THE PRESENT AND FUTURE OF AI USAGE IN THE BANKING AND FINANCIAL DECISION-MAKING PROCESSES WITHIN THE DEVELOPING INDIAN ECONOMY

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ABSTRACT   *In course of this paper, the authors have soght to examine the extent to which technology based on artificial intelligence (AI) have made inroads into the banking and financial sectors of a developing economy like India. The paper begins with providing a contextual background to the adoption of such technology in the global financial arena. It then proceeds to identify and categorise the forms of AI currently being used in the Indian financial sector and also considers the different channels of operation where such technology is in vogue. The advantages of using such technology and the future goals for integrating the same in the concerned sector have also been discussed. The paper then proceeds to refer to the various regulatory norms already or potentially applicable to the areas where the technology is currently being used to explore solutions. Finally, it concludes with a series of concerns voiced in regard to the adaptability and sustainability of such technology within the financial sector of a developing Indian economy, and also recommendations for the road ahead.*

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I. Introduction

The introduction of newdigital technologies particularly Artificial Intelligence (AI) into financial services has transformed different sphere of financial decision-making processes, and perhaps, is on the cusp of replacing the more conventional forms of human-centred decision making to a computer-based financial service.[1]Arguably, AI programmes are said to have surpassed human performances in certain tasks such as, computational and predictive financial modelling.[2]In the financial service eco-system, AI decision-making process is now pivotal for a myriad of reasons, yet it constitutes considerable challenges to global financial institutions and regulatory frameworks- not least because of the difficulties around data and privacy, and financial fraud and cybersecurity.

Challenges like data management and cybersecurity are especially acute for developing economics, who are waking up to the reality of integrating AI technology into their financial systems,[3] and governments will now have to create policies and regulations to keep up with AI technology. Similarly, building regulatory frameworks would require legislators and policymakers in developing countries to work with industry leaders and technology experts to understand and manage the risks presented by the AI in a digital age.[4]With AI policy deliberation still looming in India and other developing countries, this paper for the first time seeks a cross-jurisdiction and cross-sectors discussion on the issues of AI in financial decision-making in the Indian context.

This paper therefore argues that notwithstanding the potential risks, that the AI technology might pose to the financial industry, its emergence would have a profound effect in financial decision-making process and India should take a proactive regulatory stance in integrating AI technology into the financial systems.

The paper first conceptually defines the role of AI in the financial services in the global context to analyse how it has enmeshed itself in the wider financial sector, then it explores the contours of the adoption of AI in the Indian financial and banking sectors, followed by an analysis of the contemporary

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1   R.M. Lacasse et al., 'A Digital Tsunami: FinTech and Crowdfunding', (2016) ISCDI, available at <http://fintechlab.ca/wp-content/uploads/2016/11/Digital-Tsunami-Site-Web.pdf> accessed March 31, 2020.

2   K. Grace, et al., 'When will AI Exceed Human Performance? Evidence from AI Experts', arXiv, May 3, 2018 <https:// arxiv.org/pdf/1705.08807.pdf> accessed March 31, 2020.

3   Jon Truby et al., 'Banking on AI: Mandating a Proactive Approach to AI Regulation in the Financial Sector', 14(2) Law and Financial Markets Review 110 (2020).

4   *Ibid*.

regulation in the area in India. The paper finally concludes with recommendations on adapting the regulations in the area.

II. CONCEPTUAL DEFINITION AND BACKDROP IN THE GLOBAL CONTEXT

Within the financial services sphere, AI is amongst sophisticated new technology that is capable of processing large quantity of data faster and more efficiently than even seen before- thereby supplementing humans who had previously had autonomy over data processing.[5] Globally, financial institutions like banks and investment firms are using AI in a plethora of areas- like to help make lending decisions and to test the credit worthiness of potential borrowers,[6] future market position[7] and online security trading.[8] In Financial Technology for instance, start-up FinTech companies are using AI to leverage advances made by technology for a competitive edge.[9] However, currently, it appears as though the discussion around AI, policy and law is largely framed within a Western context,[10] and the emerging standards may not be useful or adequate for developing economies like India. In India for instance, the regulators are unsure about foundational aspects like data protection, anti-competitive practices, consumer rights etc.[11] There is a propensity to act with fiat in a reactive manner rather than focusing on evidence based proactive policies. This part of the paper briefly highlights the major initiatives to set up a policy to regulate usage of AI especially in the consumer financial-banking context.

Whilst Western jurisdictions have somewhat leaped forward in terms of creating a framework to harness AI technology by putting the necessary safeguards within their financial systems to protect individual freedoms, it remains in the policy phase with practical and philosophical questions

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[5] Malali and Gopalakrishnan, Application of Artificial Intelligence and its Powered Technologies in the Indian Banking and Financial Industry: An Overview, 25 (4) IOSR Journal of Humanities and Social Science 55 (2020).

