



राष्ट्रीय वित्तीय प्रबन्धन संस्थान
National Institute of
Financial Management

मनुष्यवती भूमिरर्थः



Government of India
Ministry of Finance
Department of Economic Affairs



भारतीय प्रौद्योगिकी संस्थान दिल्ली
Indian Institute of Technology Delhi
Department of Management Studies
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EMERGING PERSPECTIVES IN FINTECH

The Experts' Voice

A Compendium of Articles
12th November 2018

Knowledge Partners



THOMSON REUTERS



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Foreword

The history of FinTech is littered with technological innovations in the area of finance, financial inclusion and services in the developed and developing economies around the globe. During the last decade FinTech has developed at a steady pace and the emergence of new players in the form of Startups, MSMEs, Payment Banks has thrown a challenge to the traditional banks and other financial services' companies.

To keep pace with the developments, the Union Finance Minister Shri Arun Jaitley in his budget speech for 2018-19, had announced that a Steering Committee has been constituted by Ministry of Finance under the Chairmanship of Secretary, Department of Economic Affairs (DEA), Ministry of Finance. The Terms of Reference (ToR) for the committee amongst others, also included promoting ease of doing business in the financial sector and leveraging FinTech in critical sectors of the economy. The focus of the committee will be in the areas of financial inclusion, financial services, financing of MSMEs, affordable housing etc. The committee will also deliberate on developing regulatory intervention e.g. Regulatory Sandbox Model, keeping pace with the technological changes from time to time.

To elicit views of stake holders on the Indian FinTech landscape, the Steering Committee has mandated DEA-NIFM Research Programme to hold the 'International Conference on Emerging Perspectives in FinTech' on November 12th and 13th, 2018 in association with the Department of Management Studies, Indian Institute of Technology, Delhi.

The policy makers and experts from the FinTech sector from India as well as abroad, will engage in deep diving sessions, deliberating on various aspects encompassing the terms of reference of the FinTech Committee to improve the financial stability, competitive development, conduct of business in a fair manner and improve the regulatory environment of the industry.

To commemorate this international conference, DEA-NIFM Research Programme is pleased to present FinTech knowledge papers titled "The Experts' Voice – A Compendium of Articles", contributed by global industry players from India and Abroad, domain experts, institution and the scholars, focusing on various aspects of FinTech ecosystem, issues and challenges there too, along with the concerns on regulatory interventions and other related perspectives on charting out a forward looking high trajectory growth path to leverage the immense potential offered by the highly growing digital technology, for innovative financial inclusion in the country.

We are hopeful that all the readers of this compendium, find the same useful and informative.



Dr. A. M. Sherry

Professor & Head

DEA-NIFM Research Programme

National Institute of Financial Management

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RISE IN DIGITAL FINANCE MODELS FOR MSME LENDING IN INDIA



Mihasonirina Andrianaivo
World Bank Group



Ashutosh Tandon
World Bank Group

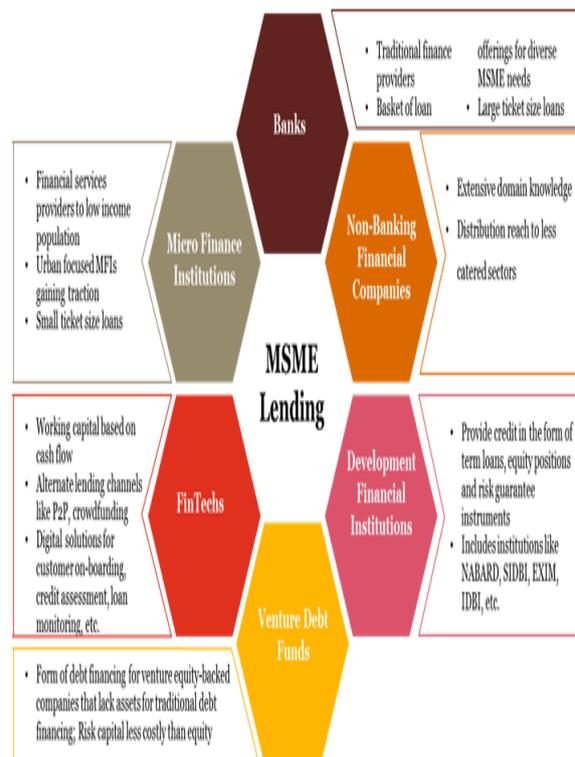
Abstract:

While banks remain the undisputed leader in providing formal debt to MSMEs in India, alternative lending models backed by technology and big-data have come up in recent years, helping MSME lending evolve to some extent. Capitalizing on the need to address the serious lack of formal credit to these businesses in general, the new models are disrupting the way enterprises are assessed for credit risk and presenting new methods of financing them in timelines that are relevant for them. Given FinTech’s potential for transformative results, an enabling regulatory environment, proportionate to the risks, as well as meaningful partnerships between traditional financial institutions and FinTech can help FinTech achieve scale and ultimately expand reach of MSMEs.

Globally credit availability, in particular to SMEs, has pulled back, following the financial crisis of 2007-2008 and the subsequent heightened regulations (including increased capital and liquidity requirements)¹. Several factors contribute to a more challenging environment for young and growing enterprises to secure credit globally and in India. Mirroring the global trend, banks in India are finding it a challenge to meet the growing demands for MSME financing because of higher risk perception of MSMEs, high transaction costs to acquire, underwrite, and serve smaller loans to MSMEs and information asymmetries.

Demand and supply side issues in MSME financing and the persistent credit gap (estimated at US\$230 billion² in 2017) have underscored the need for technology disruption in formal debt financing. Financial technology, making use of transactional and alternative data and digitization of SME credit, can help in this regard. Alternative lending models are rapidly emerging to complement

FIGURE 1- KEY PLAYERS IN THE MSME LENDING SPACE IN INDIA



conventional modes of bank credit and set the stage for the rise in FinTech firms.

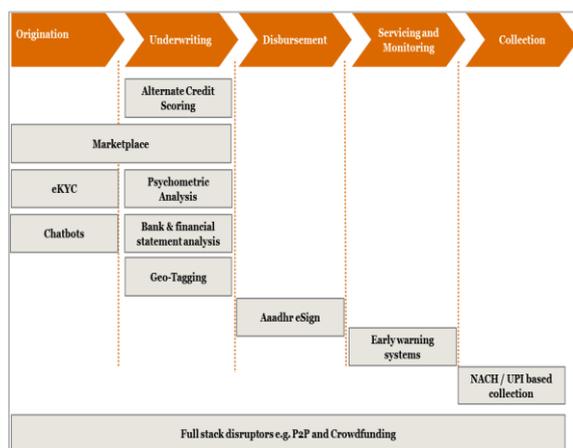
¹ WEF (2015)

² <https://www.smefinanceforum.org/data-sites/msme-finance-gap>

In India, the slew of programs announced in recent years such as Digital India, Start-Up India and Smart Cities have fostered a more favorable business environment for financial technology – or FinTech – models to emerge in the MSME lending space. The GoI push via India Stack³ and the JAM Trinity⁴ are supporting digitization and the FinTech industry. MSME banking is likely to be the fourth-largest sector to be disrupted by FinTech in the next five years after consumer banking, payments, and investment/ wealth management (PwC 2016 Global FinTech Survey Report).

MSME FinTech lenders can be broadly categorized into five distinct archetypes: Marketplace Lending, Balance Sheet Lending, Marketplace Hybrid Model, Invoice Lending, and Supply Chain Finance.

FIGURE 2- FINTECH SOLUTIONS THAT CAN BE APPLIED AT EACH STEP OF THE VALUE CHAIN



FinTech companies have emerged with innovative solutions that can substantially improve efficiencies at every step of the lending process (from loan origination to underwriting, disbursements, collections and monitoring). FinTech models can provide end-to-end solutions for the lending value chain or “full stack lending models” such as Peer-to-Peer (P2P) lending, marketplace lending, crowdfunding, invoice based financing and so forth.

Currently, FinTech companies provide small-ticket loans and are focused on

FIGURE 3- BENEFITS OF FINTECH FOR MSME LENDING {SOURCE: WEF (2015), WBG-INTELLECAP ANALYSIS}



MSMEs that have limited credit history and are in need of formal funding.

Successful partnerships between FinTechs and traditional financial institutions (incumbents) could be a game changer for MSME lending:

- Partnership between FIs and FinTech to use FinTech solutions to improve FI lending process and outreach;
- Partnership between FIs and mature FinTechs to finance MSMEs (co-lending, on-lending, guarantee mechanisms etc.); and
- Partnership between FIs to leverage together, FinTech solutions for outreach to MSMEs (for instance through P2P lending and marketplace lending)

From the perspective of financial inclusion, financial technology holds the potential to level the playing field for MSMEs and entrepreneurs from all socio-economic backgrounds and geographies. The rise in financial technology is expanding the financing options for MSMEs and pushing traditional lending players to diversify and build their capabilities in borrower outreach, credit assessment and data analytics. The World Bank Group (WBG) is supporting FinTech for MSME lending through various activities, including its financing and knowledge partnership with the Small Industries Development Bank of India (SIDBI, the APEX institution for

³ IndiaStack is a set of APIs that allows governments, businesses, startups and developers to utilise an unique digital Infrastructure to solve India's hard problems towards presence-less, paperless, and cashless service delivery.

⁴ JAM (short for Jan Dhan-Aadhaar-Mobile) trinity refers to the government of India initiative to link Jan Dhan accounts, Mobile numbers and Aadhar cards of Indians to plug the leakages of government subsidies.

MSME lending and Development). A scoping study on “FinTech solutions to support SIDBI” was conducted as part of the on-going MSME Growth, Innovation and Inclusive finance Project. The study mapped relevant FinTech models and existing frameworks for MSME lending; and how they may fit under SIDBI’s lending strategy and processes.

Given FinTech’s potential for transformative results, an enabling regulatory environment proportionate to the risks as well as meaningful partnerships between traditional financial institutions and FinTech can help FinTech achieve scale and ultimately expand

reach of MSMEs through increased affordability, efficiency and speed of delivery of financial services. The Indian Regulators, Policy Makers and Think Tanks are committed to supporting and implementing India’s ambitious financial inclusion agenda, which is to reach last-mile customers and ensure they benefit from participation in formal financial markets.

This objective can be accomplished through financial technologies that lowers the transaction costs and increase ease of access. A collaborative approach from regulators, market players and investors, will help achieve this objective.

FINTECH: A NEW TINT OF GLASSES TO SEE THE AGE-OLD WORLD OF FINANCE



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FinTech: A new tint of glasses to see the age-old world of Finance

"...digital disruption is going to soon affect every aspect of your money: how you earn it, save it, invest it and spend it. The changes are going to be both revolutionary...and mundane, but they are going to happen on a very large scale..."

- Novack (2015)

Financial Technology, or FinTech, is one of the biggest radical developments in the field of Finance in recent times. While the world has witnessed technological advancements for a long time now, FinTech emerged when the technologies were deployed in the area of financial services. The deployment was, however, not only to make the existing services more efficient, but to create new services and offerings as well (through innovation). The impact of such innovation (in finance and other areas) was so substantial that Schwab (2016), the founder and executive chairman of World Economic Forum Geneva, believed this development to have brought the Fourth Industrial Revolution. It is not wrong to state that no other sector has been impacted so radically by the advent of technology, as the Finance sector.

Marr (2017) stated, "Don't assume that FinTech is simply a fad or buzzword... investment in FinTech around the world has increased dramatically...and this is likely only to continue to increase, as FinTech touches not just the financial services sector, but every business the financial services industry deals with (which is to say, all of them)". Owing to

the growing importance of this field and its promising future prospects, many of the major finance/management firms (viz., Accenture, Capgemini, EY, KPMG, PwC, etc.) have dedicated teams to follow the developments. According to a report of KPMG (2018), the global investment in the FinTech firms during the first half year of 2018 has been \$57.9 billion, which is higher than the annual global investment of 2017. Further, a report from PwC (2017) stated that investors expected to earn returns (i.e., Returns on Investment or RoI) to the tune of 20 per cent on projects related to FinTech.

Newton's third law of motion states, "for every action, there is an equal and opposite reaction". So grand is the coverage of FinTech, it seems to be the 'reaction' against every 'action' in the field of finance. When one talks about subjectivity arising from involvement of humans in this field, it gives you an objective solution: *Artificial Intelligence!* When one worries about the limited capacity of technology to churn information from the existing sea of data, it gives you a more advanced ability: *Big Data!* When one is upset that the bank

refused financing, it offers: *Crowd funding!*

Humans dealing in currency across networks bother you about monitoring costs. It has an answer for that as well: *Cryptocurrency!* Do not want to carry cash with you, it has an alternative: *Electronic money!* Keeping a track of objects to ensure their proper functioning and maintenance is consuming your time and energy, it frees you from the trouble and enables objects to manage on their own: *Internet of Things!* You boast about learning curve, it gives you a more efficient learning: *Machine Learning!* You discourage it saying it can be risky and unsafe for consumers, it has a solution: *Regulatory Sandboxes!* Wondering how to manage your investment funds, it can advise you: *Robo-advising!* It's like you name it, you have it. Apparently, it won't be very long before this emerging paradigm would create its own vocabulary with each alphabet: and it would not be surprising if it substitutes, for the coming generation, the adage 'A for apple, B for ball...' with 'A for artificial intelligence, B for big data'.

However, there's no gain without pain, and the same holds true for the FinTech as well. While the innovations have enriched the options for consumers, they have also created new challenges for the players. In fact, FinTech is often referred to as *Disruptive Innovation*, an innovation that creates new business at the cost of disrupting the existing. For example, many FinTech firms act as financial intermediaries, perform some of the roles similar to banks and are therefore called *Shadow Banks*. They disrupt the playing field for banks as they are not subject to the same strict regulations as banks. Similarly, *TechFin* (Zetzsche et al., 2018) are the firms that originally belonged to other sectors but are venturing into financial sector and performing roles of financial firms as well. They are disrupting the playing field for existing firms as they are using data gathered from other sectors for their advantage in financial sector. A possible way out could be to cooperate with the FinTech players instead of competing with

them. According to PwC report (2017), 82 per cent of the financial institutions globally expect to increase their FinTech partnership in coming three to five years. The figure for India for the same is more than 95 per cent.

Further, owing to the magnitude of impact of FinTech firms, regulating them has been a task of prime importance. *RegTech*, therefore, is seen as another offspring of this development. This brings new challenges for the regulators and it is believed that the regulations will evolve over time. At the same time, Treleven (2015) saw it as an opportunity to improve the existing regulations and Bromberg et al. (2018) observed, in it, an opportunity for increasing global cooperation among regulators.

Thus, like any other innovation, FinTech can be seen as a blend of both a boon and a bane. However, which end of the scale dominates would depend upon the attitude of the stakeholders. Studies have shown (for example, Broby and Karkkainen, 2016) that for an economy, adopting the FinTech development brought in higher efficiency than resisting its growth. This implies that, in general, it is in the interest of the economy to develop a conducive environment for further development of FinTech. This requires joint efforts from various parties. The *government* should strive to maintain a balance between innovation and regulation: a higher level of regulation would generally imply a lower liberty for innovation, and vice versa. While very strict regulations can hamper the growth of FinTech, a very liberal regulation policy could promote more innovation but with a cost to the consumers. The consumers might lose their capital in the process of innovators' experiment. Further, the regulations should create a level playing field for all the players in the arena. The *academia* should strive to promote creative thinking among students – the players-in-making – which would ensure new ideas keep pouring in and lead to better products and services in the offering. This requires them to impart entrepreneurial skills in teaching and provide other necessary support to float

start-ups. Further, as this is an emerging field, academics can also play a key role in developing a body of knowledge that summarizes the lessons learnt across the globe in the area of FinTech. This would help the players as well as the regulators in learning from the mistakes of others and accordingly modifying their path ahead. The *entrepreneurs* can contribute to the objective of FinTech growth by cooperating amongst themselves when competing is not feasible. The ultimate objective of any business should be to offer to consumers what make them better off. Cooperation could ensure that both the consumers as well as the entrepreneurs are better off.

Focussing on India, while the Indian economy has been an attractive destination for entrepreneurs for some time now owing to its untapped potentials, the trend holds true for FinTech industry as well. While the expected RoI on FinTech projects is 20 per cent, when the study is conducted for

the global level, a study for the Indian level suggested the expectations to be 29 per cent (PwC and Startupbootcamp, 2017). A report from KPMG and NASSCOM (June, 2016) identified seven themes in FinTech and studied their adoption and maturity level in India. Table 1 reports the findings. As is evident, except for block chain, all other themes fall in the range of medium or high. This reflects that, on an average, the Indian market exhibits a pro-FinTech attitude. More than a year later, another study by Ernst and Young (EY) (October, 2017) suggested that India ranked second globally in terms of adoption of FinTech services. The report stated, "FinTech adoption in India is astonishingly high - more than half of our sample of Indian consumers claim to have used more than two FinTech products in the last 6 months... Our analysis indicates that India will ascend to the top of the global FinTech league tables in the future".

TABLE 1 - ADOPTION AND MATURITY LEVEL OF FINTECH THEMES IN INDIA (SOURCE: KPMG AND NASSCOM, FINTECH IN INDIA)

| Theme | High | Medium | Low |
|----------------------------|------|--------|-----|
| Bank in a box | | ✓ | |
| Block chain | | | ✓ |
| Financial inclusion | ✓ | | |
| Next-generation payments | ✓ | | |
| P2P (peer-to-peer) lending | | ✓ | |
| Robo-advisory | | ✓ | |
| Security and biometrics | | ✓ | |

Figure 1 reproduces the data from the E&Y study. As is evident, the adoption of

FinTech services by digitally active consumers across all the five categories

are higher in India compared to the global level. While the themes employed by the two studies are not the same, they,

nonetheless, reflect how fast India has ascended on FinTech adoption in about a year.

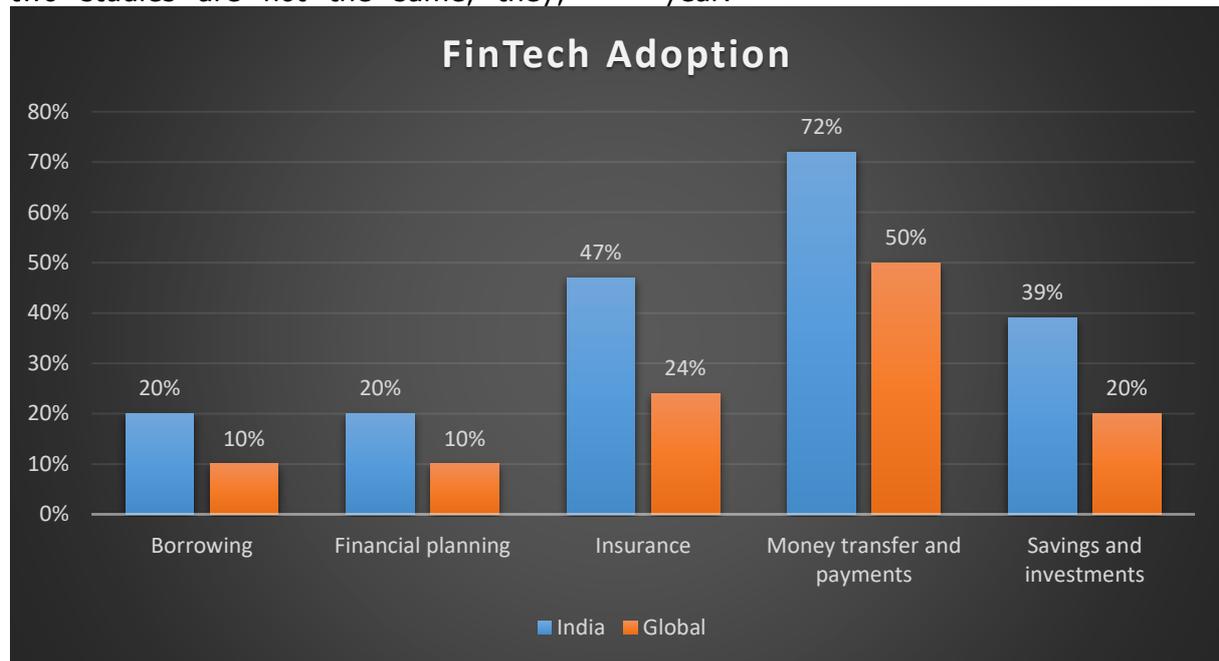


FIGURE 1: ADOPTION OF FINTECH BY DIGITALLY ACTIVE CONSUMERS (SOURCE: EY THE BATTLE FOR THE INDIAN CONSUMER)

While FinTech seems to have a promising future ahead for the world as a whole, it should be especially true for India with the nation jumping 23 notches ahead in the latest World Bank's Ease of Doing

Business Index (The Economic Times, 2018). While Finance as a domain has existed for long, FinTech can be seen as a new tint of glasses to see the age-old world of Finance.

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BSE RELYING ON 'FINTECH' TO PROPEL FINANCIAL INCLUSION



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Introduction

In this digital world, it is still widely proclaimed that billions of people across the world lack access to the financial services which, they need to attain even at the modest levels of financial comfort. In emerging markets, too many households and small businesses have absolutely nil or very limited access to formal financial services. In developed countries, many of them have only limited access to cost-effective financial services for addressing their financial needs. In fact, over two billion people who are devoid of basic banking services in the world, representing around one third of all adults globally, lack access to basic financial services. Many people who have access to basic banking services, do not have access to financial services such as low-cost payments systems, diversified investment and savings options, insurance services, or credit.

With this backdrop, no doubt, the major trends in the global capital market revolve around the ramifications of emerging technologies that aid financial inclusion. FinTech is one such application that is fast emerging in the capital markets industry as harbinger to achieve 'financial inclusion'. FinTech that we define as firms, which use innovative technology at scale to either enable or compete with other financial institutions have experienced exponential growth in the capital market domain. FinTech is also capitalizing on the rapidly changing technology landscape and customer expectations in the capital market to

shape the future dynamics of the industry.

Evolution of FinTech

The FinTech phenomenon started to evolve in the capital market in late 1960s. Since the establishment of Instinet as the first electronic communication network in 1969 and subsequently the creation of Nasdaq as the first electronic exchange in 1971, capital market witnessed three major FinTech waves.

The *first FinTech* wave was observed in 1980s and 1990s, when various capital markets used FinTech focusing on market data, risk management, news distribution and core processing. The *second FinTech* wave took place in the early millennium wherein FinTech focused more on e-trading. Post 2008 global economic crisis, multiple FinTech evolved mostly comprising enablers to address various post-crisis challenges related to capital market. The *third wave of FinTech* is fuelled by banks' rapid digitalization and is characterized by paradigm shifts in technology initiated by artificial intelligence, distributed ledger technologies, cloud c, etc. A key driver of this FinTech revolution is regulations, which prompted capital market players to adopt enhanced technologies to move towards low capital intensive business models.

Lately, the global capital market and financial industry have experienced a new wave of financial innovations, brought on

by number of technological breakthrough and digital disruption. The majority of financial innovation can be found in the field of FinTech, a convergence between financial products and services, and the modern technology. The penetration of mobile telephony and internet use, availability of high-speed computing and innovations in machine learning and data analytics are some of the elements behind the latest FinTech revolution.

Role of FinTech in shaping the Financial Services in India

Growth of digital financial services resulted from the wider availability of mobile phones. In fact, digital financial technology or “FinTech,” and the global spread of mobile phones, has facilitated expanding access to financial services to less privileged people and small businesses at low cost and risk. Emerging countries like India are no exception to this phenomenon.

FinTech has been re-shaping the financial services industry with the level and speed of innovation, which is fascinating. For instance, online payments, which have moved from a multi-step and cost-intensive process to a simple one-step process, that too at a negligible cost, are just one example of how FinTech has simplified processes. Another example is in the insurance sector. With companies—InsurTech—comparing the prices and features of insurance policies, making an informed decision is now possible. Lending too has seen significant changes, with FinTech companies, in collaboration with banks or non-banking financial companies, making services like payday loans or instant loans for consumer durables possible. Credit scores and measuring credit risk is another emerging area for FinTech companies. Though still in nascent stages, this could significantly improve the availability of credit to a large number of people.

Exchanges being the most prominent players in the capital market ecosystem

contribute towards greater financial inclusion in Indian capital market. In fact, they are increasingly adopting the use of FinTech to accelerate financial inclusion among capital market products.

BSE emerging as a FinTech Company in the Digital Age

BSE, formerly known as Bombay Stock Exchange, played a prominent role in developing the Indian capital market. BSE, the only listed stock exchange in India, was a pioneer in adopting the concept of FinTech to cope with changing customer expectations, increasing competitive pressures and dynamic regulatory environment. Transforming digitally helps BSE in effective monitoring, regulatory compliance and risk mitigation.

BSE SME - Essentially a FinTech Platform

BSE SME platform which started in 2012, is essentially a FinTech platform that offers an entrepreneur, an investor friendly environment and enables the listing of Small and Medium Enterprises (SMEs) from the unorganized sector throughout India, into a regulated and organized environment. The BSE SME platform has enabled over 270 companies raise over INR 2,500 crores so far in FY2018-19⁵. The platform has provided immense opportunities to entrepreneurs to raise equity capital for growth and expansion, and for investors to identify and invest in SMEs at an early stage. Overall, it allows for growth and expansion of SMEs in a cost effective manner, enabling wealth creation and social-economic development. In the last three years, companies based outside the big-5 metro cities have contributed to more than 65 per cent of the listings.

BSE – Leveraged on Technological Prowess

Similar to the experience with the SME platform, BSE leveraged its technological prowess to reach out to the financially

⁵ As of Oct 15, 2018.

excluded population. These initiatives yielded immediate results. UCC is a Unique Client Code generated when an individual registers with a broker. In 2004, the top-2 States, Maharashtra and Gujarat contributed more than 65 per cent of the share in UCCs. In comparison, the combined share of the next of the 10 States was less than 35 per cent. Today, the top-2 States contribute around one third of the total registered investors.

