Legality of usage of Artificial Intelligence and Machine Learnings by Share Market Intermediary

Rahul J. Nikam*

Abstract

Artificial Intelligence (AI) and Machine Learning (ML) are increasingly utilized in share market services due to significant efficiencies and benefits for companies and investors across the globe. This has resulted in an alteration in the firm's business models and has a potential impact on the effectiveness of the share market and could harm investors. Indian share market is also witnessing the usage of this technology by market intermediaries. The present regulatory framework of Securities Exchange Board of India (SEBI) on share market intermediaries is not dealing with the Fintech/ technology 2.0-based products and services offered in retail trading and investment advisor platforms in India. The research is primarily based on the normative method presenting a qualitative analysis of the usage of AI & ML in various business models by share market intermediaries. How various share market regulators are addressing and regulating this technology usage and their judicial exposition. The paper concludes that the Indian share market is no exception & SEBI require to look at this new transformation and address the challenges posed by it. SEBI needs to take a proactive step to promote, guide & regulate usages of AI & ML which is gradually seeking the attention of Indian share market intermediaries into their business models and get the maximum benefit out of these technologies.

JEL Codes G32, G38, K22, O31, O33, O38

Keywords: Artificial Intelligence (AI); Machine Learning (ML); share market services; financial market services; share market Intermediatory.

A legalidade do uso da Inteligência Artificial e do Aprendizado de Máquina por Compartilhamento

Resumo

A Inteligência Artificial (IA) e o Aprendizado de Máquina (ML) são cada vez mais utilizados nos mercados de ações devido a sua eficiência e aos benefícios significativos que trazem a empresas e investidores no mundo afora. Isso resultou em mudanças significativas nos modelos de negócios das empresas e tem um impacto na eficácia do mercado de ações potencialmente nefasto para os investidores. O mercado de ações indiano é um dos exemplos do uso dessa tecnologia por intermediários do mercado. A atual estrutura regulatória do SEBI sobre intermediários do mercado de ações não trata dos produtos e serviços baseados na Fintech e nas tecnologias 2.0 e oferecidos na Índia em plataformas de compra e venda de ações e de consultoria financeira. A pesquisa fundou-se principalmente no método normativo para apresentar uma análise qualitativa do uso da AI & do ML no quadro dos vários modelos de negócios adotados pelos intermediários do mercado de ações. Como os diversos reguladores do mercado de ações estariam abordando e regulando o uso dessa

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* Associate Professor. Faculty of Law, Marwadi University. LLM Degree in Corporate Laws in 2008 and a Ph.D. degree in IPR Protection to Outer Space Activities in 2012 from the NALSAR University of Law, Hyderabad, India. He currently works as an Associate Professor at the Faculty of Law, Marwadi University, Rajkot, Gujarat, India. His current research interests include the Technology and Law, Corporate Laws, Policy Reviews, Administration of Law & Policy. E-mail: rahulsnikam@gmail.com. ⓘ https://orcid.org/0000-0001-7279-1399

tecnologia e suas consequências judiciais? Conclui-se que o mercado de ações indiano não é exceção e que o SEBI precisa olhar de perto para esses novos desdobramentos para enfrentar os desafios por eles colocados. O SEBI precisa tomar medidas proativas para promover, orientar e regular os usos da IA e do ML pelos intermediários do mercado de ações indiano em seus modelos de negócios, e tirar o melhor proveito destas tecnologias.

Palavras-chave: Inteligência Artificial (IA); Aprendizado de Máquina (ML); serviços dos mercados de ações; serviços do mercado financeiro; intermediação dos mercados de ações.

La legalidad del uso de la inteligencia artificial y el aprendizaje automático en el mercado de valores

Resumen

La inteligencia artificial (IA) y el aprendizaje automático (AA) se utilizan cada vez más en los servicios del mercado de valores debido a las eficiencias y beneficios significativos que suponen para las empresas y los inversores en todo el mundo. Ello ha provocado una alteración en los modelos de negocio de las empresas y podría influir en la efectividad del mercado de valores y perjudicar a los inversores. El mercado de valores indio también está asistiendo al uso de esta tecnología por parte de intermediarios del mercado. El marco regulatorio actual de la SEBI sobre los intermediarios del mercado de valores no aborda los productos y servicios basados en Fintech/tecnología 2.0 ofrecidos en plataformas de comercio minorista y asesoramiento de inversiones en la India. Este estudio sigue principalmente el método normativo para presentar un análisis cualitativo del uso de la IA y el AA en varios modelos de negocio de intermediarios del mercado de valores. Analiza la forma en que los diversos reguladores del mercado de valores abordan y regulan el uso de esta tecnología y su exposición judicial. El artículo concluye que el mercado de valores indio no es una excepción y que la SEBI debe considerar esta nueva transformación y abordar los desafíos que plantea. La SEBI debe tomar medidas proactivas para impulsar, guiar y regular el uso de la IA y el AA, que está captando gradualmente la atención de los intermediarios del mercado de valores de la India para sus modelos de negocio, y sacar el máximo partido de estas tecnologías.

