Financial Technology (Fin-Tech): Revolutionizing the Indian Agrarian Sector

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Abstract: ***Agriculture is the largest employer of India which constitutes 50% of its workforce and also a contributor to 17-18% in its GDP. Still, it is one of the most disorganized and disjointed sector.Somewhere this sector has not been given due attention and itcan be proven with the fact that the GDP contribution of this sector has fallen from 43% to 18% (1970- 2018).Though the Indian Government is digitally driving to provide financial inclusion to more than 145 million households that are not having access to banking services but still the farmers aremajorlyusing traditional credit for their basic and main two factors; Production & Consumption (Distribution). The financial segment has an important role to make agriculture aprime contributorto the economic growth of the country and also in reducing poverty. A fast-evolving technological landscape is bringing up new potential to focus&provide credit, risk-sharing, and to explore technology to enhance agricultural productivity. Our paper firstly examines agricultural finance in the Indian context and then discusses how financial technology (Fin-Tech) can drive new products in credit and risk markets in India. We evaluate the role of mobile banking, financial literacy, digital financial services, digital financial technology, and block-chain technology. The paper is concluded with a discussion of policy takeaways for Fin-Tech in agriculture to promote agricultural growth, enhance financial inclusion, and improve regional economic integration through agriculture.***

Key Words: ***Fin-Tech, Digital Technology, Block-chain Technology, Financial Literacy, Digital Finance, Agriculture, Indian Economy.***

I. INTRODUCTION

Fin-Tech can be defined as use of technology in an innovative way for delivering financial services and products which provides an user-friendly and suitable way of managing finance for its consumers besides the traditional ways of financial services delivery. 'Fin-tech' term has been appearing recently in various business jour-nals to explain the upsetting challenge to the financial sector by introducing faster, cheaper and human-cantered financial services. Fin-Tech is the new process, products, and application of business models in financial services industry that ismade of one or more complementary financial services and provides as an end-to-end process through the Internet and it is used to computerize the insurance, trading activities, and risk management.

Revised Manuscript Received on October 02, 2019.

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Fin-tech can be said the future of banking and finance which provides the technical support to financial service providers. Fin-Tech and its financial services can enhance the agriculture sector to compete in global economy through various services like crowd funding, m- payments, digital money transfers, credit advancements, fund procurements, asset management, and payments or billing. Fin-Tech is an innovation as it can easily gather all business factors into a single platform. Public can be connected as first line processor investors and customers for the product at the same time by using Crowd-funding in Fin-Tech. It enables one-on-one investment where individuals actually lend money to first-line processors without having any intermediary i.e. official financial institution. Additionally, Fin-Tech creates online payment system by using virtual payment account.

The emergence of Fin-Tech along with digital market place got a huge consideration from researchers, industries, public as well as private organizations. Fin-Tech is a very important concept and also an application which triggers researches in any sector especially in Agrarian Sector. Digital market place creates many new forms of communication and transactions amidst actors within agriculture's business process (consumers, suppliers, farmers, investors, distributors, etc.), and smart connectivity that is an important part of sustainability and productivity. Food economies and sustainability can be explored by Agricultural economies & management studies. Under traditional business process, the basic problems of farmers in developing countries are funding deficiencies, capital issues, limited reach of financial institutions, and lack of access to the market. Agriculture's supply chain has many layers stating from farmers to its consumers so it creates an additional cost for products. In such case, the digital marketplace has changed the business processes in almost every sector including agrarian. Introduction of digital marketplace with the space of Fin-Tech has given a real growth to e-agriculture. In agriculture, market demand for quality of agricultural products at a reasonable price from diverse geographical locations is needed and digital market place can be a great support in this as it will speed up changes in demand which will lead a growing interest in foods from diverse geographical locations. Hence, usage of Fin-Tech in the digital marketplace can overcome the basic problems of finances faced by farmers and also it can attract more public to invest in agriculture. Digital marketplace will play the role of an intermediary and this place can be accessed by all the actors involved as per their respective roles.

The key role of the digital marketplace is to provide a platform between producers and consumers for the direct flow of goods or services from producers to consumers. For example, e-commerce transactions in agriculture are linking producers or farmers to customers and wholesalers and they perform their role on the common platform provided by digital marketplace. It includes the management of the flow of transaction and distribution for B2B, B2C and C2C. For achieving the sustainable development, the transformation of agribusiness is very critical. There is a major role of Fin-tech and of Fin-Tech integration with other (green) technologies and also with digitized agriculture in a country's growth.