BSE acting as a Catalyst for Growth of Mutual Fund Industry in India

In India, the reach of mutual funds (MF) was restricted by infrastructural issues. Traditional style of distribution was posing a major challenge for the Asset Management Companies (AMC) to enable greater retail and institutional participation. In October 2013, the Securities and Exchange Board of India (SEBI) allowed MF Distributors to use the infrastructure of the recognized stock exchanges to purchase and redeem mutual fund units directly from MF/ AMC on behalf of their clients. This enabled BSE to offer the STAR MF platform to all stakeholders enabling several advantages. BSE STAR MF, a web-based transaction processing, fully automated online mutual fund collection and settlement system has become one of the most acceptable platforms in the industry. This has enabled the growth of Assets Under Management (AUM) beyond the traditional metro markets and allowed for wider participation of the smaller cities in the capital markets. In FY2018-19, BSE STAR MF has processed over 1.70 crore transactions with a value of over INR 80,000 crore⁶. The platform commands a market share of nearly 80 per cent amongst the exchange distributed funds and it accounts for more than 50 per cent of all new retail funds flowing into Indian MFs.

To enhance the concept of financial inclusion, BSE now plans to provide

insurance distribution through its nationwide distribution system available in more than 3,000 cities having more than 2,00,000 people connected with it and who are highly compliant, literate and used to providing financial solutions. BSE insurance distribution framework is expected to roll-out in the next few months. It is expected that the platform will be as useful to investors as to the agents and other intermediaries. It will provide automated single window framework for many insurance companies and help them service their clients better as compared to the current manual framework.

Conclusion

A financial revolution is taking place around the globe, powered by mobile phones, technological innovations, access to new data, and changing mind-set of users of financial services. A consensus is fast emerging globally that technology-driven change is inevitable and capital markets are no exception.

FinTech focus on creating new value propositions or improving existing ones by reducing costs through automation and simplification, facilitating regulatory compliance and client relationships. FinTech is broadly recognized as critical to reducing poverty and achieving inclusive economic growth. Achieving financial inclusion and financial security is not an end in itself, but a means to an end.

BSE has focused on being a wealth creation platform, which is evident in its endeavour like developing the BSE SME platform to bridge the capital requirement for the SME sector and being the largest distribution platform for Mutual funds. Thus, BSE leveraged on FinTech to bring in greater financial inclusion in India.

⁶ As of Oct 15, 2018

FINTECH IN CAPITAL MARKETS – THE BEGINNING



Ravi Varanasi

Chief – Business Development Officer
National Stock Exchange of India Ltd.

In the early 90s, Indian capital market was one of the least developed markets in the world with archaic procedures, zero transparency, rampant misuse of client money/ funds, extremely limited participation, huge costs etc.

NSE effected a paradigm shift in how markets function with electronic trading, nationwide telecommunication network, dematerialization, transparent procedures, assured settlement etc.

In the absence of reliable telecommunication network at that point of time, NSE had to set up its own satellite based communication network to take capital market from trading pits in a few cities across the nook and corner of the country. Availability of terminals across the country replaced traditional order relay networks involving series of sub-brokers culminating with a main broker in Mumbai. Cost of investing came down dramatically from as high as 10% of amount invested to a few basis points.

These initiatives and others such as move to dematerialized settlement, online real time risk management framework, state of the art surveillance system, strict implementation of Rules and Regulations, focus on compliance as a way to enhance customer protection and an extensive investor grievance redressal mechanism

have changed the face of Indian capital market.

Above all, consistent focus on investor awareness and education coupled with capacity building initiatives among the intermediary community has been instrumental in turning India's backward capital market into one of the most advanced markets in the world. Both of these were achieved through deploying technology solutions for greater reach.

NSE always focused on expanding reach through easy access solutions for intermediaries and investors. Opening a new branch used to be an expensive proposition for brokerages because of investment in IT infrastructure. NSE through its subsidiary NSE Data & Analytics came out with an ASP model for branch expansion which takes care of entire front and middle office requirements of the brokerage branches. The cost of IT infrastructure of a new branch for a brokerage has been collapsed by over 95%.

All these resulted in significant expansion of capital market's foot print. Over 2.5 lakh exchange terminals are present across about 2,400 cities/ towns/ villages. Over 2.25 crore investors directly participate in the market. Nearly 50 lakh new investors have been added over the last 3 years, that is, an average

of over 15 lakhs per year. Over a third of the new investors are from tier 3 cities and beyond. Close to about 25% of this activity is through Internet and mobile devices, that is, clients are taking control of their order flow and managing it on their own.

However, when one compares participation levels in capital market with the total population, the achieved numbers look insignificant. Even today, financial products are not accessible to a large chunk of population. How do we take useful financial products to this unserved millions? How do we scale up delivery channels to reach every individual saver/ investor? The answer obviously is technology, as was the case in the beginning.

FinTech – The Second Coming

As we go forward, innovations in FinTech are opening up new vistas for equipping investors to manage their wealth far more effectively. Targeted learning, curated information, execution and monitoring are being fused together by various tools and apps to make capital market investing easy for even uninitiated. NSE and our brokerages are actively harnessing these innovative tools for delivering a seamless investing experience to investors. While electronic trading took investing to investors' home, the new age tools riding mobile/ smart phone penetration will truly democratize investing by bringing vast sections of population which hitherto did not venture beyond bank deposits. We believe, that on the back of this new revolution, capital market participation levels surpass those in advanced markets.

NSE is in the process of setting up a digital learning platform incorporating AI and ML tools that would curate and customize the information to the needs of each individual. In today's day and age, information availability is no longer the problem but finding relevant information is like searching needle in a haystack. That's where the AI and ML tools step in and glean out information that is relevant for each individual and present it as and when required. Such an offering coupled

with analytical and execution tools would give individual investors a capability to manage their money efficiently.

The demographic dividend which India is expected to enjoy over the next 3 decades could be fully realized only if the youth is appropriately skilled to handle emerging opportunities. In a country like India, this is a gigantic task and the deployment has to be on a scale and pace that would make a difference quickly. Again, advances in FinTech can make the task of skilling our youth easy. NSE's digital platform is equipped to deliver customized skill trainings on a scale that has not been attempted earlier by using advanced FinTech tools. Skilling will be further refined and reinforced by exposing students to simulated environments that would replicate practical issues to enhance real life adoptability.

SMEs have been the backbone of manufacturing prowess of many countries like China, Germany etc. Our own SMEs contribute significantly to the manufacturing output, exports and employment. However, SME entrepreneurs always find it difficult to raise finances for their operations and expansion. NSE in collaboration with SIDBI set up Receivables Exchange to facilitate unlocking trade receivables through a multi financier model. We have been using blockchain technology to eliminate onerous paperwork involved in bill discounting and to make the entire process, digital.

While many agencies have attempted creating a support structure for SME entrepreneurs, we are attempting to set up a digitally supported ecosystem that identifies needs of entrepreneurs across the value chain. Idea is to provide expert opinion and support across functions from their core operations to sales and marketing to strategy to finance and to legal. The focus is on identifying the needs and then match with expert advice so as to provide optimal guidance to the entrepreneurs on a credible platform.

Spread of broadband Internet and mobile technologies is having a profound impact

on the way, we conduct our social and business interactions. These advances are opening up exciting new opportunities across the financial services' industry. Fitech has the potential to democratize access to finance in ways which we are

only comprehending now. It's imperative, that the financial services industry puts together a collective effort to leverage the benefits of FinTech for the betterment of society.

**SMARTER HUMANS WITH SMARTER MACHINES
CRYSTAL BALL GAZING – EQUITIES, FX AND DERIVATIVES TRADING IN 2025**



Gautam Verma
Country Head, Financial & Risk Business
South Asia, Thomson Reuters

Section 1 | Evolution of Financial Markets in India

In 1992, opening up of the Indian economy set off a radical policy shift from a 'Controlled Economy' to a 'Regulated Economy' that triggered a revolution. Post liberalization, financial markets have not only matured and integrated with the global market ecosystem, but have also grown at a frenetic pace. All-pervasive technological developments have significantly changed the securities market infrastructure as well as the architecture. Electronic trading has 'disrupted' retail participation channels in the equity markets. A liberal and flexible regulatory environment has encouraged market competition, culminating into the

introduction of several innovative instruments and products, thereby broadening and deepening the financial markets.

Traversing a remarkable journey, from restricted access to capital and foreign exchange⁷ and an economy that looked largely inwards, to one supported by strong bourses, India is now one of the fastest growing economies globally. The Indian securities market is also one of the best regulated markets in the world with robust risk management systems in place.

Year Key Reforms/ Milestones for Financial Markets

| | |
|------|---|
| 1992 | <ul style="list-style-type: none"> • Capital Issues (Control) Act, 1947 repealed • Liberalized Exchange Rate Management System (LERMS) introduced • Securities and Exchanges Board of India (SEBI) Act enacted |
| 1994 | <ul style="list-style-type: none"> • NSE commences operations as India's first demutualized exchange with screen-based trading • Rupee made convertible on Current Account |
| 1996 | <ul style="list-style-type: none"> • Nifty 50 Index launched |
| 1998 | <ul style="list-style-type: none"> • Rolling settlement of trades on stock exchanges introduced |

⁷ IMF Working Paper - Indian Financial Sector: Structure, Trends and Turns, July 2017 <http://www.rakeshmohan.com/docs/WP1.pdf>

| Year | Key Reforms/ Milestones for Financial Markets |
|------|---|
| 1999 | <ul style="list-style-type: none"> • Interest Rate Swap (IRS) and Forward Rate Agreement (FRA) introduced as OTC derivatives • Foreign Exchange Management Act (FEMA) replaces Foreign Exchange Regulation Act (FERA) |
| 2000 | <ul style="list-style-type: none"> • Equity derivatives introduced |
| 2001 | <ul style="list-style-type: none"> • Clearing Corporation of India (CCI) established for clearing and settlement system across government securities, forex and money markets |
| 2003 | <ul style="list-style-type: none"> • Select stock exchanges commence retail trading in Government Securities |
| 2008 | <ul style="list-style-type: none"> • Currency derivatives introduced by NSE • Direct Market Access (DMA) facility through computer to computer link (CTCL) for Institutional clients introduced • Algorithm/ High Frequency Trading introduced in Indian bourses |
| 2010 | <ul style="list-style-type: none"> • Mobile-based trading introduced • Introduction of Smart Order Routing (SOR) |
| 2011 | <ul style="list-style-type: none"> • Co-location facility at BSE set up in partnership with Netmagic |
| 2015 | <ul style="list-style-type: none"> • BSE becomes the fastest exchange in the world with a median response speed of 6 microseconds |
| 2017 | <ul style="list-style-type: none"> • BSE becomes India's first listed stock exchange • The India International Exchange (INX), subsidiary of BSE Ltd. and India's first international stock exchange, opened • Integration of stocks and commodities trading on a single exchange introduced |
| 2018 | <ul style="list-style-type: none"> • Cross Currency Derivatives contracts on EUR-USD, GBP-USD and USD-JPY introduced • Unified Regulator for IFSC-GIFT City proposed in annual Union Budget |

Source: Reserve Bank of India (RBI), Bombay Stock Exchange (BSE), National Stock Exchange (NSE), SEBI

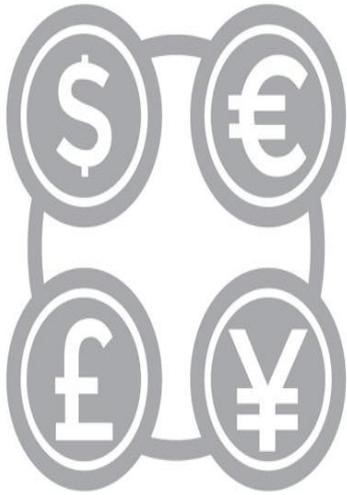
As a result of various reform measures taken over the last two decades, the Indian foreign exchange market has evolved significantly in terms of turnover, types of instruments and participation base. The average daily forex turnover has increased from approximately USD 27 billion in 2005-06, to USD 58 billion in December 2017⁸. Furthermore, with increased market participation and a

progressive regulator, new and innovative derivative products that manage market and financial risk (e.g. futures, forwards, swaps and options) have also gained traction. According to SEBI, around 5,70,000 individual investors currently deal in the derivatives segment and account for nearly 30% of the total turnover in India⁹.

⁸ "India's forex market maange more" - Dec 2017
<http://www.forbesindia.com/blog/uncategorized/indias-forex-market-maange-more/>

⁹ "Sebi expresses concern over high derivatives-to-cash turnover" - July 2017

https://www.business-standard.com/article/markets/sebi-expresses-concern-over-high-derivatives-to-cash-turnover-117071201557_1.html



\$58 billion

Average daily forex turnover up from \$27 billion in 2005-06

Derivatives investors in India



570,000

individual investors currently deal in the derivatives segment and account for nearly 30% of the total turnover in India

Equity markets in India have also grown and matured considerably over the past 25 years. With over 7,500¹⁰ companies listed on two of the largest exchanges in the country, the average monthly turnover has leapfrogged from USD 7 billion in 1998 to approximately USD 100 billion¹¹ in 2018. Significant value has

also been created for investors, with listed companies generating a market cap of nearly USD 2.3 trillion in 2017. Recent research suggests that this is likely to triple to USD 6.1 trillion by 2027¹², – growing faster than any major market in Asia.

¹⁰ IBEF Report on Financial Services in India - June 2018
<https://www.ibef.org/industry/financial-services-presentation>
¹¹ Database of Indian Economy (DBIE) - RBI
<https://dbie.rbi.org.in/DBIE/dbie.rbi?site=statistics>

¹² "India's equity market-cap to hit \$6.1 trillion by 2027: Morgan Stanley"
https://www.business-standard.com/article/markets/india-s-equity-market-cap-to-hit-6-1-trillion-by-2027-morgan-stanley-118031200437_1.html

Market cap of listed companies



\$6.1
trillion
2027



7500 companies
on India's two largest exchanges



\$100 billion
Average monthly turnover
up from \$7 billion in 1998

With almost all the operational and systemic risk management parameters, settlement systems and disclosures at par with global standards, and implementation of many revolutionary

reforms, over such a short period of time, and the Indian financial market which is globally acknowledged as robust and competitive is offering fair and equitable opportunities to all market participants.

Section 2 | Trends Transforming Trading

After the global financial crisis of 2007-2008, capital markets in India and around the world have been trying to keep pace with tectonic shifts and disruptions in regulations, technology and business in a fast-evolving competitive landscape. This has brought a sea-change in the composition of financial markets, services and institutions. In order to address this, financial regulators have had to scramble to both, understand new technology

driving the financial products and services and, in some cases, grapple to understand entirely new products. The market regulators have had to respond rapidly to a variety of factors, from greater compliance requirements to shifting consumer and business needs. These emerging trends are expected to herald tectonic change in capital markets in the near future.

Increasing Regulatory Compliance and Demand for Trade Transparency



Regulatory compliance requirements under FRTB, Mifid II, Dodd Frank, FATCA, SEBI and others, have driven automation across the capital markets value chain. A technology-led approach to innovation has become central to simplifying regulatory complexity, while continuing to safeguard consumers and markets. These regulatory requirements have been focused on enabling historical and real-time market data analysis, unbundling of trade costs and improvement in monitoring of trading behavior. Such stringent regulations with high expectations of compliance are now necessitating change in business strategy and upgradation of technology. The transformative potential of technology will only be fully captured by a new

digitally-enabled regulatory framework, which equips regulators with the necessary tools required to respond to the increasingly dynamic nature of global finance.

Significant advances in technology and data applications are also making regulatory technology (RegTech) a viable solution for organizations to meet the demands of regulatory compliance. The Thomson Reuters Cost of Compliance 2018 survey indicates that 61% of firms expect an increase in their total compliance budget in 2018 (up from 53% in 2017), and 41% of firms (up from 33% in 2017) expect to spend more time assessing FinTech and Regtech solutions over the next 12 months.

Compliance Commitments

61%

of firms expect an increase in their total compliance budget in 2018 (up from 53% in 2017)



41%

of firms (up from 33% in 2017) expect to spend more time assessing Fintech and Regtech solutions over the next 12 months

Changing Consumer Preferences

In addition to the compliance pressures, clients are increasingly demanding greater access to real-time market information, enhanced self-service capabilities, increased accountability and transparency in transaction execution and related fees¹³. Trading behavior of consumers is also changing with increased adoption of alternate and accessible channels like the internet and mobile. As per the NSE, programme-based, Direct Market Access & Smart

Order Routing with ALGO/ High Frequency Trading (HFT) and mobile-based trading have grown from 8% of total turnover traded in 2010 to over 17% in 2017¹⁴. Keeping pace with the global market practices, machine-driven, automated and programmed trading tools have gained popularity over manual trading in India, with the share of total turnover going up to nearly 50% of total volume in 2018.¹⁵

Changing Business Priorities

One of the biggest challenges for the Indian capital market has been; to widen and increase the investor base. While investor participation in Indian capital market has been fairly shallow, considering the size of the economy, demonetization in late 2016 certainly helped divert huge capital flows and new

subscribers to the capital market, especially towards mutual funds. Despite this surge, retail participation in equity markets currently hovers around a mere 2-3% of the population, of which only a fraction is active, and only 2% of Indian household savings goes into equities¹⁶.

¹³ Capital Markets Trends - 2017 - CapGemini

¹⁴ Table 99: Mode of Trading in the Equity Derivatives Segment at NSE (as percentage of Total Turnover) www.nse.com

¹⁵ "Algorithmic trading share in total turnover grows to 50% in 8 years" - May 8, 2018 <https://www.financialexpress.com/market/algorithmic-trading-share-in-total-turnover-grows-to-50-in-8-years/1159020/>

¹⁶ Equity market at all-time high, but that benefits very few Indians - May 2017

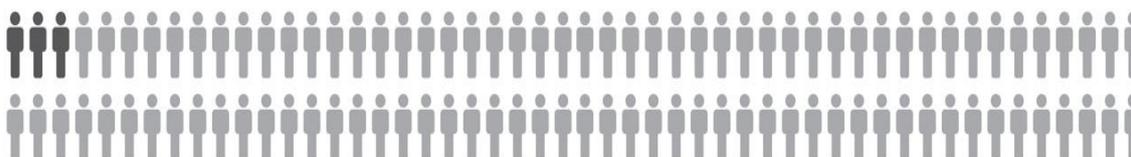
<https://economictimes.indiatimes.com/markets/stocks/news/equity-market-at-all-time-high-but-that-benefits-very-few-indians/articleshow/58491522.cms>

However, focused efforts by market participants at increasing awareness of capital market offerings, providing access through alternate channels such as internet, mobile, and offering innovative

products and services, will help attract a larger population to the capital markets and eventually build a substantial retail customer base.

Equity market retail participation

Only 2-3% of the Indian population participates in equity markets, and only a fraction of this number participates actively. Only 2% of Indian household savings goes into equities.



The other challenge lies in the management and maintenance of legacy IT infrastructure. In order to keep up with regulatory and business demands, firms are spending huge amounts of money on the upkeep of their existing but older generation IT infrastructure, products and services that are today available at much lower costs on the cloud. Infrastructure as a service (IaaS), Platform as a service (PaaS) and Software as a service (SaaS) which are on the cloud are becoming increasingly popular with young and agile companies that don't want to spend their resources investing in physical IT infrastructure.

Finally, one major change that the industry cannot ignore has been the explosion in alternative data that will likely transform trading decision making over the next few years. In the near future, Investment Management/ Broking Firms will likely use news feeds, social media, online communities, communications' metadata, satellite imagery, and geospatial information, to name a few data sets, to augment their traditional processes for securities

valuation as per the rule, rather than the exception. These approaches may improve the confidence of their estimates or simply improve the speed of estimate generation, but change is likely coming and some innovators already seem to be embracing it.

New investment ideas and trends can only be discovered using integrated analytics tools that are capable of decoding information and identifying patterns¹⁷. Vast amounts of data consumption and data generation are pushing the industry to prioritize and invest in data management, analytics systems and advanced analytical techniques such as machine learning and cognitive computing. According to a recent study by Greenwich Associates and Thomson Reuters, 50% of respondents said they would "increase the usage of alternative data sets." The alternative data most used today by investors includes web-scraped data (36%), search trends (29%), expert networks data (29%) and web traffic (21%).

¹⁷ Capital Markets Infrastructure: An Industry Reinventing Itself - Mckinsey, March 2017

Changing Market Structure and Evolving Business Models

Discount brokerage platforms are fundamentally changing the way broking is done in India. Innovative pricing models and technology are helping them scale up quicker than traditional brokerage houses. Customers are more price-sensitive, and progressively reducing their dependence on various

intermediaries in the market. Therefore, changing business models have put immense margin pressure on existing broking firms and brokers.

With SEBI having already permitted equity as well as commodities to be

Cyberattack Vulnerability



Increased Focus on Risk Management

Data and technology form the cornerstone of smart risk management. Capital market are already using analytics platforms for trade and market data analysis, risk analytics and surveillance. Given the interdependence of global financial markets and the rapid pace of digitization, there is increased IT risk and a constant threat of cyber-

attacks. Capital market firms possess enormous amounts of highly sensitive information, and data loss can lead to significant monetary and reputational loss. According to studies conducted by data-mining experts on the cyber-attack vulnerability of 44 nations globally, India has been identified as one of the most vulnerable on the list¹⁸.

Financial institutions and intermediaries also have to be cognizant of possible emergent risks such as money laundering and other forms of financial crime that could lead to regulatory and government

scrutiny. The threat of these risks calls for an integrated risk management model, and a robust compliance mechanism to protect the institutions' reputation, integrity and operations.

Section 3 | Smarter Technologies to Drive Transformation

¹⁸ Banking in the age of disruption - February 2017
[https://www.ey.com/Publication/vwLUAssets/ey-banking-in-the-age-of-disruption/\\$FILE/ey-banking-in-the-age-of-disruption.pdf](https://www.ey.com/Publication/vwLUAssets/ey-banking-in-the-age-of-disruption/$FILE/ey-banking-in-the-age-of-disruption.pdf)

Artificial Intelligence, Blockchain, the Cloud and Big Data, or as they may be called, the ABCD technologies, are emerging as disruptive forces in the capital markets space. Powered by data, these technologies can address increasing demands from regulators, shifting consumer preferences, evolving market structures, business models and risk management. Innovative and disruptive ideas that will fundamentally change the industry are being implemented, and this will profoundly impact the investors as well as people working within the industry.

An analysis of technology trends could help us anticipate where trading is headed in the future.

Artificial Intelligence (AI) will become Ubiquitous in Capital Market

With the addition of Natural Language Processing (NLP) capabilities, AI is positioned to catapult trading technology systems to the next level. Use cases have demonstrated that trading orders taken over the phone can now be authenticated via voice print, with the machine also, being able to understand the trading intent before executing it, all in a fraction of the time it takes to complete an electronic transaction today¹⁹.

Machine Learning (ML) is also being used by social media data analytics companies to provide 'sentiment indicators' to financial services players. It can reveal patterns and connections of unstructured data across the web, throwing up entirely new approaches to trading strategies²⁰. Products like Thomson Reuters MarketPsych Indices (TRMI) convert the volume and variety of professional news and social media into manageable information that accurately show the perceptions, preoccupations and concerns of market participants and help drive sharper decisions. In fact, analytics platforms are now capable of calculating

credit and market risk in minutes versus hours, achieving near-real-time Transaction Cost Analysis (TCA) and anticipation of fraud pattern.

From a regulatory and compliance standpoint, AI and ML can help participants with 'Know Your Customer' (KYC) compliance, currently a time-consuming and expensive process, by remotely determining the authenticity of documents and checking multiple public records to assess the level of risk. Applications that use AI in voice-to-text technology are already being leveraged by firms to meet pre-trade and post-trade transparency requirements for non-equity markets.²¹

Given the potential of future applications, research and investments in AI and ML are expected to grow substantially. Reports suggest that AI and ML will generate USD 34 billion – USD 43 billion in annual savings and revenue opportunities within the financial sector by 2025²².

High Frequency Trading (HFT) as a Catalyst of Growth

Over the years, HFT has had a positive impact on markets through increased

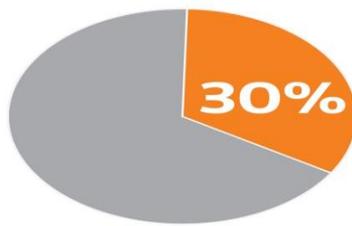
¹⁹ "How AI Trading Systems Will Shake Up Wall Street"
<http://www.itprotoday.com/machine-learning/how-ai-trading-systems-will-shake-wall-street>

²⁰ "Artificial Intelligence in Stock Trading – Future Trends and Applications" - December 3, 2017
<https://www.techemergence.com/artificial-intelligence-in-stock-trading-future-trends-and-applications/>

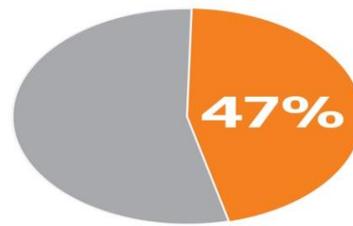
²¹ <http://www.fsb.org/wp-content/uploads/P011117.pdf>

²² "How Artificial Intelligence Helps Banks Offer Personalized Banking Experience?"
<https://medium.com/@ameliadavies/how-artificial-intelligence-helps-banks-offer-personalized-banking-experience-c8fe3695d362>

Rising investment in cloud-based IT infrastructure



2017



2019

liquidity, narrowing of spreads, improved market efficiency and increased volumes. This has been enabled by the use of high-speed algorithms for generating, routing and executing orders; direct access to feeds from exchanges as well as co-located servers to minimize latency; and shortening of timeframes for establishing and liquidating trading positions.

HFT or algo-trading systems now handle more than 75% of global trades, worldwide²³, led by the US and Europe, and are fast gaining popularity in India. Both of India's major exchanges are well established and use cutting edge technology, provide co-location facilities and have a smart order routing system²⁴.

The growth in adoption of HFT and algo-trading in India is validated by the fact that the share of algo-trading as a percentage of total turnover across the cash and derivatives market has increased from a mere 9% in 2010 to nearly 50% today²⁵, and this is expected to keep pace with the global growth rates. As technology advances, HFT is expected to dominate other asset classes like futures, options, bonds and FX.

However, the popularization of HFT is not without its downsides such as increased volatility and evidence of a trading bias built into some of the algorithms. Despite

the huge potential for growth, HFT is susceptible to stringent regulations and greater competition as more market participants adopt this form of trading only.

