committee is of the view that in some cases, data privacy requirements in existing legislation may need to be reviewed in order to tailor them to the emerging data privacy legislation. The Committee also considers that given the fact that sectoral regulators are already taking steps to maintain the security and confidentiality of consumer data in their respective jurisdictions, some obligations the Data Protection Bill seeks to place on the DPA may be given to the sectoral regulators to discharge. Regulators must therefore carefully review their existing regulatory framework and identify any changes or modifications that may be required to the current regulatory framework.

4.5 International cooperation

World over, an increasing number of people are embracing services provided by fintech companies. The World FinTech Report, 2017 estimated that over 50% of the global customers had availed of business services from a non-traditional firm.¹⁶⁶ The rate of adoption is especially high in emerging market countries like China, India, Brazil among others.¹⁶⁷ This rapid proliferation of fintech based services all over the world opens avenues for international collaborations. Through international collaborations, best practices from around the world can be adopted and knowledge sharing gets a boost. All the relevant stakeholders including government, regulators and industry benefit from the international exposure available through arrangements and collaborations.

166 'World FinTech Report 2017', Capgemini (2017), available at <https://www.marsdd.com/wp-content/uploads/2015/02/CapGemini-World-FinTech-Report-2017.pdf> accessed 24 December 2018.

167 Ibid.

The India-Singapore Memorandum of Understanding (MoU) constituting a Joint Working Group (JWG) on fintech is a major step in this regard.¹⁶⁸ The remit of the JWG is wide and far-reaching. The JWG will look at, among other things, establishing mechanisms for exchanging best practices vis-a-vis regulations and policies. Fostering cooperation between the Indian and Singaporean fintech industries is another area high on the JWG's agenda.

In this regard, it may be noted that Indian states like Andhra Pradesh and Maharashtra have also taken initiatives for international collaboration in the fintech sphere. Singapore has entered into fintech cooperation and innovation agreements with the aforementioned states.¹⁶⁹ Maharashtra has recently entered into a MoU with Bahrain for promoting fintech services in their respective markets.¹⁷⁰

International collaborations can be leveraged for stimulating innovation and investment in the domestic economy. For instance, Maharashtra's start-up sandbox is modelled on the lines of the Monetary Authority of Singapore's (MAS) sandbox.¹⁷¹ Similarly, the United Kingdom (U.K) has launched the FinTechRocketship Awards which is a mentoring programme directed by top Indian and U.K mentors.¹⁷² Through this programme, fintech entrepreneurs from both countries can gain exposure to the prevalent systems and practices in the other country. To further facilitate the exchange of ideas and learning, India and U.K have also established a fintech dialogue.

168 'Cabinet approves Memorandum of Understanding between India and Singapore on setting up of a joint working group on FinTech', Press Information Bureau (24 October 2018) available at <http://pib.nic.in/newsite/PrintRelease.aspx?relid=184334> accessed 24 December 2018.

169 Samburaj Das, 'Singapore inks FinTech, Blockchain pact with Indian State Government', CCN (26 February 2018) available at <https://www.ccn.com/singapore-inks-fintech-blockchain-pact-indian-state-government/> accessed 24 December 2018.

170 'Bahrain Economic Development Board signs MoU with Maharashtra Government to cooperate in FinTech', Economic Development Board, Bahrain (4th December 2018) available at <https://bahrainedb.com/latest-news/bahrain-economic-development-board-signs-mou-with-maharashtra-government-to-cooperate-in-fintech/> accessed 24 December 2018.

171 Romita Majumdar, 'Maharashtra to support over 500 start-ups under Fintech Policy', Business Standard (8 June 2018) available at https://www.business-standard.com/article/economy-policy/maharashtra-to-support-over-500-startups-under-fintech-policy-118060800975_1.html accessed 24 December 2018.

172 'India-U.K. list of MoUs/Agreements/Initiatives during the visit of Prime Minister to London, U.K', Ministry of External Affairs, Government of India (18th April 2018) available at https://mea.gov.in/bilateral-documents.htm?dtl/29831/IndiaUK_List_of_MOUsAgreementsInitiatives_during_the_visit_of_Prime_Minister_to_UK_London_April_18_2018 accessed 24 December 2018.

Fintech service providers are not the only parties who gain from fruitful international collaboration. Regulators can also benefit through the exchange of information and ideas in establishing a conducive fintech regulatory regime. Further, collaboration between regulators could also enable ease in providing fintech services by establishing inter-operable platforms. There has been progress in establishing infrastructure which would be inter-operable between the Network for Electronics Transfer Singapore (NETS) and the NPCI.¹⁷³

Similarly, Bahrain and UAE are seeking to improve fintech collaboration with India by establishing regulatory sandboxes.^{174 175} Collaboration between regulators internationally can also be improved by the establishment of 'FinTech Bridges'. Fintech Bridges allow regulators to bilaterally share information on innovation, emerging trends and regulatory issues in a cost-effective manner.¹⁷⁶ Furthermore, these bridges aid fintech service providers in gaining easier market access in the other country. Singapore and U.K established the first FinTech Bridge in 2016 and have higher number of such agreements with other regulators around the world.

Collaboration in the fintech sphere, internationally, is not restricted to bilateral arrangements. The Bali fintech Agenda was recently launched by the International Monetary Fund (IMF) and the World Bank group. The Agenda prescribes a set of 12 policy elements designed to aid member countries harness fintech for developing financial services and contain risks.¹⁷⁷ The 12 policy elements were identified through experiences of various member countries. It is expected that these policy guidelines would promote greater international cooperation in order to realize the transformative capacity of fintech.

173 Dipinder Randhawa, Chan Jia Hao, Vani Swarupa Murali, 'India-Singapore FinTech Cooperation: Opportunities and Challenges', Institute of South Asian Studies, National University of Singapore (3rd October 2018) available at <https://www.isas.nus.edu.sg/wp-content/uploads/2018/10/ISAS-FinTech-Roundtable-Report-October-2018.pdf> accessed 24 December 2018.

174 Sindhu Kashyap, 'The Bahrain and Indian fintech ecosystems: what each can learn from the other', Yourstory (15th March 2018) available at <https://yourstory.com/2018/03/bahrain-indian-fintech-ecosystems-can-learn/> accessed 24 December 2018.

175 Sindhuja Balaji, 'Why India's Fintech Start-ups are flocking to disrupt the UAE', Forbes (13th June 2017) available at <https://www.forbes.com/sites/sindhujabalaji/2017/06/13/why-indians-fintech-startups-are-flocking-to-disrupt-the-uae-middle-east/#60ddce913aa5> accessed 24 December 2018.

176 Matyas Fekete, 'Global Fintech Bridges: Who, where and how many?', KAE (8th November 2018) available at <https://kae.com/ideabank/blog/fintech-bridges/> accessed 24 December 2018.