[6] Raghav Bharadwaj, 'AI for Cybersecurity in Finance – Current Applications', Emerj (2019), available at <https://emerj.com/ai-sector-overviews/ai-cybersecurity-finance-current-applications/> accessed March 31, 2020.

[7] Ibid.

[8] Narcisa Roxana Mosteanu, Artificial Intelligence and Cyber Security– Face to Face with Cyber Attack– A Maltese Case of Risk Management Approach, 9(2) Ecoforum Journal 4 (2020).

[9] Malali and Gopalakrishnan, (n 5).

[10] Vidushi Marda, 'Artificial Intelligence Policy in India: A Framework for Engaging the Limits of Data-driven Decision-Making', 376 (2133) Philosophical Transactions of the Royal Society (2018), <https://royalsocietypublishing.org/doi/10.1098/rsta.2018.0087>.

[11] Ibid.

which still to be addressed.[12] Organisation for Economic Co-operation and Development (OECD) have published proposed principles that could be applied to AI regulatory framework for its members.[13] Similarly, in the US, in 2019, President Trump signed an Executive Order that required National Institute of Standards and Technology (NIST) to create standards for the AI focusing on security, interoperability, reliability etc.[14] In addition, the European Commission High-Level Expert Group for AI (AI HLEG) also produced its own guidelines to inform the European Union (EU) legal framework on AI matters.[15]

The EU have perhaps gone further than any other jurisdiction to inculcate AI governance into financial service system through the introduction of Article 22 of the General Data Protection Regulation (GDPR).[16] In so doing, the EU has not only created the parameters for "Automated individual decision-making"[17] through the use of AI technology, but it has also created the safeguards needed to protect basic freedoms and interests as AI continues to evolve and innovate financial industries. Section (1) Article 22 allows citizens the right to not be subjected to decisions made solely on the basis of automated processing and profiling of data, although section (2) allows certain exceptions.[18]

A quick review of the global regulatory approach shows that the majority of the rules revolve around data protection, consumer confidence, reliability and interoperability. While the US, OECD and EU have taken a lead in these aspects, there is still someway before a global standard or consensus may appear in this area.

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[12] Jon Truby, (n 3).

[13] 'Ratification of the Convention of OECD' <https://www.oecd.org/about/document/ratification-oecd-convention.htm> accessed 31 March 2022

[14] Jon Truby, (n 3). See also <https://trumpwhitehouse.archives.gov/ai/executive-order-ai/>; Johannes Ehrentraud, Denise Garcia Ocampo, Lorena Garzoni, and Mateo Piccolo 'Policy Responses to Fintech: a Cross-Country Overview' <https://www.bis.org/fsi/publ/insights23.pdf> accessed 31 March 2023

[15] European Commission, 'Artificial Intelligence: Commission Takes Forward its Work on Ethics Guideline', available at <https://ec.europa.eu/commission/presscorner/detail/en/IP_19_1893> accessed March 31, 2022.

[16] 'Art 22 of the General Data Protection Regulation', available at <https://gdpr-info.eu/art-22-gdpr/> accessed March 31, 2022.

[17] *Ibid.*

[18] *Ibid.*

III. Potential Use of AI in the Indian Financial and Banking Sectors

Any analysis of the use of AI in decision-making in the financial and banking sectors of a country like India ought to be conducted in the context of certain recent developments over the past few years. Such developments include government policies like demonetisation and schemes like the DigiDhan Mission.[19] Some of these schemes recognise the need for financial inclusion and seeks to bring it about through a fillip in digital payments and banking in India.[20] Being a middle income economy, India does display some limitations like restricted network infrastructure, lack of sufficient point of sales machine and the difficulties faced by a large section of the population in adapting to the technological changes brought about by the multitude of apps and platforms involved in e-commerce, financial transactions and retail banking in particular.[21] Yet the volume of digital financial transactions have witnessed a steady rise over recent years, leading to a sizable amount of data created by such transactions[22] –such data may in turn be mined and processed in order to keep a close watch on consumer behaviour, predict future behaviour and customise responses to the same, and also chart new ways of including consumers hitherto excluded from the ambit of digital banking and finance. In addition, the proliferation of mobile technology across the country, reduced cost of Internet connectivity, breakthroughs in terms of computational power and storage of data, greater reliability on energy, and advanced analytical techniques are some of the factors to have also encouraged the growth of FinTech, as well as regulators' openness to enter into partnerships with developers of technology so as to better serve the regulatory cause.[23] In this section of the paper we shall mainly focus on discussing the potential utilities of using AI in the Indian banking and financial sector. This would allow us to critically analyse the failure of adopting appropriate regulations in the Indian context.

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[19]   Digital Economy & Digital Payment Division, DigiDhan Mission Logo has been unveiled by Hon'ble Minister Electronics & IT on 5th December 21, available at <https://www.meity.gov.in/digidhan> accessed on March 2, 2022.