Cloud Infrastructure will become the New Normal

In a world where the cloud becomes the 'new normal' for deploying IT infrastructure, trading will be accessible to everyone, everywhere. Products and services will increasingly be available through an efficient and effective SaaS model. With petabytes of data accessible in the cloud, real-time analytics and big data will come to serve as an important platform for knowledge, insight and, ultimately, a data-driven competitive advantage.

Both, small and large organizations will adapt a cloud strategy and infrastructure for different business needs at different stages of life. In fact, firms are already planning to ramp up their spending on public cloud, as evidenced by DBS plans to shift up to 50% of its IT infrastructure to the cloud as early as end of 2018²⁶. According to a recent cloud survey by Thomson Reuters²⁷, firms have reported that investment will grow to 47% of IT budget in 2019, up from 30% in 2017.

²³ "The rise of AI and algorithms in the financial services sector" - July 26, 2016

<https://www.raconteur.net/technology/the-rise-of-ai-and-algorithms-in-the-financial-services-sector>

²⁴ High Frequency Trading: Evolution and the Future - CapGemini

https://www.capgemini.com/wp-content/uploads/2017/07/High_Frequency_Trading__Evolution_and_the_Future.pdf

²⁵ "Algorithmic trading share in total turnover grows to 50% in 8 years" - May 8, 2018

<https://www.financialexpress.com/market/algorithmic-trading-share-in-total-turnover-grows-to-50-in-8-years/1159020/>

²⁶ "DBS looks to the cloud to become more 'FinTech-like'", Finextra, <https://www.finextra.com/newsarticle/29235/dbs-looks-to-the-cloud-to-become-more-FinTech-like>

²⁷ "Thomson Reuters Cloud Survey" - June 2018

There are many use cases being prioritized in the public cloud today. Last year, Thomson Reuters collaborated with Google to offer Citibank's Global Banking and Markets' department, the benefits of combining Google's core data technologies with Thomson Reuters' financial market content. In a proof-of-concept experiment, we helped Citibank use Google BigQuery and Google Cloud Pub/ Sub to analyze and consume roughly 1,000 financial instruments' worth of historic and near-real time tick data from Thomson Reuters.

While proof of concept for FX correlation analysis, broker research analytics and equity trading predictive analytics are being tested for rollout in the near future, it is expected that firms will move their back-office functions to public cloud first. Over 90% of firms say that they will use public cloud for the majority of their market data needs in less than four years. However, the level of adoption will vary for different market participants²⁸.

The Transformative Effects of Blockchain Technology

The shift to Blockchain could potentially generate massive benefits, such as ledger consolidation, faster clearing and settlement, detailed and precise history of asset movements, lowering of systemic risk through pre-funding trades and mid- and back-office efficiency²⁹.

The accessibility, efficiency and security of Blockchain means that it will play an increasingly pivotal role in the future of the Equity, FX and Derivative product markets³⁰. It has the potential to transform trading norms, in the way ownership is detailed, with the volumes, prices and timing of each individual transaction recorded for perpetuity.

At present, currency and equity trading is relatively a tedious process, susceptible

to reconciliation errors, settlement delays, and data duplication³¹, with many intermediaries like brokers, online broking platforms, clearing houses, custodians and exchanges involved in the execution of the trade. A decentralized ledger could bring significant efficiency to post-trade processes and greatly shorten the settlement cycle. This would happen by directly linking participants who could then complete their transactions through a peer-to-peer network of brokers and independent traders. Blockchain systems could end up being far more economical than existing platforms; because confirmation of transactions will effectively be performed by everyone on the network simultaneously, it would eliminate the need for an additional layer to verify transactions.

Emergence of RegTech for Regulatory Supervision and Risk Management

It has become increasingly difficult to monitor progressively complex financial products, which are traded today. Regulators are looking at ways to leverage new technology and analytics to ensure effective supervision of systemic risk. In fact, The Reserve Bank of India (RBI) has very recently formed a new unit to beef up its own intellectual capital in the face of emerging technologies like blockchain and artificial intelligence³². There is specific interest in the benefits that Blockchain technology brings to the table, particularly, transactions can be validated on real-time basis.

As regulators, around the globe strive to keep pace with technology, there has been a significant rise in the number of RegTech firms looking to specifically ease regulatory compliance, risk management, and surveillance challenges. Some have even started partnering with the regulators in testing these technologies in a sandbox environment. In fact,

²⁸ Top 10 Trends in Capital Markets 2018 - CapGemini
https://www.capgemini.com/wp-content/uploads/2017/11/capital-markets-trends_2018.pdf

²⁹ Top 10 Trends in Capital Markets 2017 - CapGemini
³⁰ "How Would Blockchain Impact on the Stock and Currency Markets?" - August 30, 2017

<https://www.comparethecloud.net/articles/blockchain-impact-stock-currency-markets/>

³¹ Top 10 Trends in Capital Markets 2018 - CapGemini
https://www.capgemini.com/wp-content/uploads/2017/11/capital-markets-trends_2018.pdf

³²<https://economictimes.indiatimes.com/markets/stocks/news/new-rbi-unit-to-track-blockchain-and-ai/articleshow/65557685.cms> - New RBI unit to track blockchain and AI

Hybrid Workforce



currently, there are more than 20 regulatory sandboxes³³ across the globe, at different stages of development.

Shifting Skillsets

Adjusting to emerging technologies will require a dramatic shift in the mindsets and skill-sets of organizations, as some positions will become obsolete and junior or mid-level staffers will be freed up for more valuable tasks. Brokers in particular, would need to position themselves as consultants or advisors to the clients, as they are likely to play a drastically reduced role in the execution of the trades. Research-based advisory would become the prime piece to be served to investors. As AI revolutionizes

the industry, the demand for data scientists, robotics and AI engineers, mathematicians, quants and those with specializations in deep neural networks, big data and analytics will only grow³⁴.

Given this, education in India will have to keep pace with this emerging trend. In a fast-moving decision economy, it is imperative that the students are well-trained to study data and analytics before they step into their professional life. Setting up data labs to facilitate decoding of data to understand trends and formulate strategy, therefore, must, and will most likely become an integral part of the curriculum.

Automation will lead to leaner organizations, however it is inconceivable that algorithms can entirely replace humans. While AI and ML can help model potential outcomes, observe trading patterns and track markets faster and with greater sophistication, humans will have to take the responsibility for interpreting that analyses and sharing key information with their firms, clients and the public. The most likely vision of the future is of a hybrid workforce in which smart humans and smart machines will work in collaboration.

Section 4 | Visualizing Trading in 2025

The ABCD's of technology along with trusted data will herald the most profound period of change ever seen in the trading sector in the coming years and determine who wins and who loses the competitive game. Turning disruption into a winning solution, trading companies will not just adapt but thrive with the help of these data sets and technologies.

Emerging technologies, powered by data, could help enable inter-operability between exchanges to generate trading

opportunities across geographies and products lines leading to larger liquidity pools, better value to investors, economies of scale, and overall convenience. As trading becomes more commoditized, clearing and settlement corporations serving individual exchanges may also merge to serve multiple exchanges across geographies and product lines. Ultimately, this will result in disintermediation and consolidation leading to further transparency and market efficiency. Leveraging data and adopting ABCD

³³ "A regulatory sandbox is a hub that enables live or virtual testing of new products and services, in a controlled testing environment. Regulator provides the appropriate support by relaxing specific legal and regulatory requirements, for the duration of the sandbox. There

is a defined entry criteria to these sandboxes as well as an exit strategy in case the participant fails."

³⁴ Top 10 Trends in Capital Markets 2018 - CapGemini
https://www.capgemini.com/wp-content/uploads/2017/11/capital-markets-trends_2018.pdf

technologies will enable regulators to transition from being enforcement-oriented to being partnership-oriented. The exchanges of tomorrow could operate a multi-asset platform on which all market players have free access, with the ability to transact in a fast, seamless and efficient manner.

While technology will drive this transformation, human experience and

insight into the real world will remain crucial and will continue to play a key role providing organizations an edge over the competition. The efficient engagement of smart humans and smart machines will be the catalyst that leads to India – “Asia’s fastest growing market”, possibly becoming the largest, as well, by 2025.

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LEVERAGING FINTECH IN AGRICULTURE AIMING AT FINANCIAL INCLUSION OF FARMERS



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Abstract

Agriculture in India faces several challenges. Many of these challenges relate to timely availability of quality information, access to market platforms and other infrastructure such as standardization, grading and warehousing, connect with financial instruments etc. FinTech has so far proven its potential to address some of these problems though in other sectors. The exchange-traded electronic commodity derivatives platform has, for instance, been providing an efficient mechanism for price discovery and price risk management to a large number of stakeholders in the agricultural commodity ecosystem. With appropriate incentive mechanism, development and deployment of FinTech can help in connecting many more agri-stakeholders to financial institutions, instruments and markets, e.g., by introduction/ leverage of electronic spot trading platforms for trading in receipts issued by the WDR A-approved warehouse repositories.

Introduction

India is world's largest producer of milk, pulses and spices and has the world's largest area under wheat, rice and cotton cultivation. It is the second largest producer of rice, cotton, wheat, sugarcane, tea and various other products. Truly, India is amongst the world's agricultural powerhouses with minimal dependency given the size of its population.

Yet, the success of Indian agriculture has not been reflected in farm incomes. Enhancing agricultural revenue is critical to sustaining the country's growth story as about half of our population is employed in agricultural and allied activities, though the contribution of agriculture to our economy is only around 16%.

Sustaining profitability in agriculture is also critical for ensuring food security. Despite India being self-sufficient in food

production and its position amongst largest agriculture producers, 15% of our population remain under-nourished, as per a report released by Food and Agriculture Organisation in 2015. Agricultural growth has been fairly unpredictable and volatile over the past decade, ranging from 5.8% in 2005-06 to 0.4% in 2009-10 and (-)0.2% in 2014-15. Such volatility has had significant adverse impact on farm incomes, capital investment by the farmers and their ability to access credit markets.

Even in the face of rising and diversifying demand, Indian agriculture faces problems like decreasing size of land holdings, poor access to irrigation, continued dependence on monsoons, declining soil fertility, uneven access to modern technology, lack of access to formal agricultural credit, access to storage facilities, assaying centres and other such infrastructure, persistence of

non-remunerative prices among other chronic problems. While the solution to these problems require a multi-pronged multi-stakeholder approach, this paper focuses on the use of FinTech for empowering farmers in most of the areas: from providing marketing channels to assuring remunerative prices.

Information – The Big Levelling Tool

India has over the years followed a policy of protectionism in agricultural marketing, which has resulted in wrongful resource allocation, lengthier value chain and disproportionate payment to the value chain players resulting in a lose-lose situation to both producers and consumers, and lack of sufficient capital investment to promote agricultural productivity. However, supportive policies have also encouraged private investment in marketing, value chain development, warehousing, food processing, storage, assaying etc. in recent years.

Amongst all factors contributing to agricultural distress are uncertainties connected to weather and markets - two major sources of risks faced by the farming community, which have recently been exacerbated by climate change and interconnectedness of markets. Of these two risks, market-based risks can be better managed using technology, enabling tools and good governance.

With a view to reinforcing the competitiveness of Indian agriculture, commodity trade and commerce, after India embarked on a path of economic liberalisation in the 1990s, electronic commodity exchanges were set up in the beginning of the 21st century. The online national commodity derivatives market platform is one institution which is helping stakeholders manage the risk associated with price uncertainties in commodities. Since its inception in 2002-2003, India's commodity derivatives market has grown by leaps and bounds: the average daily turnover in commodity futures increasing from Rs.1970 crore in 2004-05 to a high of Rs. 58,928 crores in 2011-12 at a Compound Annual Growth

Rate (CAGR) of 62%. Commodity derivative markets witnessed an average daily turnover of Rs. 21,193 in 2017-18.

The commodity derivatives market, in addition to serving its most important role helping price discovery and price risk management, is also empowering small players, including farmers, to make better cropping, selling / buying decisions, improving flow of information across the entire commodity ecosystem, increasing the farmer's share of the price paid by end-consumer, developing better storage, grading infrastructure, improving access to finance etc.

The referenceable 'national price' discovered on the exchange platform increases price transparency across the value chain, enables access to timely information on prices, and helps in better decision-making by farmers and timely intervention by state agencies. The futures market empowers farmers by suggesting the most (likely) remunerative crop for the coming season based on the future prices. Besides, price transparency puts small farmers in a better bargaining position with the traders in the physical commodity markets and over a period of time, it will go a long way in connecting growers/grower organizations to consumers.

Prices discovered on commodity exchanges are already available through the large number of trading terminals and tickers on electronic media. Technology can further strengthen such price dissemination on the electronic media, mobile devices, price tickers in prominent places etc. Access to timely information like acreage, production (e.g. by monitoring of germination/ flowering through GIS), localized weather, stocks, arrivals, procurement initiatives by state agencies can also be disseminated through these initiatives, which can enable farmers to attain greater competitiveness by reducing asymmetric information.

Leveraging Current Developments in Agricultural Marketing using Technology

Serious policy efforts are being undertaken for reforming Indian agriculture, with several significant decisions taken to improve the status and income of farmers, in line with the government's goal to double farmers' income by 2022-23. Various states have amended their Agricultural Produce Marketing Committee (APMC) Acts, liberalizing the sale of agricultural commodities, aiming to reduce middlemen, develop value chain and attract investment in agricultural marketing. An important measure targeted at better price realization by farmers is e-NAM (electronic – National Agricultural Market), which is envisaged to promote online trading of agricultural produce, open markets to traders from across the state and later across the country, promote assaying and scientific storage.

As part of agricultural policy, Farmer Producer Organizations (FPOs) are being promoted by various central and state government agencies. It is generally accepted that through collective action, pooling of resources, group marketing and post-harvest value addition, FPOs have higher probability of obtaining better prices, besides developing the capability to undertake price risk management through institutional support. Aggregating arrangements, such as FPOs, can help ameliorate the current agrarian distress, which necessitate capacity building among farmers to withstand uncertainties in the market by using risk management to improve participation from farmers through aggregation arrangements.

The importance of aggregating small farmers into FPOs/ VPOs cannot be over-emphasised. Small and marginal farmers constitute about 85 per cent of the total landholdings in India, with around 40 per cent share in the total marketable surpluses, resulting in output volumes being small and dispersed at individual level. Today, there are about 2,284 regulated markets with 2,339 principal

and 4,276 sub-market yards; farmers have to rely on the marketing system of dispersed, single markets to reach upto the wholesalers who deal in bulk volumes. Besides, most of the markets are not linked to the next level and simply function as single point of sale. A majority of such farmers with uneconomical marketable lots, instead of transacting at markets simply sell to local agents at locally determined prices and not at optimal or market-linked prices. This long value chain and additional intermediary's results in lowering the share of the farmers' share of the price paid by the final customer.

By linking markets, FinTech can address this issue and enable farmers get the right and remunerative price for their produce. Aggregation at the farmers' level to create economic quantities, along with presence of electronic markets that connect groups of farmers to the final consumers, will be able to bring significant improvement in the share of consumers' Rupee realized by farmers. Inter-connection of markets will be required to make the marketing system more efficient and bring in final buyers on to the electronic platform. Grading and assaying of produce will ensure better pricing and remove intermediation levels in markets. All payments have to be digitized to ensure that the payments are timely and reach the correct beneficiaries.

A well-organized warehousing system has a major role to play in overcoming the inefficiencies of agricultural marketing, by allowing the harvested produce to be sold at a time of choice for the farmer. At the same time, availability of information about quantity and quality of commodities stored also prevents speculation on availability and build-up of risk premium on prices. Commodity repositories have come into operation, filling up a major infrastructural gap in the warehousing ecosystem, allowing farmers, FPOs and others to firstly get information about availability and quantum stored and also obtain electronic warehouse receipts (eNWRs) on their stored produce, which can then be sold or pledged for finance, without

incurring transportation costs. The operational efficiency of the warehouse, assaying / grading infrastructure and system integration for sale and pledging of the goods are factors limiting their widespread usage, where application of FinTech can be of immense use.

Information Technology can play a major role in integrating the various institutions for the benefit of the farming community. A common electronic link or platform integrating the e-NAM platform, commodity exchanges, banks, WDRA-approved electronic warehouse repositories and quality testing/assaying centres can result in better harmonization between these institutions and ultimately connect the farmers with formal markets for credit. In addition to this electronic link, technology can also help harmonise the various product standards and grading parameters adopted by different agencies. This will be required for ensuring that the warehouse receipts issued for goods stored in warehouses are acceptable to participants on spot platform like e-NAM, futures exchanges and banks, which shall be inter-linked.

Information technology can also help in widely disseminating information, dampening volatility and uncertainty associated with prices. Price of agricultural commodities are influenced by global supply demand, external socio-political factors, in addition to the local supply-demand scenario, all of which add to significant volatility in prices. This is also one factor responsible for farmers not obtaining optimal prices for their produce. With transparent availability of information, price and market intelligence can become an important tool to enhance the farmers' readiness to meet price volatility and transact in electronic markets.

Considering that it may not be feasible to take such institutional mechanisms to individual farmers to make them an integral part of the formal marketing system, farmers, particularly the small and marginal farmers, may be mobilized into farmer producer or village producer organizations (FPO/VPO). Such

FPOs/VPOs shall be linked to the online platform linking the other institutions like online spot market, futures exchange, warehouses, commodity repository and banks. The holding capacity of FPOs will be an important criteria for maximum utilization of such a platform, FPOs with high holding capacity can be facilitated by developing and upgrading godowns to standards as defined by WDRA so that the NWRs issued can be used for warehouse based post-harvest loans, hedging on commodity exchanges and eNWR based trading. For developing an efficient online platform that links various institutions, each of these institutions will have to grow to a sufficient scale, through which a progressively larger proportion of the country's agricultural production can be transacted.

Technology in Reaching the Last Mile

FinTech has made large strides in connecting stakeholders to markets. While access to financial products and instruments has increased tremendously, challenges remain in connecting agrarian stakeholders to financial markets and products. Several experiments are being tried with mixed results. For instance, considering the penetration of mobile phones in rural India, mobile phones are often considered to be the ideal tool for disseminating information and use for payment systems. However, for this to succeed, proper mechanisms, framework for collection, compilation, analysis of appropriate data and dissemination of information, needs to be laid down. Web and android based software shall be developed for online, offline collection of data, its analysis and dissemination.

Prices discovered in the electronic spot platforms and commodity exchanges need to be disseminated to enable farmers to make better decision making on what to sow and when to sell. Such an application shall cut across language barriers. The prices discovered on national commodity exchanges provide indications of the likely future spot price on the day of expiry and give clear signals of discontinuity in prevailing trends,

which can be used to make sowing and marketing decisions by farmers.

These proven socio-economic benefits of FinTech application have already been proven in the Indian agricultural markets. With an enabling policy environment,

easier and universal access to markets and incentives for development and deployment of appropriate technologies, the last mile in taking information, markets and products can surely be reached.

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ELEMENTS OF REGULATORY DESIGN FOR INDIA'S DIGITAL ECONOMY



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Abstract

Traditionally, micro prudential regulations have served the regulatory needs by enabling firm level oversight. Over time, the remit of regulations has expanded to cover risks directly associated with consumer protection, financial system and winding down of stressed firms. In the emerging scenario, the regulatory framework needs to be further equipped to protect consumers while enabling a competitive market. This article examines this using the example of open banking and peer to peer lending (P2P) and points to regulatory tools that might be useful in strengthening the ex-ante regulatory framework in the financial sector.

FinTech start-ups differentiate themselves from traditional financial firms with personalised niche services, data-driven solutions, an innovative culture, and a nimble organisation.³⁵ Globalisation and advances in technology around computing and data (capture, storage, transfer) combined with increasing Internet access is enabling new business models. This has sharpened competition by (i) enabling greater access to different markets, (ii) unlocking new business models, and (iii) placing a premium on innovation.

In FinTech, digital wallets that were permitted about a decade ago is a very visible example of effects of changes in technology and regulatory implications.³⁶ Reserve Bank of India (RBI) driven non-bank i.e. National Payment Corporation of India (NPCI) has been a key strategy for fast inter-bank payment systems like Immediate Payment Service (IMPS) and mobile based Unified Payment Interface (UPI). Last two years has seen some key regulatory developments which have implications for open banking and P2P lending:³⁷

Regulatory Developments: India

³⁵ Lee, Yong Jae Shin, 2017, FinTech: Ecosystem, business models, investment decisions, and challenges, Kelley School of Business, Indiana University.

³⁶ The regulations around the digital wallets or Prepaid Instruments (PPIs) were put in place in 2009 and permitted non-banks to participate in payments.

³⁷ Open banking can be defined as an ecosystem that furnishes the end user with data from a labyrinth of financial institutions via

application programming interfaces (APIs). APIs help a software or application (app) to communicate and work with another application and seamlessly share information. P2P lending involves the matching of borrowers and investors via an online platform with the P2P operator managing the repayment obligations of borrowers, acting as an agent for investors.

1. September 2016: Directions to regulate Account Aggregator services.³⁸
2. October 2017: Directions to regulate P2P lending.³⁹

More recently, initiatives from the Government have resulted in important building blocks:

1. July 2018: Justice BN Srikrishna Committee submitted a report and a draft *Personal Data Protection Bill, 2018* to the Government.⁴⁰
2. August 2018: An inter-ministerial Committee submitted a report along with a draft Bill to suggest major changes to the *Payment and Settlement Systems Act, 2007*.⁴¹

Regulatory Developments: Europe

Europe offers some examples of regulatory initiatives to drive open banking.

1. Payment Service Directive (PSD): Since 2007, PSD has evolved into the PSD2 that has come into force in January 2018. PSD2 provides for a risk based and ownership neutral framework for regulating payments and is expected to provide an enabling framework for FinTech through measures like Payment Initiation Service and Accounts Information Services.⁴² In case of P2P lending and investment based crowdfunding, the European oversight has largely been in the unregulated space with discussions on regulations currently in progress.

2. General Data Protection Regulation (GDPR): The Data Protection Directive (DPD) of 1995 has developed into the GDPR that has come into force in May 2018. This provides a comprehensive data protection regime applicable across sectors.

Regulatory Focus

For banks to adopt open banking on a voluntary basis is a challenge as they may either see it as a threat to their business or as an opportunity. Therefore, a regulatory push is needed. The requirements in law need to be arrived at on a risk based assessment else there is a regulatory incentive to over compensate for risks that are not well assessed. Further, the laws need to provide for a rules based access regime and standards around such access to ensure that development of ecosystem is not stifled as open banking primarily relies upon the ability of firms to connect consumers to different financial services providers across sectors.

Open banking requires traditional banking and financial services firms to open up to:⁴³

1. Make it possible for people to share their financial transactional data far more easily with third parties online.
2. Allow third parties to initiate payments directly from a persons account as a bank transfer as an alternative to credit or debit card payments.
3. Make public and openly share their product information and importantly, their customer

³⁸ RBI, Master Direction DNBR.PD.009/03.10.119/2016-17 dated 02.09.16, Non-Banking Financial Company - Account Aggregator (Reserve Bank) Directions, 2016

³⁹ RBI, Master Direction DNBR (PD) 090/03.10.124/2017-18 dated 04.10.17, Peer to Peer Lending Platform (Reserve Bank) Directions, 2017

⁴⁰ Committee of Experts on Data Protection, 27.07.2018, draft Personal Data Protection Bill, 2018. The proposed law, when enacted, shall replace the relatively modest regulatory framework around data protection comprising of Information Technology Act, 2000 and Information Technology (Reasonable Security Practices and procedures and Sensitive Personal Data or Information) Rules, 2011 under the IT Act and Contract Act, 1872.

⁴¹ Ministry of Finance, August 2018, Inter-Ministerial Committee for Finalisation of Amendments of the PSS Act, 2007.

⁴² Payment Initiation Service allows third-party service providers to initiate a payment from the user account to the merchant account by

creating a software "bridge" between these accounts, fill-in the information necessary for a transfer (amount of the transaction, account number, message) and inform the merchant once the transaction has been initiated.

Account Information Service allow third party service providers to provide consumers with aggregated online information on one or more payment accounts held with one or more other payment service providers and accessed via online interfaces of the account servicing payment service provider. The payment service user is thus able to have an overall view of its financial situation immediately at any given moment. These services aim to provide consumers with adequate protection for their payment and account data as well as legal certainty about the status of account information service providers.

⁴³ Faith Reynolds, 2017, Open Banking, A Consumer Perspective, Barclays Bank

satisfaction scores and separately other 'service level indicators'.

Unlike open banking, P2P lending does not rely on traditional markets to be priced open. It requires regulatory focus as it offers possibilities for expanding credit by mitigating lack of competition. Similarly, equity based crowd funding can fill the gap in the funding lifecycle, especially in the seed stage.

Regulatory Risks

Due to greater possibilities of network effects and two sided markets in technology driven businesses, there is an increased need for a regulatory framework that provides suitable ex-ante regulations which recognise the need to enable innovation and can help prevent market power being acquired through anti-competitive practices. The focus on network effects by firms can lead to anti-competitive practices like discrimination in access of services to firms, predatory pricing, capital dumping and abuse of consumer data and privacy. Moreover, technology led businesses have heightened the traditional conflict of interest between service providers and users as many of the services are 'free' and require monetisation through incentives from backend service providers or exploitation of behavioural biases of the consumers for cross-selling. The concerns around anti-competitive practices are amplified due to the race to acquire consumers to generate network effects.

Ex-ante regulation of competition presents a greater challenge due to the level of subjectivity involved. Today, most regulators are not equipped to deal with the issues thrown in by globalisation and technological advances. This presents the biggest challenge to the regulators and the government – how to reorganise themselves to set the "rules of the game" to deal with market practices so as to enable the benefits associated

with competition i.e. efficiency and innovation while minimising the harmful effects of barriers to competition i.e. market power led inefficiencies (higher prices and lower incentive to innovate).