Palabras clave: Inteligencia artificial (IA); aprendizaje automático (AA); servicios del mercado de valores; servicios del mercado financiero; intermediarios del mercado de valores.

La légalité des usages de l'intelligence artificielle et des apprentissages automatiques par partage

Résumé

L'intelligence artificielle (IA) et l'apprentissage automatique (ML) sont de plus en plus utilisés sur les marchés boursiers en raison de leur efficacité et des avantages importants qu'ils peuvent apporter aux entreprises et aux investisseurs du monde entier. Cela a entraîné une modification des modèles commerciaux des entreprises, avec un impact sur l'efficacité du marché des actions potentiellement nuisible pour les investisseurs. Le marché boursier indien constitue l'un des exemples de l'utilisation de cette technologie par différents intermédiaires du marché. Le cadre réglementaire actuel du SEBI portant sur les intermédiaires du marché des actions n'aborde pas les produits et services basés sur la Fintech et les technologies 2.0 et proposés en Inde par des plateformes d'opérations boursières et de conseil en investissement. Cette recherche s'est principalement basée sur la méthode normative pour proposer une analyse qualitative de l'utilisation de l'IA et du ML au sein des divers modèles commerciaux portés par les intermédiaires boursiers. Comment les divers régulateurs du marché des actions abordent-ils et réglementent-ils cette utilisation de la technologie et ses répercussions judiciaires ? On en a conclu que le marché boursier indien ne fait pas exception et que le SEBI se doit de s'intéresser de près à ces évolutions pour relever les défis qu'elles posent. Le SEBI doit prendre des mesures proactives pour promouvoir, guider et réglementer les usages toujours plus nombreux de l'IA et du ML par les intermédiaires indiens du marché boursier au sein de leurs modèles commerciaux, et tirer ainsi le meilleur parti de ces technologies.

Mots-clés : Intelligence Artificielle (IA) ; Apprentissage automatique (ML) ; services des marchés boursiers ; services des marchés financiers ; intermédiation des marchés boursiers.

股票证券交易中使用人工智能和机器学习的合法性

摘要

由于它们给全球公司和投资者带来的显著的效率和收益，人工智能 (AI) 和机器学习 (ML) 越来越多地被运用于股票市场服务。这导致了公司商业模式的改变，并对股票市场的有效性产生了潜在影响，并可能损害投资者的利益。印度股票市场也见证了市场中介机构对这项技术的使用。印度股票证券委员会(SEBI) 目前对股票市场中介机构的监管框架不涉及印度证券零售交易和投资顾问平台提供的基于金融科技/技术 2.0 的产品和服务。本研究主要基于规范的问题，对股票市场中介机构在各种商业模式中使用人工智能和机器学习进行定性分析。同时也分析了各种股票市场监管机构如何解决和规范这种技术的使用及其司法解释。本文的结论是，印度股票证券市场也不例外，作为监管机构的印度股票证券委员会(SEBI)需要审视这一新的转型并应对其带来的挑战。SEBI 需要采取积极措施来促进、引导和规范 AI 和 ML 的使用，而这些新技术研发与应用公司也正在逐渐寻求印度股票市场中介机构对其商业模式的关注，并从这些技术中获得最大利益。

关键词： 人工智能(AI)；机器学习(ML)；股票证券市场服务；金融市场服务；股票证券市场中介

Introduction

Technology 2.0 in the financial market across global is extensively used by financial intermediaries in their services and products on offers to clients and customers. This technology is also famously known as Fintech in the financial and service sector industry as it is having the potential to transform the concept of financial services. There are broadly eight categories such as payments, insurance, planning, lending, crowdfunding, blockchain, trading, and investments, data & analytics, and security having usage and impact of innovative fintech business models. The following table is an overview of these categories and products/ services on offer by companies.