[20]   Kamalika Ghosh, 'Demonetisation Catalysed Digital Payments, but Nobody Knows its Impact on Black Money, available at <https://www.outlookindia.com/website/story/business-news-demonetisation-led-to-increased-digital-adoption-that-helped-in-dealing-with-covid-19-but-still-no-data-on-black-mon/400179> accessed on March 3, 2022.

[21]   Rajat Kathuria et al., 'Implications of AI on the Indian Economy, 2020', available at <http://icrier.org/pdf/Implications_of_AI_on_the_Indian_Economy.pdf> accessed on March 2, 2022.

[22]   JermyPrenio and Jeffery Yong, 'Humans Keeping AI in Check – Emerging Regulatory Expectations in the Financial Sector', 2021, available at <https://www.bis.org/fsi/publ/insights35.htm> accessed on March 3, 2022.

[23]   Vidushi Marda, (n 10).

One of the forms of technology that are currently being deployed in the banking and financial sector in India in a slow yet steady manner is that of a combination of blockchain and AI –such deployment is in vogue both in the domain of direct consumer service as well as back-office activities, all the more so since instances of successful proof of concept exercises have revealed the competitive advantage that such technologies may bring to a market player.[24] This trend is significant even from the perspective of financial inclusion, because when one considers the major reasons why a large chunk of the population of a developing nation are traditionally underserved by the banking and finance sector[25], viz. lack of formal identification, ascertainable credit history and acceptable collateral, it may be possible to find alternatives to at least the first two by using AI to get relevant information about such potential customers based on their regular interfaces with data in course of their daily lives.

Some of the AI-based technology that are already in vogue in the banking and finance sector outside India include natural language generation (NLG) and processing (NLP), computer vision (CV), and machine learning (ML) and deep learning (DL) via the use of neural networks (NN).[26] If one carefully considers the different domains within the aforesaid sector where such technology is being used, one may be able to broadly categorise those into two different sub-domains, viz. *operations that are related to finance* and *operations that are related to business and management*.

In the first category, we have examples of algorithms being utilised for collecting information about individuals based on mobile usage, banking transactions, family history and other relevant factors, so as to build credit and risk profiles and scores for them, which in turn facilitate and expedite lending decisions.[27] At the same time, data about spending and transactional habits of such individuals obtained in similar manner can also help the companies and regulators to identify potential fraud and malpractice in terms of banking transactions as well as trading in secondary markets.[28] AI can also be used to track spread of financial rumours which create false market

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[24]   Saman Goudarzi et al., 'AI in Banking and Finance, Report by the Centre for Internet and Society', 2018, available at <https://cis-india.org/internet-governance/files/ai-in-banking-and-finance> accessed on March 2, 2022.

[25]   *Ibid.*

[26]   Deloitte, 'The New Physics of Financial Services: How Artificial Intelligence is Transforming the Financial Ecosystem', available at <https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Financial-Services/gx-fsi-ai-wef-summary.pdf> accessed on March 2, 2022.

[27]   Saman Goudarzi, n 24.

[28]   *Ibid.*

and identify those who indulge in such practices.[29] Predictions based on ML models are also contributing to providing customised portfolio management advice including insight into possible price fluctuations to high-end clients, as well as efficient financial plans for even lower-end clients by analysing their income, expenditure and saving data and financial goals.[30] On the security front too, AI-based voice-identifier technology is being integrated into various banking and finance applications, thus reducing the onerous nature of multi-step verifications without compromising with the security of the system.[31] In general, algorithmic trading has also been thriving in the capital market, with AI models having displayed high accuracy in dealing with complex data sets and smooth automation.[32]

Within the second category, there exist sub-categories of operations that are witnessing adaptation of AI-based technology at present. A case in point is the increasing use of chatbots or virtual assistants by banking and financial websites and applications to provide a range of responses to customer queries, using modes such as text, video or speech.[33] Coupled with this is the practice of cognitive analysis of customer needs and wants by tapping into customer data streams on digital platforms and mapping behavioural patterns and transactional history[34] –this in turn is being used to curate customised products and advance assistance for said customers in order to gain a competitive edge over business rivals. On a macro level, such technology also offers more efficient inter-departmental coordination within these banking and finance companies and innovative strategies in product development and marketing by leveraging aforementioned analysis of consumer data, especially in the digital payment platforms and FinTech operations.[35] In addition, a host of back-end operations of these companies have now been streamlined with the usage of AI-based technology such as NLP to mine and

[29] Financial Stability Board, 'Artificial Intelligence and Machine Learning in Financial Services: Market Developments and Financial Stability Implications', 2017, available at <https://www.fsb.org/wp-content/uploads/P011117.pdf> accessed on March 3, 2022.

[30] *Ibid.*

[31] Jermy Prenio and Jeffery Yong, 'Humans Keeping AI in Check – Emerging Regulatory Expectations in the Financial Sector', 2021, available at <https://www.bis.org/fsi/publ/insights35.htm> accessed on March 3, 2022.