The current regulatory design makes it challenging for the regulators in India to evaluate the potential risks and frame appropriate regulations. It can also leave the market unsure of the outcomes flowing from the regulations. To illustrate, RBI's:

1. Account aggregation directions require Financial Information providers (banks etc.) to implement interfaces that will allow an Account Aggregator to submit consent artefacts, and authenticate each other, and enable secure flow of financial information to the Account Aggregator. Now, this would be required to be done as an industry wide measure for it to be really enabling for FinTech. There is no status report to inform status on this.
2. P2P lending direction prescribe micro prudential requirements.⁴⁴ The risk assessment that has resulted in these is not available and there is no direction to suggest how the norms may be reviewed based on market observation. The directions mandate data storage in India.⁴⁵ The regulatory risks which require this are not ascertainable.
3. Both the P2P lending directions and the Account Aggregator directions require firms to seek prior approval in case of any change in shareholding that will give a right to nominate a director. The need for this requirement is not obvious, as this requirement is in addition to the other requirements for seeking

⁴⁴ A minimum net owned funds of Rs2 crore, leverage ratio of not exceeding 2, aggregate exposure of a lender to all borrowers at any point of time, across all P2Ps, to a cap of Rs. 10,00,000/-, aggregate loans taken by a borrower at any point of time, across all P2Ps to a cap of Rs. 10,00,000/-, exposure of a single lender to the same

borrower, across all P2Ps, to cap of Rs. 50,000/-, and maturity of a loan to not exceed 36 months.

⁴⁵ 6(1) (x) Scope of Activities: store and process all data relating to its activities and participants on hardware located within India.

permission for change in control of management.

Regulatory Design

Open banking is not an explicit regulatory strategy of the RBI or the Government. Similarly, enabling innovation is not part of the regulatory design in the financial sector. This is because the laws have historically been drafted around micro prudential risks. Therefore, the relevant regulatory developments are more likely to be incremental measures to deal with specific issues. This seems logical as regulations follow market developments. However, this approach emphasises ex-post regulations. It is ill equipped to create a suitable ex-ante framework which could potentially enable open banking or more generally ensure that the regulation making is equipped to assess risks and recognise the importance of enabling innovation. Innovation cannot be mandated through regulations but a lack of appropriate legal framework is likely to stifle it.

The Personal Data Protection Bill provides for a strong consent based regime. It imposes important obligations on firms including purpose limitations, collection limitations, and privacy by design. Much debate has gone into focussing whether the Bill strikes an optimum balance between ensuring privacy and enabling innovation. The provisions around mandating data storage in India appear to be particularly disproportionate as they are prescribing the *means* (mandating local storage) rather than guidance towards the desired *ends* (access to data).

Confidence in ex-ante regulation making is likely to come from the reputation and track record of regulators. Competition authorities are already seized of the importance of this.⁴⁶ This holds equal

importance for sectoral laws as enforcement should not depend on the personalities of the people but be guided by the laws. In this context, the recent draft Bill to replace the existing PSS Act has proposed useful measures for handling the emerging regulatory requirements.

- a. It provides for certain objectives to be considered and balanced while making regulations and issuing directions - (i) consumer protection, (ii) systemic stability and resilience, and (iii) competition and innovation.⁴⁷ The Bill provides guidance to the regulator on these objectives. Under competition and innovation, regulation making is required to consider the need for:
 - i. system participants to access payment systems based on objective, ownership neutral and proportionate standards,
 - ii. interoperability among system participants and among payment systems,
 - iii. payment systems and payment services to be developed and operated in a manner that promotes their ease of use, and
 - iv. improvement in the quality, efficiency and economy of payment systems and payment services.
- b. The Bill provides for:
 - i. authorisation criteria to be risk based as there can be different classes of payment systems with different risks,
 - ii. a mechanism for innovation through regulatory sandbox whereby authorised entities may apply for individual guidance and potentially limited period exemptions from regulations to bring genuine innovative products such as new payment services

⁴⁶ The International Competition Network (ICN) has provided Guiding Principles for Procedural Fairness in Competition Agency Enforcement. These stress on impartiality, effectiveness, transparency and predictability, meaningful engagement, objectivity, opportunity to respond, judicial review/ appeal, confidentiality protection and efficient and timely investigation.

⁴⁷ The objectives are directed towards addressing situations where the competitive outcome of markets is not satisfactory for the society. The market failures in the payments industry may generally relate to systemic risk, network externalities, collective action problem and information asymmetry.

- to market more quickly, while ensuring adequate customer protection,
- iii. a mechanism for the industry to suggest changes in regulations or seek formal clarifications through rule making petition whereby a person may apply for regulation making where no regulations exist or where an amendment to existing regulation is sought
 - iv. an obligation to follow a consultative process to regulation making by:
 - a) publishing draft regulations with sufficient information on the problem being addressed by the regulation and the

- b) considering public feedback in finalising its regulations and provide an analysis of its treatment of such feedback,
- v. An independent grievance mechanism to settle disputes related to the orders of the regulator, and
- vi. Reporting requirement on the regulator to present an analysis of its performance.

These measures are on the lines of best global practices in EU, Australia and Singapore and can be useful legislative tools to strengthen ex-ante regulatory design and may lead to better risk assessment and consequently a more competitive market place.

FINANCIAL INCLUSION - CAN TECHNOLOGY REPLACE HUMAN INTERVENTION?



Tamal Bandyopadhyay

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“Technology itself cannot be peddled as a product for financial inclusion; it is an enabler. Human connect continues to be critical, at least in near future”

Globally, the FinTech companies —the new kids on the tech block— are getting into fund transfers, mobile banking, shopping. They can provide loans much faster than their old-world rivals and are building better financial products for customers. However, are they reinventing the wheel? Or, are they efficiently using the existing platforms? Their genius lies in developing sophisticated application programme interfaces or APIs--rules, commands, functions and objects for building software applications and these apps are finding a home on every smartphone.

So, the banks need to ask themselves: Why don't we disrupt ourselves instead of waiting to be disrupted by FinTech companies? Why can't we give a loan fast? Why can't we invent something to transfer money in just a click? Why can't we reduce the friction in the banking system?

Can the FinTech companies take over the business from banks? Even if they do, they would still need to have a banking network. It is not easy to take away the bank's business by merely promising a good payment experience.

There was a time when people liked to go to a bank branch, interact with humans and withdraw or deposit money. In the next phase, they wanted to do things on

their own. Now, they want to do things on their own but also need someone to discuss and help them out.

Digital payments seem to be the holy grail of financial services. The total digital payment market in India is expected to touch \$1 trillion over the next five years, according to a Credit Suisse report.

What's the future for traditional channels such as branches and ATMs? Is the feasibility of the brick and mortar model under threat? Before we discuss this and focus on what the FinTech companies can do, let's take a look at financial inclusion.

Financial Inclusion

Financial inclusion is a process which ensures access to financial services, including timely and affordable credit, by the weaker sections and low-income groups of society. And, the access must be not only to banking but also other financial services such as insurance and mutual fund products.

Financial inclusion is delivery of financial services, including bank accounts for savings and transactional purposes; low-cost credit for productive and personal consumption; financial advisory services; and mutual fund and insurance products to those people who otherwise do not have access to the high-street banks.

Former Governor Reserve Bank of India (RBI), Y.V. Reddy coined the term 'financial inclusion' while working on the draft of the annual monetary policy

statement for the fiscal year 2006–07 along with then Deputy Governor, Usha Thorat.

While researching on 'financial exclusion', Reddy thought that since the Indian central bank had been trying to encourage commercial banks and other financial intermediaries to reach out to more and more people, shouldn't the right term for these activities be financial 'inclusion' instead of 'exclusion'?

Indeed, the term was coined in 2006 but the mission of reaching out to the masses by India's formal banking sector started even before the banks were nationalised in 1969 by giving loans to the neglected sectors of the economy and weaker sections of the population.

A decade later, in the 1970s, the banking regulator formed the norms for the so-called priority sector lending under which the banks are to channel 40% of their loans to agriculture, small industries and the weaker sections of the society. The priority-loan norms are in force even now even though the constituents of the borrowers and the profile of such loans have changed. The norms are uniform now for both Indian and foreign banks.

There have also been experiments with Regional Rural Banks, Local Area Banks and the Self-help group-bank linkage programme, among others, to spread the banking service in India's hinterland.

The objective of financial inclusion is to bring the low-income groups to the fold of formal banking sector and free them from the exploitation of usurious moneylenders. Money borrowed at a relatively cheaper rate enables them to build assets, support children's education and the family's health. Access to banking also creates savings habit.

India has always believed in a bank-led financial system but outside the formal banking fold, the microfinance entities have been offering small loans to the people in the bottom of the pyramid. Most banks are not able to lend 40% of their loans to the priority sector directly as

they do not have the reach. So, they lend the money to the microfinance entities, which in turn, lend them to their borrowers.

Indeed, the cost of loans taken from a microfinance entity is higher than bank loans, but these intermediaries do business in those pockets where banks fear to tread because of high transaction costs and probability of higher defaults as these loans are not supported by securities.

For small borrowers, access to finance is always more important than the cost of funds. Also, local moneylenders are far more expensive than microfinance institutions.

Since banks do not find branch expansion in rural India commercially viable for reasons ranging from low volume of business to high transaction costs and unwillingness of employees to relocate from urban centres and metros, the framework of Banking Correspondents (BCs) was designed to enhance the access of banking services.

The RBI also encouraged banks to adopt a planned approach to financial inclusion through board-approved Financial Inclusion Plans (FIPs). The first two phases of FIPs were implemented over 2010–13 and 2013–16. The business model included the Basic Savings Bank Deposit (BSBD) accounts –which does not require minimum balance but allows deposit and withdrawal of cash at the bank branch and ATMs, receipt/ credit of money through electronic payment channels and facility of providing ATM card and the issuance of RuPay Cards—a domestic debit card.

The Know Your Customer (KYC) norms were relaxed and simplified to facilitate easy opening of bank accounts, especially for small accounts with balances not exceeding ₹50,000 and aggregate credits in the accounts not exceeding ₹1 lakh a year.

The RBI also relaxed the branch authorization policy to encourage the

banks to open outlets in unbanked pockets. Indian banks are now allowed to freely open branches in Tier 2 to Tier 6 centres with population of less than 1 lakh as long as they keep the regulator informed about the branches. They do not need any permission from the RBI to open branches in north-eastern states and Sikkim. As a result, the number of banking outlets in villages has been growing by leaps and bounds.

Even before the completion of the second phase of the FIPs, India witnessed the world's biggest-ever financial inclusion drive in the form of Pradhan Mantri Jan-Dhan Yojana (PMJDY), in August 2014, by the Bharatiya Janata Party (BJP)-led National Democratic Alliance (NDA) government. Its objective is to ensure access to various financial services such as availability of basic savings bank account, need-based credit, remittances facility, insurance and pension to the excluded sections.

The plan also envisages channelling all government benefits (from centre/states/ local bodies) to the beneficiaries' accounts and pushing the direct benefits transfer (DBT) scheme of the Union Government.

The PMJDY scheme has opened around 329.4 million accounts; out of these, 194.6 million accounts are in rural and semi-urban pockets. These accounts had Rs. 86,164 crore deposits in September 2018. Besides, 247.1 million Rupay debit cards have been distributed.

The aggressive push by the PMJDY has changed the landscape dramatically. Basic savings bank deposit accounts have gone up and the total number of transactions done by the BCs has also risen substantially.

The debt benefit transfer scheme of the government for which the Jan Dhan accounts are used has the potential to change the culture of banking in rural India. When such entitlements under various state and centre sponsored schemes directly flow into bank accounts, account holders feel encouraged to save.

New Banks

Also, through differentiated banking licences, the RBI is aggressively opening up the banking sector to foster competition and spread banking services. From Independence till July 2015, India got 12 new banks (all of them did not survive) in two phases – 1994 and 2004, but since August 2015, we have got two new universal banks, 10 small finance banks and a few payments banks.

The payments banks can accept demand deposits up to ₹1 lakh per individual customer, issue ATM and debit cards, offer payments and remittance services through various channels, and distribute mutual fund units and insurance products. Besides, they can act as the BC of another bank.

The small finance banks, on the other hand, are required to extend 75% of their loans to sectors eligible for classification as priority sector lending. While 40% of such loans should be allocated to different sub-sectors of priority loans, they can allocate the balance 35% to one or more sub-sectors where they have competitive advantages.

The maximum loan size and investment limit exposure to a single and group borrower of such banks is capped at 10% and 15% of capital, respectively, and at least 50% of their loan portfolios should constitute loans and advances up to ₹25 lakh. Clearly, the focus is on small borrowers.

The licence for universal banking has been put on tap. This means, there is no special window for seeking a new bank licence and any entity can seek the licence at any time.

The banking regulator is also planning to open the turf for new kinds of banks such as wholesale banks and depository banks. Besides, foreign banks operating in India are being encouraged for local incorporation. One of them, Singapore's DBS Bank Ltd, has already got the regulator's nod for setting up its Indian subsidiary. The RBI is also encouraging large and well-managed cooperative

banks to transform themselves into full-fledged commercial banks.

Small and marginal farmers, sharecroppers, micro and small industries and the millions of workers in unorganized sectors want bank credit, but most of them depend on informal sources to meet their credit needs. The challenge is to make them creditworthy.

Mere access to financial services will not change the lives of the poor. If we want them to become entrepreneurs and generate sustainable income and lift their families out of poverty, the financial intermediaries also need to help them acquire skills to produce things and market them.

Role of Technology

Technology will play a key role both in bringing them under the banking fold and helping them become entrepreneurs. Digital channels provide convenience for customers, lower the transaction cost for banks, and overcome many challenges related to infrastructure and geography. They also help risk management, credit appraisal and recovery of loans.

The biggest hurdle for catering to small businesses remains non-availability of information within the banking system. While credit bureaus have greatly helped in identifying customers with "intent to pay," banks continue to struggle to get customers with "ability to pay" in the absence of streamlined business transactions through the banking system. The new tax regime will help increase routing of business transactions.

In an urban market, a customer's income and spend can be tracked meticulously and hence technology can probably replace the human intervention. However, the hinterland tells a different story. It is virtually impossible here to track people's cash flow because of the nature of their jobs as well as their spending pattern. Rural India still

believes in cash economy. The trend is changing but at a very slow pace.

In urban India, the KYC or know your customer norm is being changed to MYC or mine your customer (data) by most banks but this cannot be replicated in rural India. So, for effective financial inclusion, we need a "bricks-and-clicks" distribution model, including physical branches. When the customers borrow from banks, the risk is with the bank but when they keep money with the banks, the customers themselves bear the risk.

Can Technology Create Trust?

Technology can onboard people who have never had access to banking services but creating trust is the biggest challenge on the financial turf. Unless they trust the bank, they will not keep their money with the bank. The presence of branches, ATMs, debit cards and people create that trust. Most of these customers do not have any credit history. Once they start taking loans and a credit history is created, technology and data analytics can come in at the second stage. Then, their financial track record can be created to support lending decisions and this can be done at a fast pace.

Digital technologies have also unleashed a slew of mobile phone apps tailored to meet the semi-literate credit-starved masses but it will take a while to treat technology as a product, a panacea for all ills that the traditional banking channels face in rural pocket in the form of high transaction cost, lack of credit history of first-time borrowers, risk-management, etc.

The time is not ripe as yet for technology to replace human connect in this segment. To identify the right borrowers, ensure repayment of loans which are not backed by securities and encourage people to park their savings with banks, human connect will continue to be the mainstay in the hinterland and technology will play the role of an enabler. At least, in the near future.

FINTECH & BANKS: CO-CREATING VALUE FOR CUSTOMER



Alok Mittal
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Indifi

FinTech (Financial Technology) is the buzzword which connotes an enabler and a disruptor in the same breath. The space of financial technology companies is so wide that it promises to change the current paradigm in almost all areas of banking – be it deposits, lending, wealth management, forex or treasury management. Many of the enabling technologies around FinTech are relevant for incumbent banks as well as for new companies alike. These would include classical enterprise technology stack in context of banks – right from core banking systems to new models of CBS, and to innovations aligned to, what is now referred as India Stack (Aadhar, e-Sign, e-KYC, UPI).

The banks and financial institutions have been a lead adopter of technology through decades. Why is this surge of technology then different from the previous waves? Does the new set of technologies enable fundamentally different capabilities than the gradual evolution of technology we have seen in the past? Above all, what does this mean for incumbent banks, as they see a slew of specialist FinTech companies spring by – is this a threat or an opportunity to cooperate?

The Impending Paradigm Shift

The set of technologies appearing on the horizon signify a departure from the nature of technologies that have been experienced in the past. Historically, technology deployment by banks has mostly been in the back office and middle

office – be it mainframes or CRM – with possible exception of ATMs and Internet Banking. Needless to say, these technologies led to improvement in customer experience as well. However, the primary rationale for adoption was to introduce more efficiency and scale in the banking system. Most of these technology innovations did not change the worldview of customers in relating themselves with their banks. Banks continued to be places where consumers go to deposit money, take loans, transfer funds etc. That is about to change.

The recent wave of financial technologies enable a fundamental shift in how customers will think about banking – or better still, *stop* thinking about banking. This shift is primarily being enabled by a decade of accumulated gains in making the banking infrastructure streamlined. However, it will be driven through the biggest customer-interface innovation of our times – the mobile phone. For the first time, customers have anytime anywhere interactive access to availability of banking services.

The underlying user experiences a paradigm on the mobile device breaks through the barriers of monolithic service providers. It is creating a host of opportunities to rethink banking and make it pervasive to a point where customers will not think about their banks the way they do today. There is a cycle of unbundling of banking services, and re-bundling them with other non-banking services, which leads to a completely different user experience – that, in my

mind, is the real disruption that current generation of FinTech companies will cause. Let us consider a few examples:

1. WB21 is an online-only bank that unbundles the foreign exchange remittance service that is conventionally provided by large banks. However, WB21 creates a seamless customer experience and a pricing value proposition, which allows a customer to get the best forex service without ever leaving their desk or talking to a customer service representative. It rides on decades of investments in financial infrastructure – but it teases out perhaps the most profitable franchise on the basis of disruptively superior customer experience. Similar examples are beginning to appear in other banking services such as wealth management.
2. Go and ask a hundred people what PayTM is – and none of them is likely to say that it's their bank! PayTM unbundles a select set of banking services (the consumer liabilities side of business), and bundles it with non-banking services from mobile top-ups to e-commerce, creating a completely new customer proposition. Similarly, services like MoneyView take the investment side of business, and seamlessly combine it with a spend management utility to create a new savings and investment product. Such unbundling and re-bundling of services lies at the heart of FinTech companies, and are likely to change how consumer perceive banking.
3. Alternate lenders such as Indifi enable credit into the customers' business context. In many cases, the customer may not even think about taking a loan, but the offering is available in an integrated manner with their sales and purchases during usual course of business. Rich data analytics help address current limitations of credit algorithms. Such integration between business processes and financial services will address both access and usage gaps.

Competition or Cooperation

FinTech companies are adopting a wide variety of business models in market. The new-age NBFCs and Payment Banks, look to control the entire value chain right from customer experience to the balance sheet. Others, such as marketplace platforms, attempt to combine the best capabilities through, a partnership models.

In this equation, the key capabilities that FinTech companies bring to the table centres around their ability to reimagine the customer experience, which is essentially driven through diversity of ideas and approaches, and deliver it through compelling usage experiences. These companies also bring an unwavering focus on customer experience as the organizational DNA – something, that generally speaking, is not associated with banking.

However, most of these startups lack the capabilities that have been built in the banking system over decades. These include the infrastructure (technology as well as operating), the understanding of risk, regulatory compliance processes, and the sheer scale which leads to more efficient and reliable services. This is where the partnership opportunities for FinTech companies and banks will reside. In effect, the un-bundling and re-bundling of banking services at the customer front-end will be mirrored by creation of new partnerships between FinTech companies and banks, which leverage their respective strengths to co-create customer value.

The Indifi Experience – So Far

Indifi is innovating in the space of supply chain financing, basis shared credit intelligence. Indifi integrates its financing product deeply with the processes and cash flows in the supply chain – they not only provide a loan, and are used in terms of provisioning a loan, but also create other technology-enabled market linkages through payment systems and analytics. As an example, Indifi has created a product for financing

distributors for a large travel consolidator, using supply chain data and other segment-specific signals. Lenders use this analysis to extend working capital loans to the agents, thereby enhancing their business capacity.

Indifi works in partnerships with banks to bring these products to the market. Banks gain by getting access to new segments and tighter linkages into the business flows. Customers gain by seamless access to financing products that fit their use case and process flows.

It is expected that such models focus on co-creating the value for customers.

Conclusion

Evolution of FinTech is at an inflection point, where it is no longer confined to technology and operational functions. It now has a bearing on customer interfaces and strategy of financial institutions. This allows co-creation of new business models by FinTech companies and banks, which will define the basis of new terms of engagement of a customer with their financial service providers.

DIGITAL PAYMENTS- AN IMPORTANT CONSTITUENT IN INDIA'S QUEST FOR FINANCIAL INCLUSION



Navin Surya
Chairman Emeritus
Payments Council of India &
Chairman, FinTech Convergence Council

Digital payment transactions in India grew at an average rate of over 50% annually, over the last three years, which is the fastest among all the major emerging economies. Over the last few years, Indian digital payments industry has achieved phenomenal success which has overturned many old records thereby creating newer ones in the process.

Not so many years ago mobile phones set its feet in India and now it has penetrated the nook and corner of the country. Today almost everyone in the country has a mobile phone. The growth of digital payments in India reminds many of the telecom industry. However, in spite of the massive success, digital payments penetration in India is still at far lower levels compared to global peers. Unlike the metros, substantial inroads have to be made for digital payments adoption in the non-metro cities and the rural areas.

In my opinion to mirror the success of telecom, payments industry needs to innovate far more. Infact, innovation needs to be deep rooted into the system. Gone are the days of standard operating procedures; infact thinking out of the box should be the new SOP. India needs a 360 degree approach to innovation – right from technological innovation to business innovation to policy innovation.

One such innovative measure is inter-operability of Prepaid Payment Instruments (PPI). Recently, the Reserve Bank of India issued the final inter-

operability guidelines for PPIs which is definitely a very progressive move especially for the non-bank players. It has the potential of being one such game changer which will take the country light years ahead. It sets the foundations to extend the reach to under-banked and unbanked with equally powerful payment products.

Unified Payments Interface or UPIs, yet another innovation by the digital payments industry in India, has seen tremendous traction since its launch. With inter-operability, large section of the population who are not actively using banking services will now be empowered to access UPIs.

Digital Payments growth would also fundamentally depend upon parity between cash as payment instrument vs digital payments instruments like debit/credit cards or PPIs or any other similar options. Currently, in our country cash is used for almost 88-90% of transactions as this still is the best option in terms of acceptability, Liquidity, Fungibility and literally no PMLA compliance's required like KYC, AML & CFT diligencies for transactions below INR 50,000. For gold transactions the same cash limit is INR 1,99,999. Currently, in this aspect all digital payments are over regulated with compliance similar to banking transactions while these should be regulated like cash as commercial compliances and not banking regulations.

The reform could pave the way for PPIs contribution to digital payments jumping up 30-40 per cent in next 5 years, significantly up from the current share. Interoperability will lead us to an era of greater convergence. The payments ecosystem would be significantly benefitted because of this one single strong move.

However, India is a country of dichotomy. In a recent landmark verdict, the Hon'ble Supreme Court, has put a stop to using Aadhaar by private companies for e-KYC. Aadhaar, India's innovation to build a digital economy, with its database of over a billion citizens is a cost effective method of vetting customers. The FinTech industry which is a little over a decade old in India and operates on a low-cost business model will be adversely impacted owing to this judgement. Disallowing the industry players to use Aadhaar for e-KYC will entail physical verification of customers in most cases. This would increase both the cost of operations and the customer on-boarding time. Coupled with stringent data privacy norms, Aadhaar verdict pushes the industry towards greater uncertainty.

Recently Joint committee of Finance Ministry and RBI had released Draft Payment and Settlement Systems Bill 2018. The same was well covered in media but mostly with attention about conflict on control of payment systems in our country between RBI and Finance Ministry. While this debate continues, it is expected that these two stakeholders would find the right solutions soon. However, the bill has some interesting positive aspects and features proposed like:

- a) Risk based regulatory framework with classification of payment systems into Designated Payment System, Infrastructure Payment Systems and Small Value Payment systems (for transactions below INR 2000.)
- b) Proposal of having full time Chairman and few other key members is key to deal with

highly dynamic payments industry and matters related to the same.

- c) Inter-operability as standard across payment systems which now partly already implemented for PPIs on issuing side. Similar model on acquiring of merchants could also be very useful for industry growth.
- d) Some critical provisions around regulatory changes and initiating new laws for innovation where existing policies and regulations may not be sufficient. Also additional provisions to test innovative products/ ideas on sandbox even when existing policy or regulatory framework may not cover these solutions.
- e) Provisions for compulsory being heard before any final orders by regulators to reaffirm principles of natural justice being available to all regulated entities and provisions for appeal which currently is proposed as SAT. However appropriate independent payment experts Tribunal can be set up.

It is an industry request that rest of the Draft Bill where committee members are already in consensus should be urgently implemented which would drive higher growth for digital payments in our country.

In its endeavour to build up a less-cash digital society, India has made rapid strides over the last few years and digital payments industry played a crucial role in fostering this accomplishment. Digital payment is an important constituent in India's quest for financial inclusion and hence as the industry enters into its next phase it is imperative that all the stakeholders collaborate more to further spur innovation and make its benefits widespread. Financial sector needs to be

reformed on the basis of completely new set of policies which are backed with innovative future technologies such as blockchain, artificial intelligence and

machine learning. We must allow new innovative models to find better and inexpensive solutions.



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1. Introduction

Financial Institutions are undergoing a dramatic transformation in the digital age – from their roles and responsibilities, service offerings, products to the distribution channels. With the adoption of technology, ever-changing regulatory landscape and ever-growing consumer expectations, there is a rapid influx of new entrants in the market, which is of growing concern for the incumbent financial institutions (FIs). FinTech ecosystems have also evolved significantly with a considerable effort from financial institutions, start-ups, the government, venture capitalists and regulators to create a conducive environment of collaboration and dynamism. The sweeping changes introduced by FinTech start-ups are likely to have an impact that extends beyond the confines of the traditional financial services industry.

