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Human–AI Interaction and Its Role in Transforming Financial Services

Article History:**Name of Author:**

Tarunpreet Kaur Ahuja

Affiliation:

School of Business, UPES, Dehradun-India, 248007

Corresponding Author:

Tarunpreet Kaur Ahuja

Tarunpreet.stats@gmail.com**How to cite this article:**

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Abstract: Artificial Intelligence (AI) is transforming the financial services sector by reshaping how financial products and services are designed, delivered, and managed. This paper examines the increasing utilization of AI in finance, with a particular focus on efficiency enhancement and financial advancement. It explores the emergence of cooperative dynamics between AI systems and human agents in the provision of financial services. As AI technologies continue to evolve, they are increasingly embedded in critical financial processes, improving performance, accuracy, and customer experience. The study identifies key benefits of AI adoption, including improved forecasting of macroeconomic and financial variables, more effective investment management and risk mitigation, reductions in operational and human capital costs, and enhanced customer experience through more personalized and responsive services. These advancements contribute to greater efficiency, trust, and decision quality within financial institutions. However, the paper also highlights significant challenges associated with AI implementation, such as bias in AI tool selection, limited transparency in AI-driven decision-making, and gaps in skills and training among financial professionals. The findings underscore the need for a balanced human AI collaboration framework to ensure responsible, transparent, and effective use of AI in financial services.

Keywords: Artificial Intelligence; Financial Services; Machine Learning; Digital Economy.

INTRODUCTION

AI adoption in the Financial Services Industry (FSI) has brought great benefits for customer service, marketing and decision-making in any sector. AI has a range of definitions but is acknowledged to be the emulation of human intelligence in computational systems within organizations embedded in businesses – from business operations, interactions, and products. With the tremendous availability of these structured data and the significant utilization in this area, the financial services industry is one of the very suitable fields for the deployment of AI. This has made the FSI a pioneer domain of AI advancements leading to a paradigm shift in its services[1]. AI has emerged as an integral part of many of the processes for FSI businesses and replaced human input. The idea of an innovative FSI application, through artificial intelligence is developed as a product for

asset management, risk assessment, and financial advisory. Interest in AI is believed to be at an all-time high in the FSI due to the growing data set, reduced costs of computing power [2]. AI technology in the financial industry (largely driven by fintech firms) is rapidly gaining ground. The sector's recent use of technologies like cloud computing and big data, combined with the growing digital economy, has made efficient adoption of AI solutions easier. According to a relatively new study with financial institutions (WEF 2020) [3], 77 percent of participants anticipate high or very high value from AI within their enterprises within the next two years. Anticipating that the banking sector stands to benefit as much as \$1 trillion from AI [4], we make the following assumptions that the AI is sparking a seismic change to the banking ecosystem. Its prime application includes redefining customer

experiences. In the form of communication with financial service providers (like chatbots), investment advisory services (like robot-advisors), easier lending processes (like automated mortgage underwriting), and advanced identity verification (using image recognition), AI is bringing about a paradigm shift in the operating environment of financial institutions. Through operational process automation AI produces considerable cost savings, through predictive analytics improves product offerings and improves risk management, fraud detection, and regulatory compliance efforts. At a systemic level, AI systems are granting central banks and other regulatory bodies new tools to strengthen surveillance of systemic risk and strengthen prudential oversight, thereby strengthening the overall integrity of the financial ecosystem.

II. AI APPLICATIONS IN FINANCIAL SERVICES

The Financial Services Industry (FSI) is the financial sector that interacts with businesses and households to provide a variety of finance-related products and services ranging from investment and lending to risk management, wealth management, and more [5]. Prominent lines in the FSI include: (a) depository credit institutions; (b) non-depository credit institutions, which includes mortgage bankers and brokers; (c) holdings and trusts; (d) the securities sector; which includes various divisions in banks, securities brokers, insurance institutions, dealers and registered investment advisers; and (e) the insurance sector. The FSI is currently using AI technology in order to provide customers direct interaction with front-office solutions [6]. This growing adoption of AI-Front-office based applications in high-tech retail banking is particularly evident as the current state of the technology [7]. In front-office operations, AI can be utilized for different purposes, including automated customer support augmented with personalized interactions such as chatbots [8], in the use of voice assistants as well as natural language processing (NLP) [9]. These chatbots serve as digital virtual customer assistants (VCAs), providing guidance or advice to customers voice- or text-based and sometimes even handling financial transactions for the customer. Moreover, AI is also advancing financial identity verification in front-office environment. This includes the use of technologies (such as face recognition or voice input recognition) that help to verify and authorize the customers access to financial institution information systems. For example, facial recognition payment systems based on AI techniques have started appearing where users can complete payments by only smiling at a vending machine or using gestures [10]. AI solutions found their way into investment management, giving advisers more help to invest. These services come as algorithms that emulate the decision-making process of human advisers in order to assist investors in