II. SCOPE AND DESIGN OF THE STUDY

This study observes the role of innovations in a rapid reshape of the agricultural landscape, globally and especially in India. It discusses how the technological solutions highlight the key accomplishments in respect of increased income of the farmers, and larger availability and affordability of agricultural produce, and also its impact on the environment from a sustainability viewpoint. In the present study, authors had undergonea detail reassessment by a descriptive study of the types of technological innovations in Fin-Tech in the agrarian sector and also their increasing impact on the agricultural sector, farmers and consumers. The reappraisal exercise is based on peer-reviewed research from the academiaand also focuses on recent research reports and studies. The study also considers the policy and institutional reforms that could catalyze the introduction and adoption of the unconventional financial technology solutions in the context of Indian agrarian sector.

III. FIN-TECH IN INDIA

Fin-Tech is the recentinnovation in technology which aims to overcome the limitations of traditional financial methods in delivering the financial services. For example, smart phones usage for mobile banking and investing services are such technology innovationwhich makes financial services easily accessible to the public. Fin-Tech is obscuring lines between financial services and technology. It is a segment of financial services sector which is rapidly evolving. In this segment, technology focused start-ups and other new market participants are disturbing the traditional operations ofthe financial services industry. New Fin-Tech companies and market actions are rebuilding the competitive economiclandscape and also changing the meaning of a player in the financial services sector. Fin-Techis appearing relatively a new industry in India. The companies using Fin-Tech are operating in various areas such as insurance, banking, billing payment, credit etc. In India there has been an emergence of several Fin-Tech start-ups, accelerators and incubators since past few years. And now India is making efforts to position itself as a global Fin-Tech centre. India has a great opportunity to capitalize on the growth of the agrarian sector. The National Association of Software and Services Companies (NASSCOM) report says that India has more than 400 companies in the Fin-Tech space and there will be a growth of 1.7 times in Fin-Tech software and services market by 2020, making it worth $8 billion. Few Statistics regarding The Indian Fin-Tech growth is as below; payment processing (34%), banking (32%) and both public and private trading sector (12%). Andhra Pradesh government has opened Fin-Tech Valley Tower which has a role of promo ting the investments in the state. India Fin-Tech Forum represents the Indian Fin-Tech firms as part of the Global Fin-Tech Hubs Federation (GFHF).

IV. LITERATURE REVIEW

Definition	Source	Year
Fin-tech is covering the whole scope of products and services that was traditionally involved in agrarian sector and it is not restricted to few sectors like financing or business models or peer-to-peer (P2P) lending.	*Arner DW, Barberis JN, Buckley RP*	2015
Mobile-centred IT technology is used in Fin-tech service sector which enhances the efficiency of the financial system and this fin-tech is known as mobile fin-tech.	*Kim Y., Park Y. J., & Choi, J.*	2016

Fin-Techdescribes a business model that is aimingto provide financial services by usingtechnology software and modern technology.	*Fin-Tech weekly*	2016
Organizations are merging innovative technologies and business models to enable &enhance the usgefinancial services.	*Ernst &Young*	2016
Fin-Tech is one of the most rapidly emerging segment in the area of banking and financial services. And it is making banking and finance more perceptive, personalized and also empowering.	*Deloitte report*	2017
Institutional Credit has been increasing in India and banks are more focussed towards enhancing it by using various training to the customers and with the help of SHGs, tribal groups, Bank-Correspondents etc.	*Mishra A. K. and Mohapatra U. - IJESRT August 2017;* **"**Agricultural Finance In India- An Overview"	2017
Smartphone, Agropay and other digital technology enabled Fin-Tech can become the most useful platform to conduct business transactions relating to Agriculture upliftment.	*M. Anshari, M. Nabil Almunawar, M. Masri& M.Hamdan- CPESE 2018, 19–21 September 2018, Nagoya, Japan.;* "Digital Marketplace and Fin-Tech to support Agriculture Sustainability."	2018
A village in Gujrat was adopted ICICI bank for its digitization and to enable it financially dependable. It focused on three C's i.e. cashless, connected and comprehensive which actually had a huge impact on well-being of the villagers.	*Saxena, D. & Joshi, N. (2018) South Asian Journal of Business and Management Cases;* "Digitally Empowered Village: Case of Akodara in Gujarat, India"	2018
Fin-Tech Startups are supported by the Government but customer's confidence and and	*VinayKandpal&RajatMehrotra-Indian Journal of Economics & Business, Vol. 19, No.1 (2019) : 85-93*	2019