[32] *Ibid.*

[33] Organisation for Economic Cooperation and Development, 'AI in Finance', available at <https://www.oecd-ilibrary.org/sites/39b6299a-en/index.html?itemId=/content/component/39b6299a-en> accessed on March 2, 2022.

[34] *Ibid.*

[35] Organisation for Economic Cooperation and Development, 'Trends and Policy Frameworks for AI in Finance', available at <https://www.oecd-ilibrary.org/sites/cbc9d1af-en/index.html?itemId=/content/component/cbc9d1af-en> accessed on March 2, 2022.

extract relevant information from documents, automated writing of reports, setting up workload management software and dashboards and so on.[36]

The wide range of use of AI technology in the banking sector has been made possible by helping the banks realise the significant value addition arising out of such use. Not only does the superior customer experience provided by such automation and customised curation help the service provider gain more customers, but the lifetime value of each customer also gets increased in the process with the provider being able to connect with each customer vide a wider range of products and services catering to the latter's needs and wants.[37] At the same time, the automation of document-processing and diligence, as well as lowering of credit risks via better screening of loan applications have also led to the banks being able to reduce their operating costs significantly, even after the adaptation costs for the new technology.[38]

In relation to what the future holds for such adaptation in India, a range of suggestions and recommendations have been forthcoming from several domain experts. These include[39] *inter alia*

  (i) acquiring customers by processes such as hyper-personalised offers, customer retargeting, propensity-to-buy scoring, channel mapping;

 (ii) taking credit-related decisions by ascertaining credit qualifiers, assessing limits, optimising pricing structure of products and services, and preventing fraudulent activities;

(iii) monitoring and supervising by looking out for early-warning signals, ascertaining default probability and then taking self-corrective measures, segmenting customer base via value at risk methodology and mapping customer-agent relationships;

(iv) strengthening relationships with existing customers via intelligent offers, reducing churning and applying fatigue rule engines; and

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[36] *Ibid.*

[37] Financial Stability Board, 'Artificial Intelligence and Machine Learning in Financial Services: Market Developments and Financial Stability Implications', 2017, available at <https://www.fsb.org/wp-content/uploads/P011117.pdf> accessed on March 3, 2022.

[38] Deloitte, 'The New Physics of Financial Services: How Artificial Intelligence is Transforming the Financial Ecosystem', available at <https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Financial-Services/gx-fsi-ai-wef-summary.pdf> accessed on March 2, 2022.

[39] Akshat Agarwal et al., 'AI-powered Decision Making for the Bank of the Future', 2021, available at <https://www.mckinsey.com/~/media/mckinsey/industries/financial%20services/our%20insights/ai%20powered%20decision%20making%20for%20the%20bank%20of%20the%20future/ai-powered-decision-making-for-the-bank-of-the-future.pdf> accessed on March 2, 2022.

(v) facilitating smart services to customers by providing real-time rec-
ommendations, dynamic customer routing, reviewing and training
agents via AI and so on.

IV. LEGAL AND REGULATORY CONCERNS

With the exponentially increasing scope of usage of AI in the financial and
banking sectors, it is rather obvious that regulation of such technology is
more often than not left behind, always trying to catch up to technological
disruptions. It is a well-known fact India as a developing nation is yet to have
any overarching policy or regulatory regime catering to AI use. One may
of course argue that this presents as much of an opportunity as a cause for
concern –it may be possible for modifying and adapting at least some of the
existing regulations in the banking and finance sectors to render those appli-
cable *mutatis mutandis* to AI-based technology. The two major sectoral reg-
ulators who would be required to take the lead in this are the Reserve Bank
of India (RBI), the central bank and monetary authority in India, and the
Securities and Exchange Board of India (SEBI), the regulator of the Indian
capital market.

RBI has traditionally been responsible for regulating the activities of
all the scheduled and commercial banks, as well as cooperative banks and
regional rural banks. However, the ambit of its jurisdiction is currently being
subjected to further growth with non-banking financial companies (NBFCs)
offering a wide range of alternative payment services all over the country,
including those involving e-commerce, digi-finance and online intermediar-
ies that are gaining considerable popularity in the country. An indication of
such widening ambit can be observed in the RBI's efforts to come up with
licensing norms for such small and payment banks offering a specific range
of services.[40] The major legislations that are applicable in this regard are the
Reserve Bank of India Act, 1934 and the Banking Regulation Act, 1949[41],
as well as a host of regulations framed by the RBI[42] under these umbrella

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[40] Reserve Bank of India, 'Guidelines for Licensing of Payments Banks', available at <https://
      rbi.org.in/scripts/bs_viewcontent.aspx?Id=2900> accessed March 2, 2022.
[41] Provisions of this Act require and/or enable various banks to identify customers, verify
      their identity and create customer profiles based on the category of risks that they repre-
      sent. Such customer data is however, confidential in nature and the banks are not supposed
      to divulge the same. The Master Direction - Know Your Customer Direction, 2016, issued
      by the RBI provides for the process of collecting and preserving such data. However, with
      AI-based models of collecting traditional and non-traditional customer data including per-
      sonal information and behavioral data, these norms may need to be changed.
[42] Examples include the RBI Master Directions on Access Criteria for Payment Systems,
      2021, RBI Master Direction on Issuance and Operation of Prepaid Payment Instruments,

legislations along with periodic notifications for governing the functioning of such banks and related financial institutions. RBI has also set up 'regulatory sandboxes' to test fintech products in a controlled setting,[43] however, no such steps have been taken on the aspects of AI.