177 'The Bali Fintech Agenda: A Blueprint for Successfully Harnessing Fintech's Opportunities', International Monetary Fund Press Release No. 18/388 (11 October 2018), available at <https://www.imf.org/en/News/Articles/2018/10/11/pr18388-the-bali-fintech-agenda> accessed 31 December 2018.

Options could be explored in establishing fintech Bridges with a greater number of countries as benefits accrue to both regulators and fintech service providers. The progress being made in establishing inter-operable infrastructure between NETS and NPCI could be replicated across other jurisdictions as well. Options could also be explored for regulatory collaboration with jurisdictions having different models of regulatory sandbox. This would enable drawing the best practices for the design of regulatory sandboxes within the country. Mechanisms could also be established for collaboration between the domestic fintech industry and international players. For instance, Singapore based fintech companies have demonstrated expertise in securing payments systems. In India, demand for payment solutions is significant and mechanisms could therefore be explored for facilitating interaction between the Indian and Singaporean fintech industries.

4.5.1 Centres of excellence in fintech

There is a need for research and continuous evaluation of emerging technologies to explore their application in improving public service delivery in addition to aiding capacity development of stakeholders. Concerted efforts are needed to develop centres of excellence in fintech. Such centres would be required to upgrade talent and skill set of relevant stakeholders so that they may be able to apply emerging technologies in their sphere of work. Internationally many examples of such capacity building initiatives are seen in recent times. Singapore's National Trades Union Congress (NTUC) has entered into a collaborative agreement with Singapore Polytechnic (SP) and Singapore Fintech Association to organise short-term fintech talent programmes. The training programme encompasses emerging technologies such as use of blockchain, big data and machine learning in finance.

In India, efforts are being initiated to set up such centres of excellence in fintech. As an example, a Centre of Excellence in fintech is being set up at STPI Chennai with the support of Ministry of Electronics and Information Technology (MeitY). The proposal to set up the centre has received administrative approval and will be implemented over a period of 5 years.

4.6 Recommendations

4.6.1 Cooperation with leading nations: Since fintech is an evolving theme; there is a scope for collaboration and consultation to benefit from the mutual exchange of ideas. Indian policymakers should enter into collaborative arrangements with other countries to develop a shared understanding of benefits and risks from fintech, using multilateral and/or bilateral fora, i.e. collaboration between regulators and collaboration between fintech business platforms, etc. *The Committee recommends that efforts should be made to effectively tap joint forums such as the JWG set up with MAS of Singapore and use these fora to connect Indian regulators and fintech industry with counterparts abroad to enable cross learning.*

4.6.2 Fintech advisory council in each financial sector regulator: The RBI Working Group on FinTech and Digital Banking had recommended that all financial sector regulators need to engage with fintech entities in order to chalk out appropriate regulatory response and with a view to realign regulation and supervision in response to the changing environment, and suggested that partnerships/engagements among regulators, existing industry players, clients and fintech firms will enable the development of a more dynamic and robust financial services industry. *The Committee recommends that every financial sector regulator constitute an Advisory Council on fintech to bring together industry leaders and fintech experts, who can identify viable ways to provide inputs periodically to modernize the regulatory architecture, develop use-cases for RegTech and SupTech, design better risk management systems, sharing innovation and consumer protection standards.*

4.6.3 Taskforce on data protection in the financial sector: The Committee is of the opinion that the provisions of the proposed draft Data Protection Bill, 2018 may have far-reaching implications for the growth of fintech sector. The Committee accordingly recommends that regulators urgently review their existing regulatory framework with respect to data protection and privacy concerns, in keeping with emerging data privacy legislation in India. *The Committee recommends that a taskforce in the Ministry of Finance may be set up with the participation of the regulators and make suitable recommendations to safeguard the interests of consumers, while also enabling a positive climate for innovation.*

4.6.4 Inter-regulatory coordination on fintech: The Committee recommends that in addition to the creation of a regulatory sandbox by each regulator, there is a need for inter-regulatory coordination to support hybrid financial products and common distribution, where licensing or regulatory requirements of more than one regulator may have to be complied with, development of common standards on RegTech and SupTech, consumer protection measures, sandboxes, etc.. The Inter-Regulatory Technical Group (IRTG) set up under the FSDC Sub-Committee should be the forum for such inter-regulatory coordination

4.6.5 Inter-Ministerial Steering Committee on fintech in the financial sector: In light of the fact that many of the underlying technologies supporting fintech have cost-saving and efficiency enhancing potential, *this Committee recommends that an Inter-Ministerial Steering Committee on fintech Applications in Department of Economic Affairs (DEA), Ministry of Finance, continue to carry on the tasks of implementing this report, including exploring and suggesting the potential applications in government financial processes and applications, particularly accounting and asset management, welfare services, taxation, and handling citizen grievances.*

4.6.6 Ministry level fintech working groups: Fintech represents a unique opportunity to promote the objectives of financial inclusion and distributed economic growth, especially for MSMEs and those involved in the agricultural sector. Ministries/departments with potential for fintech use cases, especially MSME, DFS, Agriculture, HRD, MoRD, DOLR, MoHUA, may set up ministry-level fintech working groups to identify, screen and implement potential use cases for fintech in collaboration with start-ups and service providers. *Considering the potential use of fintech in enabling application and delivering non-financial services across the wider government, the Committee recommends that every department/ministry in the government may create a ministry-level fintech working group to assess the potential of using GovTech and fintech applications in their ministry/department.*

4.6.7 Inter-ministerial group on fintech: In light of the fact that many of the underlying technologies supporting fintech have cost-saving and efficiency-enhancing potential, the adoption of some of these technologies for governmental functions could result in significant efficiency

gains. *The Committee recommends that an Inter-ministerial group on fintech Technologies be established at MeitY, for exploring and suggesting the potential applications of the underlying technologies (such as open APIs, blockchain, robo-advisories, big data analytics, NDSAP etc.) in government processes, particularly in accounting and asset management, welfare services, taxation, and handling citizen grievances, to make recommendations on technology choices, providing inter-ministerial inputs to fintech Working Groups in each Ministry on the requirements of different departments. The Group can also perform the role of periodically reviewing the technological systems and scope for introduction of new technologies in a coordinated manner across the Central Government.*

4.6.8 Centres of excellence on fintech: There is a need for carrying out research and evaluation of the application of fintech technologies to public service delivery problems, besides assisting in the capacity building of stakeholders. *The Committee, therefore, recommends setting up Centres of Excellence on fintech in 2 or 3 key premier National Institutions like IITs/NITs and Government Financial Sector Institutions like IDBRT/NIBM/NIFM.*