Table 1: Overview of Fintech Categories, Products & Services on Offers and Name of Providers

Name of the categories	Products/ services on offers	Name of some providers
Payments	Processing of payments, mobile money transfers, forex, credit/ prepaid cards, and rewards on use.	AilPay, Paypal, Squre etc.
Blockchain	Digital currency, smart contracts, Payments & settlement by blockchain, asset tracking, identity management, etc.	Ezetech, Ripple Labs, Coinbase etc.
Insurance	Brokerage, underwriters, claims settlements, Risk management, etc.	Oscar, insureon, Lemonade, knip, etc.
Trading & Investments	Investment management, trade pricing, algos, Trading IT & platforms, robo-advisory, brokerage, clearing, etc.	Succession advisory, Wealthfront, Motif Investing, Nutmeg, etc.

Name of the categories	Products/ services on offers	Name of some providers
Planning	Personal retirement, finance, enterprise resource planning, tax, budgeting, CRM, KYC compliances, data storage, allied services	Strands, Mint, etc.
Lending and crowdfunding (CF)	CF platforms, P2P lending, mortgages, corporate loans, etc.	Funding circle, DianRong, Kabbage, etc.
Data and Analytics	Big data technology & solutions, visualization of data, predictive analytics, data providers	Credit Benchmark, Solovis, DocuSign, etc.
Security	Digital identity, fraud management, authentication, cybersecurity, and date encryption etc.	Bit9, Veracode, TeleSign, etc.

Source: Secondary data analysis and compilation by author.

Let us understand how AI &ML is used and transforming products and services offered to investors and clients by various share market intermediaries and their potential challenges and legal implications. Fintech technology business models are typically targeted to offer specific products or services in financial markets through the usage of internet or internet-based technology through unbundling it against traditional financial products and services. Some examples of it are crowdfunding equity share placements through intermediate platforms (MARTUCCI, 2021) offered by AngelList, Microventures, Fundable, StartEngine, EquityNet, Wefunder, Localstake, SeedInvestetc. P2P lending for sale loans or intermediate platforms offered by Faircent, Lendbox, Lendingkart, Finzy, etc. Automated advice for investment based on robo-advisers is provided by SoFi Automated Investing, Betterment, Wealthfront, Vanguard Digital Advisor, Stash, etc. Investment services or brokerage social trading platforms such as eToro, TD Ameritrade, tastyworks, AvaTrade, Comdirect, etc.

Legal material and methods

The article strives to highlight that technology 2.0/ fintech is evolving in innovative ways. It is transforming the traditional approaches and practices involved in products and services offered by various share market intermediates in the share market to the investors and clients overall. No share market or regulator is left unaffected by these technological developments. This has raised very significant legal questions on overall governance, liability, risk-mitigating factors, investor protections, market resilience, streamlining and accommodating innovative

technology in various business models, etc. This paper identifies the use of AI & ML by share market intermediaries in retail trading and investment advice and responses given by various share market regulators. The article proposes model regulation for SEBI in India to govern and address this innovative technology usage, addressing various risks associated with it and clarifying present legal framework application if any.

Result and discussion

Online trading and investment platforms have evolved significantly over the past four decades pressuring traditional ways of providing customers access to products and services through multiple channels of distribution. This pressure is resulting in an environment of cost competitiveness pushing companies for more robust use of automated technology, processes, and expansion of products and services. Let us understand the types of mainstreaming online trading and distribution platforms. Basically, there are three types of platforms i.e., online trading, online assets management, and exchange distribution platforms. In the first type of platform customers are enable to access and manage their accounts and related information, do research using online tools provided by the firm, and investment decisions in a broad range of products like exchange trade, mutual funds, and over-the-counter securities, placing of orders, professional advisor connections on request, etc. In the second type of platform assets management companies (AMC) are offering their funds, third-party funds to customers along with access to manage their information, research through online tools, and professional advice. The third type of platform is used by stock exchanges where various fund products of different companies are distributed with fund subscription and redemption in primary or secondary trading or in a combination of both. Some exchanges provide information to customers for making their own assessment prior to investment in those funds.

Share Market Transition Based on Customer Demand and New Business Models Supported by Fintech

Innovative technology usage in the platforms related to retail trading and investment has accelerated by customer demand which is changing nowadays. As Customers are increasingly becoming techno savvy with the development of technology. This is resulting in a changing online usage behavior pushing share market firms to adopt and increase usage

of artificial intelligence, processing of natural languages, cloud computing, machine learning, etc. As there is abundant information available on various media including social media, and open-source data which support to use of the said technology in retail trading and customer investment decisions on related platforms. So, there is a growing trend of a variety of business models of technologies supported to the platforms of retail trading and investment vis-a-vis support given to the decision-making of customers in these platforms. Some of the business models supported by Fintech are website comparison, platforms for financial aggregators, robo- advisers, platforms related to social trading and investments, sentiment analysis, research, networking of various media, etc. These business models are becoming more significant due to the increased usage of technology by younger-generation investors and their online behavior in doing and managing their investments. These models can be further categorized into a daily management of spending, savings, and investment of investors such as informed decision-making through website comparison and platforms of financial aggregators. Another category is mobile base management for various level income group investors where automated service advisors, social trading, and social media help with personal finances. This technology is not risk-free and there are challenges involved in it.

