

Application of Technology and Innovation in Fintech and its adaptability in India

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Abstract— India is a growing fintech market with a population of approximately 1.3 billion. The bankless and majority of the bankless population makes India an exciting global space for financial technology. Fintech is seen as a game changer and disruptive innovation that can rock traditional financial markets. Fintech has grown rapidly in India over the last five years and is expected to continue to grow in the near future. This article first focuses on the basic types of financial technology and its capabilities, and also discusses the opportunities and challenges faced in the Indian business environment. This research article basically extends FinTech's quantitative assessment of customer adaptability and qualitative analysis of technical, economic and demographic factors that may lead to FinTech's adaptability in India.

Keywords— Consumers; Emerging Markets; Fintech; Fintech Ecosystem; Financial Services; Financial Institutions; Investors; Innovation; Regulators; Stakeholders; Start-ups

I. INTRODUCTION

Advancement and innovation in technology have realized an extreme change traditional financial services. The world has seen the rise of in the excess of 12,000 new companies and monstrous worldwide investment of USD 19 billion out of 2015 (KPMG, 2016)[1] in the fintech space. These pioneers are using tech instruments to acquire consistent and innovative financial services for the banked and unbanked populace. The worldwide fintech technology and service sector is required to blast as a USD 45 billion (Nandhe, 2016)[2] open door by 2020, developing at an aggravated yearly development rate of 7.1 percent according to NASSCOM. Fintech might be described as innovation and technology based businesses that contend with empower, and additionally work together with financial institutions (KPMG westerns)[3].

Fintech's new entrepreneurial ventures take part in outer partnership with institutions dealing in financing, educational colleges, universities and research based institutions, specialist in technology, governmental agencies, industry experts, consultants and associations. Through these associations, they make an exceedingly coordinated collaborative system that carries with it the aptitude, expertise, innovation and support of all the elements in combined manner. Development and market growth of the fintech centre begin from an incorporated network. An effective fintech ecosystem is the place all the market participants interface, connect with and share thoughts crosswise over dynamic networks and systems, just as recognize and translate the available prospects into commercial activity. In the present time, when customers are open to adopt newer financial services, service providers need to work in collaboration in this period of advancement driven services in finance world.

The consultancy company Ernst & Young (EY) has identified four core Fintech ecosystem attributes (EY, 2016)[4] and also corresponding factors. Also, in the list of which they consider it important to include "solutions" as the next factor.

A commercial ecosystem is defined as "an economic community sustained by a foundation of interacting firms and individuals—the business world's creatures" from a broad perspective. Customers, who are also members of the ecosystem, benefit from the economic community's goods and services. Vendors, main producers, rivals, and other stakeholders are among the member organisations. They co- evolve their capacities and roles over time. They have a tendency to follow the directives of one or more central companies. The companies that occupy leadership positions may vary over time, but the ecosystem leader's role is valued by the community because it allows members to work toward common ideals, coordinate their investments, and identify mutually beneficial roles."

TABLE 1. ECOSYSTEM ATTRIBUTES AND BENCHMARK FACTORS
(ADAPTED BY THE AUTHORS FROM EY 2016)

S. No.	Attributes	Factors	Description
1	Demand	Consumer Demand	Adoption by local consumers(B2C)
		Corporate Demand	Adoption by corporate, SMEs (B2B)
		Financial Institutions Demand	Adoption by FIs(enterprise)
2	Talent	Talent Availability	Present accessibility of talent in Technicality, Financial Services, new Venture talent
		Talent Pipeline	Accessibility to talent of future in domestic & foreign market.
3	Capital	Seed Capital	Access to startup capital (£0m-£5m)
		Growth Capital	Access to growth capital(£5-£100m)
		Listed Capital	Access to the markets in community
4	Policy	Regulatory regimes	Regulator support for start-ups and newer commerce model
		Government Programmes	Government support to open up the sector, high competitive, invite multinational FinTechs & better cyber securities
		Taxation Policy	Availability of tax support for investors and business houses
5	Solutions	Easy and Fast Technology	Latest technology, products, services & processes