4.6.9 Capacity building: The underlying technology behind fintech, such as blockchain, open APIs, open data policies, etc. need to be carefully evaluated for adoption across a range of sectors, requiring a better understanding of fintech by officials of ministries and regulators. *A capacity building program in fintech for senior government officials in ministries and departments, regulators and financial institutions to sensitise officials on potential use cases, potential, risks, costs and benefits of fintech, through government training institutions, such as NIFM, IDBRT, NIBM, etc.*

Chapter 5

Summary of Recommendations

Chapter 1: Measures Required for Expanding Fintech Services

- 1. Removing discriminatory regulatory barriers in the digital payments infrastructure sector:** The Committee has noted the recommendations of successive government committees for the promotion of digital payments in India. It notes that while the digital payments have grown rapidly in India, still there is a lot of cash payments in the system. Digital payments have the potential to expand enormously. To realise the full potential, a level playing field needs to be created amongst banks and non-bank players. The NPCI may provide non-discriminatory access to fintech firms and other financial firms that are not currently shareholders of the NPCI. Restrictions on non-bank' access to payments infrastructures, such as AEPS, needs to be re-evaluated and appropriate steps need to be taken. RBI may also take necessary measures and if and when Payment and Settlement Board comes into existence, the calibrated liberalisation may be continued by the Payment and Settlement Systems Board to achieve the goal of bringing in financial inclusion, make digital payments as the primary mode of payment and usher in competition amongst various service providers. *The Committee is of the view that non-discriminatory access must be the norm unless the respective regulator clearly provides reasons for a separate treatment to a specified category of financial firms. The Committee also urges Government and RBI to take necessary steps to eliminate discrimination in access to payments infrastructure to non-banks vis-à-vis banks with a view to enhancing competition and innovation.*
- 2. Fintech for cybersecurity, fraud control & AML:** Exposing financial performance information, in addition to the concerns surrounding account access, is understandably worrisome for any business. In addition, frauds impose significant financial losses and reputational costs on financial sector firms. Investing in technologies and talent that support banks' confidence in their ability to make such assurances is a logical parallel step. Indeed, some of the most promising fintech innovations today are emerging in cyber-security, enabling protection from lending frauds, as well as handle threats related to money

laundering and cyber-attacks. *The Committee, guided by success stories elsewhere in the world, recommends the use of fintech, especially by PSE financial service companies to bolster cybersecurity, fraud control and anti-money laundering. The Committee also recommends that fintech firms specialising in this field should be encouraged to set up their businesses in India and provided necessary regulatory approvals for expanding their services in the country.*

3. **Expanding agricultural credit guarantee schemes:** The Committee was informed that NBFCs' extending credit facilities to retail traders, educational institutions and agricultural activities are currently excluded from availing the 'Credit Guarantee Funds Scheme' provided by SFAC. There is a need to attract more sources of institutional lending. *The Committee recommends that, since NBFCs have made significant progress in leveraging Fintech to increase their outreach, such NBFCs may be incentivised to work in the agricultural space by including them in credit guarantee schemes.*

4. **Flow-based lending for MSMEs:** In order to increase MSMEs' access to financing, the trusted invoice infrastructure must be urgently established in India. TReDS and GSTN should jointly provide the backbone of a trusted e-invoice system, as announced in the Budget for 2018-19. *The Committee recommends that GSTN data integrated with TReDS exchanges could form the basis of a flow-based lending system for MSMEs by banks and NBFCs. However, cash flow-based lending will need superior fintech based systems to track the borrower for providing early warning signals given that there is no collateral backup (available in normal asset-based loans). There is need to promote greater participation of financial institutions, buyers, sellers on the TReDS platform and fine-tune the guidelines to enable the system to gain acceptance. The Committee recommends that necessary open API MSME stack based on TReDS data validated by GSTN for use by the fintech companies can be developed by DFS, MeitY, DoR/CBIC/GSTN. It is also recommended RBI may evolve master directions for "cash flow-based" financing of MSMEs by financial services companies, using a standardised and trusted e-invoice infrastructure designed around TReDS-GSTN integration. The Committee notes that the Factoring Act, 2011 restricts participation on TReDS platform to those NBFCs that are*

licensed as NBFC-Factors. It is recommended that, in order to promote greater participation of NBFCs on TReDS platform, this legal barrier be examined by the Government.

5. **Reforming P2P markets and creating a marketplace model for debt financing:** Many restrictions distort the level-playing field between fintech companies and traditional insurers, block significant revenue streams, prevent cost efficiencies for both financial services companies as well as fintech firms, thus precluding both innovation and competition. In India, a modest beginning has been made for P2P platforms by permitting specialised NBFCs to undertake this activity. The credit needs of MSMEs, households and individuals can be taken care of by creating a *marketplace model of debt financing* where savers, non-banks and banks are all permitted to lend. Participants of P2P platform include an individual, a body of individuals, an HUF, a firm, a society or any artificial body, whether incorporated or not. This means that it spans across savers, banks, non-banks and other potential lenders. *The Committee recommends that the Ministry of Finance may develop a marketplace model of debt financing in India by reforming the present model of P2P lending platforms. Potential hindrance in terms of restrictions on overall and individual exposure limits may be reviewed and options like allowing Mudra Bank to directly fund or co-fund SMEs and MSMEs through P2P platforms may also be examined as an alternative credit delivery channel.*

6. **Virtual banking:** The Committee notes that The Hong Kong Monetary Authority (HKMA) has recently issued guidelines for setting up virtual banks and is examining applications for virtual banking licenses. Banks are increasingly moving towards virtualisation of services. *The Committee recommends that DFS and RBI may examine the suitability of ‘virtual banking system’ in the Indian context, costs and benefits regarding allowing virtual banks and prepare for a possible future scenario where banks do not need to set up branches and yet deliver the full scale retail banking services ranging from extending loans, savings accounts, issuing cards and offering payment services through their app or website.*