Challenges and Risk Associated with automated products and services based on AI & ML

Risk is analyzed in the context of investor protections and minimum standards required to be followed by share market intermediaries in offering products and services on their platforms. Below are the risks associated with different platforms.

Most of the brokers and sub-broker, dealers, and investment advisors are required to get permission from regulators to share market-related activities. This permission is given in terms of licensing, fees charges, and commissions for transactions in securities by clients/ investors. Issues arise when platforms are offering cross-border services on offer to foreign clients/ investors as they required a license and without this requirement, it may lead to violations in overseas markets and clients thereof. Sometimes the automated platform algorithms are programmed in a manner to direct clients to a preferred specific range of securities and investment options or other intermediaries' platforms. In doing so they get more commissions, fees, or other types of compensation. This may lead to a conflict of interest and a lack of transparency in terms of cost and fees. Sometimes license is issued to platforms for the execution of securities transactions only and there is a different requirement of licensing for investment advice platforms. Execution of securities

transactions platform may cross this line due to the demand of clients for various tools and services for client's guidance and assessment to take a decision. Thus, this pushes clients into a risky environment where execution securities transactions platforms lack the suitable background of knowledge and sophisticated assessment structures before giving any investment advice. Other risks posed by automated platforms are a lack of sufficient opportunity to know the client and the suitability of his requirement to understand him or unique/ unusual circumstances through detailed questionnaires to clear up inconsistencies before giving responses against the traditional know-the-client process. The questions which are asked to be filled by clients are short or not enough/ proper to gather detailed (COOK, 2016) profile information of clients. Due to this automated client profile process platforms may not be able to resolve the said situation to understand clients in detail and give suitable investment advice. Most of the automated platforms are using robo services which are smart and less costly in place of human advisors. So, there is an inherent risk of non-suitable advice given by them which is not better understanding unique situations or market correct weather, systematic investment plans to the clients. Sometimes this automated platform does offer professional referrals but still, the risk is the same as they lack proper client history and give appropriate advice. Since the products and services offered on the platform are based on AI & ML, clients may not be able to know in detail the scope, associated risks, and limits of such services and products offered. AI and ML algorithms are based on the automated environment they may be lacking appropriate data, high-quality decision charts, loops related to the feedback, and questions that are controlled to have an automated process. There is a chance that the qualitative decision-making process outcome for investors is not convenient/ beneficial due to the velocity of the algorithms being programmed. Sometimes robot-based investor advisor platforms have a risk of errors in the algorithms program itself. As it contains the client data which is observed which is processed by algorithms to give output through various financial advice to clients. There is a risk that algorithms can give results that are unintended due to design faults, mistakes in software programs that are not aligned with the methodology involved in algorithms, and firms' predefined approaches. This will lead to the non-systematic and mismatched sales of investment products/services which are not in the interest of investors (COOK, 2016) or different advice to the identical profiles of various clients (SCHACHT, 2015). This leads to the risk associated with errors with the complexity of algorithms that generate different advice based on client-specific profiles which is not easy to understand by investors. If the

algorithms are too simplistic then also it will have errors in generating the services or products in the form of a plan that is managing clients' accounts. Therefore, algorithms must be robust to capture appropriate data consisting of the client's various information such as overall financial situations/ constraints, income flow, tax implications, expenditure patterns, other income sources, etc. This information is processed by algorithms through questioners and included in a plan i.e. generic investment strategy as a response to the client. These plans are sometimes not a better-suited strategy due to a predetermined set of alternatives used by algorithms to respond to specific clients' needs. If the algorithms do not gather sufficient client data over a period with different frequencies, then information becomes static and the advice given by the algorithm will be ill-equipped which may not be suitable to the unique conditions and overarching financial conditions of clients. Similar challenges are there in social trading/ media sentiments/ research/ networking platforms. Social investment and trading platforms are having conceptual risks such as auto trading advice is not suitable for all investors due to potential errors in it, less transparent & disclosure of trade strategies, unrealistic high returns, non-reasonable reliance on virtual creditors portfolios, less awareness of investors towards risk associated with it/ fees, the risk associated with leveraged products on offer on such platforms and regulatory arbitrage. The more or the same risk is also there in media sentiments/ research/ networking platforms as media analytics providers may give less accurate readings of sentiments in or of the market, and analysis of market sentiments is based on incorrect data such as old tweets/ chats and reuse of it, unwitting disperse of incorrect information, emotional appeals, lack of monitoring on networking websites and their records, etc.