It is essential to know the constituents of a fintech environment, components and sub-components associated to the stakeholders and connected to the five core environmental factors (see Fig. 1):

1. The demand factor is the resultant of the connections made among customers and various stakeholders in Financial Agencies, Corporates, and Government.
2. The talent factor (mainly related to technology, financial and entrepreneurial talents) is dependent on colleges, universities and other academic institutes because they play an important role in imparting technical, financial and entrepreneurial skills in the students, technology and financial experts, insurance agents, companies providing investment management and other financial solutions in finance and non-finance industry including tycoons having businesses in connected and similar areas of financial technology.
3. The capital factor is dependent on three main groups of investors:
 - **Angel investors/ Business angels:** These investors are rich in cash and like to invest their money in new start-ups and ventures in exchange of equity offered by entrepreneurs. Hence, as compared to capitalists, Angel investors in order to become more successful keep looking for business investment opportunities in early phases of businesses quite patiently for investing in new start-ups or ventures in many industries.
 - **Venture Capital Investors:** These investors are also commonly known as VC investors. These investors

like to fund to start-ups and new businesses with promising higher returns in future and establishments that have demonstrated good growth already. This growth is similar to expansion of businesses in any sense be it: number of employees, annual revenue, turnover or offering ownership stakes to venture capitalists. VCs bear a lot of risk by investing in start-ups or new innovation based technology like IT based Cloud computing, cleaner/ environment friendly technologies, biotechnology, or new business model. Hence, a lot of support is provided by VCs to the companies and entrepreneurs that do not have access to equities market.

- **Initial Public Offering (IPO)** – It is the process of offering shares of private company held by investors to the general public in a new stock issuance i.e. selling shares of private companies publicly for the first time. Hence, IPO is a method to raise the capital from the public investors.
4. The policy factor: The policy is inclusive of specific as well as general policy surrounding environment. It includes the government regulations and policies related to taxation and incentives. The general stakeholders in the same area are as mentioned below:
 - **Regulators:** Regulators provide support for fresh entrants and newer commerce models.
 - **Government and taxation programs:** These are the programs to facilitate the entry and tax incentives to enhance competition and innovation in the restricted market.

5. **The solutions factors:** This factor depends on the technology-oriented organizations, the academic world and on the prospective on crowd sourcing

What's more, at the central point of the fintech network, there are the financial technology organizations, that may get benefitted by the framework or depending on a number of factors like particular structure, abilities, and capacities of the organization to benefit from the surroundings. Also, it is affected by the viability of the paths that connects the various elements of the entire surrounding.

In view of the traits and factors that comprise the basis for standardizing the action, it is conceivable to opt to consider a depiction of the world's various areas that as of now involve the top rank in the fintech setting. This research article basically extends a quantitative assessment of customer adoption of fintech and qualitative analysis of technological factors, economic factors and demographic factors which might have led to FinTech adaptability in India.

II. REVIEW OF LITERATURE

Digital innovation is changing the world of services being provided in financial sector. A number of innovations in the area of financial technologies have taken place in recent times in the world that are: payments through mobile and mobile money, peer-to-peer (P2P), marketplace lending, robotic advice, and insurance technology (Insurtech) and crypto assets. Over the last ten years, FinTech has already been accessed and the ease of using financial services will improve services for end users i.e. customers. Artificial intelligence (AI), cloud services, and distributed ledger technology (DLT) are changing the wholesale market in a variety of areas, including trading in financial market and regulatory and supervision technologies (Regtech and Suptech). Several new companies have emerged to apply latest technologies to meet the demands of customers demand, and majority of already existing companies have intent to have digital transformation as an important part of their strategic initiatives (Feyen et al. 2021)[6]. Infact, major banking corporations are quickly closing the gap between internal processes and customer-provided digitalization, competing with FinTech and other big tech companies that are also competing in the battle. (Frost et al 2019)[7].