7. **Dematerialisation of financial instruments:** Dematerialisation of financial instruments is customer-friendly given wide reach of mobile technologies. It also leads to disaster resilience and speedy recovery. *The Committee recommends that suitable regulatory and legislative changes be made to enable FDs and other financial instruments to be issued in dematerialised form and allow their frictionless use as collateral. The Committee recommends that the Government undertake a campaign to convert all financial assets held, especially by entities under its control like Post Offices, in demat form as far as possible but certainly in electronic form. Necessary suitable amendments to enable dematerialisation of financial instruments such as FDs and other deposits of the Post Offices, other forms of small savings certificates issued, Gold Deposit Certificates issued under GMS, Sovereign Gold Bonds, etc. may be undertaken. Similarly, deposits made under schemes like Sukanya Samriddhi Yojana in the name of individual beneficiaries should also be dematerialised. Additionally, all necessary administrative action to convert the existing stock of such deposits and certificates may also be taken in a time bound manner. Pending changes in laws and regulations that may be required to enable depositories to store all financial assets, the information pertaining to the assets may be stored in repositories, so that consumers can access this information through a single window.*
8. **Reform of Pre-paid instruments (PPI) system:** PPI system is quite convenient for making routine payments and its use is getting increasingly popular. However, there are quite a number of restrictions which hinders expansion of PPI system in the country, especially with respect to the rural areas. PPI issuing firms have many strict requirements regarding KYC norms that substantially increase their operational costs. For example, the maximum outstanding amount at any point of time in a PPI account (even if it is a full KYC account) is Rs. 1 lakh. This limits consumer benefits from such accounts and reduces the ability of PPI issuing firms to onboard customers. As deposits in PPI do not earn any interest, any apprehension that these might replace the banking system may not be well founded. Only those persons will hold amount higher than Rs. 1 lakh in the PPI account that have genuine payment needs. UPI, linked to bank accounts, has no such restrictions. There is a case for substantially revising this limit upwards. *The Committee recommends a thorough review of*

the PPI system with a view of considerably liberalising its use with adequate non-monetary limits safeguards to enable expansion of fintech.

- 9. Reformed KYC process in the light of the recent Supreme Court judgement on Aadhaar:** Fintech firms have been affected by the Judgment on account of legal infirmity in the Aadhaar law about online KYC not being permissible on a voluntary basis. The online KYC and authentication using Aadhaar was a sound system with considerable efficiency and convenience. Given the judgement by the Hon'ble Supreme Court, there is need to explore several alternatives such as Original Seen and Verified (OSV) to be done by banking correspondents for physical KYC, e-Sign, non-face to face on-boarding, including offline authentication modes prescribed by the UIDAI. The Committee notes that Ministries of the Government have issued interim alternative authentication procedures, while a bill is under consideration of Parliament to amend relevant acts to enable voluntary use of Aadhaar and Aadhaar authentication. *The Committee recommends that various options, including possibility of Video-based KYC, making available validated electronic versions of KYC related documents through DigiLocker, making these available for verification by service providers with prior customer consent, etc., may be considered early.*
- 10. Using unconventional data sources for better credit scoring and increasing access to credit:** The Committee notes that the poor and the unbanked are often unable to access credit due to the lack of formal credit history and non-availability of other relevant documents. Fintech companies focus on a number of unconventional sources of data and advanced data analytics to create better credit profiles of such individuals. These fintech companies collect information pertaining to social media behaviour, financial transaction behaviour, product purchase behaviour etc. These kinds of information are not captured by CICs. Fintech companies collect these kinds of information from the mobile phones of consumers with prior consent. Banks are being encouraged to explore the possibility of establishing new alliances with players like fintech companies for ease of loan sanctioning process enabled by new technologies. *In order to increase access to credit and to stabilise the growth of such practices and keeping in view recommendations of the Justice Srikrishna*

Committee, this Committee recommends that MeitY and TRAI may formulate a policy to enable such practices through a formal, consent-based mechanism.

Chapter 2: General Policy, Technology and Databases Related Actions for the Promotion of Fintech

- 11. Dedicated innovation teams in Public Sector Financial Services companies:** A well-defined team focused on innovation can serve as a visible, centralized point of initial contact for fintech. PSBs and other financial sector entities need to be far more proactive and innovative in remaining ahead in the use of fintech in delivering all their services. *The Committee recommends that Public Sector financial service companies establish innovation teams and sandboxes with bright talent (from inside and outside the PSEs) to experiment with cutting edge technology and evolve promising fintech solutions. Public Sector Financial Sector Enterprises may also be encouraged to create a common knowledge sharing platform for cross-learning and rapid deployment of innovative solutions.*

- 12. Artificial Intelligence for back-end processes:** Applications of machine learning include the automatic reading and interpretation of the implications of regulatory/contractual documentation using natural language processing as a means of reducing compliance risk. *The Committee recommends that Department of Financial Services (DFS) and PSU banks may work together to explore significant opportunities that exist to increase the levels of automation using Artificial Intelligence (AI), cognitive analytics & machine learning in back-end processes of PSU banks, especially Risk Management, Compliance management and Fraud Control, and make a roadmap to implement the strategy in time bound manner. Implementing such technology automated systems will bring in more efficiency to their work and reduce fraud and security risks.*

- 13. Public sector block chain-based trade finance:** The Committee feels that digitising the supply chain can remove the inefficiencies and lower risks in trade finance in India, by solving the issues of authentication of identity of companies, authorisation of signatories,

validation of documents, ownership validation and payments. A few IT solutions companies and private sector banks have already offered solutions. Scalability and attendant power requirements of blockchain applications are aspects that need to be considered before deciding to move processes to blockchain based technology. *The Committee accordingly recommends that the Ministry of MSME should work with DFS and RBI for testing and implementing block-chain solutions in trade finance for MSMEs in public sector banks as well.*

14. Remote Sensing & Drone Tech for Credit & Insurance: A drone policy has been announced by Ministry of Civil Aviation which has come into effect from December 1, 2018. PMFBY guidelines also provide for innovation in various aspects of the scheme, including crop cutting experiments. *The Committee recommends that Insurance Companies and Lending agencies in Agri sector should be encouraged to use drone and remote sensing technology, directly or using services of fintech companies, to assess discrepancies in self-reported cropping patterns and crop cutting experiment processes, enabling more efficient delivery of both credit and insurance products and reduce credit/insurance risks.*

15. Digitisation of Land Records: The country needs a dedicated National Digital Land Records Mission based on a common National Land Records Standards which should deliver common standards based land record data within a 3 year deadline. DoLR may collaborate with DFS, MEITY, Ministry of Agriculture & Farmers Welfare and State Governments, so as to put in place a robust land records management with real-time access to digital land records data through open APIs for all financial service providers. It is also essential to create applications involving State Registration departments enabling financial institutions to view as well as create or discharge encumbrances on property, avoiding multiple charges on the same asset. *The Committee recommends that the Government takes up modernisation and standardisation of land records in the country on a war footing with a deadline to complete such a system in the country in a period of three years. For this purpose, a steering committee comprising of Department of Economic Affairs, Department of Financial Services, Ministry of Agriculture, Ministry of Rural Development, Department*

of Land Resources and MEITY with involvement of State Land and Registration departments should be constituted to draw up a blueprint for doing so.