SEBI, on the other hand, is entrusted with regulating the activities taking place in the primary and secondary markets, including intermediaries operating therein and also mutual and investment funds. The Insurance Regulatory and Development Authority (IRDA) is also another sector regulator that frames the regulations for the insurance sector and also acts as the registering authority for all private sector players in the sector –given the proliferation of AI use in the concerned sector by players both private and public, it is therefore important to consider the regulatory framework created by the IRDA too as applicable to such use.[44]

Despite having no dearth of regulatory supervision in the banking and financial sectors therefore, the main concern when it comes to the use of AI-based technology in those sectors is that the regulators have for the most part been accustomed to exercising oversight over traditional operations in those sectors. The disruptive nature of AI is likely to change many of the accepted norms and practices if it is not already doing so, and the onus lies on the regulators to revise their perspectives so as to ensure that their capability matches the new challenges and concerns bound to result from such change. A case in point is the lack of clarity surrounding the precise regulatory jurisdiction that the FinTech companies may fall within, given the multitude of services offered by them that often cut across regulatory borders.[45]

One of the biggest causes for concern with the proliferation of AI in these sectors is the impact on privacy of the parties involved, individual consumers and institutions alike. It is a well-established point that AI models are capable of using traditional as well as non-traditional data in order to create profiles of individuals based on their location, social and financial behaviour,

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2020, RBI Master Directions on Prepaid Payment Instruments, 2021, RBI Master Circular – Mobile Banking transactions in India – Operative Guidelines for Banks, 2021, RBI Guidelines on Digital Lending, 2022 and many others.

[43] Avimukt Dar, 'RBI's "sandbox" Tests for Fraud-Proof Fintech' *The Hindu Business line* (12 March 2023) <https://www.thehindubusinessline.com/business-laws/rbis-sandbox-tests-for-fraud-proof-fintech/article66608800.ece> accessed 23 March 2023

[44] Department of Economic Affairs, Government of India, Report of the Steering Committee on Fintech Related Issues, 2019, available at <https://dea.gov.in/sites/default/files/Report%20of%20the%20Steering%20Committee%20on%20Fintech_1.pd> accessed on March 2, 2022.

[45] Margarete Biallas and Felicity O'Neill, 'Artificial Intelligence Innovationin Financial Services', EM Compass 85, International Finance Corporation (2020).

transaction data and so on; the question arises as to whether while doing so, the established principles of privacy[46] such as consent, due notice, limitation of collection and purpose, adequate disclosure etc. are being adhered to. In this relation, there are several legislative provisions that may need to be revisited or repurposed so as to ensure adequate safeguards and governance of AI used in the financial decision-making process, especially given that India as a developing country is yet to come up with any dedicated privacy or data protection regime, instead relying so far on jurisprudence developed from individual case-laws. India is trying out its first foray through the Digital Personal Data Protection Bill, 2022.[47] However, it already suffers from several deficiencies like asymmetric bargaining power in consent, ill-defined powers to the new regulator (the Data Protection Board of India), no specific mention of permitted usage (especially in a sandbox situation). This bill also subsumes s43A of the Information Technology Act, 2000.

Amongst the existing regulations, we would need to focus on the Information Technology Act, 2000 and the Information Technology (Reasonable Security Practices and Procedures and Sensitive Personal Data or Information) Rules, 2011. In particular, Section 43A of the Act lays down an obligation on companies collecting data to adopt a slew of security measures with regard to such data. However, the definition of 'financial data' and the specific usage restrictions would undoubtedly have to be re-examined once AI models are used for collecting and analysing such data and making predictions based on the same. The aforementioned principles of privacy need to be statutorily reflected in these provisions, and new concepts such as automated data collection and anonymisation need to be specifically addressed. Specialist committees such as the Srikrishna Committee set up by the Ministry of Electronics and Information Technology[48], as well as the RBI Working Group on FinTech and Digital Banking,[49] have already recommended dedicated data protection and privacy regulations in the light of the technological advancements in general and AI use in particular in this domain.

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[46] *Ibid*.
[47] Digital Data Protection Bill, 2022 <https://www.meity.gov.in/writereaddata/files/The%20 Digital%20Personal%20Data%20Protection%20Bill%2C%202022.pdf> accessed 23 March 2023
[48] 'White Paper of the Committee of Experts on a Data Protection Framework for India', 2017, available at, <https://www.meity.gov.in/writereaddata/files/white_paper_on_data_ protection_in_india_171127_final_v2.pdf> accessed March 4, 2022.
[49] Report of the Working Group on FinTech and Digital Banking, 2017, available at <https://rbidocs.rbi.org.in/rdocs/PublicationReport/Pdfs/ WGFR68AA1890D7334D8F8F72CC2399A27F4A.PDF> accessed Mach 4, 2022.