Due to the said risk and challenges and growing trends of the use of AI & ML based products and services on offer in the share market, most of the regulators have started bringing measures through regulating this area in terms of guidance on the expected growth of such products and services/ clarifications on the application of the present regulatory framework and best practices to be adopted by investors and providers. The following table gives a broad overview of various regulators' responses to AI & ML-based products and services offered by share market intermediatory and if required they have introduced new regulations to govern this area.

Table 2: *Legal frameworks on AI & ML of Selected countries and their particulars.*

Name of the Country	Legal Framework on AI & ML	Particulars
United Arab Emirates	The Financial Services Regulatory Authority (FSRA)- Abu Dhabi Global Market (ADGM) ADGM Data Protection Regulations 2021 (ADGM, 2021)	Digital Investment Management (DIM) Regulatory Framework Guidance 2019. DIM required a prior license from FSRA to carry out any/ all the following activities in ADGM. Investment/ credit advice, arrangements of investment deals, or assets management to clients. DIM required to do the compliances of conduct of business & prudential requirements; robust frameworks and controls related to client suitability and disclosures, algorithm governance, and technology governance; suitable limited human interventions assessment in between DIM & clients; Clients Risk Profile Questionnaire with mechanisms for "knock out" questions to safeguard client investment & products offered on platform; risk management on adequate algorithm and technology governance policies and processes involved in business model; establish internal governance structures for robust oversight and control over the design, performance, deployment and security of algorithms and roles and responsibilities of people involved in algorithms; maintaining proper documentation on development and testing of algorithm & it is explainable, traceable and repeatable and end result is adhering this things; compliance of clients data protection regulations with in-house robust data security policies.

Name of the Country	Legal Framework on AI & ML	Particulars
United Kingdom	The Financial Conduct Authority (FCA) Markets in Financial Instruments Directive (MiFID II) (REGULATION..., 2016)	Firms are required to ensure that trading algorithms are appropriately defined, and developed, capture all activities & identify changes if any; must have an audit trail & clear methodology across the business; Approval and sign-off processes must be consistent with the firm's risk appetite; field deployed algorithms must maintain pre & post-trade controls, real-time monitoring with the functions of kill switch; the firm must adhere to the Senior Managers and Certification Regime to have a compliance check done by an independent committee & responsible for trading algorithms.
Canada	Canadian Securities Administrators CSA National Instrument 23-103 Electronic Trading and Direct Electronic Access to Marketplaces (ONTARIO SECURITIES COMMISSION, 2014) The Investment Industry Regulatory Organization of Canada (IIROC) Notice 12- 0364 – Guidance Respecting Electronic Trading, the Montreal Declaration for responsible AI, 2018. (DILHAC; ABRASSART; VOARINO, 2018)	Firms should ensure their trading algorithms system has gone through appropriate testing, built-in functions to prevent or provide real-time trade information, or pre-defined parameters to limit the trade within limits and override the disengaging system if a situation demands in place before going to engage in trading. There shall be supervisory procedures and policies relating to trading algorithms testing with written reports to substantiate testing of algorithms by it or of service providers. All laws of CSA are equally applicable to AI services & tools.

Name of the Country	Legal Framework on AI & ML	Particulars
Germany	Federal Financial Supervisory Authority (BaFin) The study report on Bid Data meets Artificial Intelligence (BDAI) 2018. (BAFIN…, 2018)	Firms should have supervision governance where Senior Management (SM) is responsible for BDAI governance in Germany. Firms SM gives guarantees to the decisions taken by BDAI are monitored, explainability and traceability, models identify and improvable on overfitting and dada bias, independent backup system of algorithms, and maintaining written documents showing the results of the evaluation of the intended test scenario. BADI must have employee conduct monitoring and compliance processes for financial crime and prevent the conduct of employees involved in the above process. All BADI models must be having supervisory approval of SM to limit the actual effects of it to mitigate any risks and follow existing standards for protecting information against security risks and in line with Basel III norms.
China	[CSRC No.176] Measures for the Administration of Domestic Securities and Futures Investment by QFIIs and RQFIIs (CSRC, 2020).	Intermediaries using AI & ML corporate and IT governance integration with appropriate measures where senior management is responsible for IT management of AI & ML. measures include back office & front office compatibility with each other and in compliance & risk management, various departments like compliance management, risk & management, data life cycle governance, and data security management, and appropriate service providers selection to prevent trade strategies convergence.