Financial institutions are increasingly adopting a collaborative approach with FinTech start-ups to provide personalised and engaging services to customers. Furthermore, the government's reformist stance has paved the way towards building a vibrant open digital economy. In this era of catapulting technologies, changing ecosystems, dynamic business models and the ever changing customer requirement, one thing that still remains of paramount importance to institutions in general, is the accuracy of the customer identity and the security of the

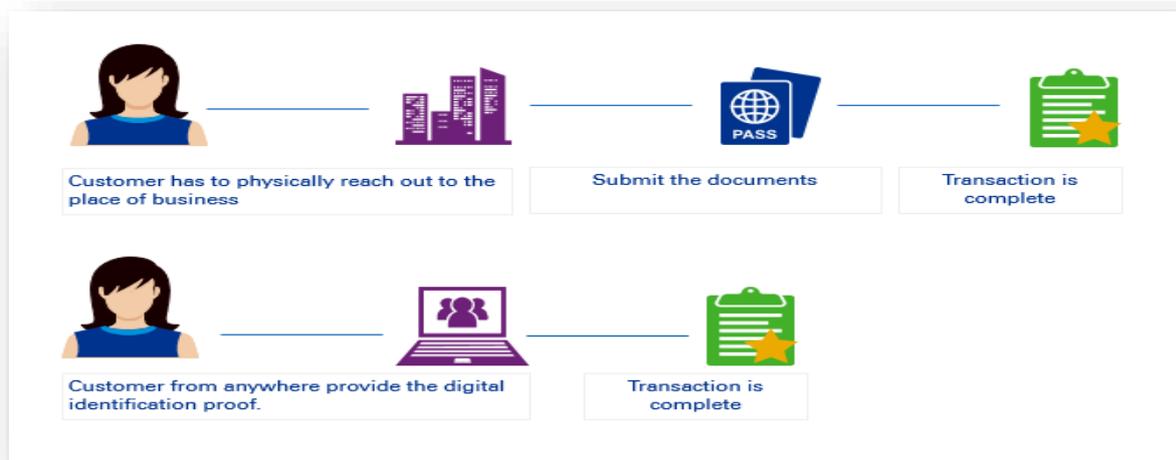
data associated with this identity. However, while the world is moving towards digitisation, customer identity is still holding on to paper and cards.

Customer demands and expectations are at an all-time high now. Simple, efficient, effective and quick solution without compromising the security and integrity is the need of the hour. Digital identity could be the answer to these pressing questions.

This paper gives a view upon what is digital identity, why it is the need of the hour and what are the various trends in the current ecosystem to enhance the use of digital identity.

2. Digital Identity – Need of the Hour

In today's ecosystem, we are living in a society which is driven by digital connections, from basic to complex needs. Customers today have apps to fulfill their demands, right from buying groceries, finding jobs to their banking needs, almost everything a customer does today has a digital footprint. When a customer sets up a mobile application and chooses to sign up via a social media account, the customer is providing answers about their identity by referencing a pre-existing identifying document even if it is in the form of a profile on digital platform. Quite similar to this, when a customer opens a bank account for the first time and provides



their physical identity proof (Driver's License, Aadhaar card, PAN card, etc.) the customer is certifying who they are by referencing to a pre-existing document potentially divulging information. Either ways the customer is divulging information to prove their identity. While physical identity proof has been in existence since ages, there are some potential challenges and threats associated with them. The digital identity is comparatively a new phenomenon but is quickly gaining prominence in the ecosystem for the ease and security it brings.

2.2 Moving Past the 'Password Era'

Traditionally, customers have been using passwords to protect their data. With the advent of technology and the plethora of platforms, mobile applications, web applications etc. the number of passwords an individual has to remember has become humongous. For an easy, quick reference and to save the time and energy in thinking of a new password each time, customers start repeating the login id and passwords used. Eventually it all merges down to one single password for multiple key platforms like bank accounts, Income tax return (eITR), e-wallets, email accounts etc. This enhances the chances of a security breach as it becomes convenient for a hacker to break open a customer's entire ecosystem.

2.1 Ever-Evolving Digital Identity

A customer's digital profile that is created over a social media platform is a form of identity proof. However, it is built by the customer themselves. Hence, it is not a satisfactory proof in case of a business transaction that has higher value and risk. However, a government provided identity proof is reliable and provides the right kind of authentication. However with the technological disruption which has heightened customer experience expectations, convenience often trumps security.

A digital identity brings in a system which is a secure alternative to the traditional – security threat prone- methodology.

2.3 Reaching the Last Mile in Financial Services

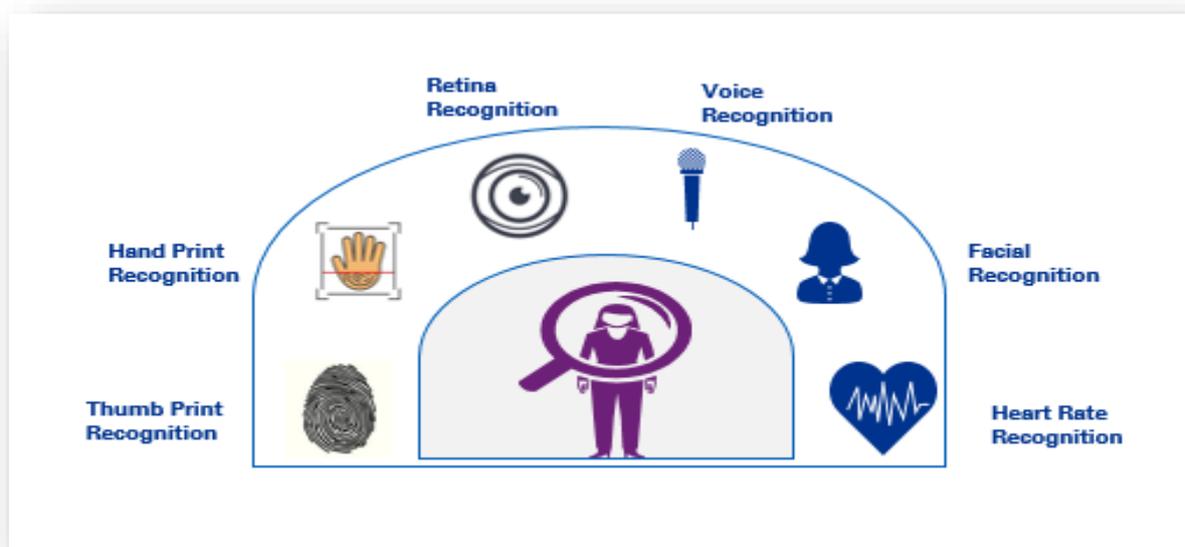
India is a dynamic market with a huge population base, while there are multiple initiatives by the government of India like the Jan Dhan Yojna. Despite the efforts, India has a large unbanked population. While digital identity serves as an option of convenience for the urban population, this technology could also be leveraged to onboard the unbanked population. Illiterate masses, which face the issue of unavailability of mandatory documents for account opening, or inability to fill out the required forms, can be assisted to open bank accounts using the biometric recognition technique.

3. Towards a 'Password Free' Secure Digital World

There are multiple techniques for a password free, convenient, quick, and efficient experience. Two predominantly used methods are – biometrics and facial recognition. These techniques have become so common and are methodically getting ingrained in the way an individual functions. The next generation smartphones are coming with features which lets a user log in through a

fingerprint detection or through facial detection.

Technology today is moving with leaps and bounds and so are the financial institutions. From the brick and mortar banks and bank branches, India is now moving towards digital banks which run only through mobile applications, providing the customers with the ease of logging in through the touch of a finger, which is an innovation in itself. It is the easiest way to prove a customer's identity, digitally.



3.1 Various Use cases of Digital Identity

Digital identity can be incorporated at every stage of customer journey. In-case of a financial institution customer, the digital identity can be an extremely efficient alternative to e-KYC.

While there are multiple use cases of digital Identity some are highlighted below:

a) Customer-on-Boarding – Digital face authentication of a customer against the digitally uploaded mandatory government approved Id. cards is likely to lead to genuine authentication of the customer.

b) Secure User Log in to Accounts – While a customer might have a single relationship with a bank, but the customer might have multiple devices through which they would try to access the same account. Traditionally, while logging in the customer is expected to provide log-in id and password. However, with facial recognition, a customer can swiftly log in through any device.

c) Step up 2 Factor Authentication – In a financial transaction, security is of primary importance. To protect customer data and avoid security breach, financial institutions have put in a layered architecture. Once the customer has entered the password or card details they are prompted to confirm the OTP which is given on the

same device. To safeguard this further, the second factor authentication can be through biometrics such as through a thumb print, retina or facial recognition.

d) Unlock Account – Multiple times, customers get locked out of the account due to wrongful attempts to unlock the forgotten passwords, breached the number of log in attempts, etc. What follows is a tedious process of dialing into the IVR of the bank and going through a number of steps. Through biometric acceptance, this process can become extremely quick. A genuine user could unlock their account using their fingerprint.

3.2 Blockchain & Digital Identity

Over the past couple of years, block-chain has been one of the most talked about emerging technology. There are multiple proof of concepts that have been run in the industry to prove the potential

convenience. Government of India has issued Aadhaar cards for the citizens, which serves as a central database repository and can be used to file taxes, open bank accounts, register properties, etc., This rectifies the issue of multiple 'digital-versions' to a certain extent.

Given the potential of the solution and the technology, there are multiple FinTech organisations developing this solution to gain the early adopters' benefit.

3.3 Customer Consent Architecture

While there could be multiple use cases for biometrics and digital identity, one crucial parameter for the success of the use cases is the 'customer consent'.

Until the customer provides consent to use the digital identity instead of physical identity, the institutions cannot leverage it. The main challenge here is, to educate the customer about the benefits of a digital identity.



of this technology. Concurrent adoption of block-chain and digital identity technology could lead to an extremely secure and robust framework.

Currently, an average internet user has multiple digital profiles across various platforms. The user might be storing similar information across all the platforms like telephone number, home address, local address etc. When a parameter of the disclosed information changes, the user would not log into various platforms and change the information resulting in multiple 'digital-versions' of an individual user. This reduces the security and customer

A challenge foreseen with physical identity proof is providing excessive information, which might be irrelevant for the transaction. Since it is available on the physical identity card hence it is submitted. A common use case of providing excessive information is while hotel check in – the customer provides a government authorized physical identity card like a passport, driver's license etc. The hotel requires the identity proof to confirm customer's name, age, address (from where they are coming). However when the customer provides a passport as an identity proof, the customer is providing excessive information like – passport start & end date, last travel, any

potential future travel (approved visa), passport number etc. While there are measures taken by the hotel staff in safeguarding the privacy of customer, there are chances of a potential security breach and identity theft. In such situations, digital identity technology could play an important role in safeguarding the customer information. The hotel could request for the required set of information and the application with 'customer consent' can share it.

The design of a digital identity application should be done in such a manner that it protects the privacy of customers and provide ease of doing business at the same time, some key factors to be considered would be as follows –

| Design Principles | Design Requirements |
|--|--|
| Privacy design | Embed privacy into everything you do, products, services, systems, data bases and products |
| Data Minimization | Collect and use the minimum amount of data necessary for your Purpose |
| Information Security | Prescriptive requirements for keeping data secure |
| Transparency & Choice | Provide information about your data collection and use practices |
| Accountability | Demonstrate your compliance |
| ID Verification and Individual Rights | Confirm the identity of an individual before disclosing any personal data to them |

3.4 Benefits v/s Challenges of Digital Identity

Over the decades, user Id and password has been one of the most common method of accessing information online. It is in a way deeply embedded in the

psyche of a common internet user. The major challenge of using a digital identity or a biometric authentication mechanism would be the breaking down the age old habits and moving towards a secure and efficient methodology. Another challenge from the Indian market perspective is the lack of required infrastructure. While the technology is disrupting the industry, the basic infrastructure to complement the technology is a must. Every new technology takes time to be adopted by the masses, but when the benefits are paramount, the adoption is quick.



Potential Benefits of Digital Identity

4. Conclusion

Widespread adoption of digital identity could lead next generation to a secure, robust and connected banking framework. This framework can act as a strong defense against identity theft. While identity theft can be reduced drastically through digital identity management, it will also be a step towards addressing the pressing issue of Financial Inclusion in the Indian economy. Digital identity is a positive step towards a truly secure digital economy.

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LEVERAGING TECHNOLOGY TO CREATE INCLUSIVE OUTCOMES IN ACCESS TO FINANCIAL SERVICES



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Abstract: This paper begins with a profile of our typical customer and the unique experiences and circumstances of this segment that lends credibility to the case for improving access to financial services by providing intuitive and tailored financial solutions. It describes Kaleidofin’s mission and approach to propel customers to realize their real-life goals by leveraging technology, analytics and familiar channels to deliver curated savings solutions. Finally, it highlights the key regulatory and policy changes that are required to create an enabling environment for financial inclusion in India.

Keywords: financial inclusion, access to financial services, FinTech, financial advice

1. Making Financial Services Work for our Customers

Our typical customer is a middle-aged woman entrepreneur living in rural India with dependent children. A brief overview of the financial life and history of such individuals indicates an intricate story weaving a number of financial instruments and options that are leveraged to make their lives work. For example, our typical customer may save regularly in her co-operative bank savings account, make regular contributions to a local chit fund (over 59% of chit fund customers earn less than Rs.50,000 per year)¹ and also place a certain amount of money as an interest earning deposit with her landlord. Separately, these customers are generally regular borrowers from at least one prominent microfinance institution active in the locality borrowing over Rs.20,000 at a time.

1.1. Our Customers Save and Borrow Simultaneously

Thus, savings and borrowing are critical components of the customer’s financial

life. In fact, a recent NABARD survey of 40,000 households across India found that 47% of the householders in the lowest monthly per capita expenditure decile had saved money over the past one year (the average annual savings amount in the lowest decile was slightly over Rs.10,000).² Further, we have observed that since customers are typically forced to borrow larger amounts than their requirement from an MFI, they tend to save a sizeable portion of the borrowed sum as well.

1.2. Dealing with Volatilities: Employing a Multitude of Financial Products

As a result, we observe that the gap in access to financial services is not due to a lack of options, but on account of poorly designed financial solutions that betray a narrow understanding and consideration of the unique circumstances, experiences and goals of this customer. Income volatility is characteristic of the financial lives of the poor and those working in the informal sector. Studies have shown that income volatility in the informal segment can be in excess of 50% over a six month

period.³ Since they lack access to formal and reliable financial products to manage their income volatilities, we find the poor taking recourse to a wide range of instruments and financial services to optimise their cashflows. This has been enabled largely by the penetration of microfinance institutions, which currently service over 26.5 million customers and has an asset base of over Rs.531 billion,⁴ and by government schemes such as the Pradhan Mantri Jan Dhan Yojana, which has enabled millions to access basic banking channels. Such formal channels are invariably supplemented with a variety of informal instruments such as emergency loans from money lenders, availing credit from local shopkeepers for the purchase of essential commodities and borrowing from friends and family.

1.3. Customer-Centric Approach: Delivering Liquid and Flexible Solutions

As a corollary to income and cashflow volatilities, liquidity and flexibility of investments are other significant unmet needs of the poor. Customers at this income level are generally subject to mis-sale of products that are illiquid or come with large penalties for irregular or missed payments or are too rigid to account for such volatilities. At the same time, the penetration of flexible formal financial instruments that are both liquid and have low penalties like mutual fund units remains negligible largely on account of stringent know-your-customer requirements that are not relaxed for customers at this income level and an overall failure to adopt a customer-centric approach to the delivery of such solutions (for example, missing a few payments in an SIP can lead to closure of the folio). It is no wonder then that only 9.5% of Indian households reported any investment in the previous financial year and over 73% of these were in physical, non-financial assets.⁵

1.4. Gender Issues in Solution Design

In addition, there is an urgent need to embrace and account for unique gender issues in solution design. According to the World Bank's Global Findex data, less

than 20% of Indian women save through formal channels and less than 5% of Indian women have borrowed from a formal financial institution – for reasons spanning limited geographic coverage of such institutions to low penetration of debit cards and smartphones among women to unique life stages in a women's life cycle such as maternity.⁶

2. Kaleidofin: Realizing Unlimited Possibilities of Life

Thus, we believe that a one-size-fits-all approach in designing financial products does not work for the unique experiences, needs and goals of the traditionally excluded informal customer. We believe that everyone deserves and requires access to a suite of financial products that are intuitive and easy to use, flexible and personalised to real goals that can make financial progress and financial freedom possible for everyone. For too long, the financial services industry has been a manufacturer producing products and fitting customers to their products. At Kaleidofin, we endeavour to provide mass tailored yet customer centric solutions that are best suited to meet the customer's own goals/challenges. Our focus is on providing financial solutions (i.e. financial plans that are bundles of financial products like credit, savings, investments and insurance) to make the real life goals of 600 million customers working in the informal sector a reality. Today, Kaleidofin is present in seven states in India and has over 5,000 active customers. We have partnered with six asset management companies, two banks and insurance companies in order to provide full service financial plans to the customer.

Kaleidofin leverages technology, existing networks, analytics, structuring and user-centred design to drive outcomes for customers; in the process, we also help enrich the digital asset of each such customer. Our approach is: (i) to combine distinct financial products (credit, investment, insurance, savings) to form a solution that actually both resonates with and works for the customer; (ii) to build customer profiling, underwriting, solution

design and machine learning suitability algorithms to solve this gigantic customer problem; and (iii) to leverage networks such as agents, cooperatives, self-help groups, NGOs and microfinance institutions to deliver suitable solutions at enormous scale.

3. Enabling Financial Inclusion: Key Policy and Regulatory Measures

Over the last several years, the introduction of a national identification system in the form of Aadhaar, e-authentication and all the other constituents of the India Stack and the JAM trinity, as well as impetus for digital transactions spearheaded by the National Payments Council of India (NPCI) and the Pradhan Mantri Jan Dhan Yojana have provided important infrastructure allowing rapid gains in improving access to financial services to the unorganised and underbanked segments of the population. In addition, the regulatory push from the Securities and Exchange Board of India and the Association of Mutual Funds of India on the promotion of mutual funds in B30 geographies along with gains from customer education has contributed significantly to creating inclusive outcomes in relation to investments in formal channels vis-à-vis high risk informal mechanisms. However, we believe that certain enabling clarifications to the regulatory framework are required to supplement financial inclusion efforts in India.

3.1. SEBI

(i) Easing stringent KYC/AML requirements for the opening of a folio through the RTA/AMC if investments are made entirely through the customer's bank account which is KYC compliant – specifically, enabling existing customers to easily complete centralized KYC and exempting transactions through KYC compliant bank accounts (including further investments and redemptions) from additional KYC requirements.

(ii) Enabling the creation of lien and power of attorney for transacting on the customer's behalf as an AMFI-registered distributor/SEBI-registered investment adviser through electronic signature/indication of acceptance/consent (e.g. through OTP). Since these households experience significant volatility, allowing the creation of a lien on mutual fund investments without requiring a paper-based wet signature, will enable the provision of loans secured against the customer's investment, which is often far cheaper than partial sale of the investment (after accounting for potential exit loads).

(iii) Relaxing the requirement of PAN for availing investment advisory services would enable those who are in need of high quality financial advice to access it easily and at low cost. While the SEBI has exempted systematic investment plans and lumpsum investments not exceeding Rs.50,000 per year per investor from the requirement of PAN, this relaxation is not applicable in case of availing investment advisory services. Given the low penetration of PAN, and that Aadhaar card is often the sole form of identity available to our customer segment⁷, replacement of PAN with other additional forms of identity as a means of satisfying KYC for investment advisory services would allow significant inroads to be made in making such services available to the vast majority of the population.

3.2. RBI/ NPCI

(i) Removing penal charges imposed by banks on failure of NACH/ECS/SI debit due to insufficient balance in the customer's bank account considering that currently no

charges are levied on failure of a debit card transaction at a merchant point-of-sale, the elimination of variation in the treatment of these two situations would allow low-income customers significant flexibility in leveraging investment options to meet their financial goals.

- (ii) Creation of default UPI ID (e.g., "bankaccountnumber@bankname") for financially underserved customers thereby removing the accessibility issues surrounding debit card and smartphone penetration (both of which are presently required to create a UPI ID)
- (iii) Setting up recurring payment mandates using UPI-based consent, thereby enabling wider participation in the digital transaction revolution, particularly in the wake of the Supreme Court judgement on Aadhaar which severely cripples the use case of e-NACH as well as in light of the signature mismatch and other structural concerns with respect to paper NACH.

3.3. Legislature: Impact of the Supreme Court Ruling on Aadhaar

The Supreme Court of India recently considered the constitutionality of the Aadhaar (Targeted Delivery of Financial and Other Subsidies, Benefits and Services) Act, 2016 (the "**Aadhaar Act**") in *K.S. Puttaswamy v. Union of India*. Section 57 of the Aadhaar Act which enabled private parties to rely on Aadhaar to establish the identity of any person, for any purpose, pursuant to any law or any contract to this effect was read down to prohibit private entities from performing Aadhaar based authentication in light of two main concerns – *first*, that the usage of biometrics by private parties pursuant to a contract "can amount to

commercial exploitation of biometrics" and violates the right to privacy and *secondly*, that extending Aadhaar authentication platform to private parties stretches beyond the original purpose of the Aadhaar Act.

Aadhaar-based authentication has enabled India to make large strides towards achieving financial inclusion by enabling private sector participation in making credit, savings and investment products and insurance available at the bottom of the pyramid. *First*, it provides the opportunity for individuals with no other acceptable proof of identity to enhance their digital asset by building a reliable credit and transaction history and comply with know-your-customer requirements.⁸ *Secondly*, it allows individuals who because of their inability to place accurate signatures to continue to rely on their thumbprint to initiate relationships with financial institutions and authenticate transactions.⁹ *Finally*, it enables access to financial services not only by reducing the associated costs of maintaining and operating relationships with the formal banking and financial sector but also by allowing transactions to be authenticated solely on the basis of identity thereby enabling far deeper penetration of payments points of sale than previously thought possible.¹⁰

Rolling back access to the Aadhaar authentication platform to private parties would be a regressive step as it would all but dismantle hundreds of such institutions which are currently leveraging it to innovate and offer financial products and solutions to the underprivileged. There is an urgent need for an enabling legislative and regulatory environment that allows the private sector to continue to leverage the Aadhaar authentication platform (detailing the circumstances under which authentication can be undertaken and the pre-requisites for gaining informed consent) for such use cases that promote access to essential financial services for the excluded customer.

¹Invest India Market Solutions, Towards an Inclusive Financial System, p.2 (available at <http://www.micropensions.com/pdf/Publications/Financial%20Services%20Demand%20and%20Utilisation%20by%20Indias%20Low%20Income%20Workforce.pdf>)

² NABARD All India Rural Financial Inclusion Survey 2016---17, p. 110.

³ CGAP Working Paper, Why is micro---credit unsuitable, p. 8.

⁴ MFIN Micrometer, Issue 26 (June 2018).

⁵ NABARD All India Rural Financial Inclusion Survey 2016---17, p. 24.

⁶ Global Findex Database 2017.

⁷ UIDAI estimates that about 400 million customers have Aadhaar as the sole form of identity.

⁸ Owing to the relatively poor penetration of other documentary proofs of identity (i.e., passport (less than 6%), PAN (less than 20%), voter ID, driving license (likely to be low in rural areas especially among women) and NREGA job card), it is estimated that approximately 400–500 million Indians rely on Aadhaar as the sole form of acceptable identity to access financial services. Today, 80% of the Indian population has a bank account. This has been enabled largely by the Pradhan Mantri Jan Dhan Yojana coupled with the Aadhaar authentication infrastructure – over 60% of the 300 million Jan Dhan accounts have been seeded with Aadhaar. Access to banking channels has further opened the doors of formal finance to millions of Indians. With the advancements in digital identity, small ticket offerings suited to the excluded portions of society became financially viable for the first time. For example, fully leveraging the India Stack can reduce the cost of processing a loan to a fraction of its paper-based cost. In the absence of Aadhaar eKYC authentication, it can cost up to Rs.250 per customer to complete paper-based KYC. As a powerful instance, over 26 million women entrepreneurs are serviced by microfinance institutions, which are able to underwrite and provide unsecured credit based on a combination of their Aadhaar and uniquely identified credit bureau records. See, Mastercard Center for Inclusive Growth & University of Toronto Munk School of Global Affairs, Reach Project 2017, India: Case study – Aadhaar: providing proof of identity for one billion, https://static1.squarespace.com/static/5769a0b5f7e0ab7b91a3362b/t/5a2576f5419202014ee6d6b7/1512405956013/INDIA_CaseStudy_ReachProject2017.pdf; Business Today, <https://www.businesstoday.in/current/economy-politics/passport-seva-project-passport-seva-kendra-mea-data-passports/story/257002.html>; India Today, <https://www.indiatoday.in/india/story/pan-aadhaar-linking-income-tax-return-filing-1029454-2017-08-13>; Economic Times, <https://economictimes.indiatimes.com/news/politics-and-nation/election-commission-may-resume-seeding-voter-cards-with-aadhaar-numbers/articleshow/65974368.cms>; IDInsight, 'State of Aadhaar' dataset, <https://stateofaadhaar.in/about-state-of-aadhaar/>; Microfinance Institutions Network, <http://mfinindia.org/wp-content/uploads/2018/09/Micrometer-Issue-26.pdf>; Financial Express, <https://www.financialexpress.com/opinion/increasing-credit-reach-data-powering-lending-to-msmes/1316906/>;

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⁹ Paper-based forms of payment rely heavily on signature verification for success, at stark variance with the reality of over 300 million Indians who are illiterate and do not have an ink signature. Conventional forms of electronic payments such as online banking and even new digital offerings such as Unified Payments Interface (which was initially situated within the Aadhaar ecosystem and today requires a debit card) are inaccessible to the vast majority of the population – while only 12% of the banking population uses online banking, 98% of Indians do not have a credit card and 47% do not have a debit card. Aadhaar-based authentication that enabled payments on the basis of biometric verification through platforms such as Aadhaar-enabled payments system (AEPS) and eNACH have been a boon to migrant workers and other excluded communities.