making informed investment decisions [11]. The expertise of AI algorithms encompasses the best method for optimising investor portfolio composition and finding a better balance between the investment risk appetite of an investor and the projected return. In addition, AI provides advanced automation capabilities to determine lending and credit decisions [12]. In the area of credit scoring, AI has traditionally been used to decide whether individuals will receive credit based on a complete assessment after considering every possible angle. At the back end, artificial intelligence (AI) in the form of robotic process automation (RPA) is used to perform business tasks more automatically while lowering service delivery costs. AI can streamline routine business operations, mainly in the form of robotics. Thus, RPA can extract information from legal documents using natural language processing, and contract documents can be extracted through natural language processing. AI for back-office roles in insurance companies is increasingly being used elsewhere. The case, for example, is of leveraging cognitive information for individual risk calculation, claim processing, building risk score, and underwriting. AI is used by regulators in the FSI middle office to more properly monitor the financial system and discern hazards. As a case in point, AI could be harnessed to uncover and prevent fraudulent activities, based upon customer real-time location data. To cut into a nutshell, AI technology falls along the line of 3 general applications, which are: (a) predictive analytics, (b) automation of processes and applications (c) virtual assistants and conversational user experience [13].

III. THE APPLICATION OF AI IN THE FINANCIAL SECTOR

Harnessing the potential of AI and machine learning is fundamentally changing the landscape of finance as it allows companies to collect huge amounts of data from their environments and process them through artificial intelligence (AI). Besides its work on risk assessment and compliance — strengthening oversight and providing central banks with additional instruments to perform their economic and system stability obligations, AI and machine learning improves the way they anticipate upcoming economic, financial and risk driven events. It may transform even the financial markets.

This holds true even in financial markets where AI/ML systems are being employed to monitor business condition, meet customer expectation, predict macroeconomic and financial factors.

Financial Forecasting: Traditional statistical and economic analyses are more rigid; AI/ML models are diverse, can assist the exploration of otherwise difficult-to-recognize correlations between variables

that are difficult to observe, and moreover can broaden the toolkit of institutions. ML techniques achieve superior forecasting accuracy and stability to linear regression-based models [14]. As good as it is to use AI/ML for predictive purposes, it is critical to bear in mind some pitfalls. AI/ML could point out new patterns among various factors by employing non-traditional data such as social media exposure, browsing activity and location tracking. In addition to structured data consumption, unstructured data like email content can also serve as inputs to the prediction using a computer-based model that makes use of AI-driven natural language processing (NLP). But there are a variety of concerns around this unconventional use of the data in financial forecasting. It does cover all aspects of legal and regulatory framework, privacy issues, ethical considerations, and data quality, accuracy, relevance, cleanliness, and biases [15].

Investment Management: AI and ML have assisted the investment management in finance industry along multiple lines on a few occasions in an unprecedented manner. For decades, technology has been at the core of trading, clients' service delivery, and backend activities, managing the massive volume of trade data and information and enabling the high-frequency activity of trading. However, all manner of emerging technologies, including AI/ML, are disrupting the status quo by attracting new participants, of which adaptable product offerings, customer engagement driven by chatbots, sophisticated data analytics and decision-making techniques, as well as machine-learning-based automation are some of the prominent tools [16].

Banking Sector: The level of AI/ML integration has been slower than the rate of investment management; traditionally, banking has led in these technologies — with ATMs, internet banking and electronic payments by card. However, the unique nature and confidentiality of financial information today have also limited the fast implementation of AI/ML. That being said, there has been an increased use of AI and machine learning in banking in recent years. At least in part, this transformation is a result of growing competition from fintech actors (including fintech lenders) and a growing acknowledgment of the transformative potential of ML to strengthen customer connection (think chatbots and ML-enabled mobile banking), personalize product approaches (blending behavioral and personalized insights analytics), and optimize back-end enablement, improve risk reduction and sharpen credit underwriting ideals. Traditionally, technology has been utilized to enable compliance and reporting activities to be digitized. Over the past few years, however, this trend has changed as AI has progressed. By leveraging vast

data, usually as it actually happens and automating compliance decisions, it has been transforming the entire industry of risk and compliance management. This evolution has yielded cost savings as well as increased the accuracy of compliance [17]. AI is the foremost technology on the horizon, according to a sweeping global study of regulatory technology companies. AI has become an increasingly integrated part of the regulatory tech sphere and is now being applied far more broadly, including banking, securities, insurance, and all manner of financial products. Within this context, AI has a variety of functions that can be adopted like, identity validation, anti-money laundering, counter-terrorism financing measures, fraud detection, risk management, stress testing, etc. [18].