Name of the Country	Legal Framework on AI & ML	Particulars
France	The Autorité de contrôle prudentiel et de resolution, and The Autorité des marchés financiers (AMF) Artificial Intelligence: challenges for the financial sector guidance 2018 (FLICHE; YANG, 2018)	Firms must make sure that there is reliable allocation of assets, internal models & algorithms adhered to risk & governance management rules, usage of standard datasets, monitoring, and automated tools to control and assess specific risks of algorithms. Algorithms should be explainable the mechanisms and criteria followed by them, and tests of data sets must be achieving pre-defined quality results & methodologies followed by risk assessment analysis and management to reduce market volatility.
Singapore	Monetary Authority of Singapore (MAS) Principles to Promote FEAT in the Use of AI and Data Analytics in Singapore's Financial Sector 2018 (SINGAPORE, 2018).	The paper sets out the principles of fairness, ethics, accountability, and transparency in the use of AI & ML and the materiality of the decision and the complexity of the model depends on more robust testing of their algorithms.
Netherland	Authority for the Financial Markets (BURGT, 2019).	Firms must have risk and compliance safeguards and safety on the use of AI & ML which is the responsibility of senior management with clear governance policy. Algorithms should be explainable, and tests of data sets with appropriate documentation explaining why firms have considered and decided to choose a specific path of algorithms.

Name of the Country	Legal Framework on AI & ML	Particulars
USA	The Securities and Exchange Commission (SEC) established strategic FinHub. Robo-advisers Guidance 2017 under Investment Advisers Act of 1940 (US SECURITIES AND EXCHANGE COMMISSION, 2017) The Financial Industry Regulatory Authority (FINRA) Special Notice on Financial Technology Innovation 2018 (FINRA, 2018a) The Report on Technology-Based Innovations for Regulatory Compliance ("RegTech") 2018 (FINRA, 2018b) FINRA Risk Monitoring and Examination Priorities Letter 2019 (COOK, 2019)	FinHub looks after the AI & ML & steps taken by SEC. Guidance 2017 applies to services substance & disclosures to clients, obtaining clients information to provide suitable advice, and effective compliance implementation on automated advice. FINRA Rule 3110 required brokers and dealers to supervise the activities of associated persons through a proper system & compliance of present laws. FINRA regulatory notice 15-09 to firms who practices AL & ML and trading algorithms strategies to be controlled & supervised by them. Regtech focuses on RegTech tools that must be monitored, supervised & have a client's risk assessments. 2019 letter pushes for more effective- efficient- risk-based efforts to be put in by broker-dealers using RegTech tools.
Luxembourg	Commission de Surveillance du Sector Financier (CSSF) White paper 2018 (CURRIDORI, 2018)	It is practical guidance to the Firms involved in AL & ML trading practices makes sure data governance & associated risks, good data quality, establishment of human interruption in controlling important decision-making by AL & ML, potential impacts, deviations detection on performance, and accurate results output by algorithms. Senior management has overall responsibility of above governance, clear policy on liability & compliances of the employee, third party providers & staff involved in it.

Source: Primary data analysis of regulations and Acts of countries and compilation by author.

Proposed SEBI regulation on usage of AI & ML by share market intermediatory

Indian share market is regulated by the Securities Exchange Board of India through the Act of 1992. Presently research analysts, investor advisors, Stockbrokers, and sub-brokers Asset Management Company (AMC) are governed under the SEBI (Research Analysts) Regulations, 2014, SEBI (Investment Advisers) Regulations, 2013, SEBI (Stock Brokers) Regulations, 1992 and SEBI (Mutual Funds) Regulations, 1996 respectively. These regulations are silent on the usage of fintech technology i.e., usage of AI & ML in offering products and services to investors by these share market intermediates. Involvement and usage of technology 2.0 in share market activities are growing day by day. As per Section 11 of the SEBI Act 1992, the Board must protect the investor's interest in the share market and promote developments and regulate the share market through such appropriate measures which SEBI thinks fit. To achieve these mandates following is a proposed model draft of regulation governing the usage of technology 2.0 by share market intermediaries while offering products and services in the Indian Share market.

Objective Of the Regulation:

Share market participants specially registered intermediaries and Asset Management Companies who are engaged in the adoption and usage of AI & ML-based trading portals and offering services based on algorithms are governed under the said regulation.