These advancements have the potential to make the market more diversified, aggressive, and productive and integrated, however they can also enhance concentration. Innovation has led to increased opposition forces among many players and inclusion, especially in growing and developing countries (Pazarbasioglu et al. 2020)[8]. Fintech appears to be distinctly effective in not so developed financial markets (FSB 2020; Didier et al. 2021)[9]. However, the essential profitability of a brokerage firm associated with new technology can be concentrated in both conventional and newer financial service providers. The monopoly or the situation in

which minimal competition among large technology based platforms is already under scrutiny. As financial services move to a likewise technology-driven configuration, supervision authorities are addressing the question of how best to regulate and monitor the landscape more gradually shaped by fresh actors and business methods. Also, the solutions for various problems like financial instability, financial integrity, unbiased competition, and consumer data privacy and safety. The ongoing pandemic crisis COVID 19 has increased the adoption of digital transformation and has helped in conducting interaction, meetings, and problem inquiry through online platforms. Various technology platforms have reduced the need for customers and financial service providers to go in person and have physical meetings for various business purposes. To provide the uninterrupted business services, run the economy smoothly during pandemic and post COVID19 world, organizations understand the importance of remaining connected digitally with their customers. For example, pandemics are already accelerating the switch to digital payments (Auer et al. 2020a)[11]. Online businesses (BIS 2020; Alfonso et al. 2021)[11] has also been enhanced, which has the potential to benefit large technology companies and their financial activities. In countries with strict COVID19 guidelines and low mobility of municipalities, the number of financial app downloads increased significantly after the outbreak (Didier et al. 2021)[10]. Finally, it has the potential to accelerate the work of central banks in the Digital Currency (CBDC)(Auer et al 2020)[11].

India offers the highest returns in the world for investments in FinTech. Singapore has developed a state-of-the-art sandbox for testing new FinTech products with world-class digital and physical infrastructure. The potential for mutually beneficial cooperation is immeasurable. The main recommendations are: We need to share information about policies for intergovernmental collaboration, data protection consultations, cyber security, and more. Interoperability allows seamless transfers between geographic zones using a single account. ((McMorrow 2021)[12].

"FinTech: The Savior of India's Affected Banking Industry"-FinTech is the latest buzzword for banking and financial services. FinTech has emerged as a potential source of turmoil in the financial sector with products and services that have successfully challenged the advantages of traditional financial institutions. Traditional Indian financial institutions, in particular, have been in a turbulent phase in recent years characterized by an increase in non-performing loans, customer dissatisfaction with some financial products and services, and an increase in the loss of public confidence in the face of looming situations. I have. Fear The financial crisis seems like an opportunity for emerging markets, but FinTech remains a new player in India's financial sector. Therefore, working with sick traditional financial institutions will help give India a

new direction in the financial sector. Therefore, this paper focuses on relativizing the role FinTech can play in helping a country's banking sector regain its lost stance in a highly dynamic sector (Baradaran 2015)[13].

FinTech Innovation in Digital Banking-This paper discusses the role of artificial intelligence, augmented reality, and blockchain in online banking. AR technology is currently having a swaying impact in many industries. AR technology is currently used in healthcare, oil and gas construction, retail and manufacturing to make the processes more efficient, lower down the costs and reap a variety of economic advantages. Artificial intelligence is gaining attention in the world of technology ((Ru and Schoar 2016)[14]. "FinTech Landscape of India"-This document describes the FinTech landscape of India and analyzes it from the perspective of FinTech, regulation, investment and human resources. This document serves as a snapshot of the key pillars of a country's FinTech ecosystem, giving you an overview of FinTech's state at a glance. India's FinTech sector is growing rapidly, enabling an environment backed by a large consumer base, unmet funding needs, credit gaps between SMEs, regulatory initiatives and guidelines. Payments made through digital ways that leverage recent innovations such as the United Payments Interface (UPI) platform is the primary driver for the adoption of FinTech in the country. India has seen a significant transition from cash to digital, mainly due to government efforts and the proliferation of mobile phones and the Internet. The banking and financial services industry works closely with FinTechs, resulting in a growing presence of B2BFinTech in the country. (Ru and Schoar 2016)[14].