See, Oxfam India, <https://www.oxfamindia.org/education/10-facts-on-illiteracy-in-India-that-you-must-know>; Boston Consulting Group, Encashing on Digital: Financial Services in 2020, http://image-src.bcg.com/Images/BCG-Facebook-Encashing-on-digital-Jun-2017_tcm21-163357.pdf; Global Findex Database 2017.

¹⁰ For instance, 280 million low income customers in rural areas (including migrants as well as pensioners) remit money and access their savings bank accounts via 543,000 banking correspondents (BCs), wherein each banking correspondent is powered by the Aadhaar-enabled payment system which is based on the Aadhaar authentication platform. Of the 534,000 banking correspondents, 438,000 of these BC points are in small villages (with populations under 2000). In comparison, public sector scheduled commercial banks have a combined network of just 95,386 branches as of June 2018.

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TECHNOLOGY: THE KEY ENABLER FOR FINANCIAL INCLUSION



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Abstract

FinTech is playing a significant role in the space of financial inclusion in our country with the advent of small finance banks and payment banks. These niche banks have adopted technology that has contributed to digital adoption for financial inclusion. FinTech enables us to scale up operations efficiently, reduce the cost and achieve financial inclusion at a greater pace. While the entire customer journey has been impacted for the better through technology, innovations should be driven by customer needs.

What is FinTech?

According to the Financial Stability Board of the Bank for International Settlements, "FinTech is technologically enabled financial innovation that could result in new business models, applications, processes, or products with an associated material effect on financial markets and institutions and the provision of financial services." This broad definition helps us to understand the depth of technological penetration in the financial services sector and make us aware of the risks and challenges associated with such innovations.

Why FinTech?

FinTech enables us to scale up operations efficiently, reduce the cost and achieve financial inclusion at a greater pace. This digital revolution now encompasses the entire spectrum of financial sector. These include:

Payment Services and Market Infrastructures

- E-money and mobile money products

- Application program interfaces allowing overlay of services on existing products
- Use of distributed ledger technologies for new ways of structuring market infrastructures
- Leveraging transaction data and other sources of data for credit appraisals
- Transaction data from e-commerce and payment platforms such as Alibaba and Paypal
- Mobile phone usage data
- Social network related data

Deposits, Lending and Capital Raising

- Crowd-sourcing ideas and funding them through crowd funding
- Peer 2 peer lending
- Internet-only banks

Investment Management

- Automated processing and dissemination of investment advice

Principles of Digital Financial Inclusion

The G20 high level principles on digital financial inclusion⁴⁸ capture the essential

⁴⁸ https://www.gpfi.org/sites/default/files/documents/G20-HLP-Summary_0.pdf

elements that are required for effective financial inclusion based on digital platforms.

- Principle 1: Promote a digital approach to financial inclusion
- Principle 2: Balance innovation and risk to achieve digital financial inclusion
- Principle 3: Provide an enabling and proportionate legal and regulatory framework for digital financial inclusion
- Principle 4: Expand the digital financial services infrastructure ecosystem
- Principle 5: Establish responsible digital financial practices to protect consumers
- Principle 6: Strengthen digital and financial literacy and awareness
- Principle 7: Facilitate customer identification for digital financial services
- Principle 8: Track digital financial inclusion progress

Impact of FinTech

Digital Innovation and technology have brought about a radical change in traditional financial services. The world has seen the emergence of more than 12,000 start-ups and massive global investment of USD 19 billion in 2015⁴⁹ in the FinTech space. The global FinTech software and services sector is expected to boom as a USD 45⁵⁰ billion opportunity by 2020, growing at a compounded annual growth rate of 7.1%, according to NASSCOM.

The Indian FinTech industry grew 282% between 2013 and 2014, and reached USD 450 million in 2015. At present around 400 FinTech companies are operating in India and their investments are expected to grow by 170% by 2020. The Indian FinTech software market is forecasted to touch USD 2.4 billion by 2020 from a current USD 1.2 billion, according to NASSCOM. The transaction

value for the Indian FinTech sector is estimated to be approximately USD 33 billion in 2016 and is forecasted to reach USD 73 billion⁵¹ in 2020.

With the advent of new players such as Small Banks and Payment Banks, FinTech is playing a significant role in the space of financial inclusion in our country. These niche banks have adopted Aadhaar-based digital identity with secure biometrics, usage of data enabled smart phones, mobile-specific/local language content and these innovations have gone a long way in driving digital adoption for financial inclusion. The advent of Open API and AI, which is a harbinger of customer-centric solutions, are going to further change industry dynamics in the areas of paperless micro loans and P2P digital lending.

The Challenges

While FinTech has been revolutionizing the way the payment and settlement systems function, there is no denying the fact that cash transactions still play an important role. The fact that the currency in circulation, which was Rs. 17.96 lakh crores as of November 2016, has increased to Rs. 18.13 lakh crores as of March 2018,⁵² is a clear pointer towards this trend.

We have a gap wherever the combination of physical and digital is required to succeed. Given the complexity around vernacular languages and the informal way of doing business, information required to make any digital solution work is a challenge because no data is being captured.

Education and ecosystem readiness are the two key challenges: education of customers to a formal basis of reporting and engagement is the key to success. If customers shun cash, it's better for them, not just for us. However, it is equally important to build an ecosystem in the

⁴⁹ Report of the RBI's inter regulatory group; The pulse of FINTECH_KPMG 2016, India emerging a hub for FinTech start-ups <https://rbidocs.rbi.org.in/rdocs/PublicationReport/Pdfs/WGFR68AA1890D7334D8F8F72CC2399A27F4A.PDF>

⁵⁰ https://www.business-standard.com/article/companies/india-emerging-a-hub-for-FinTech-start-ups-116051700397_1.html

⁵¹ <https://rbidocs.rbi.org.in/rdocs/PublicationReport/Pdfs/WGFR68AA1890D7334D8F8F72CC2399A27F4A.PDF>

⁵² <https://economictimes.indiatimes.com/news/economy/finance/after-16-months-currency-in-circulation-back-to-pre-demonetisation-levels/articleshow/63304790.cms>

customers' vicinity that supports digital transactions. This is now the single biggest challenge as we need to also build a strong pull and push approach. There is not enough opportunity in the economically weaker segment to deliver digital usage and shunning of cash.

A large section of society still finds it easy to deal in cash; digital payments need to be an option of choice and not a compulsion. At the same time making the end user aware of the benefits of the adoption of a digital platform can lead to a stronger sense of connect for financial institutions to engage with customers further for lending, liabilities and their other financial other needs.

A trade-off between the profitability of the entity vis a vis the investment in the FinTech solution is another issue that needs to be addressed.

Way Forward

FinTech has played a unique and significant role in filling the gaps lying vacant in this long journey where banks could not match the pace of change and agility so needed. Starting from customer acquisition, transactions, servicing, fraud/regulatory monitoring, the entire customer journey is now widely impacted for the better.

Digital acquisition, authentication, lending and AI-based servicing are major thrust areas that can be seen. What's needed more is the alignment/collaboration between banks and FinTech for the common goal – the digital and payment life of the customer that gives him/her control of his/her journey, always.

Banks, FinTech and government are now aligned for ubiquity and security of digital payments to make an impact on the lives of customers' journey in helping the way customer accepts/makes day-to-day payments without worrying about the safety and security of the money.

It's imperative that banks make the best of the environment and align all journeys keeping the end customer in mind. The vast amount of customer information

available with banks has not been put to the best use to understand our customers better and to create products that solve the underlying problems in the most efficient and cost effective manner. One size doesn't fit all. Innovations will have to be tailor-made keeping in mind the various customer segments.

The maximum impact of the FinTech revolution has been on the retail or individual customer segment. This includes identification of customer base, customer on-boarding, and servicing their needs. Going forward, customer segments such as small businesses will be seen as potential drivers of the economy which will fuel economic activities where the FinTech will have a definite role to play.

SME segment is another promising sector that has witnessed strong change waves from digital payments across a wide variety of payments around the value chain. The SME segment digitization will serve in reducing costs which is the critical component of success of the SME business. Most of these will be financing costs. While the financial sector will see this income reducing, it will see a manifold increase in business as digitization will open up the informal sector for formalization.

The issue around small and medium business has been lack of formalization which then leads to need for collateral or makes many banks shy. Formalization of business led by technology will lead to a permanent solution to this critical sector of the economy.

Regulatory Challenges

Every financial innovation poses its own set of challenges to the regulatory authorities. FinTech is no exception. The issue of data privacy, complexity of products and players, scaling of supervisory skills to address various linkages of products and players, misuse of digital payment channel for criminal activities are some of the issues that need to be addressed to make way for an effective and efficient FinTech-driven banking system.

Need for Customer-Centric Approach

The importance of designing products and solutions that are scalable, economically viable and profitable and that can be offered to large customer segments spread across geographies is vital. At the same time it is always

necessary to keep in view that any innovation is driven by customer needs. Their expectations dictates the speed and direction of changes. The ecosystem needs to continuously strive to understand better and design the product to solve the customer needs. It is this skill to adopt and innovate that differentiate the better players in the markets.

LEVERAGING TECHNOLOGY TO RE-IMAGINE INDIA'S CREDIT ECOSYSTEM



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Abstract

Alternative data - based underwriting for unsecured retail credit has finally come of age in India with demonstrated impact. The leading player in this space, CreditVidya, has underwritten the largest set of individuals in the new-to-credit category thus far, at 10 million⁵³. Data indicates that the predictive power of alternate data-based underwriting exceeds that of traditional models employed by credit bureaus, with banks and NBFC's now able to underwrite 15% more new-to-credit customers, at the same level of risk. With digital footprints deepening further; and deep learning algorithms constantly improving; alternative data-based lending has the potential to transform the retail credit ecosystem in the country.

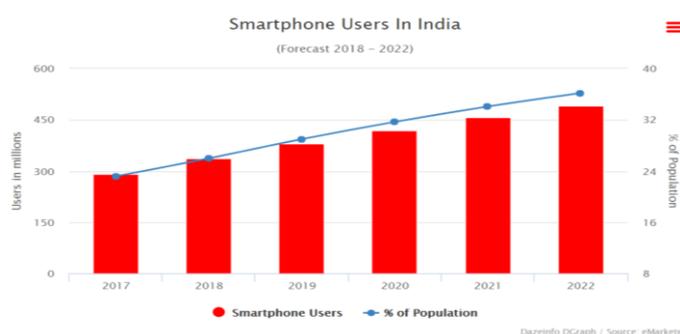
Keywords: Financial inclusion, alternative lending, alternative data, unsecured lending

The Hunger for Institutional Credit

2 billion people in the world do not use banking and formal financial services, which led the World Bank to call for Universal Financial Access (UFA) by 2020. In India, only 20 percent of the adult population is covered by a credit score from a bureau. Due to the paucity of data required to underwrite individuals, loan applications of approximately 50 percent of first-time borrowers are rejected. This is especially true for those who are not salaried (self-employed). The coverage of credit bureau data in the below-35 age group is particularly low. However, this segment of credit-seekers is arguably the most productive, within the population. Denying reasonably-priced institutional credit to them, only means that the Indian economy is losing out on considerable productive potential.

When individuals, most in need of credit, fail to meet the criterion set by formal lenders, they may be unable to meet critical personal and business requirements, such as medical emergencies, or capital in the case of a small enterprises. Informal sources of credit, such as moneylenders, are notorious for their predatory rates of interest, and these high rates only increase the chances of default by the borrower.

Leveraging the Data Explosion



⁵³ As on August 2018

In 2015, CreditVidya set out to build a scoring platform⁵⁴ for India's vast new-to-formal-credit segment, leveraging the increasing smartphone penetration and deeper 'digital footprints' of millions of individuals. CreditVidya's scoring platform sources upto 10,000 data points for every prospective borrower using social and geographical fingerprints.

There are five types of fingerprints - social fingerprint (anything you put on social media), device fingerprint (e.g. SMS), browser fingerprint (anything that identifies a person's device), click stream fingerprint (how fast a person types) and biometric fingerprint (the physical fingerprint). The type of data source it uses can vary. For instance, from an expense perspective, what does an individual's profile look like? Does they spend money as soon as they receive their salary? Do they have savings? From the perspective of transactions, a positive correlation was noted between a regular post-paid phone bill payer and timely credit card payments. Another data point to consider is location.



We have identified certain geographical locations where the percentage of defaulters spike. For an applicant, from such a neighbourhood, this would weigh in negatively, as the probability of default would be considered to be higher. There is also something called the network effect that is considered. This refers to a combination of data linked to the density and frequency of inter-personal interaction across geographies. Simply put, if two people are talking to each other, they are likely to be part of the same socioeconomic strata and we can

build a hypothesis around it. We can ascertain the income bracket in which a person falls, from network-related data.

CreditVidya's proprietary machine learning algorithms are applied to convert this large pool of unstructured data to semi-structured data. The unstructured data undergoes multiple enrichments to estimate positive and negative influencers, on a scale of 100 to 1000. The negative influencers include network ignorance, defaults on utility payments, financial instability and high merchant interactions. Positive influencers include travel logs, communication logs and social outreach. Moreover, recent positive and negative events as well as behavioural patterns can be factored into the model. CreditVidya's AI-based frameworks combine these influencers to generate an accurate predictive modelled statistical output. This is therefore, a far more comprehensive approach for risk assessment of first-time borrowers.

The rise in smartphone penetration⁵⁵, spurred by one of the lowest telecom rates in the world, which was shortly followed by an increased focus on retail credit on the part of institutional lenders. From the early days of attempting, to convince lenders about the viability of alternative data-based assessment, we have come a long way. Today, banks and NBFCs realize the potential of this untapped segment of nearly 167 million smartphone users (40% of the adult population), and are examining how best to expand credit to them. Alternative data - based products have also evolved considerably, and now cover the entire range of the lending process, with underwriting, fraud detection and income verification, generating the most value for lenders. As our experience with developing products has grown, the time to roll them out has dropped appreciably. Today, CreditVidya's Software Development Kit (SDK) can be built into the mobile app of an institutional lender and be ready for rollout within a month.

⁵⁴ Patent pending for the technology platform that provides insights into transactional behaviour from unstructured data.

⁵⁵ India is witnessing the highest growth of smartphones, globally, at 16% YoY

What this Means for the Retail Credit Ecosystem

For the first time in India's history, an estimated 28.8% of individuals, with no credit history are data-rich and credit-poor. It is also for the very first time, that institutional lenders are able to offer unsecured credit to completely 'new-to-credit' individuals, both salaried as well as self-employed. The segment we speak about, is typically between the ages of 20 to 45. A significant portion of the loans are sought for two-wheelers and consumer durables such as televisions and air-conditioners. Unsecured loans are also sought for medical expenses and urgent home repairs.

Alternative, digital lending has distinct advantages over traditional lending for banks and NBFCs:

- 1) Higher approval rates: Our products have helped our partners to disburse small ticket loans of upto 60,000 INR with a 15% higher approval rate.
- 2) Lower cost of underwriting: A huge amount of documentation, third party resource utilization and lengthy processes make it difficult for financial institutions to tap creditworthy consumers from first time borrowers requiring unsecured loans for short durations and small amounts. By automating the lending process for unsecured small ticket loans, it is possible to cut the cost of underwriting new-to-credit applicants by 50 percent.
- 3) Faster turnaround time: The total time for loan disbursal has been reduced from 2-3 days to under five minutes.
- 4) Greater accuracy of underwriting: Advanced, AI-based algorithms have been shown to be twice as effective as traditional underwriting methods. Lenders have witnessed 33% lower delinquencies. Moreover, alternative data - based algorithms have also improved prediction of rates of default for individuals with an existing credit history. This can be partially attributed to both the number of data

points, as well as the fact that the data is real time and far more relevant.

The retail credit segment in India is growing approximately 15% annually, and with more than a quarter of the population estimated to use smartphones by the end of 2018. Banks and NBFCs have an opportunity to significantly increase the consumer credit to GDP ratio in India from the current 15⁵⁶.

The Road Ahead: Towards a Holistic Pre-Lending Process

In lieu of the increasing cases of credit fraud, the Reserve Bank of India has issued a directive to lenders to strengthen their KYC procedures. This is a part of the overall efforts to strengthen risk management in lending. A laudable move by the central bank, the objective of this is, to have more comprehensive due diligence for customers, and removal of standardized 'checkbox' approach of collecting and verifying (primarily) ID documents.

The interpretation of 'customer due diligence' has been left to the financial institutions. Consequently, each one is including, whatever check boxes, they deem fit. Alternative data based tools play an overarching role, in this. For e.g. social network mapping, determining intent, propensity to pay, etc.

This is a great opportunity to develop more comprehensive and robust alternative data-based products and drive their adoption. We are witnessing that banks and NBFCs are becoming far more open to innovation and are engaged in faster adoption of technology. Risk management systems are becoming a focus and a range of products are helping lenders save time, reduce the cost and improve the accuracy of lending process, as well as reducing the chances of slip-ups due to human intervention.

In recent years, there have been commendable efforts to create more robust technical infrastructure on the part

⁵⁶ China's ratio stands at 40.

of several public bodies, which has been complemented by an evolving policy framework around lending. India is currently home to over 350 million first-time borrowers. Alternative data - driven risk assessment is the only way, through

which lenders can afford to give these individuals access to affordable credit. It calls for all stakeholders, lenders, technology players as well as the state, to work together to build scale and trust in the credit ecosystem.

ENABLING CURATED ACCESS TO PROFESSIONAL SERVICES FOR SMEs ACROSS BUSINESS LIFE-CYCLE: A FINTECH APPROACH



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SME Value Advisors

The Confederation of Indian Industries (CII) reports that the SME sector contributes around 45% of India's exports. India's leading financial daily The Economic Times projects that by 2020, SMEs in India would be a \$25.8 billion market for emerging technologies. And yet, a huge number of these SMEs may be working below their optimal level for a surprising reason.

What is Holding Back Indian SMEs?

A large proportion of SMEs, particularly those in Tier II & Tier III cities and even many of those, in Tier I cities, lack knowledge, understanding and professional expertise across many of the crucial areas and functions of business and entrepreneurship. Some of the most critical drawbacks of Indian SMEs are listed below:

- **Mobilization of Growth Capital:** Raising funds for growth and expansion is an immense challenge that SMEs battle with. They need advisory support for deal discovery, since their understanding of how and where to seek funds and matching prospects is, at best, limited. The fund-raise process involves multiple stages from business preparation, sourcing prospects and deal discovery, matchmaking, negotiation, deal structuring and closure. Without the right expert advice that could help them generate funds to scale up, these SMEs may never flourish, or worse, may soon decline. Even those SMEs that are on the threshold of turning into public limited listed companies often have to restrict

themselves to service-providers who can offer little beyond the minimum.

- **Decoding Best-Fit Business Strategy:** A good number of SMEs can grow to the next orbit while drastically improving their profitability and overall financial health. However, a considerable number of these SMEs are based in Tier II and Tier III cities. Their access to management consultants, research specialists, training professionals, strategic growth advisors, business development professionals and marketing cum branding expertise is severely constrained. As a result, their stature remains permanently locked as that of a small-business. Conversely, practitioners in strategic growth, innovative learning solutions, market research, brand building and marketing may have under-utilized service capacity that these businesses could have benefited from.
- **Business Plan, Financial Modelling and Business Valuation:** Business plan, financial modelling and business valuations are areas where thousands of SMEs have virtually no access to experts. Whether they are considering take-

over offers from others or are themselves contemplating acquisitions, these businesses have to make do with dated practices. Advanced, comprehensive valuation models are beyond their grasp. At the other end, there are consultants in this domain, who can bring a lot of value but do not know how to connect with seekers of their services.

- **Legal and Compliance Matters:** Let us take Intellectual Property (IP) rights, for instance. While many of the SMEs know the importance of protecting their IP, only a handful of them know how to actually go about implementing it. Fewer still, have access to professional services that can help them with IP registration and protection. Consequently, they remain vulnerable to the IP infringements without appropriate legal recourse. IP consultants, on the other hand, who can help out these SME owners with quality service, have no idea how to reach out to them. Similarly, SMEs and service providers also bear the brunt in areas like taxation, human resource management, company affairs and accounting.

Value-added services from seasoned and forward-looking professionals/ firms can make a significant difference to SMEs, only if:

- SMEs and these professionals/ firms are brought together in a curated manner by a third party
- Technology is deployed as a connective tissue by the third party, and then its competent team curates both ends of the transactions - i.e. the requirements & the service providers, and
- The third party takes full responsibility for successful execution of each transaction in an end-to-end manner.

Today, a professional service provider leveraging technology can potentially offer his or her services almost globally,

without being held back by geographical borders. Small vendors have benefited too - they can now easily sell their wares online. The Amazon or the Alibaba model, for example, brings together on a common platform the makers of various products and buyers, eager to buy these products. And yet, if technology alone was enough, why is the serviceability of SMEs still a big question mark? This is because, in reality, services are much customized and there is little or no standardization. Quality human intervention here becomes the key, as the standard platform model requires intensive and high-quality curation on both ends of the transactions - i.e. the requirements & the service providers - to succeed.

This is where platforms such as www.SMEValueAdvisors.com add value.

The leadership team at SME Value Advisors has spent over a decade working with SME owners and professional service providers. They have been a first-hand witness to the aforementioned challenge that the SME ecosystem, faces. The firm started out as a one-man army relying on hand-written notes, email communications, excel sheets and other databases to leverage an extensive network in order to connect SMEs and service providers, alike. But soon, it was realized, that the next paradigm shift will be, when technology connects professionals with under-utilized expertise to businesses seeking such expertise, with curation and execution by quality human intervention, being the cornerstones of the solution model. Such a technology-enabled platform would have to go much beyond being a mere aggregator of demand (seekers of services) and supply (providers of services). It would have to be backed by discerning professionals to carefully evaluate the needs of every business and identify what professional services would best address the needs of each business. At www.SMEValueAdvisors.com, this is exactly what has been accomplished over the last few years.

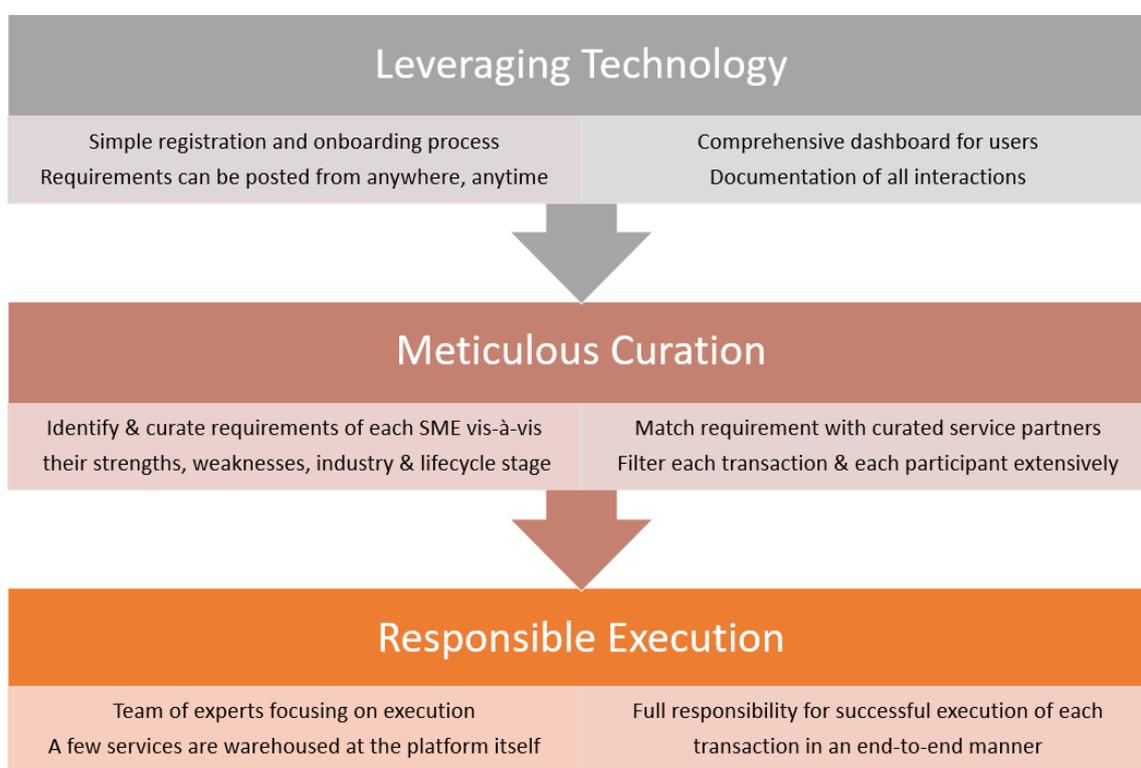


Technology, Curation & Execution - 3 Pillars of Servicing SMEs

- Leveraging Technology:** The model has started out as a one-sided platform (aggregating only demand side users) by leveraging technology to rope in SMEs and their trusted advisors (called relationship partners) in a seamless, hassle-free and transparent manner. For this, the

to-understand dashboard enables customers or the relationship partners to gain a comprehensive view and useful insights into all their transactions. All interactions with the experts on the platform are documented in the chat box linked to each deal/ transaction.

- Meticulous Curation:** Curation of each originated transaction is the key



platform is made accessible to all with a simple registration and on-boarding process. The system is made intuitive and user-friendly such that the requirements of an SME can be posted to the system from anywhere, anytime. Once a customer or its trusted advisor posts a requirement, their problem becomes the problem of the platform and its experts, who start working on the requirement with complete ownership in order to understand it better and then match it with the potential solution. An easy-

feature of the platform. Curation begins by understanding the characteristics of the industry that the business is operating in, the stage in the lifecycle of the business, SWOT analysis, unique needs and requirements, discovering the full potential of the SME, and identifying the challenges on the way. The platform is committed to correctly identifying what the business needs in each area. This is crucial as businesses may not always articulate their requirements well. As an

illustration, their expressed desire may be of going public, whereas their actual need of raising funds could be better satisfied by private equity. This is then matched with the wide network of curated service partners (called product partners) who are best suited to cater to this business. The objective is to filter each transaction/ deal and work extensively to ensure that curated deals reach to the product partners and curated product partners are connected with customers - the seekers of such services. While origination happens by direct customers or their trusted advisors (the relationship/ origination partners), the platform's competent team looks at each transaction carefully, interacts with customer/origination partner to understand that better and then crafts a highly customized solution.