Rationality Of Scope and Application of The Regulation:

While considering the proposed regulation emphasis is on the rationality of scope and application which is a very important component of the present regulation. There must be a fine balance between risk emerging out of AL & ML vis-à-vis key safeguards that are required to be put in place by market intermediatory. The focus must be on the activity carried out based on algorithms, the potential risk emerging out of it, and the potential effect of such technology on clients and the overall integrity of the share market. Based on the market atmosphere if there is a need, said regulations can be applied in a phased manner. The scope of the said regulation will be applied based on activities carried out by firms, technology's substantial impact on participants in markets along with clients, and using AL & ML-based service tools. Therefore, the size of firms is immaterial in terms of big or small

entities. As technology may have varied effects on back/front office functioning and clients' outcomes functions. Thus, said regulation is a measure to curb the major potential risks, harms, and implementations of AL & ML in terms of regulating firms, their model of business, and the overall legal & regulatory framework of SEBI.

1. Senior Management Responsibility and Overall Governance in The Firm

This regulatory clause is one of the most important clauses as it takes care of the overall accountability of the firms while using AI & ML-based technology in share market trading platforms. The senior management (SM) is a key decision maker and player having control over the overall functioning of the firm. Sometimes SM of a firm if not having appropriate knowledge, then they can take help from another senior person and designate him for the support within the firm. As AI & ML-related technology is at its nascent stage and helps the firm's top management to understand its usage, deployment, testing, and monitoring of algorithms, its intended output, and overall implications. Thus, if something goes wrong then Senior management will be accountable for it and responsible for overall supervisory functions of AI &ML including third-party outsourcing models. This supervisory responsibility includes clear-cut policies covering approved procedures for developing, deployments, periodical updates of trading algorithms, solving identified major problems in the process of monitoring such algorithms, and accountability of staff involved including third-party outsourcing models. All the above policies must be clearly documented with the compliance reports of AI & ML technology in line with the compliance of risk management and existing legal framework. These policies must contain the understanding of utilization and predefined outcomes in deploying AI & ML technology, appropriate implementation of controls (sericite breakers) and governance to oversee the challenges pose by outcomes of such technology; the detailed methodology to be adopted in compliance report of the use of such AI & ML of its complete life cycle must be periodically audited across its business; assessment of the application of technology is within the ethical manners of firms appetite risk management with the client tolerance risk.

2. Independent Continuous Testing & Operation of Algorithms and Responses to Market Conditions & Regulatory Compliances.

Due to the underlying complexity and systematic risks associated with AL & ML technology, testing should be conducted independently from the live market environment, and if any material changes are detected the system must trigger further in-depth testing. This testing must ensure that AI & ML is responding as expected in un/stressed market conditions, functions & deployment of the kill switch, and simultaneous operation is fulfilling the obligation imposed by regulation/tor. After deployment of the technology, real-time monitoring of performance and output must be observed and if the situation demand, the kill switch is automatically triggered with backup solutions. It must be kept in mind that this technology is assessed and tested as per the risk associated with it, the market is not being abused, and the privacy of the dataset and cyber threat/ security and working as intended. The post-development outcome also needs to be continuously monitored. There must be other forms of tests and oversight arrangements in a standby mode to control the behavior of algorithms. Because when an Algorithm start processing more data, it may change its behavior in an unforeseen manner. In such a scenario other techniques are used in traditional algorithms that shall be used to continuously monitor to ensure that the AI & ML algorithms get adjustment and transformation.

3. Skills, Expertise, and Experience in Staff Compliances Policies and Leaving the Firm

The importance of this policy is to highlight that firms may be lacking adequate skills, expertise, and experience with internal staff in maintaining and oversight of AI & ML. This may further aggregate the situation resulting in difficulties in algorithms models updating and sometime dependability on third parties. Therefore, to overcome such difficulties it is essential that in-house staff must possess the requisites of the aforementioned knowledge, expertise, and experience for supervisory risk management and compliance with legal regulatory parameters. It is advised that firms must constitute multi-disciplinary teams of IT/ database administrators, risk & compliance management, data scientists, legal personnel, etc. to investigate the above-mentioned matters. There must a written documentation, backup copy for continuity of models, and defined processes in case staff involved in the above process has left the job in the firm for smooth functioning of AI & ML technologies. Also, while doing the due diligence on compliance with the model supplied by third-party providers.

4. Relationship of the Firm with Third Party Service Providers & Governance

Sometimes firm itself will not have the capability to develop and test AI & ML. In such a scenario firms will take the help of third-party service providers or simply use the technology developed by them. In such a scenario it becomes important for firms to understand operation resilience and manage their relationship with service providers. Therefore, it is recommended that firms must have clear-cut policies relating to accountability, firm ethics, model performance, algorithms monitoring, and dataset analysis, indicating what is expected performance of such technology, functions, scope, and responsibilities of third parties as well as if there is poor performance then what are the sanctions for such poor or non-performance. To cover, there must be a service contract clearly highlighting all important areas, how the firm is going to perform due diligence throughout the life cycle of such a technology, and obligations/ expected outcomes through services availed from the service providers.