"How does digitization affect India's banking and financial markets?"-We cannot stop the digitization of our private and working lives. Advances in networking pave the way for new elements of globalization: ideas, perspectives, possibilities and more. Digital technology approves and enables new framework terms, and customer loyalty is becoming increasingly important to many service providers. The Digital Economy is the most recent manifesto for changing India into a knowledge economy and a digital society. Digitization mechanizes both products and processes, improving standards and productivity. This wave in digitization is contributing to advances in online banking, ATMs, credit cards and more. Information and communication technology can have a levelling effect. Indian micro finance institutions and new FinTech companies are working on technological advances that benefit the needy and deprived by providing access to capital (Armantier et al. 2021)[15].

III. CUSTOMER ADOPTION OF FINTECH

Financial institutions are altering rapidly in the digital age, offering new services and adopting new technology to satisfy client expectations. The confluence of

technology and financial service institutions will contribute to the development of a strong digital economy. Financial service businesses embrace and implement technological advancements into their business models in order to provide better service to their consumer groups.

IV. RESEARCH OBJECTIVE

The existence of Fintech in India has mostly gone unstudied. There are few studies on the use of Fintech by bank clients and the factors that impact adoption. As a result, the study's goal is to look at the elements that influence Fintech acceptance when it comes to financial services. The goal of this study is to see if there is a substantial difference in venture capital-backed funding between continents. The report also highlights the numerous elements that influence client Fintech adoption and their impact on Fintech usage.

V. RESEARCH METHODOLOGY

The purpose of this research is to look at the elements that influence consumer use of Fintech in India. This study focuses on the several critical elements that people consider while deciding whether or not to use Fintech. The method of empirical investigation is used.

VI. RESEARCH HYPOTHESIS

The research hypotheses have been developed in light of the study's objectives, as follows:

- a. HO: There is a fundamental distinction between Fintech and consumer adaptability.
- b. H1: There is no discernible difference between Fintech and customer adaptability.

Sample Size: Based on a Bank's random sampling approach, a sample of 10 and 20 respondents was chosen.

Data collection: Structured questionnaires were used to obtain data from a sample of clients. Google forms have been used to accomplish this.

VII. ALGORITHM

All the computations were performed using R, at a graphics workstation running a standard windows system.

In short, R implements standard Object oriented Programming language, 'S'. Analysis being done as a

series of steps, with intermediate results being stored in objects. Beside built-in packages, some packages were installed (Reference and details are given at appropriate places). Standard procedures and set of rules of Object Oriented Programming about Class, objects and their attributes, were followed.

We divided our work into 3 main steps:

Step 1: Data management:

- Data was collected and prepared using structured questionnaires from Google forms.
- Data was sorted and saved in appropriate form in .csv file, "DATAset.csv"
- Two columns were named 'set1' and 'set2', with first row reserved for the name.
- Two datasets, from now-on, are vectors, DATAset.csv[["set1"]] & DATAset.csv[["set2"]] or DATAset.csv\$set1 & DATAset.csv\$set2, accordingly used in our work.
- We will be using readr package for our work. We decided to use this package rather than using built-in functions, like read.csv() or fread() or read.table() because of its user-friendly and dynamic characteristics.
- We had a choice to install just "readr" package directly. Instead, we opted for the package "tidyverse" because it is a collection of dynamic, friendly, and coherent packages. Also the inbuilt functions in "readr" can quite easily handle characters as: etc., integers, non- standard names etc.
- We used the function read_csv(), from the package "readr". We use the data file DATAset.csv (with appropriate directory path), prepared in the earlier step, as an argument read_csv(DATAset.csv).

Step 2: Selecting for the appropriate statistical test and its parameters:

Task

- ⇒ Hypotheses(explained in RESEARCH HYPOTHESES):
H₀: mean of the two sample sets is same.
H₁: mean of the two sample sets is NOT same.
- ⇒ TEST: Two Sided Test.
- ⇒ Unequal Sample Sizes.
- ⇒ Equal Variances is False.
- ⇒ We need to perform, Welch's t-test, which will be implemented in Step 3 using appropriate statistical function and parameters, selected in this step.

Step 3: Calculations:

- Working directory is chosen to be same as data storage and process.
- The R Package {stats} was used.