16. Re-engineering Legal Processes for the Digital world: Insistence on wet signatures on physical loan agreements for filing of loan recovery suits in courts need to be replaced by paperless legal alternatives as these can enable cutting costs and time in access to finance, repayment, recovery, etc., for businesses and financial service companies. *The Committee recommends review by Department of Legal Affairs of all such legal processes that have a bearing on financial services and consider amendments permitting digital alternatives in cases such as power-of-attorney, trust deeds, wills, negotiable instrument, other than a cheque, any other testamentary disposition, any contract for the sale or conveyance of immovable property or any interest in such property, etc., (where IT Act is not applicable), compatible with electronic service delivery by financial service providers.*

17. Open APIs: The Committee believes that APIs of relevant datasets be created such that fintech solutions can be built using them. These APIs must be open, to ensure equal access to all those wishing to build on this data, and anonymised, or, where identifiable, shared with the person's consent, to ensure the privacy of the people and built on the lines of IndiaStack. An *India AgriStack* can be built, such that lenders can evaluate the creditworthiness of agricultural borrowers. This stack can include a farmer's borrowing history, land ownership data, cropping pattern, and income data, among other information. An *India MSME Stack* can also be built, where data on MSMEs can be pulled through APIs to facilitate trade financing, flow-based lending, insurance and bill factoring. RBI has licensed 5 entities as NBFC-AA to act as account aggregators. *The Committee recommends that MEITY coordinate the process of identification of the datasets that can be shared through open APIs, setting targets for the creation of such APIs by the relevant Ministries while enabling and supporting Central, State and Local governments to create relevant open APIs. The Committee also recommends that greater nudge from all regulators combined with development of open API eco system will enable account aggregator services to take off.*

- 18. Expanding Open Government Data:** The Ministry of Science and Technology has formulated the National Data Sharing and Accessibility Policy (NDSAP), while MEITY is the nodal Ministry to implement the policy. The Committee notes the power of open Government data in spawning new businesses and improving business models, subject to privacy laws. *The Committee recommends that NDSAP needs wider acceptance and implementation, making way for sharing of data generated by Government agencies (including Ministries of Union Government, Autonomous bodies, State Government and Local Governments) in real-time through Open APIs.*
- 19. Support for new business models:** There are quite a few restrictions presently which may require reconsideration in the New Economy being built on digital infrastructure. For example, remuneration from advertisements on platforms pertaining to web aggregators and online platforms offering services in the insurance sector are barred. Similarly, financial services companies are restricted from outsourcing activities to fintech companies in the insurance sector, as well as restrictions on offering any other services apart from insurance. *The Committee recommends that Regulators should consider permitting new or innovative business models that can reduce costs, enable choices for consumers, while preventing conflicts of interest.*
- 20. Competitive ‘neutrality’ in regulation:** Regulators should take a functional approach to regulation, which means that they should be neutral to the institutional forms and activities that are performing to the functions of the financial system. Regulations must promote competition and a fair, and open, level playing field for digital financial inclusion by ensuring that providers of similar digital financial services have similar rights and responsibilities regardless of their institutional type and the technology used. This framework also should ensure that similar risks are regulated in a similar manner and that an appropriate risk-based approach to supervision is developed. *The Committee recommends that Regulators may approach fintech keeping in view the principle of ‘competitive neutrality’ with a view to enhancing competition while making regulations.*

21. Regulatory Sandboxes: The Committee notes that many economies across the world (UK, Singapore, Canada, Thailand etc.) have set up regulatory sandboxes as early as 2015 enabling financial sector innovations. A detailed blueprint of RBI's regulatory sandbox in India is provided in the *Report of the Household Finance Committee*, while other regulators have carried out similar studies. *The Committee recommends that regulators should introduce mechanisms, such as regulatory sandboxes and laboratories, that enable learning and adaptation of regulatory responses which can play an important role, without further delay, in order to maintain India's competitive edge.*

22. Planning for high impact fintech scenario: Fintech could have low, moderate, or high impact. At present, India can be said to be in the low impact scenario, and the regulators should focus on investing in research and enhancements to the regulatory regime to enable adoption of fintech and related risk management systems. In due course, the moderate impact or high impact scenarios could evolve leading to creative destruction of incumbent firms, and regulators need to anticipate and prepare for bankruptcies and resolution regimes for existing financial service companies that fail to gear up. *Regulators should establish prudential regulations for fintech to enable the moderate and high impact scenarios of fintech development to emerge.*

23. Open Data for enhancing competition: All financial sector regulators may study the potential of open data access among their respective regulated entities, for enabling competition in the provision of financial services. To start with, the Committee recommends that RBI may consider making it mandatory for financial service companies to encourage banks to make available databases of rejected credit applications (referral pools) available on a consent-basis to a neutral marketplace of alternate lenders. For increasing access to credit in rural areas, access to PSU bank rejection data would be especially helpful to alternate lenders. As seen from the example of *Open Data Regulations* in the UK banking sector, opening up customer data with consent safeguards can help promote competition in financial services and unlock greater efficiency. *Taking note of this, the Committee recommends that RBI may consider making available banking data (such as transaction and account history data) for use by the financial sector, including fintech*

firms, (based on consumer consent and with other appropriate safeguards) through APIs. It also recommends that all financial sector regulators study the potential of open data access among their respective regulated entities, for enhancing competition in the provision of financial services.

24. Eliminating costs of on-boarding KYC data on eKYC Depository: There is an urgent need to reduce the costs of KYC to promote financial inclusion among the weaker sections. The Central KYC (CKYC) Registry has commenced work and the legacy KYC data are being uploaded by service providers. While large financial institutions can afford to pay for uploads, this may not be affordable for small players. The cost of on-boarding a customer is an expensive proposition and, in this way, the new banks are at a serious disadvantage. *The Committee recommends that there should be no charge for uploading KYC data, while every download can be priced based on the user pays principle. This will enable CKYC to take off early.*

25. Mandatory use of C-KYC Registry: In light of representations made by multiple stakeholders, the Committee is of the opinion that e-KYC has the potential to reduce customer on-boarding and servicing costs significantly. *It therefore recommends that all financial sector regulators fix deadlines for on-boarding existing KYC data to the Central KYC registry and make CKYC fully operational and make KYC a digital and paperless process. At least the KYC data from the time the concept of Officially Valid Documents was introduced vide PML rules should be uploaded. In respect of legacy accounts, data may be uploaded by banks during the process of re-KYC.*

26. Consumer Protection framework: Fintech while offering myriad opportunities, also poses threats – arising out of illiteracy, ignorance of risks, etc. The PM Gramin Digital Saksharata Abhiyaan (PMDISHA) has been launched to enhance digital and financial literacy of 6 crores rural persons on characteristics, advantages, and risks of digital financial services and channels. Nevertheless, there is need for legal framework to redress grievances of consumers in the financial sector, especially digital services. The legal framework needs to address risks specific to the digital environment, ensure consumers of digital financial

services have meaningful choice and control over their personal data—including through informed consent, require that data not be used in an unfair discriminatory manner in relation to digital financial services, confusing user interfaces that raise the risk of mistaken transactions; inadequate security of systems; irresponsible lending through digital channels; online frauds, system downtime that prevents access to funds; unclear or limited recourse systems; potential misuse of AI/ML, etc. Government had in budget for 2015-16 announced the creation of a *sector-neutral Financial Redress Agency (FRA)* to address the grievances of retail consumers against all financial service providers (FSPs). *The Committee recommends that a legal framework for consumer protection be put in place early keeping mind the rise of fintech and digital services. It further recommends enacting such a law early keeping the rise of financial technologies in view.*