5. Fairness in How Much Disclosure is Required to be Made by Firms

There can be two types of disclosures i.e. at the level of clients and customers and at the level of regulators what kind of oversight information/ governance of firms are having while using AI & ML. customers and clients must get meaningful information in a comprehensible language so investors will be able to know the nature of AI & ML technology-based algorithms, their impact & outcome, products characteristics & services on offer. All these things can be in detailed objective disclosures made by firms to the clients and customers. So, it provides transparency and an opportunity to evaluate benefits and associated risks with such a technology involved in selling products so that informed decisions are taken by clients.

6. Appropriate Controls and Sufficient Quality of Data to Prevent Biases & Well Relied AI & ML Applications

AI & ML-based algorithms must get bias-free and qualitative data for the appropriate performance of algorithms. Otherwise, it will jeopardize firms and customers while using it because of the risk associated with it in and it may result in inadequate and discriminatory advice to the investors. Firms should ensure that as per the objectives sets in algorithms,

the dataset must be relevant, complete in itself, samples representing targeted populations, and non-discriminatory of sex, age, and background of investors, etc. Analysis of algorithms output and discriminatory risk must be ensured by firms in the dataset collection. The firms must develop a proper process at the place to identify, control and remove any biases from data if it is still present to restrict any potential harm to investors. Therefore, it is recommended that there must be continuous training be given to staff and dataset scientists involved in raising awareness amongst themselves.

7. Culture of One Size Fits All Must Not Be an Approach Adopted by Firms and Regulators

It is borne in mind that this regulation should be conducive to the conduct of the market and must be good and competitive for the usage of AI & ML. The above-mentioned approach of the firm and regulator will not serve the basic purpose of the effectiveness of the said regulations. A key element of the effectiveness lies in ethics which includes due diligence, care, respect towards others, fairness, and honesty on which the whole foundation of regulation relies to build upon. In the firms, it is the top and senior management who manages the cultural behaviors and driving forces to create and practice such ethics. This helps firms with the appropriate behaviors of staff to reduce potential harm to investors, minimize risks, design models of algorithms, be ready to face challenges, accountable for controlling the environment of the said ethics code. Against this backdrop, the regulator's role also becomes important to promote and bring more transparency in culture with appropriate disclosure to all stakeholders and assist firms to follow robust adaptive cultures within themselves and in the share market overall.

8. AI & ML Operational Resilience

AI & ML operations may have a wide impact on investors, market intermediaries, the integrity of the Share market, and the firm's viability overall. The widespread usage of AI & ML will also have the resilience of operation effects of interconnectedness forms which are not earlier expected. This may also impact on the financial stability of markets and firms. As third-party service providers are providing ever-green technological solutions based on the cloud which are cheaper & more secure compared to in-house developed algorithms technology. Thus, regulators through firms must have a separate mechanism of oversight

and due diligence over third-party AI & ML services to control and mitigate any problem posed by their technology.

Conclusion and suggestions

As globally technology 2.0 is making a substantial impact and opening new avenues so is the case of the Indian share market and intermediaries will be none to second to leverage such benefits. These new avenues are simultaneously bringing potential harms and associated risks to investors and the share market. SEBI must be vigilant on how this technology is being used, its benefits, and its drawbacks while allowing usage by intermediaries in the share market. Sooner or later AI and ML-based technology is going to transform the present scenario and business models used by intermediaries. Therefore, it is recommended that SEBI must identify recent developments and examine the best practices and guide properly the industry intermediaries about the development, testing, and risk associated with the deployment of AI & ML in a regulated manner. The proposed regulation is focusing on the oversight, control, and governance of algorithms, monitoring, and testing, bias less, and qualitative datasets with proper circuit breaks and liability of top management and people involved in the process. The algorithm's process and logic must be transparent and able to explain in detail, the use of outsourcing services, expectations and liability of outsourcing firms, and overall ethical concerns. The proposed regulation is covering only AI & ML-based retail trading and investment advice-related products and services only. Other areas of such technology 2.0 used by institutional trading platforms, alternate financing platforms, and distributed ledger technology are not being regulated under this regulation. But this should not be a problem. As there is a further scope of expansion of the proposed regulation as and when it is required to cover such technologies usage by these participants of the share market.

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