- For our task we used the function: `t.test(x, y = NULL, alternative = c("two.sided", "less", "greater"), mu = 0, paired = FALSE, var.equal = FALSE, conf.level = 0.95,...)`.
- The function `t.test()`, based on the arguments in step 2, stores the hypothesis results as a list in the objects of class `htest`. For our purpose, we created a object, `Fintech.htest`.
- The required components were accessed from this list, and values are reported in later section. Eg. #p-value as `Fintech.htest$p.value`, #test statistic as `Fintech.htest$statistic` etc.

VIII. DATAANALYSIS

A survey of consumer adoption of Fintech is conducted by collecting two sets of customer review samples from a bank.

In this case two data sets are prepared with different data of than Set 1's. Is the gap between 19.4 and 21.6 attributable to chance alone, or are there real variations in client acceptance of Fintech. The data sets, with the corresponding mean and variance values, are as follows:

TABLE II. T-VALUE DISTRIBUTION

S. No.	Set 1	Set 2
1	19.7	28.3
2	20.4	26.7
3	19.6	20.1
4	17.8	23.3
5	18.5	25.2
6	18.9	22.1
7	18.3	17.7
8	18.9	27.6
9	19.5	20.6
10	21.95	13.7
11	-	23.2
12	-	17.5
13	-	20.6
14	-	18
15	-	23.9
16	-	21.6
17	-	24.3
18	-	20.4
19	-	23.9
20	-	13.3
Mean	19.4	21.6
Variance	1.4	17.1

We begin by assuming the null hypothesis that the mean of the two sample sets is the same, and then we test the hypothesis with a t-test to check if it is believable.

The unequal variance T-test formula is used to determine the t-value and degrees of freedom for the aforementioned data set because the number of data records is different ($n_1 = 10$ and $n_2 = 20$) and the variance is also different. When the number of samples in each group vary and the variance of the two data sets differs, the unequal variance t-test is employed. The Welch's t-test is another name for this test. For an unequal variance t-test, the t-value and degrees of freedom are calculated using the formula below:

$$T\text{-value} = \frac{\text{mean1} - \text{mean2}}{\sqrt{\frac{\text{var1}}{n1} + \frac{\text{var2}}{n2}}}$$

Where Mean_i , var_i and n_i are means, variances and sample size of sample i , $i=1,2$

$$\text{Degrees of Freedom} = \frac{\frac{\text{var1}^2}{n1} + \frac{\text{var2}^2}{n2}}{\frac{\frac{\text{var1}^2}{n1} + \frac{\text{var2}^2}{n2}}{n1-1} + \frac{\frac{\text{var1}^2}{n1} + \frac{\text{var2}^2}{n2}}{n2-1}}$$

Where var_i is the Variance and n_i is the sample sizes, of sample i , $i=1,2$. -2.24787 is the t-value. The computed value is 2.24787 since the minus sign can be omitted when comparing the two t-values.

One can set a probability level as a requirement for acceptance (alpha level, level of significance, p). A 5% number can be accepted in the great majority of instances. When the degree of freedom is 24 and the level of significance is 5%, the t-value distribution table provides a value of 2.064. Comparing this number to the computed value of 2.247 at a significance level of 5% reveals that the calculated t-value is greater than the table value.

IX. ANALYSIS AND RESULT

As a result, it is safe to reject the null hypothesis of no change in means. There are fundamental disparities in the population set that are not random.

This means that Fintech consumer preferences vary depending on a variety of internal elements such as location, people's adaptability, options, and living standards, among others.

1. Fintech's Growth Drivers

Technical breakthroughs, innovation spirals, altering client expectations, and macroeconomic and financial background changes have all contributed to the growth of fintech.

With rising mobile phone ownership and a 59 percent adult literacy rate, there's a chance to digitize financial services and deliver them via mobile phones. The Indian market has seen a steady increase in the acceptance and spread of mobile technology, with a mobile tele-density of 69 percent. In addition, the count of mobile internet users and subscribers is predicted to expand from 9 million in 2014 to 59 million in 2019, transforming India the nation with the highest number of people using Mobile Internet. According to the Global Fintech Survey, the most connected technologies for financial institutions to invest so as to embrace the disruptive nature of

fintechs are mobile data analytics, cyber-security, public cloud infrastructure, biometrics, and identity management; it is secure to say that technological variables in India are also taking place in well desired and accurate manner.