27. Tech-enabled calibration of regulatory burden: Fintech may reduce the need for regulations by enabling better third-party monitoring and by enabling better risk management by the financial firms. Firms that adopt RegTech and sectors with SupTech implementation can be subject to lesser compliance burden. The Committee notes that the RBI Working Group on FinTech and Digital Banking (Nov 2017) has recommended that regulatory actions may vary from “Disclosure” to “Light-Touch Regulation & Supervision” to a “Tight Regulation and Full-Fledged Supervision”, depending on the risk implications. *Hence, the Committee recommends that all financial sector regulators must consider regulations proportionate to risks and factor in risks mitigated by use of tech-enabled systems by regulated entities.*

28. Regulation Technology (RegTech): The Committee notes that RegTech is still evolving and innovations may lie ahead. Much of the effort in development thus far has focused on digitization of manual processes, but the larger objective is to meet increasingly strict know-your-customer (KYC), anti-money laundering (AML) and counter-terrorist financing (CTF) requirements. AI applications, especially, have the potential to help firms detect compliance risks and make better-informed decisions about how to mitigate them. RegTech can reduce firm-level compliance risks and also reduce supervisory risks. *The Committee recommends that the financial sector regulators (RBI, SEBI, IRDAI, and PFRDA) must*

develop standards and use-cases for RegTech by financial sector service providers to make compliance with regulations easier, quicker and more automated for regulated entities.

- 29. Supervisory Technology (SupTech) for Regulators:** SupTech applications can be found in data collection, data reporting, data management and virtual assistance. Within data analytics, SupTech could work in four key areas: market surveillance, misconduct analysis, micro-prudential and macro-prudential supervision. SupTech can reduce costs of both compliance and supervision. *The Committee recommends that each financial sector regulator must study the applications of SupTech, or supervisory technology efforts and evolve an institutional framework for developing use-cases, testing, deployment, monitoring and evaluation of SupTech.*

Chapter 3: Fintech for Financial Inclusion

- 30. Fintech for lending by Cooperatives and other financial institutions:** The Committee noted that currently, the credit bureau records for farmer loans or Kisan Credit Card Schemes, largely given by the Cooperative Sector although commercial banks share is also significant in terms of total exposure, are not collected in any central registry. This leads to a situation of non-availability for credit history for small and marginal farmers leading to denial of credit to them and possible over-leveraging. The Committee notes that some fintech companies, Credit Mantri, CreditVidya, Samunnati, to name a few, are using Artificial Intelligence (AI) and Machine Learning (ML) to create alternate lending data score, a vital requirement for fulfilling the financial inclusion agenda. Government of India in 2017-18 Budget provided an allocation of Rs. 1,900 crore over three years support to NABARD for computerisation and integration of all 63,000 functional PACS with the Core Banking System of District Central Cooperative Banks. This presents a great opportunity to infuse fintech. *The Committee recommends that NABARD should take immediate steps to create a credit registry for farmers with special thrust for use of fintech along with core banking solutions (CBS) by agri-financial institutions, especially cooperative financial institutions, for credit scoring, default analytics, predictive crop analytics, repayment, monitoring fraud control and improving efficiency in credit services.*

- 31. Leveraging Fintech in Agri-insurance/PMFBY:** As per the current PMFBY guidelines, only Financial Institutions like Commercial Banks, Co-operative Banks, and Regional Rural Banks are eligible as Implementing Agencies to cover borrowers under PMFBY. The guidelines also state that the loanee farmers will be covered only through Banks/Financial Institutions whereas non-loanee farmers shall be covered through banks and/or insurance intermediaries. This keeps NBFC lenders, most of which leverage on fintech, outside the claim settlement process, enhancing risk of default by borrowers. Consequently, NBFC firms that have lent seasonal Agricultural Operations loans are forced to cover their farmers as non-loanee farmers and need an IRDAI license to become an insurance intermediary. There is need to extend the concept of loanee farmers to include credit advanced by fintech-based NBFC lenders. *The Committee recommends that fintech firms may be provided with a supportive regulatory climate to participate in agri-credit & insurance markets effectively, given that the demand for agri-credit and insurance far outstrips the existing supply. Insurance premium payments (for national as well as private insurers) should be accepted through mobile and other digital modes to enable speedy and hassle-free coverage especially during short cultivation seasons.*
- 32. Fintech in micro-Insurance and Employees Insurance:** *The Committee recommends that deployment of fintech in micro-insurance enrolment, claims management, subscriber information etc. will enable cost reduction and exponential growth in coverage. The Committee recommends that ESIC, EPFO and PSE Insurance Companies must deploy fintech in the front-end and back-end processes to reduce risks, widen coverage, enhance subscriber confidence and support seamless claims management.*
- 33. Fintech in micro-Pension & EPFO:** The Committee notes that only 7.4 percent of the working age population in India is covered under a pension program. That compares with 65 percent for Germany and 31 percent for Brazil, another major emerging market economy. The Committee recommends that use of fintech in micro-pension schemes such as the Atal Pension Yojana, EPF and other retail schemes can enable reduction of administrative costs, create greater customer traction and make way for significantly higher

enrolment levels and competition. *Harnessing fintech would enable monthly contributions to be paid in several instalments over each month, making it possible for daily wage earners.* Even for non-micro-pension subscribers, fintech can help in personalisation through a dashboard, investment options, integration with other rewards platforms and advanced analytics. *The Committee recommends creating a common digital platform for all micro-pension schemes and Government pension schemes, including EPF, through which pension subscribers can subscribe to specific schemes seamlessly and reduce access barriers by allowing payments through various modes such as Jan Dhan Yojana accounts, debit card, credit card, internet banking, mobile wallets etc.*

34. Fintech adoption in MUDRA: Revising the refinancing criteria for digital lenders at competitive rates through MUDRA (revising margin caps for small ticket MSME loans) and SIDBI (relaxation of profitability requirements) are required to be considered. Currently, Commercial Banks, Regional Rural Banks and Scheduled Cooperative Banks are eligible to avail of refinance support from MUDRA for financing micro enterprise activities. *The Committee recommends that the MUDRA program needs to open up credit supply channels through non-banking fintech credit companies, besides mandating use of fintech by all players to enable ease of delivery of services such as AI/ML based credit scoring system for applicants leading to reduced risks and costs of lending.*