In addition, we have the Credit Information Companies (Regulations) Act, 2005 and the associated 2006 Regulations, which require credit decisions to be transparent and reasonable and also lays down certain protocols to be followed for collection of credit information; in the light of the use of AI models to collect and analyse such information, the relevant provisions may need to be changed so as to ensure a more contemporary definition of credit information and that the rights of the credit applicants include the right to get such automated decisions reviewed by human beings.[50]

The Payment and Settlement Systems Act, 2007, the associated 2008 Regulations, and related instruments such as the RBI's Policy Guidelines on the Issuance and Operations of Prepaid Payment Instruments in India collectively form one of the most significant frameworks in this context, because they may apply to the FinTech companies and the latter's modes of operation in consonance with AI-adaptation even now; this is because the said Act and Regulations encompass all payment-related activities within the country regardless of the identity of the players involved or the medium in which they operate.[51] While the 2007 Act and 2008 Regulations entrust the RBI with regulatory supervision and standard-setting for such activities, and also require the players to comply with the aforesaid Policy Guidelines, they are yet to be amended so as to reflect dedicated provisions towards AI usage in financial decision-making, an oversight that needs to be remedied at the earliest under the present circumstances.[52] The Guidelines may eventually be superseded by the RBI's Master Directions on Issuance and Operation of Prepaid Payment Instruments in India, 2021 –an examination of this instrument will reveal that the regulator is more keen addressing security concerns, upgradation of information security infrastructure, regular review, monitoring and audit by the RBI, risk management and adequate grievance redressal of customers, especially in the light of greater technology integration including AI-based processing in the PPIs.[53]

Another piece of legislation that is likely to gain traction when it comes to using AI in the capital market via algorithmic trading and robo-advisors is the Securities and Exchange Board (Investment Advisers) Regulations, 2013 –while at this stage the Regulations do not yet create any template for dealing with such use, the Consultation Paper on Amendments/Clarifications

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[50] Saman Goudarzi, (n 24).

[51] *Ibid.*

[52] *Ibid.*

[53] Ashima Obhan and Nishtha Jaisingh, 'India: The RBI's New Master Direction on Prepaid Payment Instruments', available at <https://www.mondaq.com/india/financial-services/1111936/the-rbi39s-new-master-direction-on-prepaid-payment-instruments> accessed March 4, 2022.

to the SEBI (Investment Advisers) Regulations, 2013,[54] as released by SEBI, provides a series of recommendations *inter alia* assigning liability on investment advisors for using robo-advisors and requiring such usage to be in consonance with the fiduciary duties owed by the former to their clients in line with the 2013 Regulations. The paper offers an interesting stance by treating the robo-advisors as mere tools to be wielded by human advisors, and carves out a liability regime based on that stance, besides trying the safeguard the interests of retail investors trying to participate in a market not only characterised by hitherto unknown processes like automated trading and asset management, but also prone to associated dangers like flash crashes.

Apart from these, if issues pertaining to liability related to products and services offered in the financial markets arise, one may also consider seeking recourse to the Consumer Protection Act, 2019 and accordingly modify provisions within that Act to meet such needs. If the entity creating an AI-based product and the entity using such product to offer financial services to customers are different ones, then such matters may add additional layers of complexity when challenged under the consumer rights jurisprudence. As of now, the FinTech companies appear to be saddled with the liability arising out of any decision-making on their end regardless of the significance of the role that AI may play in such decision, yet as the nature of the AI used evolves from its narrower version to a more general form capable of functioning independent of human supervision, affixation of such liability solely on the user company may become more difficult. Further research and consultation is required in order to appropriately apportion liability in such cases of mistakes by the AI. The liability should not be too high as it would unnecessarily hamper companies from using AI and consumers from benefitting from it, however it should not be too low, such that the AI produces too many errors and become less useful.

Finally, while the use of AI can give rise to legal concerns for the financial sectoral players, AI may also provide a wide range of solutions to those very players when it comes to ensuring adherence to compliance, vide what is now being popularly referred to as 'RegTech', which is nothing in essence but an array of technology-based solutions to facilitate regulatory compliance, timely reporting, adequate monitoring, risk control and dynamic predictions,

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[54]   Securities and Exchange Board of India, Consultation Paper on Amendments/Clarifications to the SEBI (Investment Advisers) Regulations, 2013, available at <https://www.sebi.gov.in/reports-and-statistics/reports/oct-2016/consultation-paper-on-amendments-clarifications-to-the-sebi-investment-advisers-regulations-2013_33435.html> accessed March 4, 2022.

leveraging AI models, Big Data and breakthroughs in cybersecurity.[55] Other than fraud detection and malpractice prevention uses, RegTech is also capable of providing sustainable means of navigating the ever-growing labyrinth of regulatory compliances to the banks and other participants in the financial market.