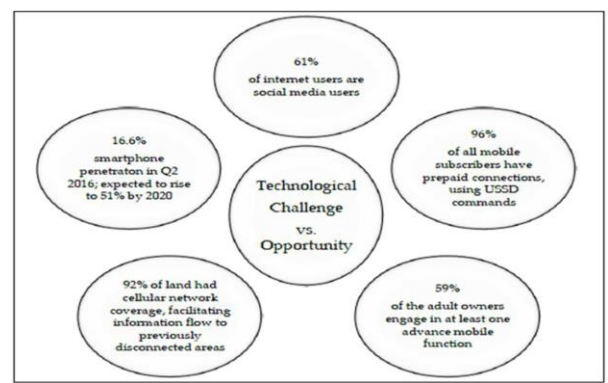


Figure1.SourceWorldBank,(UNESCO)

2. Fintech: A Regulator and also Competitor

Better solutions and capabilities, as well as significant industry change, are influencing consumer behaviour and expectations in the developing payments landscape (Broom, 2015)[19]. Businesses, especially startups, are leveraging technical and payment system advancements including cloud-based solutions and application programming interfaces to quickly build and change their operations (APIs)

New cloud and API technology has benefited startups in posing challenges to established businesses and speeding up transition.

3. Technological Challenges Vs Opportunity of Fintech in India

Figure depicts the technological potential and obstacles for fintech growth. Smartphone, internet, and social media usage are relatively low (16.6 percent), but they are growing.

With rising mobile phone ownership and a 59 percent adult literacy rate, there's a chance to make or

convert financial services in a digital mode and send them to people through their mobile phones. The Indian market has seen a steady increase in the acceptance and spread of mobile technology, with a mobile tele density of 69 percent.

In addition, India's mobile internet users and subscribers are expected to expand from 9 million in 2014 to 5.9 crore in 2019, making India a country no 1 in making mobile internet accessibility.

Mobile data analytics, cyber-security, public cloud infrastructure, biometrics, and identity management are one of the most updated technology for many institutions to explore the disruptive technology of Fintech as per the Global Fintech Survey; it's safe to say that technology in India are also taking a big leap.

As long as digital currencies provide anonymity for financial transactions, they will continue to gain popularity, and any move by central banks to provide anything similar could generate public outrage and possibly legal action.

CBDCs are still a long way from being a reality.

Also another important reason is that any central currency issued by the bank, either physical or digital may have a smooth or similar value as per the other country currency.

If this is the case, the CBDC will be the same as the money already in bank accounts, which is already available in digital mode. Furthermore, while major banks may promote CBDC as a retail payment option, it is not clear about CBDCs offer that it is better than the existing payment systems such as Alibaba, Tencent, Facebook, WeChat, and, in other cases, the National Payments System.

CBDC proponents point to a number of benefits and things that a central bank can achieve with its permission, including a significant portion of monetary policy options, direct access to risk-free assets, increased public awareness, and increased financial system safety as commercial banks' systemic importance is reduced. (Dyson & Hodgson, 2016). Even it is seen that these factors are important if a central bank produces CBDC and pursues these goals, it will trigger global banks. 2017.

X. CONCLUSION

Fintech has grown at a dizzying rate around the world as a result of shifting client attitudes and behaviours, as well as technical advancements and legislation.

Fintechs, which operate at the intersection of many technologies, provide clients with highly personalised and interactive services by allowing them to do transactions using their phones, hence boosting customer experience. Fintechs have the ability to expand financial inclusion on a bigger scale by allowing new goods and

services to be introduced to populations that previously did not have access to traditional financial services.

Fintechs have the ability to expand financial inclusion on a bigger scale by allowing new goods and services to be introduced to populations that previously did not have access to traditional financial services.

Due to the fact that India is still a growing country with high infrastructure costs in banking, a considerable portion of the population remains unbanked.