trust needs to be gained because customer is more likely bent towards traditional banking system. Cashless Banking should be promoted to enhance the reach of Fin-Tech.	"Financial Inclusion: The Role Of Fin-Tech And Digital Financial Services In India"	
Block chain Technology is one of the most popular digital technologies which may provide a basis for digital finance leading to more usage of Fin-Tech. TCE model is utilized to figure out the transaction cost which should be minimized by Fin-Tech so that more & more investment can be done.	*SaurabhAhluwalia, Raj V. Mahtob, Maribel &Guerreroc -Technological Forecasting & Social Change (www.elsevier.com/locate/techfore)* "Blockchain technology and startup financing: A transaction cost economicsperspective"	2019
Green Technology and analytical approaches with mobile financial services, e-payments, digital finances atc. Can create a system which will enhance digital usage of financial services.	*Hinson R. , Lensink R. & Mueller A. (2019)- Current Opinion in Environmental Sustainability 2019, 41:1–9*; "Transforming agribusiness in developing countries: SDGs and the role of Fin-Tech".	2019
Empirical study says that usability convenience, timing and easily available internet banking actually has an impact on digital finance and its usage.	*Durai ,T&Stella ,G. - JETIR January 2019, Volume 6, Issue 1; "*Digital Finance And Its Impact On Financial Inclusion".	2019
Agriculture is more dependent on older generation of the population who are more likely to use traditional technologies, hence to attract younger generation, their keenness to use new technologies has to be considered by applying technological solution in agrarian sector.	*Rivza1 B., Vasilevska D., Rivza1 P.- Engineering For Rural Development Jelgava, 22.-24.05.2019; "*Impact Of Digital Innovation On DevelopmentOf Agriculture In Latvia".	2019
Performance of Indian Formers Fertilizers Cooperative Limited (IFFCO) has been analyzed for five years based on their	*Srivastav, S., Gupta, A., Garg, V.,(2019)- International Conference on Automation, Computational and Technology Management (ICACTM);* "Improving Performance Analysis Of Indian FarmersFertilizers Co-Operative Limited (IFFCO) ThroughTechnology	2019

database and it was found that IFFCO is really in bad situation as per financial indicators like financial rations. Still its WCM seems good based in Current Ratios.	Management"	

V. FIN-TECH FACILITATORS AND TECHNOLOGY ENABLERS FOR FIN-TECHECO SYSTEM INDIA

The regressive focus on Financial Inclusion, digitization, and make-in-India start-ups activities came up with the creation of policies whichhave provided a strong base to the Fin-Tech sector in India. Fin-Tech is a rapid growing segment of the financial services sector which is receiving much importance and it is overcoming the limitations of the traditional financial services value chain. Newly evolvingFin-Tech companies and their market activities are rebuilding the competitive landscape by blurring the identity of a player in the financial services sector.The policy measures of the government of India includes the following-

1. **India Stack**: Through the introduction of India Stack,which is a name given to APIs family (Application Programming Interface), open standards, and infrastructure components which allows an Indian user to demand services digitally and allows Fin-Tech companies and governments to utilizeIndia's unique digital Infrastructurefor financial service delivery that is presence-less, paperless,and cashless. By 2019 the India Stack offered services like approving identity, completing KYC(Know Your Customer), making digital payments, signing documents digitally and sharing of data. The government has provided a worldwide technological framework to entrepreneurs, innovators, and corporations an opportunity for the fastest growth of Fin-Tech ventures.Open API platforms in India includeAadhar, UPI, Bharat Bill Payments and GSTN.

2**. Start-up India Program**: Indian central government launched this under Make-in-India program which embraces the simplification of regulatory processes, tax exemptions, patent reforms, mentorship opportunities, and increased government funding. Government sources have stated that Indian Start-up system has seen a growth of 49000 from 7000 in 4 years only starting from 2008. Also approx 1.3 billion people have been benefitted by start ups.