On an international level, there appear to exist consensus-building exercises such as the ones carried out by the Oragnisation for Economic Cooperation and Development (OECD) and the Artificial Intelligence High-Level Expert Group established by the European Commission –the purpose of these exercises is to produce a set of principles acceptable to governments across the world for regulating AI usage in multiple sectors, of which financial sector is definitely meant to be one.[56] In India we must first ensure individual data protection through more public consultation of the Digital Personal Data Protection Bill, 2022. Only when we have created a safe environment for personal data can we hope to achieve accurate AI construction which would need to be fed with a 'starter' data. Ensuring human oversight of automated processes on a macro level, developing robust and safe frameworks committed to the ideals of fairness, non-discrimination, diversity, transparency and accountability, advocating privacy and data governance and working towards the goals of societal and environmental well-being are some of the more prominent principles[57] emerging from such exercises –yet one must remember that the extent of adaptability of these principles in the domestic AI regulations would doubtless depend to a considerable degree on the socio-economic realities of the concerned jurisdiction, as well as the ground realities singular to such jurisdiction.

V. Conclusion

It is clear from the discussion above that there exists a need to draft new legal provisions, or restructure existing one to address more effectively the concerns that may arise out of AI usage in the financial market. At the same time, one should not lose sight of the fact that even *prima facie* legal use of AI to any significant extent in the financial decision-making system may further exacerbate the flaws of the already highly subjective and occasionally discriminatory and/or biased processes that are in vogue especially in the

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[55] Jermy Prenio and Jeffery Yong, 'Humans Keeping AI in Check – Emerging Regulatory Expectations in the Financial Sector', 2021, available at <https://www.bis.org/fsi/publ/insights35.htm> accessed on March 3, 2022.

[56] Jon Truby, (n 3).

[57] *Ibid.*

banks and credit decision-making companies. The large data sets used by AI to train itself via ML and DL stand the risk of being monetised without the data subjects being any the wiser.

One of the major concerns for AI integration in any market, including the financial market in a developing country like India, include lack of access to accurate, affordable and objective training data. While some of the major players may have the resources to obtain such data, many of the start-up FinTech companies may be lacking in it and despite that, the products and services offered by them to a sizable populace have considerable AI-involvement –referred to as a problem of data parity, this issue needs to be acknowledged and specifically addressed before such companies plan to scale up their operations even further in the garb of greater financial inclusion.

Another major issue is that of data privacy, while the 2022 bill on digital data privacy is a welcome step, however, it suffers from several issues which need to be resolved before it can provide any reasonable solutions. In addition to this, in a country like India where recorded instances of systemic and historical discrimination exist, chances of such discriminatory practices seeping into the collection of data and leaving so-called 'dark spots' in it that may be apparently invisible to an external observer once the data has been used by AI models to arrive at financial and credit decisions, cannot be entirely discounted either. Even assuming that the dataset that is used to train a model can be purged of such bias, the choice of design at the model level, including selecting appropriate features or according suitable weights to various attributes, may also be susceptible to discrimination. While principles like fairness are certainly laudable goals to pursue, one ought to also consider the geographically, socially and culturally appropriate definition of fairness in the context of a developing nation like India, and ensure that such definition encompasses the constitutional values and ethos including the various rights, affirmative action considerations and so on. The privacy challenges further assume significant proportion in the light of India's continuing inability to establish a formal and dedicated privacy and data protection regime.

Whether tools and methodologies used by AI models in the financial sector such as sentiment analysis and surveillance, ostensibly for the sake of credit profiling, may also have graver implications including chilling effects for freedom of expression of the data subjects, is also a point to ponder upon. There also exist specific challenges posed by the financial sector itself when it comes to AI usage -those posed by data margins, diversity in financial behaviour of the data subjects, lack of equality and accountability in data

collection, usage of proxy markers for features otherwise protected against information extraction, ensuring informed consent given by data subjects, facilitating information security, accounting for granularity and scrutability in the models used, providing for grievance redressal and impact assessment, are some that deserve mention in particular.[58]

In the aftermath of the COVID-19 pandemic in particular, preceded by the event of demonetisation, the Indian economy is well on its way to assimilating digital banking, payment system and associated financial services. The banks are slowly yet steadily evolving into so-called 'AI-First' institutions in order to achieve goals like increased profits, scaled-up customisation for their various products and services to their diverse customer base, specific user experiences across channels, greater financial inclusion and quicker innovation cycles.[59]

With this development comes the possibility of rising and evolving expectations from those customers, resorting to AI-based solutions gaining more popularity as technology-based firms enter the financial space and the digital ecosystem starting to complement if not replace traditional financial operations. The competitive race to provide intelligent, personalised and omnichannel customer experiences are likely to motivate the FinTech companies and banks to automate to a high extent most existing manual tasks and to augment if not entirely replace decisions by human being with diagnostic ML and DL processes in more than one area of banking.[60] If advanced automation and ML models can be deployed at scale in both laboratory environment as well as factory conditions, and those models can be further augmented with edge capabilities to provide enhanced customer-service experiences, the entire nature of the Indian financial sector can be radically transformed in the coming years.