35. Common Fintech Platform for Small Saving Schemes: Small Savings schemes, as 8 products, are being distributed through a large network of distribution agencies, i.e. 1,54,000 Post Office spread all over the country, nearly 8,000 branches of the Nationalised Banks. *In order to expand the reach of small savings schemes, provide ease of access and transactions to consumers, reduce risk of frauds, enable trading in secondary markets, etc., the Committee also recommends that all Small Savings Products, which are neither accessible online nor available in demat form, should be brought on a common online platform in demat form. For vulnerable groups and weaker sections who are neither digitally and financially literate, a combination of both human interface and technological application may be effective.*

36. Fintech in PS Bank Education Loans: Education Loan disbursements climbed 9.25% in FY18 to touch a portfolio size of Rs. 82,600 crore as of March 2018, with share of commercial banks declining from 90% to 83% and NPAs rising to 8.15%. NBFCs aided by fintech have begun to play a small but increasing role. The Vidyalakshmi portal has enabled a single window electronic platform integrating access to Educational Loans from all commercial banks. *The Committee recommends use of fintech by Public sector commercial banks to enhance credit scoring, follow up of repayments, predictive analytics, etc., so as to enable reduction of NPAs in this space.*

Chapter 4: Organizational and Administrative Measures in Government of India for Promoting and Monitoring Expansion of Fintech and GovTech

37. Cooperation with leading nations: Since fintech is an evolving theme; there is a scope for collaboration and consultation to benefit from the mutual exchange of ideas. Indian policymakers should enter into collaborative arrangements with other countries to develop a shared understanding of benefits and risks from fintech, using multilateral and/or bilateral fora, i.e. collaboration between regulators and collaboration between fintech business platforms, etc. *The Committee recommends that efforts should be made to effectively tap joint forums such as the JWG set up with Monetary Authority of Singapore and use these fora to connect Indian regulators and fintech industry with counterparts abroad to enable cross learning.*

38. Fintech advisory council in each financial sector regulator: The RBI Working Group on FinTech and Digital Banking had recommended that all financial sector regulators need to engage with fintech entities in order to chalk out appropriate regulatory response and with a view to re-align regulation and supervision in response to the changing environment, and suggested that partnerships/engagements among regulators, existing industry players, clients and fintech firms will enable the development of a more dynamic and robust financial services industry. *The Committee recommends that every financial sector regulator constitute an Advisory Council on fintech to bring together industry leaders and fintech experts, who can identify viable ways to provide inputs periodically to modernize*

the regulatory architecture, develop use-cases for RegTech and SupTech, design better risk management systems, sharing innovation and consumer protection standards.

39. **Taskforce on data protection in the financial sector:** The Committee is of the opinion that the provisions of the proposed draft Data Protection Bill, 2018 may have far-reaching implications for the growth of fintech sector. The Committee accordingly recommends that regulators urgently review their existing regulatory framework with respect to data protection and privacy concerns, in keeping with emerging data privacy legislation in India. *The Committee recommends that a taskforce in the Ministry of Finance may be set up with the participation of the regulators and make suitable recommendations to safeguard the interests of consumers, while also enabling a positive climate for innovation.*
40. **Inter-regulatory coordination on fintech:** The Committee recommends that in addition to the creation of a regulatory sandbox by each regulator, there is a need for inter-regulatory coordination to support hybrid financial products and common distribution, where licensing or regulatory requirements of more than one regulator may have to be complied with, development of common standards on RegTech and SupTech, consumer protection measures, sandboxes, etc. *The Committee recommends that Inter-Regulatory Technical Group (IRTG) set up under the FSDC Sub-Committee should be the forum for such inter-regulatory coordination.*
41. **Inter-Ministerial Steering Committee on fintech in the financial sector:** In light of the fact that many of the underlying technologies supporting fintech have cost-saving and efficiency enhancing potential, *this Committee recommends that an Inter-Ministerial Steering Committee on fintech applications be set up in Department of Economic Affairs (DEA), Ministry of Finance, to continue to carry on the tasks of implementing this report, including exploring and suggesting the potential applications in government financial processes and applications, particularly accounting and asset management, welfare services, taxation, and handling citizen grievances.*

42. Ministry level fintech working groups: Fintech represents a unique opportunity to promote the objectives of financial inclusion and distributed economic growth, especially for MSMEs and those involved in the agricultural sector. Ministries/departments with potential for fintech use cases, especially MSME, DFS, Agriculture, HRD, MoRD, DoLR, MoHUA, MHRD, MoL&E, may set up ministry-level fintech working groups to identify, screen and implement potential use cases for fintech in collaboration with start-ups and service providers. *Considering the potential use-cases of fintech in enabling application and delivering non-financial services across the wider government, the Committee recommends that every department/ministry in the government may create a ministry-level fintech working group to assess the potential of using GovTech and fintech applications in their ministry/department.*

43. Inter-ministerial group on fintech: In light of the fact that many of the underlying technologies supporting fintech have cost-saving and efficiency-enhancing potential, the adoption of some of these technologies for governmental functions could result in significant efficiency gains. *The Committee recommends that an Inter-ministerial group on fintech be established at MeitY, for exploring and suggesting the potential applications of the underlying technologies (such as open APIs, blockchain, robo-advisories, big data analytics, NDSAP etc.) in government processes, particularly in accounting and asset management, welfare services, taxation, and handling citizen grievances, to make recommendations on technology choices, providing inter-ministerial inputs to fintech Working Groups in each Ministry on the requirements of different departments. The Group can also perform the role of periodically reviewing the technological systems and scope for introduction of new technologies in a coordinated manner across the Central Government.*

44. Centres of excellence in fintech: There is a need for carrying out research and evaluation of the application of fintech technologies to public service delivery problems, besides assisting in the capacity building of stakeholders. *The Committee, therefore, recommends setting up Centres of Excellence on fintech in 2 or 3 key premier National Institutions like IITs/NITs and Government Financial Sector Institutions like IDBRT/NIBM/NIFM.*

45. Capacity building: The underlying technology behind fintech, such as blockchain, open APIs, open data policies, etc. need to be carefully evaluated for adoption across a range of sectors, requiring a better understanding of fintech by officials of ministries and regulators. *A capacity building program in fintech for senior government officials in ministries and departments, regulators and financial institutions to sensitise officials on potential use cases, potential, risks, costs and benefits of fintech, through government training institutions, such as NIFM, IDBRT, NIBM, etc.*

Annexure A: Terms of Reference of the Committee

F.No. 11/15/2017-COIN
Government of India
Ministry of Finance
Department of Economic Affairs
Investment Division

North Block, New Delhi
Dated 5th March, 2018

OFFICE ORDER

Subject: Constitution of a Steering Committee on Fintech related issues.