3**. Jan DhanYojana (PMJDY):**To achieve 100% financial inclusion, Indian Government launched the Prime minister anDhanYojana which is one of the world's biggest financial inclusion program. This policy have been intending to the creation of bank accounts for large uncategorized sections of India larger population.

4. **Aadhaar Adoption**: Aadhar biometric authentication allows for bank accounts to be opened through e-KYC at any Banking Correspondent (BC) location. It is reducing transaction costs which was a major shortcoming in traditional banking KYC.

5**. National Payments Council of India (NPCI) Initiatives:**Unified Payments Interface (UPI) was introduced by NPCI. UPI has an impact on the growth of mobile phones in the form of acquiring devices which led to the reduction of the infrastructure cost forFin-Tech ventures and also there is an unexpected growth in the digital banking. These somehow became the advantages for the growth of Indian Digital Financial Sector.

6**. Public Relations**: Financial Literacy played an important role in digital finance and Government always tried to educate the public regarding the same by reaching more and more population.

7. **Digital Banking**-Its a process where banking is done with the usage of internet through desktop/mobile/laptops etc. It is a high automated and web based technology which reduces the transaction costs for customers and also provides various online benifits.

8. **Robo- Advisory***:* Algorithms are being used to support the investing process which comprises of goal setting-portfolio rebalancing and management and monitoring of investment through tracing and checks.

9. **Digital Payments**: Fin-Tech is changing the traditional way of making wholesale payments by consumers. Fin-Tech like digital paymentis enabling to make payments with speed,convenience, efficiency, and multichannel accessibility.India launched its first real-time payment systems 'IMPS' in 2010 and in 2016 it introduced UPI.Presently, there are more than 375 Payment start-ups in the country from which Mobile/digital wallets, gateways, POS/ mobile POS sub-segments account for over 50% of the payment start-ups in India.

10. **Block chain**- It is expected that block chain will grow at CAGR 37 percent till 2024 in India. Banks havealready started investing in block-chain technology for their processes, particularly in authentication of digital transactions such as mobile payments and remittances and tracing such transactions with absolute proof of ownership.

11**Trade Finance**- Lately emerged Fin-Tech companies are providing display place to MSMEs to sell their invoice or other receivables at a discount for working capital. For the purpose of providing finance to MSME's RBI issued guidelines on TREDS(Trade Receivables Electronic Discount System) on December 2014.TREDS is an online mechanism. For functioning of the TREDS platform, RBI has given license to bodies like Receivable Exchange of India (RXIL). RXIL is a joint venture between the National Stock Exchange (NSE) and Small Industries Development Bank of India (SIDBI).

12**. Smartphones**-New digital technologies are resulting in the betterment of the functioning of agriculture markets at a very low cost per farmer. Creating and setting up initial mobile phone coverage results in fixed costs, but with progress of time the marginal cost of phone communication in rural areas is nearly zero

because cell phone towers are operating below capacity.

13. **New business models determined by artificial intelligence, machine learning, etc**- Artificial Intelligence is causing a paradigm shift in the area of delivery of services by financial institutions to the customers with popular applications. Chatbots which are applications of Artificial Intelligencehave developed Virtual Assistants or Chatbots..also termed as transactional bots. These virtual assistants are used for offering financial guidance and training services to customers. Improvements in customersatisfaction plan have been noticed through Chatbots. are providing24*7 services to clients at no additional cost while solving customer queries instantly. This diminishes costs for financial institutions in terms of hiring personnel. Natural Language Processing (NLP) are being used to provide qualitative services which enhances the quality of services offered by the chat bots. NLP is a form of machine learning which improves human language and process data accordingly.Artificial intelligence application is evident in Sun Life Insurancewhich is doing through its virtual assistant Ela which is assisting customers in using their insurance plans. Bank of America is using its chatbot called Erica, which also is providing financial services to clients with the help of text and voice messages.

Fig1.1 displays that how the Fin-Tech ecosystem in India comprises high tech firms like start-ups and big firms, traditional firms like banks and financial institutions and government which is the regulatory bodies like SEBI, RBI, and IRDA. The Fin-Tech industry in India is categorized into major segments and these companies are providing a large gamut of services like lending services, payment services, investment services, equity funding services, and financial research services. Indian agricultural sector is being efficiently serviced by these Fin-Tech companies because of the facilitators like AI, digital payments, digital banking, India stack, start-up India program launched by the government of India and Aadharadoption on a massive scale.