The government of India is not oblivious of such potential, as is evident from the setting up of the Task Force on Artificial Intelligence and the Steering Committee on FinTech Issues, as well as the formulation of the National Strategy for Artificial Intelligence by NITI Aayog, all three recommending a series of measures for capacity building, research, deployment and regulatory governance of AI.[61] Other measures such as advocating use of

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58 Vidushi Marda, (n 10).
59 Suparna Biswas et al., 'AI-Bank of the Future: Can Banks Meet the AI Challenge?' available at <https://www.mckinsey.com/industries/financial-services/our-insights/ai-bank-of-the-future-can-banks-meet-the-ai-challenge> accessed on March 2, 2022.
60 *Ibid.*
61 Rajat Kathuria et al., 'Implications of AI on the Indian Economy', 2020, available at <http://icrier.org/pdf/Implications_of_AI_on_the_Indian_Economy.pdf> accessed on

Unified Payment Interfaces for payment and settlement services, encouraging the growth of peer-to-peer lending platforms, the use of technology-based solutions including blockchain, AI and distributed ledger techniques not only for banking, insurance, pension fund investment and capital markets, but also for account aggregator services, cross-border payments, smart contracts, trade finance, security settlements, credit rating services, digital currencies and utility and security tokens, are all instances of the overall governmental approach of facilitating the integration of AI and related technology in the Indian financial sector.[62] In this context, the government's positive stance with regard to the G20 High Level Principles for Digital Financial Inclusions deserves mention, as do the various initiatives put in place for the use of FinTech in the growing MSME sector in India to further accessibility and affordability of finance.[63]

To conclude, one will not be far off the truth in opining that there exist very tangible concerns when it comes to adopting AI-based technology in any sector in a developing country like India, the financial sector not being an exception. The core legacy systems of any existing organisation including banks need to undergo significant overhaul and procure access to quality data in order for proper integration of such processes and models, and while doing so, ensure adherence to the principles that have been proposed for better AI regulation.[64] Using RegTech and SupTech (Supervisory Technology) for compliance, risk monitoring and management, data analysis and flagging, some of the concerns can be alleviated in a sustainable manner. At the same time, the significant impact on the economy, society and labour markets of such technology integration cannot be overlooked either. Given the potential positive outcomes of adopting AI-based policy measures, such as financial inclusion, innovative solutions, customer acquisition and value addition, cost reduction, managing of risk, the economy and the players in the financial sector cannot stay away from such measures for long.[65]

While the Indian government is already taking certain policy measures and legislative initiatives to address the regulatory concerns involved, it would do well to implement the recommendations of the expert committees set up to look into such matters so far. These suggestions including *inter alia-*

(i) having a nodal agency within the existing governmental structure to cater to developing and supporting AI research and diffusion thereof,

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March 2, 2022.
[62] *Ibid.*
[63] *Ibid.*
[64] Vidushi Marda, (n 10).
[65] *Ibid.*

especially in the financial sector given the broad implications of sudden disruptions within that sector,

(ii) carrying out collaborative and joint efforts involving the various stakeholders from the industry, academia and the government including cross-border collaboration and ventures,

(iii) framing a suitable data strategy and explore alternative data sharing models suitable to the needs and realities of a developing economy on the one hand and enhancing the capability of existing public institutions to process available data in a format compatible with AI-use,

(iv) delineating basic workflows and standardising document and data parameters for specific application contexts within the existing AI-research ecosystem in India and bolstering the latter with relevant skill development from grassroot level including but not limited to interdisciplinary training via the educational institutions,

(v) addressing the gaps in finance in the developing economy by resorting to options such as AI-enabled supply chain management, consolidating financial lives via multi-provider platforms and building customer-centric banking infrastructure, sponsoring microservices and cloud functions and also externalising best-in-class procedures, and

(vi) controlling the cultural and management shifts taking place within organisations that are seeking to integrate AI within back-office as well as front-office solutions.[66]

Greater focus on 'explainability', reliability, fairness, transparency of AI/ML models, susceptibility of such models to ethical and security audits at the development stage as well as during and post-use, reengineering legal processes to better suit the concerns of the digital world, setting up of regulatory sandboxes for AI products, and placing greater reliance on open data to enhance competition in the financial sector without compromising on data integrity, privacy and security, are some of the other steps that the authors would recommend in order for effective, sustainable and competitive AI-integration and use to take place in the Indian banking and financial industries in their current form.

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[66] Department of Economic Affairs, Government of India, Report of the Steering Committee on Fintech Related Issues, (n 44).