- **Responsible Execution:** The platform is building a team of experts whose primary role is to focus on execution vehemently. At the core of every initiation is quality execution. The platform owns full responsibility of execution towards its customers, once the transaction is taken up, irrespective of who the product partner or the execution partner is. Indeed, a few services are warehoused at the platform itself - for example, raising private capital. Significant emphasis is given on curation of product/ execution partners to ensure that the platform delivers quality services to its customers in a timely manner. The platform takes full responsibility for successful execution of each transaction in an end-to-end manner.

Value Delivery of the Platform to Each Participant

- **Relationship Partners:** This model works directly with the trusted professionals of SMEs (CAs, CSs, Independent Advisors etc.) and joins hands with them to offer an expanded set of services to their customers

without jeopardizing their interest. Therefore, the platform works with these professionals as its relationship partners and shares the fees in a transparent manner through cooperation and co-creation of value. The professionals have an opportunity to expand their services base, serve their customers and augment their income, while sitting at their office by simply leveraging platform's technology, network and competent team of experts.

- **SMEs:** The platform owns full responsibility of quality and timely delivery of work to the SMEs, irrespective of who the product partner is. Business owners are able to trust the platform (through the relationship partners or otherwise) as one that connects them with the most appropriate and trusted service providers and that saves them from the pain of physical search for service providers, price bargains, lack of transparency and poor quality of services. Each of these are excruciating problems, currently suffered by the SMEs, which they can now off-load to the platform and its expert team and focus on running and growing their businesses, better.
- **Product Partners:** Service providers or product partners on the platform get carefully curated assignments where their expertise is appropriately deployed and valued. Robust filtering and curation of each transaction by the platform ensures optimal use of their time and expertise. Further, the platform is made robust, through credit control mechanism. Product partners are made immune to the credit risk of customers. They get paid by the platform in a timely manner irrespective of the payment from customers to the platform.

Interestingly, platform participants can also play both the roles - relationship partners as well as product partners. For example, a CA who focuses only on valuation and works with platform as product

partner can also originate transactions for other services on the platform as relationship partner. Alternatively, an independent advisor registered as relationship partner on the platform can also come as product partner for preparation of an investor presentation.

Success Stories

Here are a few success stories to elucidate platform's approach and demonstrate market validation.

Success Story 1: Support to Investment Bank on Capital Raising from Private Market

An Investment Bank wanted to raise capital for its customer from private markets. Platform facilitated the transaction by preparing pitch book, information memorandum, building future projections and delivering valuation models.

Key Value Delivered:

Investment bankers focused on what they knew best (deal management) and outsourced the documentation work to specialists to optimize on time, cost and quality (best value proposition for them and their customers).

Success Story 2: Support to Corporates on Capital Raising Initiative

A power company wanted to raise capital from its potential investors. Platform added value to the company by preparing pitch book, information memorandum, building future financial projections and valuation models.

Key Value Delivered:

The company focused on dialogue with potential investors and outsourced the documentation work to specialists to optimize on time, cost and quality (best value proposition for corporate).

Success Story 3: Support to Corporates on Benchmarking with Other Players

A chain of retail stores wanted to benchmark itself against the large listed companies in retail business. Platform provided this company with insights on main qualitative and quantitative parameters of the leading brands of three large, listed companies, viz. Shoppers Stop, Pantaloons and Trent. The company was empowered to compare itself with these large organizations on given parameters and take strategic actions to get to the next level.

Key Value Delivered:

The client got insights into large competitors in the shortest possible time, took actions to improve business at various fronts and gained insights into changing shape of retail business to take some more strategic steps in the near future.

Success Story 4: Support to Corporates on New Initiatives

A business house was exploring opportunities in new areas. While solar power appeared to be a large opportunity from perspective of rising demand and initiatives from the Government of India, the company didn't know where exactly to focus on its business resources. Platform worked with this business house to map the solar power value chain and provided insights on different pockets of this value chain in terms of competition, opportunity etc. Based on these insights, company could take a decision to enter into specific opportunity in solar space.

Key Value Delivered:

Identification of opportunity in most optimal and cost-efficient manner, avoidance of potential loss by client by entering into a wrong space, capex and time.

Success Story 5: Support to Asset Managers on Investment Research

An Asset Management firm wanted to outsource their research component. The idea was that small team of fund managers (2 fund managers) should focus on insights in business and managing money rather than doing detailed research work on each company/

industry. Platform took up the work on company/ industry research and supported these Fund Managers.

Key Value Delivered:

Fund Managers focused on what they knew best - managing money, and outsourced the research work to specialists, thereby optimizing time, cost and quality. Platform worked hard on providing both qualitative and quantitative dimensions of businesses, as well as carrying out number crunching on valuation models and finding comparables – in transaction and trading.

Concluding Note

The SME sector today is beset with thousands of missed opportunities. This is exactly what FinTech platform www.SMEValueAdvisors.com is trying to

resolve. This triad-model of Technology, Curation and Execution deployed by the platform will add tremendous value to SMEs as well as to the entire SME ecosystem. It will bring high quality, tailor-made business transactions to the doorstep of SMEs through their trusted advisors (relationship partners). The network effect of the platform will create a multiplier-effect on its participants and transform missed opportunities into tapped opportunities - the beginning of a new era, indeed.

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FUSING FINANCE AND INNOVATION – A ROADMAP FOR ASPIRING FINTECH ENTREPRENEURS IN INDIA



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In this article, two silos – the finance silo and the entrepreneurs’ silo are fused, for the benefit of budding FinTech entrepreneurs. Part I covers the Financial Ecosystem. Part II covers the Innovation Ecosystem with examples from overseas. The article ends with a Way Forward, as a guidance for entrepreneurs.

Part I: Financial Ecosystem

The term ‘financial services’ came into the common lexicon of finance in India during the late 1980s, to signify the services being provided by leasing and hire-purchase companies, many of whom operated on a stand-alone basis, distinctly from banks. With the formation of the Securities and Exchange Board of India (SEBI) in 1992, merchant banking got formalised, in addition to the syndication of financing which took place by some entities on a stand-alone basis. Universal banking entities, however, continued to provide a wide range of services under one roof.

Today, the regulatory framework for financial services in India can be visualised across the jurisdictions of Reserve Bank of India (RBI), Securities & Exchange Board of India (SEBI), Insurance Regulatory Development Authority of India (IRDAI), Pension Fund Regulatory and Development Authority (PFRDA) and the Insolvency and Bankruptcy Board of India (IBBI). These regulatory bodies are constituents of the Financial Stability and Development Council (FSDC) which is chaired by the

Minister of Finance and co-chaired by the Governor of the RBI. The Ministry of Finance has, within it, a Department of Financial Services (DFS), which coordinates policies with the RBI as far as banking is concerned, the IRDAI for insurance and PFRDA for pensions. The Department of Economic Affairs coordinates with the SEBI on policy matters pertaining to the financial markets.

The Ministry of Corporate Affairs oversees the functioning of the Registrars of Companies (ROCs) in various states and union territories. The Securities (Contracts) Regulation Act of 1956 and the Depositories Act of 1996, in addition to the Companies Act, 2013 create the foundation for financial sector laws. Other supporting amendments came in the form of the Consumer Protection Act, the Limited Liability Partnership Act and the Arbitration and Conciliation Act.

The wide range of financial services under various regulators are captured in the table below. At least 30 types of fund-based and fee-based services are on offer, as can be seen. This is an ever-expanding range of services.

| | | | | | | | | | |
|--------------|-------|---------|--------|-----------|---------|---------|--------|-----------|-------|
| RBI | Banks | NBFC | HFC | RNBFC | MFI | AD/MC | SFB/PB | MFI | BC |
| SEBI | MF | AIF | FPI | PMS | MB | Brokers | DP | IFA/Dist. | CRA** |
| IRDAI | Life | General | Health | Re-ins. | Actuary | Agent | Broker | Surveyor | |
| PFRDA | Mgr. | RA | | | | | | | |
| IBBI | IRP | RP | Liq. | Inf. Util | | | | | |

*Other intermediaries included Primary Dealers and Arrangers who play a crucial role in the bond markets. There are also credit card service providers.

**Other intermediaries regulated by SEBI include Custodians, Registrars and Share Transfer Agents, Bankers to Issues, Debenture Trustees, Underwriters, SROs etc. Exchanges and Depositories are front-line regulators and oversee listed companies and brokers, and work in conjunction with a clearing corporation.

Financial services, which grew on the basis of contacts and executed through the telephonic markets, came on-board, electronic platforms, first with the National Stock Exchange of India and later, the NDS-OM system of the Clearing Corporation of India for the Bond Markets. The passage of the Depositories Act, 1996, completed the marriage of the markets with the ICT framework as India leapfrogged to a T+2 trading & settlement pattern.

Taking the Jan Dhan, Aadhaar and Mobile (JAM) trinity further, the marriage of finance and technology resulted in a boom for the FinTech sector in India. IT talent and Finance talent merged to create a range of products through more powerful mobile phones which enabled the miniaturisation of technology.

Part II: Innovation Ecosystem

In a "Polya Process", firms give birth to firms and so on. The Silicon Valley innovation cluster is well known, with the presence of a large number of entrepreneurs, venture capitalists and the intellectual base of Stanford University. In Europe, the phenomenon of innovation clusters was done by Breschi and Malerba. Two contrasting models come to view: the Cambridge cluster, an endogenous movement and the Côte d'Azur cluster in France, an

exogenous movement, both described below.

Under the Cambridge model, professors, students and ex-students carried on with their ideas and extended them into real business. A presence in Cambridge provided networking benefits to all the stakeholders, resulting in a high level of innovations.

Under the Côte d'Azur model, visitors from outside France settled down to enjoy the ambient climate, and brought in their ideas, for further maturing when they stayed back. This brought an influx of external ideas into the local community, creating a fusion of ideas.

Paul Krugman agreed with neither of these models in toto, and had his own perception of economic geography. A reference may be made to the case of a Japanese auto firm seeking alternative sites for a production facility, in USA and Canada. The Japanese firm preferred Canada, where the local government invested heavily in public education and health, to a site in USA which provided neither, but offered tax incentives, instead.

Apple Inc. is known as one of the most innovative companies. It recognized that the atmosphere for innovation is conducive in start-ups than in a giant,

established company like itself. To get the best of both worlds, it has a system of acquiring start-ups and also offering jobs to the founders of these start-ups. Apple appointed a former investment banker, Adrian Perica to head its M&A strategy to put this strategy to the ground.

Bo Burlingham, in his remarkable book, 'Small Giants' spoke about the 'mojo' or the spirit of innovation that make small businesses propel through passion. Legendary stock-picker and small/ mid-cap specialist Peter Lynch also believed in spotting investment opportunities in companies when they were small. Philip Fisher, the qualitative analyst, said that the number of truly outstanding companies are small; such companies possess the traits of: new product lines, a culture for R&D, outstanding sales personnel, outstanding personnel relations, worthwhile profit margins, cost controls, certain unique advantages and above all, integrity. This becomes the desiderata for potential investors. On the flip side, budding entrepreneurs must build their enterprises along such lines.

Bangalore is referred to as India's very own Silicon Valley. However, innovation in the FinTech sector in India is not restricted to Bangalore alone. Entrepreneurs and policy-makers need to look at various global and indigenous success stories to understand what success factors are at work. On the technological side, much improvement has taken place in mobile handsets, handset production, band-width, electricity connection and internet telephony, school, college and engineering education, and financial literacy and education. On the business side, innovation and incubation centres, seed funds, SME credit, angel, venture and private equity funding, SME exchanges and listing etc., are well developed.

Way Forward

Entrepreneurs need to build relationships with banks, angel investors, venture funds, private equity funds, government agencies, marketing consultants, stock exchanges and institutional investors. At an early stage, they need to get incorporated as a company, for tracking their own as well as others' investments and to keep a tab on expenses. Essentially, good housekeeping is required and the services of an accounting professional are well advised.

Subsequent rounds of funding could be in the form of seed funding from government/ institutional networks, crowd-funding (at a discussion stage in SEBI), and, as the ticket size increases, angel funds, venture funds, private equity may be the other sources. A shareholders' agreement and term sheet are concepts that will come into the reckoning.

External investors will seek an exit route through a buy-back by promoters, warehousing, sale to other anchor investors, Initial Public Offering (IPO) and a listing on the SME exchange. As the company grows, migration to the main board of an exchange is a distinct possibility.

However, as Bo Burlingham and Philip Fisher advised, the entrepreneurs need to stay focused on the business. The share price will take care of itself.

In conclusion, all businesses revolve around an idea, but all ideas do not necessarily translate into a good business. Serial entrepreneurs will sell off to the VC/ PE firms. Entrepreneurs with passion and mojo may prefer to keep the company and use external financing as a supplement rather than a substitute. That is a big decision.

DIGITAL IDENTITY CONUNDRUM – THE WAY FORWARD



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"As we go from data-poor to data-rich, we are just getting started in FinTech."

-Nandan Nilekani, Former Chairman – UIDAI

Introduction

Mission Financial Inclusion of the Government of India with conducive relaxations in banking regulations by RBI has radically transformed banking landscape in the country. Shifting focus to cashless society, propelled by Digital India initiatives of the government, a bouquet of new age consumer-facing financial services has emerged, that were non-existent till recently. Such has been the pace of growth that average citizen has become more aspirational and demanding. A journey which began from Business Correspondents offering basic technology-backed financial services, it has leapfrogged to an ecosystem adaptable to escalate the reach of financial services to the under-served population of India. Technology is ubiquitous, set to revolutionize the entire process of Financial Inclusion and this time AI including other technologies have arrived as the Change Agent.

It cannot be denied that historically banking system in India due to multiple reasons have not seen financially excluded citizen, MSME sectors as profitable target customer segments. Technology provides economic way out – its' efficacious as it is embedded with LASIC principles - Low Profit Margin, Asset Light, Scalable, Innovative and above all Ease of Compliance. Researches

have established that it has advantaged India with FinTech adoption rate at 52 per cent that is significantly higher than the global average of 32 per cent in addition to around 2.6 million students graduating with STEM qualifications. FinTech as the most preferred strategy for Financial Inclusion has also been conclusively evidenced. According to EY report on Innovation in financial inclusion, India (20.6%) and China (11.6%) have highest number of financially excluded population in their respective countries. FinTech with its inherent benefits has thus proved to be the most preferred strategy for embracing wholesome financial inclusion policies as state policies. It is further noted in EY report that by expanding financial inclusion through innovative channel strategies, India's GDP will get a boost of 14 per cent, commensurate banking revenue would also increase.

G20 High Level Principles for Digital Financial Inclusion provide a basis for country action plans reflecting country context and national circumstances to leverage the huge potential offered by digital technologies. The principles have noted 'while tremendous gains in financial inclusion have already been achieved, digital financial services, together with effective supervision (which may be digitally enabled), are essential to close the remaining gaps in financial inclusion. Digital technologies offer affordable ways

for the financially excluded - get a small business loan, send a remittance, or buy insurance.

With the array of cost-efficient financial services offerings, the FinTech players have been able to establish themselves as significant players in the Indian financial landscape. 'Unbundling' of traditional financial services has increased the reach to the 'bottom of the pyramid' - the under-served people of the country. Two major policy shifts - Demonetisation of high value currency notes and Digital India initiatives, admittedly accelerated and cemented technology-backed financial services offerings in India. JAM has also been one of the significant contributors to the Indian FinTech sector. Conducive relaxations by RBI, SEBI, IRDA and other regulators have also been a significant contributor to the growth of FinTech sector in India. National Payment Corporation of India (NPCI) has leveraged the increasing usage of smartphones and mobile apps. India has set payment rails in the country by launching UPI - Universal Payment Interface, a set of standard APIs with an open architecture provided to the banking institutions which facilitates account-to-account transfer by entering digital identity of the customer. Efficient and seamless P2P transactions eliminating waiting time as well as counterparty risks have reposed customers' confidence in the online payment and gateway which in effect boosted the financial sector in totality. Such has been the exponential growth potential exhibited by the FinTech players that the common man on street has started acknowledging these so-called 'disruptive technological innovations', as the silver lining to the economic welfare of financially excluded population of India. Adoption of Technology backed financial services like Money transfer and payments, Savings and investments, Borrowing, Insurance etc. are gradually becoming popular in India over the years. With mobile internet users' figure touching 187 million in rural areas alone, the prospective of mobile banking will be foolish to deny. Researches have evidenced FinTech adoption will further intensify with

introduction of new financial services and entry of new players in the sector.

As the cliché goes, 'All that glitters is not Gold'. India's financial services ecosystem lags in terms of physical infrastructure and has not been able to reach the poor, with more than 19% of the population unbanked or financially excluded, notes the Assocham-EY joint study. Keeping the ₹35.4 Lakh Crores of Agri & Retail exposure aside, the credit exposure to the MSME is 35% of the overall exposure to businesses. TAT for lending to MSME entities have shown a continuous improvement- from 32 days in 2016 to 26 days in 2018.

Aadhar Conundrum

'Identification' of and 'Authentication' by the customer are the cardinal principles of credit-based financial services. It minimises the repudiation and fraud risks. Digital Identity provides a potentially transformative solution to bridge the Identity Gap in developing economies including India. Such technology has the ability to leapfrog the development of paper-based systems and rapidly establish robust identification infrastructure. World Bank in its paper titled Digital Identity: Towards Shared Principles for Public and Private Sector Cooperation has noted, 'over 1.5 billion people in the developing world suffer from 'identity gap'. This 'identity gap' is increasingly recognized as not only a symptom of underdevelopment but as a factor that makes development more difficult and less inclusive. The inability to authenticate oneself when interacting with the State—or with private entities such as banks inhibits access to basic rights and services, including financial services, voting, social transfers, and more. India's Unique Identification (UID) number has been globally recognised as an opportunity to rapidly close the "identification gap."

The Hon'ble Supreme Court of India in its judgement on 26th September, 2018 while upholding the constitutional validity of Aadhar said, 'Aadhaar is meant to help benefits reach the marginalised sections of the society and takes into account the

dignity of people, not only from personal but also from community point of view'. However, the Hon'ble Court struck down several irrelevant provisions related to Aadhaar card linkage where no benefits, subsidies are involved, especially in the private sector. The Aadhaar ruling is perceived to have a major adverse impact on payment banks and FinTech players, including e-wallets, online loan givers, online brokerage houses, and P2P lending platforms in the country. Most respectfully to the decision of the Hon'ble Supreme Court, it is submitted that the decision of the Hon'ble Court has shaken the digital payments ecosystem in India which generally uses Aadhaar for customer identification and authentication. It may create more gaps in delivery of financial products than resolving the underlying issues. Similar concerns have also been made by the Payment Councils of India.

In short, the recent decision on Aadhaar has created a conundrum for the financial sector in India more particularly for FinTech companies. In the backdrop of these developments, this paper is an endeavour to identify technological innovations that establish digital identity of the customer and also address the impasse without compromising on the concerns of data privacy. Increasing the reach of financial services to the financially excluded Indian population by adopting these technologies, is also an issue addressed by this paper. Fraud is a necessary concomitant to digital finance. The objective of this paper also provides an opportunity to deliberate on the recent developments to augment fraud management. To support our contentions, PoCs based on successful implementation of the technologies by FinTech companies are also recorded in this paper.

The Way Forward

Exploiting the potential of AI, ML, IoT and DLT

Artificial Intelligence (AI), Machine Learning (ML), Internet of Things (IoT) and Distributed Ledger technology (DLT)

have the technological advantages and if fully exploited do provide the answer to the concerns. AI can create credit score / credit worthiness scores using data from various centrally governed social security numbers, farming turnover, affordability (mobile usage, mobile bills, recharge frequency), social network (social media, cell phone call logs), travel information (GPS data, google timeline) and other such features using predictive modelling and ML algorithms.

ML algorithm can eventually build credit profiles for those who were never exposed to banking system and remain excluded from 'financial exclusion'. Cash-flow based loans to MSME may be provided by learning patterns from various unstructured data sources including transactions, purchases, financial statements, tax statements and various other documents. Loan Frame, India uses ML to access credibility of their customers. Monsoon Credit Tech, India uses AI to determine credibility of MSMEs for loan-underwriting platform as a service (SaaS). It is claimed to have improved the asset quality and profit margin of a diverse set of loan books by identifying future delinquencies at the time of underwriting, thus reducing delinquencies without affecting approval rates. Kopo Kopo (by Grow) in Kenya says capital requirement of MSME is seamlessly and authentically predicted and kept apart for repayments without creating a dent in the cash flow. Many other FinTech around the world have confined every documentation had approval over a mobile app for loans by analysing streaming cash flows of MSME using data from various digital wallets.

The underlying value in IoT is the transfer of data, and the financial sector relies heavily on gathering and analyzing data, it's hard not to imagine IoT disrupting the financial services industry. PwC, India in its paper titled 'IoT: The catalyst for invisible payments' has noted, 'The government's objective is to develop the IoT industry in India to the tune of 15 billion USD by 2020'. It is claimed that Finance, Retail and Healthcare sectors

though late entrant contribute around 1.3 million in revenue.

DLT clubbed with AI can be used to create digital DNA of customers who may not have relevant documents for availing banking facilities. Oradian along with Blockchain platform Stellar (by technologically integrating the Stellar platform into their core banking system) brought low cost micro-payments in Nigeria. Oradian has around 300,000 customers mainly female across rural areas in the country who transfer money between MFIs over the Stellar network without paying heavy charges thus creating huge tractions for such services.

Voice Footprint Identification Techniques

Proprietary Phoneprinting technology of Pindrop's can identify 147 different features of a human voice from a call to create an audio fingerprint of that caller and generate alerts for unusual activity and also potential fraud to trace unsolicited callers. Integrated with internal systems of Companies, it can identify prospective customers' voices, locations, and devices. This is added to a database for future reference and to help segregate legitimate callers from scammers.

Santander Bank and HSBC are now using voice-identification based banking technology on their mobile apps in collaboration with Nuance Communications which are intended as an additional layer of biometric security for customer. By analysing over 100 factors like including speed, diction, accent and pronunciation, individuals can authorize themselves and make payments, report lost cards, set up account alerts and answer questions about spending.

Recently, Bank of America launched a financial digital assistant called Erica while other banks like UBS, Credit Suisse and JP Morgan are using virtual-advisors (intelligent chatbots) that makes the use of cognitive and ML to guide customers with financial planning and investments. One such breakthrough is Amelia that

was able to manage 65% of the most common customer queries in under four minutes instead of the average 18 minutes in case of manual query resolution. Importantly, for the banking industry, Amelia can perform all of the key customer related processes without ever wandering away from the rules & regulations. 'Luvo' is another online virtual assistant developed using IBM's Watson AI system, recently rolled out by the Royal Bank of Scotland (RBS) and NatWest to interact with customers and address queries and perform simple banking activities via a chat tool powered by AI.

Credible Database to create Digital Credit History

Tala, South Africa uses non-traditional data to predict credit score of those who are not covered by credit rating agencies by looking at data ranging from 'social networks, mobile texts and calls data, online transactions, app usage frequency and purpose and various other individuals' attributes. This helps in creating a digital credit history, or financial identity, over time for the benefit of its customers.

CreditVidya, India, assesses lending risk by analyzing consumers' internet footprint, social media usage and psychometric test results. Within two years, the company has five million customers and partnerships with over 20 leading financial institutions.

Kaleiodifin, India, a financial technology platform, creates customers profile database by analysing number of dependents, earnings of the spouse, nature of profession – construction worker or farm labourer, seasonality of their work etc.

Tigo-Une, Columbia has converted 13,000 pay phones into "payphone banks," allowing underserved customers to deposit coin-denominated daily earnings into their own micro-savings accounts. These accounts can be used to pay utility bills or apply for micro loans at appliance stores.

Capture Customer Insights

'Keva' is an AI-powered voice bot integrated with Kotak Mahindra Bank's phone-banking helpline aims to augment the traditional interactive voice response (IVR) system in both English and Hindi. Keva uses automatic speech recognition, natural language understanding and text-to-speech technology to help customers navigate smoothly and quickly through the IVR. It helps the bank to understand real customer insights.

In China, the agriculture FinTech company Nongfenqi assesses creditworthiness of customers through conversations with their business partners, customers and fellow villagers. Analyzing customers' reputations anecdotally has resulted in a default rate of just 0.1% on loans made to over 20,000 farmers as of early 2017.

Aye Finance, India, is a small businesses lender that develops credit assessment processes using business and behavioural data, trade associations and referrals, coupled with modern workflow automation. It has disbursed US\$32m of loans to MSMEs in India since 2014.

Turbulence in FinTech Ecosystem – Fraud Management

Digital payments can be executed anywhere, anytime, from any device. This technology is though disruptive to the traditional banking landscape, the ease of banking by way of disintermediation has caught fancy of all the players. On flip side, it is accompanied by additional uncertainty, notably fraud and risk. AI and ML provide the gateway to large scale adoption of digital economy.

Alert Generation

ML may be used to label the payments, explicitly indicating fraudulent payments. Besides, it can also alert the system (pre-empt) to be cautious of the next transaction as disputed transaction that warrants next level validation before transaction closure. Technology can also

be exploited to identify customers with high probability of raising dispute that may lead to fraud dispute (dispute despite being provided with evidence). Similarly, analysis of pattern of sequence can also help in identifying fraudulent transactions. Scores may thus be generated to confirm the suspicion that can be first used to create an alert and more importantly as a feature to create credit transaction classification models for dispute. Extensive features may capture transactional details, customer scores and a few engineered features like Shift from spending pattern, Shift from general mode of transaction, Distance from Common transaction area, Common fraudulent previous merchants that have high probability of frauds.

Signzy, India provides cloud API-based background checks on digital identification, forgery detection and contract management system services. This has helped reduce the identification and verification process for some banks from approximately two weeks to two days.

RBS Royal Bank of Scotland, Danske Bank, OCBC Bank, Singapore are using AI to predict fake transactions in real time. ML can allow computers to learn suspicious pattern and raise alerts and by automation of triaging process for alerts. ML is quite fast in learning behaviour and find out anomalous pattern that could indicate various financial crimes. Few examples being abnormal transactions between borders, abnormal transaction values, abnormal transactions time, sequence and pattern of transactions.