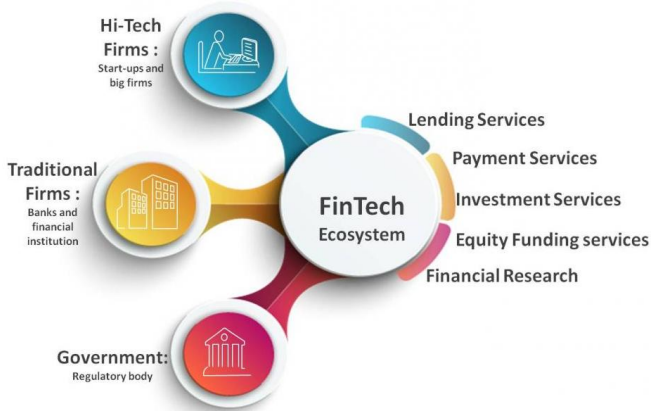

Fig 1.1

At the primary level of the fast growth of Fin-Tech lie the technologies that have changed ways in which financial products and services are shaped, provided and accomplished. Some of these technological improvements permit the creation of entirely novel products. Some of the important progresses in technology supporting in Fin-Tech are:

(a) Data intensive technologies- The existence of various data intensive technologies such as analytics, Biometrics, sensor-centred technologies, AI or Machine Learning, etc., is providing an in-depth understanding of the customers needs that makes it more relevant with the help of personalized offerings of various financial products.

(b) Infrastructure-Infrastructure focussed technology through AI platform and open APIs is reforming the future of the financial services industry,

(c) Operational brilliance-Various areas of RPA, chatbots, and DLT are enabling greater agility, efficiency, and exactness.

(d) Front-end Frontiers-The journey of consumer is made fast, convenient, and flawless and easy with the help of design-based philosophy and simple-to-follow user-interfaces. Also cybernetic reality and ramification are helping customers to mingle with firms in ground-breaking ways. From a business model point of view, the Fin tech sector is discernible by technology companies that either intends to disinter mediate or partner within Banks and Financial Institutions depending on strategic description and market setting. Hence, Fin-Tech is becoming an important focus area for all the important stakeholders in India's Financial Services industry regulators, traditional banks, NBFCs, payment banks, investors, payment service providers, broking and wealth management companies, insurance companies and other Fin-Tech companies.

Fig 1.2 below displays technology enablers for Fin-Tech like data focussed technologies, data focussed technologies, operational excellence and front end crossing points which are acting as catalysts.

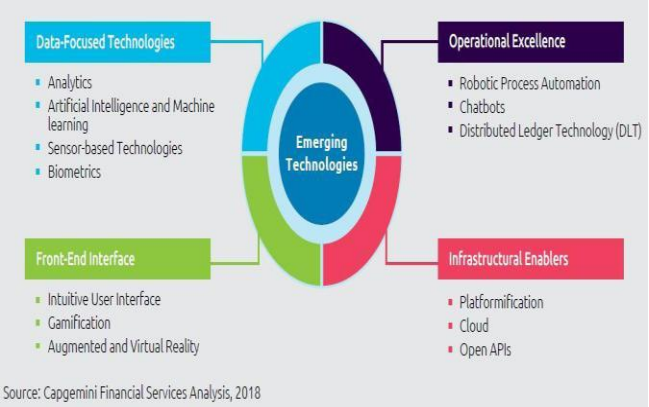

Fig 1.2

VI. FIN-TECH INNOVATIONS ARE HARBINGERS OF CHANGE IN THE AGRICULTURAL SECTOR.

An incorporation and amalgamation of agri-tech and Fin-Tech sectors are having an implausible impact on the people who work inside the agriculture chain. There are large numbers of companies which are already on the anvil and they are using a wide variety of tech solutions that are helping in the facilitation of financial transactions prevailing in agriculture. These companies are providing digital solutions and also developing apps that are more user-friendly and are critical for the

success. Maximum number of steps within the agricultural value chain requires some financial activity. They are also rendering servicesof granting loans to insurance sector so as to make them more efficient and self-sufficient. These are the few sectors in agriculture that are ready for disruption. Today start-ups are leveraging technology to help solve the many issues which small scale farmers are facing daily with respect to finance, insurance, acquisition of seeds, fertilizers, etc.