Fintechs can jump in and deliver financial products at affordable rates due to poor financial inclusion, expanding mobile phone and internet penetration, changing consumer needs in favour of digitization and online commerce, biometric authentication of mobile SIMs, and a supportive regulatory framework.

In India, there are a few established and rising fintechs, mainly in the banking and insurance industries.

The Indian financial regulatory environment is often bold and strong, with legislation such as the State Bank of India's Payment System Operators (PSOs), Payment Service Providers (PSPs), and Branchless Banking Regulations serving as platforms for Fintech-led growth.

REFERENCE

- [1] KPMG, (2016). The Pulse of Fintech
- [2] Nadhe, S.S. (2016). India emerging a hub for Fintech start-ups, Business Standard, http://www.business-standard.com/article/companies/india-emerging-a-hub-for-fintech-start-ups-16051700397_1.html, 17 May 2019.
- [3] KPMG website, <http://portal.ema.kworld.kpmg.com/Adv/GM/Pages/MarketIssue/s/Fintech.aspx>, accessed on 17 May 2019.
- [4] Ernst and Young. (2016). *UK Fintech: On the cutting edge*, Ernst and Young Report. Retrieved July 31, 2016, from [http://www.ey.com/Publication/vwLUAssets/EY-UK-FinTech-On-the-cutting-edge/\\$FILE/EY-UK-FinTech-On-the-cutting-edge.pdf](http://www.ey.com/Publication/vwLUAssets/EY-UK-FinTech-On-the-cutting-edge/$FILE/EY-UK-FinTech-On-the-cutting-edge.pdf)
- [5] Moore, J. F. (1996). *The death of competition: Leadership and strategy in the age of business ecosystems*. New York, NY: Harper Business.
- [6] Feyen, E, RR Heffernan, H Natarajan, M Saal and A Sarkar (2021): "World Bank Group Fintech and the Future of Finance report
- [7] Frost, R. (2019): "The Economic Forces Driving Fintech Adoption Across Countries" In M King and R Nesbitt (eds), *The Technological Revolution in Financial Services*, Toronto: University of Toronto Press
- [8] Pazarbasioglu, C, A Garcia Mora, M Uttamchandani, H Natarajan, E Feyen, and M Saal (2020): *Digital Financial Services* World Bank April
- [9] Financial Stability Board (FSB) (2020): "BigTech in emerging market and developing economies" October.
- [10] Didier, T, E Feyen, R Llovet Montanes and O P Ardici Alper (2021) "Global Patterns of FinTech Activity and Enabling Factors." World Bank Group Fintech and the Future of Finance report.
- [11] Auer, R, G Cornelli and J Frost (2020): "Rise of the central bank digital currencies: drivers, Approaches and technologies" BIS Working Paper, pg-880.
- [12] McMorrow, R (2021): "China tech groups given a month to fix antitrust practices," *Financial Times*, 13 April 2021.
- [13] Baradaran, M (2015): *How the Other Half Banks: Exclusion,*



Exploitation, and the Threat to Democracy, Cambridge, MA, Harvard University Press.

- [14] Ru, H and A Schoar(2016):“Do Credit Card Companies Screen for Behavioral Biases?” NBER Working Paper\.
- [15] Armantier, O, S Doerr, A Fuster, J Frost and K Shue 2021 “Whom do consumers trust with their data? US survey evidence” BIS Bulletin 42.
- [16] Alexander, K. (2017). Financial inclusion: The role of finthech and digitalfinancial services. In *UNCTAD Multi-year Expert Meeting on Trade, Services and Development*.
- [17] Bech,M.&Garratt,R.(2017).Centralbankcryptocurrencies.*BIS QuarterlyReview*,September, 55–70.
- [18] Bergara,M.&Ponce,J. (2017).Howdisruptivearefintechs?
- [19] Broom,D.(2015).Innovationinpayments:Thefutureisfintech.
BNYMellon.
- [20] Chiu, I. H.-Y. (2016). Fintech and disruptive business models in financial products, intermediationandmarkets-policy: Implications for financial regulators. *Journal of TechnologyLaw&Policy*,21,55–112.