Conclusion

Digital technologies offer convenient cost-effect, efficient financial services in a fair and equitable manner to save, make payments, access credit, obtain insurance and array of other financial services. India has made extensive efforts to expand its digital infrastructure, to expand access to financial services, including the Unique ID scheme and the Digital India program, notes World Bank in its paper titled 'Digital Financial

Inclusion: Emerging Policy Approaches. In the preceding paragraphs we noted that there has been significant growth in digital financial services in India over the recent years. Technological innovations in financial services and strategic channels have benefited a large section of hitherto financial excluded section of the society. Aadhar which provides Digital Identity to the customer, after the recent decision of the Hon'ble Supreme Court, has created an impasse in the FinTech industry. This paper is an endeavour to identify recent technological innovations that help in creating digital identity of the customer and also spur the growth of FinTech sector in the country. We conclude this paper by quoting the leading crusader of digital finance in India.

"There is no dearth of ideas and we know there are many challenges, but we believe tomorrow beckons us with huge opportunities."

- **Krishnan Dharmarajan,**

Executive Director, Centre for Digital Financial Inclusion

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AADHAAR – ADVANCING FINTECH OPPORTUNITIES WHILE CONFRONTING LEGAL TURBULENCES



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I. Introduction

Few years ago, long queues were seen at the offices which provide various financial services including banks, pension offices, provident fund offices, income tax offices, post offices etc. However, in a very short span of time, technology and innovations have engulfed the country in such a manner that every individual now carries, a personal banking system and other offices providing financial services in the form of different electronic applications in a small mobile device. This has largely been possible due to advancement of these technological applications supported by the rigorous and efficient KYC procedures, which are one of the most important elements in effective management of risks related to banking, capital markets, taxes, insurance etc., going beyond the account opening, record-keeping, due diligence and proactive monitoring for suspicious activities. To spread it more, the drive of Digital India programme for turning India into faceless, paperless and cashless economy has been bestowed the highest priority by the Government of India. The programme is assumed to bring each and every segment of the country under an umbrella of digitisation. Moreover, the agenda of digital economy has resulted into elimination of entire mechanism of physical presence of an individual at

various offices and departments from the inception of a task to its conclusion, making citizens of the country tech-savvy from one end to another.

At this transitional phase, where an Indian economy is entering into an era, almost run and controlled by algorithms, making everything sophisticated and easier at just one click, the firm adoption e-kyc system has further added to the ease of doing business by completely eliminating paper work and in-person verification to complete the KYC procedures at the time of on-boarding at different platforms like opening of bank accounts, demat accounts, trading accounts, PF and PPF accounts, digital lockers, creating fixed deposits, e-insurance policies, and application for loans and other credit facilities, generation of account statements, generation of pension slips, choosing nominees, closure of loan accounts and other banking services. Moreover, the facility of e-sign provided by the Aadhaar system complements the e-kyc procedures by making the same much easier for banks, investment houses, brokers, insurers, tax departments etc. Going further, the requirement of physical sign on documents is abolished and clients receive digitally signed documents such as statements of savings and current accounts, credit card

statements, receipt of fixed and other deposits, insurance policies, tax receipts, form 16, form 16A, TDS, 80C certificates, electronic contract notes, e-policies etc., through online mode directly to the client's mail id which are completely valid and acceptable.

Aadhaar is playing one of the major roles in developing the desired ecosystem of Digital India with its robust, safe and secure infrastructure. Such a huge database thrashing the issue of identity gap of the residents of the country, requires an appreciation but several questions had been raised and applications being filed in the court of law since its inception, questioning the legality and constitutional validity of the system. Also, concerns are continuously being raised for such an enormous centralised database exposed to various in-house and foreign FinTech firms. Various takes and standpoints by the courts of the country, some against and some in favour of it has created, each time, a commotion amongst those who are driving the ancillary industry; and entrepreneurs' who have developed their FinTech start-up models, based on the support of underlying technology of the Aadhaar.

II. Origination of the Concept of KYC, A Joint Initiative of Entire World in Support of Anti Money Laundering and Combating of Financing of Terrorism, Advanced to the Idea of Aadhaar, leading towards Digital India – A Journey

In order to adopt National Money Laundering Legislation & Programme, the Political and Global Programme of Action assumed by the United Nations General Assembly (UNGA), in June, 1998, summoned all its members,⁵⁷ keeping "Know Your Customer (KYC)" as one of its agendas, related with the contest against money laundering, principally pertaining to the province of Financial Action Task Force. India being a member of UN accordingly, in the year 2002, enacted

the Prevention of Money Laundering Act (PMLA).

Further, the International Organization of Securities Commissions (IOSCO) in May, 2004 released principles on Client Identification and Beneficial Ownership for the securities industry. It stated that "the Client Due Diligence process (CDD process) is a key component of securities regulatory requirements intended to achieve the principal objectives of securities regulation including; the protection of investors; ensuring that markets are fair, efficient and transparent; and the prevention of the illegal use of the securities industry". It was additionally among various other principles directed that "CDD process must be carried out by authorized securities service providers, to fulfil client and beneficial owner identification and verification, as well as know your client requirements".⁵⁸

Therefore, in compliance with the provisions of PMLA and also according to the IOSCO principles adopted by India, the market regulators i.e. Reserve Bank of India and Securities and Exchange Board of India, respectively, as the members of the global body of regulators, subsequently, issued enabling directions/guidelines/ regulations/ circulars to usher domestic market participants into KYC compliance system. Thus, originated from UN and other global concerns, strengthening of KYC systems of the country was then a new agenda gaining pace. India pro-actively participated into the regime and introduced various legislations which are gradually being accepted by the regulators. Adoption of such directions are then flowing downwards to the market participants and then towards the end users, finally.

While fulfilling the aforementioned requirements, a persistent problem of multiple identities of a common man was faced by the system. Hence, for deletion of duplicate identities of a person and fill the identity gap of the countrymen, proposals and various recommendations were made to introduce unique national

⁵⁷ <https://www.un.org/documents/ga/res/20sp/a20spr02.htm>

⁵⁸ <https://www.iosco.org/library/pubdocs/pdf/IOSCOPD167.pdf>

identity card for every individual. The system was supposed to be; robust, safe and secure, based on the residents' demographic and biometric information & developed by the use of open source technologies. Followed by this idea, the concept of Aadhaar emerged, which took a rigorous exercise of enrolling people in its centralised database. Slowly and gradually, it led towards the introduction of numerous programmes facilitated by Aadhaar based e-kyc and e-sign, giving thrust to the concept of Digital India, an umbrella programme for building digital infrastructure in India.

The PML Amendment Rules, 2015⁵⁹, inter alia, provided that every reporting entity shall "within three days after the commencement of an account-based relationship with a client, file the electronic copy of the client's KYC records with the Central KYC Records Registry (CKYC)⁶⁰. The CKYC shall process the KYC records received from the reporting entity, for de-duplicating⁶¹ and issue a KYC identifier for each client to the reporting entity which in turn will be communicated to the client." It also mentioned that "the reporting entity shall, retrieve the KYC records online⁶² from CKYC, by using the KYC identifier and shall not require a client to submit the same KYC records or information or any other additional identification documents or details. The communication from CKYC Records Registry to the reporting entity shall also be in electronic mode." Simultaneously, this information was also floated through amendments in the PML Act and various inter-departmental circulars that e-KYC service is entirely acceptable as launched by UIDAI and is a binding process for KYC authentication. Also, it was intimated that the client details and photograph

provided by UIDAI in e-kyc procedure is an adequate identity proof and address proof of the client.

Aadhaar was then given a statutory recognition by enactment of Aadhaar (Targeted Delivery of Financial and other Subsidies, Benefits and Services) Act, 2016 ("Aadhaar Act, 2016")⁶³. Prior to enactment of the Act, the UIDAI functioned, as an attached office of the Planning Commission.

World Bank's Chief Economist, Paul Romer described Aadhaar as the most sophisticated ID programme in the world, and the world's largest biometric ID system.⁶⁴ It enabled hundreds of national e-Governance plans⁶⁵ throughout the country. Mission mode projects⁶⁶, direct benefit transfer schemes⁶⁷ and other programmes under Digital India are individual projects within these e-Governance plans that focuses on each and every aspect of electronic governance in India. To support this development agenda, National Payments Corporation of India⁶⁸, National Automated Clearing House⁶⁹, Unified Payments Interface⁷⁰ etc. were also established. These are used in consolidated transactions towards distribution of dividends, subsidies, salary, interest, pension etc. and simultaneously in collecting payments of telephone bills, electricity bills, water bills and other utility bills along with the pay-outs towards the loans, investments in mutual funds, insurance premium etc.

Out of total 1,133 schemes from 74 different ministries, there are 501 DBT applicable schemes & services from 63 ministries. This is being possible only due to e-kyc systems running with the help of Aadhaar. DBT schemes aim to transfer

⁵⁹ <https://dor.gov.in/sites/default/files/PML%20%28Maintenance%20of%20Records%29%20Amendment%20Rules%20dt.%20%2007.07.2015.pdf>

⁶⁰ The Government of India vide their Notification dated November 26, 2015 has authorised the Central Registry of Securitisation Asset Reconstruction and Security Interest of India (CERSAI) to act as; and to perform the functions of the Central KYC Records Registry i.e. centralized repository of KYC records of customers in the financial sector-
https://www.sebi.gov.in/sebi_data/commndocs/21072016_Annex3_p.pdf

⁶¹ Emphasis added. It may please be noted here that the legislative intent is single-place storage and maintenance of multiuser-data by a single repository, by avoiding duplicate gathering, collating and storage of same information.

⁶² Emphasis added to impress on the legislative intent of de-duplication of client's identity.

⁶³ https://uidai.gov.in/images/the_aadhaar_act_2016.pdf

⁶⁴ <https://en.wikipedia.org/wiki/Aadhaar>

⁶⁵ <http://meity.gov.in/divisions/national-e-governance-plan>

⁶⁶ <http://meity.gov.in/content/mission-mode-projects>

⁶⁷ <https://dbtbharat.gov.in/>

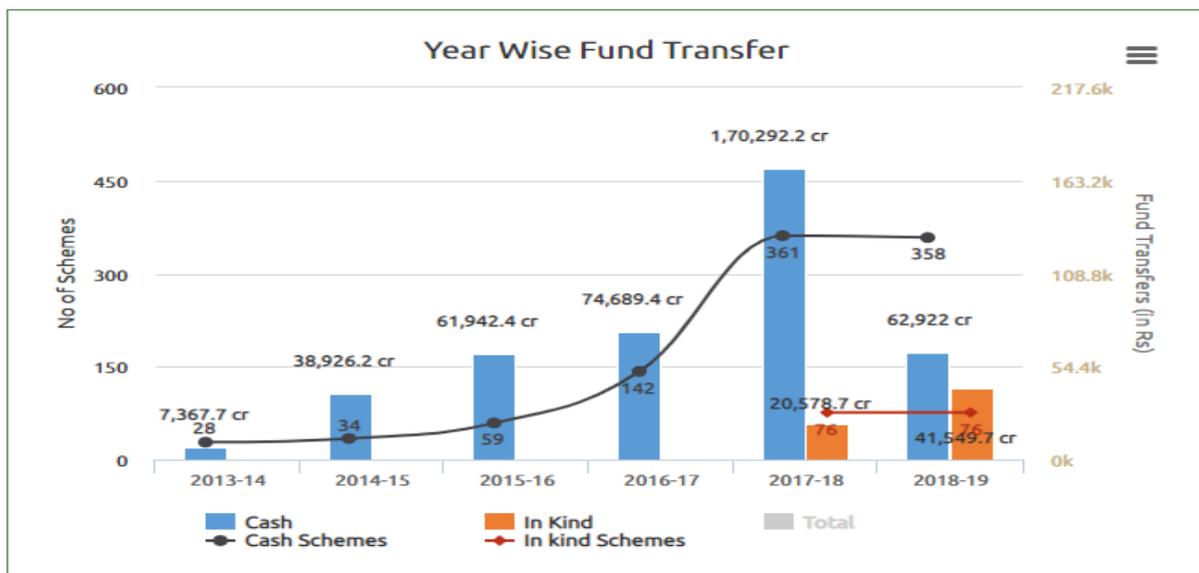
⁶⁸ An umbrella organisation for operating retail payments and settlement systems in India.

⁶⁹ Web based solution to facilitate interbank, high volume, electronic transactions which are repetitive and periodic in nature.

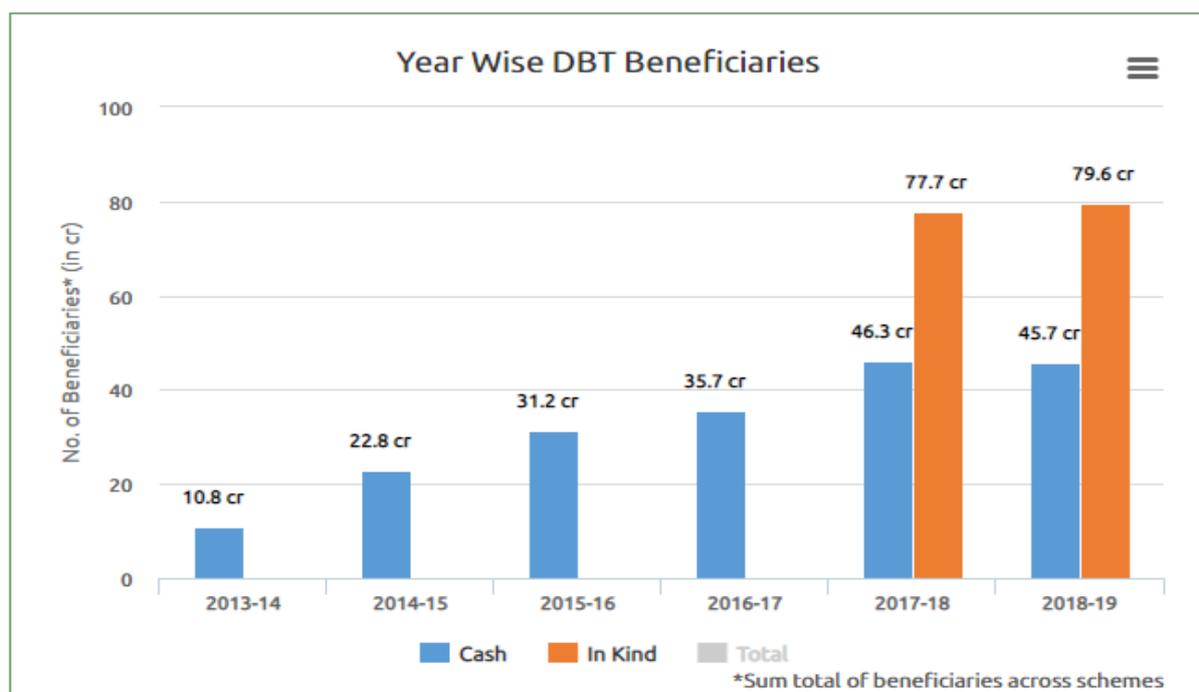
⁷⁰ Single mobile application for accessing different bank accounts with several banking features, anytime and anywhere.

subsidies to the people by crediting amount directly into their bank accounts, reducing leakages and delays.⁷¹ Total direct benefit which has upto October, 2018 been transferred to the accounts of beneficiaries amounts to INR 4,78,268 crore where total estimated savings/benefits occurred to the government amounts to approximately INR 90,000 crore. Further, 3.79 crore fake, duplicate and non-existing, inactive LPG connections have been eliminated from

the system. In addition, 2.22 crore consumers stopped claiming subsidy. Also, Deletion of 2.75 crore duplicate fake and non-existing ration cards took place. Moreover, based on field studies, the government has estimated 10% savings on the wages, with deletion of 2.2 lakh fake, duplicate and non-existing, ineligible beneficiaries under it. In addition, removal of 7.05 lakh fake, duplicate and non-existing beneficiaries of scholarship schemes has been done.⁷²



Year Wise Fund Transfer of DBT from the year 2013-14 to 2018-19 (Source: DBT Bharat)



Year Wise DBT Beneficiaries from the year 2013-14 to 2018-19 (Source: DBT Bharat)

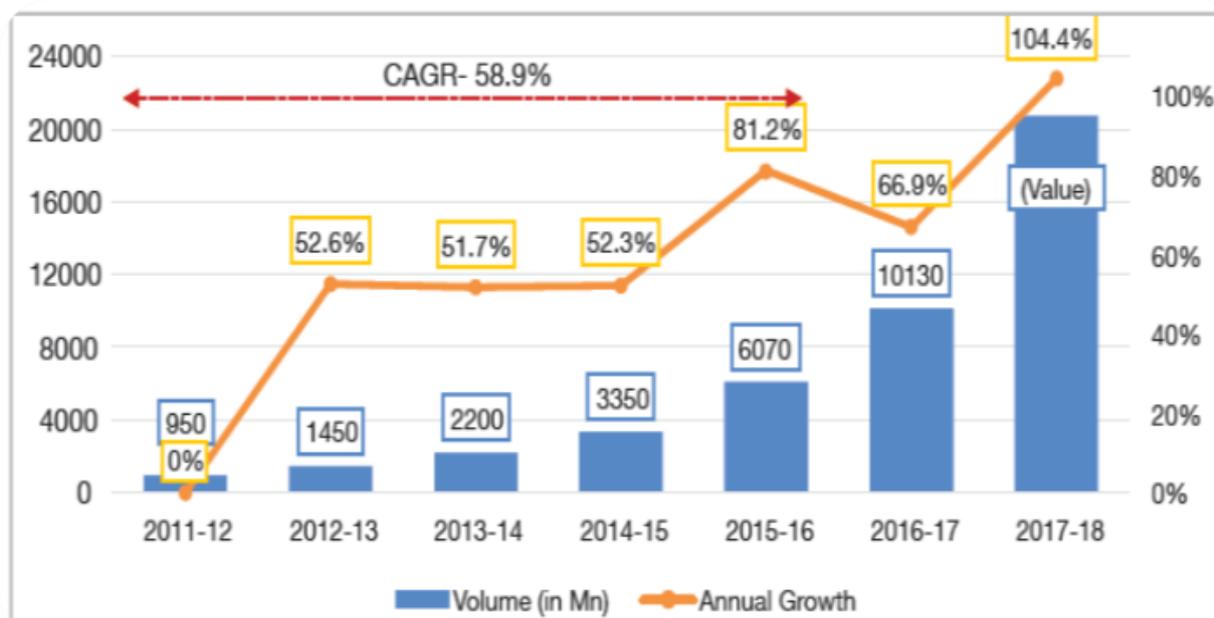
⁷¹ <http://nari.nic.in/direct-benefits> + <https://dbtbharat.gov.in/>

⁷² <https://dbtbharat.gov.in/>

During last seven years, the digital payments have grown with the compounded annual growth rate of 58.90 percent. The value of UPI transactions has increased to INR 74,978.27 crore in

October, 2018 from INR 3.1 crore in August, 2016 along with the rising volume of 48.236 crore from 93 thousand in the same period.⁷³

GROWTH OF DIGITAL PAYMENTS DURING LAST SEVEN YEARS



Source : Digital Payments – Trends, Issues and Opportunities, Niti Aayog (July 2018)

Also, under the Digital India programme, electronic filing of documents; issuance of PAN card; SIM card; utility connections; applications under FEMA for FDI, ODI, import-export; applications for MSME, FSSAI, trade licences, MCA etc. including e-tenders, e-bids, e-projects and e-procurements due to combination of Aadhaar based kyc systems and electronic signature authentication have gained pace. It is leading India, to turn itself into a paperless, cashless, transparent, safe, non-manipulating and fair economy with the mechanism of substantial audit trail, preventing money laundering and other scrupulous activities.

III. Potential Services which may be further announced with the help of Aadhaar Based e-Kyc and e-Sign systems

- Introduction of e-cheques, e-drafts and other e-financial instruments.
- Other asset classes which are still in the physical form may also be digitally tokenised, for e.g. real estate records in Telangana⁷⁴ and Andhra Pradesh⁷⁵ are under the process of digitisation.
- General contracts between parties may be brought under the digital platforms.
- Peer to peer lending space can be generated through inter-operable and portable digital wallets.
- Driving licenses, vehicle registrations, e-passports, health records, certificates for birth, marriage, tribe, caste, death, domicile, income and residence etc. can be given facility of e-generation and e-access (some of these are already part of mission mode projects of the government of India).

⁷³ <https://www.npci.org.in/product-statistics/upi-product-statistics>

⁷⁴ <http://dharani.telangana.gov.in/>

⁷⁵ <http://www.meebhoomi.ap.gov.in/>

IV. Concerns with respect to Encroachment in Data Privacy

Aadhaar has its own centralised database containing demographic and biometric details of almost all the inhabitants and such a huge database is exposed to budding FinTech firms, many of which, do not even contain safe infrastructure and enough risk management capabilities. Further, each time, whenever there is a requirement of a download of an additional application in our mobile phones or subscription of new service, the respective entity takes permission to access all the data of the device, without which it doesn't move forward. In the course, it collects & processes vast amount of data pertaining to an individual. Ample amount of this data is extremely delicate personal facts such as bank account details, online banking credentials, Aadhaar number, birth date, credit score, credit history etc. which increases its sensitivity, as over a period, a complete picture of a person may be generated.

Additionally, various cases were witnessed where money was withdrawn from the bank accounts of the customers using their personal details, without their knowledge. For customer protection, zero liability of a customer is assured in all the cases of a third party breach where the deficiency lies, neither with the bank nor with the customer, but lies somewhere else in the system and the customer notifies the bank within three working days of receiving the communication from the bank, regarding the unauthorized transaction.⁷⁶ However, there is loss to the country, even if the customers are guaranteed protection against it. As a result, infrastructure for prevention of cyber-attacks, and the effective measures to strengthen data security systems with proper framework of laws, regulations and compliances, applicable for maintaining data privacy in

the country are of critical importance, today.

V. Legal Hassles faced by Aadhaar

Various petitions were filed in the Hon'ble Supreme Court of India including landmark writ petition by Justice K.S. Puttaswamy (Ret'd) vs. Union of India in the year 2012, challenging, the constitutional validity of Aadhaar. Several questions were also raised regarding linking of Aadhaar numbers with SIM cards, bank accounts and PAN cards. In addition, move of the government of India, to make Aadhaar mandatory for availing benefits and subsidies was also contested by many. Consequently, first breakthrough judgement was made on August 11, 2015, stating that Aadhaar card was purely voluntary and could not be made mandatory while decision on whether the biometric authentication scheme violated the privacy of Indians was postponed to be given later.⁷⁷ On 23 September, 2013, the Hon'ble Supreme Court issued an interim order saying that "no person should suffer, for not getting Aadhaar" adding that the government cannot deny a service to a resident, who does not possess an Aadhaar, as it is voluntary in nature.⁷⁸

Later on August 24, 2017, the constitutional bench of Hon'ble Supreme Court decided that the "right to privacy is a fundamental right".⁷⁹ The Hon'ble Supreme Court also noted in the matter that "the government has initiated the process of reviewing the entire area of data protection and it would be appropriate to leave the matter for expert determination so that a robust regime for the protection of data is put into place."⁸⁰ Meanwhile, the committee of experts on a data protection framework for India chaired by Justice Shri B. N. Srikrishna was formed⁸¹ which released a white paper on November 27, 2017⁸² followed

⁷⁶<https://rbidocs.rbi.org.in/rdocs/notification/PDFs/NOTI15D620D2C4D2CA4A33AABC928CA6204B19.PDF>

⁷⁷ <https://www.sci.gov.in/jonew/judis/42841.pdf>

⁷⁸ <https://en.wikipedia.org/wiki/Aadhaar>

⁷⁹https://www.sci.gov.in/supremecourt/2012/35071/35071_2012_Judgement_24-Aug-2017.pdf

⁸⁰<http://www.mondaq.com/india/x/671084/Data+Protection+Privacy/Privacy+Policy+Policy+Of+Privacy+Data+Protection+Conundrums>

⁸¹http://meity.gov.in/writereaddata/files/Press_Brief_Data_Protection_1Aug17.pdf

⁸²<http://www.prsindia.org/uploads/media/Report%20Summaries/Report%20Summary-%20Data%20Protection%20Expert%20Committee%20White.pdf>

by the detailed report⁸³. In the matter, the Ministry of Electronics & Information Technology (MeitY) issued a press release on December 28, 2017 seeking public comments on the whitepaper by the end of January 31, 2018⁸⁴.

Lately, on the September 26, 2018, Hon'ble Supreme Court ruled that Aadhaar is mandatory for filing of income tax returns and allotment of Permanent Account Number but not required for new SIM cards, for enrolment in exams of CBSE, UGC etc. following which, the payment banks and e-wallet companies, had to take a halt, which were asking customers to get their KYC done on their platforms, using Aadhaar details and were also warning that their services will be blocked, if in case they failed to do so. The court added that Aadhaar card is however must for availing facilities of welfare schemes and government subsidies, as it empowers the poor and marginalised, granting exception to children, saying, that no child can be denied benefits of any scheme if he or she

doesn't have Aadhaar card. Moreover, section 57 of the Aadhaar Act was struck down by the apex court as an "unconstitutional" meaning, no entity can seek identification via Aadhaar and indirectly guarantees a privacy of individual's Aadhaar data⁸⁵.

VI. Conclusion

Where, on one hand, the Aadhaar is facing several turbulences related to its constitutionality and legitimacy, in the name of data protection and privacy concerns of an individual, on the other hand, it is considered to be a tool which has facilitated ease of doing business. Although, the extant government is under the procedure to address the concerns of data privacy via proposed Personal Data Protection Bill, 2018⁸⁶ and is engaged in developing its framework, but in digital space, more than laws, a strong technology is required, in order to face any technical challenges which threaten the existence of Aadhaar.

⁸³http://meity.gov.in/writereaddata/files/Data_Protection_Committee_Report.pdf

⁸⁴http://meity.gov.in/writereaddata/files/public_consultation_on_white_paper.pdf

⁸⁵https://www.sci.gov.in/supremecourt/2012/35071/35071_2012_judgement_26-Sep-2018.pdf

⁸⁶http://meity.gov.in/writereaddata/files/Personal_Data_Protection_Bill,2018.pdf



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