1. Insurance Products: Climate and weather is always uncertain and agriculture in India is affected by rains so the insurance products are custom-made to help overcome agricultural risks which is really important for the farmers. These products have to be priced aptly and at the same time ensure ease of availibity Use of technology helps in directly tracking weather conditions and pay out claims in the event of risk and loss having incurred. Insurance products offering companies are making the process more effective and efficient. Fin tech companies like BankBaazar, Fino Payments Bankare doing good work.

2. Pay-As-You-Go Financing: In the agricultural sector, heavy capital guarantee is required. Major expenditure which is mostly farmers is to obtain equipment, especially for small and medium farmers who are in reality are not able to acquire the agricultural inputs which can increase the productivity. Pay-as-you-go provides an option of financing the provision of farm equipment and well-organized rental options. This enables the rationalization of various processes through technolog thereby reducing the cost and increasing the access to farmers. This is a win-win scenario for the farmers who require the equipment as well as for those who own it and do not want to purchase it, thereby creating a new income source of earning for those who are offering it e.g. Lending K art, Policy Bazaar, Ezetap, Capital Float.

3.Savings Platforms: There is a gap between earnings and consumption expenditure of their families for a small-scale farmer. Generally earnings are lesser than consumptions. Therefore, savings are critical that to in times of vagaries of weather conditions, Farmers have to be prepared to handle crop failures and other unforeseen natural disasters.Savings platforms that are tailor-made to suit the different lifestyles of various communities ad complementingthe everyday small savings which willbe assisting farmers to builda corpus of funds for the rainy-day.

4.Alternative Credit Scoring: Farmers always require ready credit and this has always been a problem faced by the farmers as readily available credit is not up to the mark in India. Although there are large number of microfinance firms and commercial banks has tried to overcome this problem in agrarian sector but still small and medium farmers face challenges in retrieving funds. Lack of easy availibity of credit and low credit scores starts a vicious circle leading to segregationof farmers from the formal financial system.There has been use of alternative credit scoring methods which provide more reliable scores to farmers by using agriculturally relevant indicators e.g.CreditMantri is a firm doing commendable job in this area in rural India.

5. Supply Chain Interventions: There are various deficiencies in the supply chain so which the farmers perpetually get the shorter end of the stick. Within agriculture, a supply chain interruption has received rigorous funding and also huge attention, but is still confined in its coverage.Supply chain mediations should be planned and implemented in effective way so that it will not result in additional roadblocks.

VII. CONCLUSION

Fin-Tech in India is projected to increase at a CAGR of 20.2% during 2017-21 and will reach $92 billion. The Fin tech adoption rate in India is as high as 64 % as per the report of EY's 'Global Fin-Tech Adoption Index 2019'.There is high degree of awareness among non-adopters. In this sphere the emerging markets of India and China are leading the way with an adoption rate of 87%. This is evident by the major increase in the number of new Fin-Tech start-ups being initiated in India between the time period of 2015-18.during which 1300 plus Fin-Tech start-ups were set up in this timeframe, the number overtaking the US in terms of home grown start-ups in 2016. Globally, the US and India have been at par over the last four years in terms of new Fin-Tech start-ups founded in a particular year. As per the report on Fin tech by MEDICI India in 2019 showed that India had the largest number of new Fin tech start-ups except China Today, about 90% of India's population has a unique Aadhar identity, which is important as per KYC i.e. "know your customer" requirement by the financial institutions. This provides a unique opportunity for Fin-Tech to capitalize and provide financial services to the unbanked audiences. As per the MEDICI database, Indian Fin-Tech's raised $1.83 billion in funds in 2018, with payments and other important segments showing the way. The number of Fin-Tech start-ups in India has exponentially increased driven mainly by venture capital funds and private equity investors. This coupled with the growing telecom industry, plummeting data costs and greater use of mobile internet services has allowed Fin-Tech firms to gain ground and have a higher outreach. This has acted as a disruption in the traditional financial services market. Fin-Tech firms have revolutionized the system of retail payments but its biggest impact has been felt on Micro, Small and Medium Enterprises lending. New start-ups that are using technology that can work along with the financial institutions, government institutions microfinance and others sectors in the agricultural setting to create reminiscent impact. While each of the performers in the ecosystem is working faster than ever but it is the start-ups that are providing the improvement so greatly needed to guarantee and confirm last big leap to achieve the milestone.

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