The undersigned is directed to say that in pursuance to the announcement made in the Budget Speech 2018-19 (Para 75), it has been decided to constitute a Steering Committee under the chairmanship of Secretary, Department of Economic Affairs, Ministry of Finance, as follows:-

A. Objective: - To consider various issues relating to development of Fintech space in India with a view to make Fintech related regulations more flexible and generate enhanced entrepreneurship in an area where India has distinctive comparative strengths vis-à-vis other emerging economies. The Committee will also focus on how Fintech can be leveraged to enhance financial inclusion of MSMEs.

B. Composition: - The Steering Committee would comprise of the following members:-

Sl. No.	Designation	Department	Remarks
(i)	Secretary	Department of Economic Affairs (DEA)	Chairman
(ii)	Secretary	Ministry of Electronics and Information Technology (MeitY)	Member
(iii)	Secretary	Department of Financial Services (DFS)	Member
(iv)	Secretary	Ministry of Micro, Small and Medium Enterprises (MSME)	Member
(v)	Chairperson	Central Board of Excise and Customs (CBEC)	Member
(vi)	Chief Executive Officer	Unique Identification Authority of India	Member
(vii)	Deputy Governor (DG)	Reserve Bank of India	Member
(viii)	Joint Secretary (Investment)	Department of Economic Affairs (DEA)	Convener

B.1. The Steering Committee may also invite participants from the private sector.

C. Terms of Reference: The Terms of Reference of the Steering Committee will be as follows:-

- i. To take stock of the developments in the Fintech sector globally, and in India, and arrive at a common shared understanding of the current state of play;
- ii. To analyse critically the regulatory regime spread over different entities that has impacted the growth of Fintech in India;
- iii. To consider how Fintech can be leveraged in critical sectors of the economy, especially financing of MSMEs, affordable housing, delivery of e-services to vulnerable sections, provision of land record management and other government services, access and adoption of digital payments, and to study the developments in these areas;
- iv. To develop regulatory interventions, e.g., regulatory sandbox model, that will enhance the role of Fintech in the sectors identified for focused interventions;
- v. To promote ease of doing business in the Fintech sector;
- vi. To consider means of using data with GSTN and data residing with information utilities such as Credit Information Companies (CICs), etc in open domain with a view to developing applications for financing of MSMEs.
- vii. To work with Government agencies like UIDAI to explore creation and use of unique enterprise identification number;
- viii. To consider international cooperation opportunities in Fintech with countries like Singapore, UK, China, etc.

2. This issues with the approval of Hon'ble Minister of Finance.


(Akhilesh Kumar Mishra)

Director

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Email: akhileshk.mishra@nic.in

To

1. Secretary, Department of Economic Affairs (DEA), North Block, New Delhi
2. Secretary, Ministry of Electronics and Information Technology (MeitY), Electronics Niketan, 6, CGO Complex, Lodhi Road, New Delhi
3. Secretary, Department of Financial Services (DFS), JeevanDeep Building, Sansad Marg, New Delhi
4. Secretary, Ministry of Micro, Small and Medium Enterprises (MSME), Udyog Bhawan, New Delhi
5. Chairperson, Central Board of Excise and Customs (CBEC), North Block, New Delhi
6. Chief Executive Officer, Unique Identification Authority of India, 3rd Floor, Tower II, Jeevan Bharti Building, Connaught Circus, New Delhi - 110001
7. Deputy Governor (DG), Reserve Bank of India, Central Office Building, Shahid Bhagat Singh Road, Fort, Mumbai, Maharashtra 400001
8. Joint Secretary (Inv & IER), Department of Economic Affairs (DEA), North Block

F.No. 11/15/2017-COIN
Government of India
Ministry of Finance
Department of Economic Affairs
Investment Division

North Block, New Delhi
Dated 16th March, 2018

OFFICE ORDER

Subject: Constitution of a Steering Committee on Fintech related issues.

In partial modification of this Department's OM of even number dated 5.3.2018 (copy enclosed) , the Steering Committee on Fintech related issues would comprise of the following members:-

Sl. No.	Designation	Department	Remarks
(i)	Secretary	Department of Economic Affairs (DEA)	Chairman
(ii)	Secretary	Ministry of Electronics and Information Technology (MeitY)	Member
(iii)	Secretary	Department of Financial Services (DFS)	Member
(iv)	Secretary	Ministry of Micro, Small and Medium Enterprises (MSME)	Member
(v)	Chairperson	Central Board of Excise and Customs (CBEC)	Member
(vi)	Chief Executive Officer	Unique Identification Authority of India	Member
(vii)	Deputy Governor (DG)	Reserve Bank of India	Member
(viii)	Joint Secretary (Investment)	Department of Economic Affairs (DEA)	Convener
(ix)		Representative of SEBI	Member
(x)		Representative of Invest India	Member

2. The terms of reference and other conditions mentioned in the O.M. dated 5.3.2018 under reference shall remain the same.
3. This issues with the approval of Secretary, DEA.



(Akhilesh Kumar Mishra)

Director

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To

1. Secretary, Department of Economic Affairs (DEA), North Block, New Delhi
2. Secretary, Ministry of Electronics and Information Technology (MeitY), Electronics Niketan, 6, CGO Complex, Lodhi Road, New Delhi
3. Secretary, Department of Financial Services (DFS), JeevanDeep Building, Sansad Marg, New Delhi
4. Secretary, Ministry of Micro, Small and Medium Enterprises (MSME), Udyog Bhawan, New Delhi
5. Chairman, SEBI
6. Chairperson, Central Board of Excise and Customs (CBEC), North Block, New Delhi
7. Chief Executive Officer, Unique Identification Authority of India, 3rd Floor, Tower II, Jeevan Bharti Building, Connaught Circus, New Delhi - 110001
8. Deputy Governor (DG), Reserve Bank of India, Central Office Building, Shahid Bhagat Singh Road, Fort, Mumbai, Maharashtra 400001
9. Joint Secretary (Inv & IER), Department of Economic Affairs (DEA), North Block
10. CEO, Invest India

Annexure-B

List of industry participants in Consultations

1. RBL Bank	16. USISPF
2. State Bank of India	17. Shardul Amarchand Mangaldas
3. National Stock Exchange	18. GSTN
4. YES Bank	19. NASSCOM
5. iSPIRT Foundation	20. TRA Law
6. Indifi Tech	21. DSCI
7. Paisabazaar.com	22. Pinelabs
8. Northern Arc	23. Mobikwik
9. OMIDYAR Network	24. Cashless Consumer
10. Invest India	25. Wealth India Financial Services
11. RXIL	26. Zest Money
12. EICI	27. Phone Pe
13. PayPal	28. Facebook
14. Digital Lenders Association of India	29. Aspada Investments
15. MasterCard	30. Funds India
	31. IMAI