Discretionary Control: AI has found an important place in data collection and analysis specifically, yet decisions will go to the supervisor who is equipped with the authority to have them. Several international regulatory bodies are using AI and natural language processing techniques to improve the data analysis process, processing, verification, and plausibility checks among members of the Financial Stability Board [19]. Managers use Artificial Intelligence, to draw every insight they can from data and make more precise decisions. Supervisory technology, augmented by AI, can provide highly accurate forecasts. AI/ML holds a lot of promise, however, it is not a permanent solution on the whole. The effectiveness of supervision is always to rely on human judgment, as well as the prevailing risk culture within an organization. At present, what is increasingly happening are the areas where supervisory technology plays heavily in data management, reporting and problem-solving around wrongdoing. In the case of the more specialized use cases, applications cover virtual assistance, macroprudential and microprudential analysis, market surveillance (with less usage frequency) among others.

Central Banking: Central banks could deploy AI/ML applications to accomplish their mandates, but they've been slow to embrace it. AI or ML systems could assist with more accurate monetary and macroprudential policy, and the central bank operations, also assist a central bank in understanding more economic and financial events. And they might better the ability to monitor systemic risk, possibly predict if the issues of systemic problems will surface, or hasten the steps at crisis response. Even so, using AI/ML processes in the policymaking should not be taken lightly. Finally, there might also be increased internal control possibilities on central banks (e.g., allocation of resources among functions and monitoring of internal operations) with the help of AI and machine

learning [20]. Minimizing operational and human capital expense AI is revolutionizing the client and marketing experience within Financial Services Industry (FSI). An example is chatbots and Virtual Customer Assistant (VCA) that became commonplace in customer support and they help to enrich the customer experience. This technology enables the customers to communicate with the FSI firms via text, voice or audio-based communication agents in their first language and from any place at any time [21]. As much as such intelligent customer service chatbots show significantly better customer satisfaction scores than human service representative methods. Due to their impartiality which is innate for FSIs, one should trust AI when interacting with specific customers, particularly chatbots. Additionally, AI shines even in FSI marketing, where aggregated information from huge corporates supports personalization of services and provides more meaningful product portfolios and segmentation, a degree of specificity often difficult for any human counterpart to produce. As AI deals with large amounts of data in its data handling (both structured and unstructured), it interprets the sense of significance faster and with greater accuracy than ordinary man does. This idea is already found in the area of automated decision-making. At the same time, improved efficiency is achieved and the quality of financial services is elevated. Automation of credit scoring for example reduces the number of application and review processes of credit application and robot advisers makes wealth management cheaper and more efficient in the investment management sector [22]. Thus, the convergence of automatic decision-making and large data volume could potentially translate well into a substantial surge in finance industry sales for FSI firms. What were once highly restricted services like credit and financial advisory services, have now been transformed into accessible mechanisms that will enable broader access to financial services. In the FSIs operational field, Robotic Process Automation (RPA) is put into place to mitigate customer service problems. It does so by reducing time it takes for business functions to be finished and eliminating typing errors caused by human error. And that, in turn, builds customer relationships and trust. At the bottom line, introducing RPA into FSIs results in tangible cost reductions - operating costs and personnel costs of service delivery. This results in a smaller price tag for the clients. AI-powered FSI service providers, unlike their human colleagues, are ceaselessly operational, they neither tire nor demand holidays, and their efficiency is uninfluenced by the clock. This striking continuity of functioning ensures not only savings on human capital cost but also removes the burden on investment in hiring and retaining workforce [23].

IV AI-HUMAN COLLABORATION AS A DRIVER OF THE DIGITAL ECONOMY IN FINANCIAL SERVICES

The financial services transformation is no longer solely about artificial intelligence (AI), but rather how AI systems and expert human collaboration are being used in synergy together for digital services is being driven increasingly by artificial intelligence (AI) within. Findings from the PwC–FICCI report on AI adoption in the Indian financial services sector indicate that AI is deployed mostly as an augmentation technology enabling human decision-making, operations and service quality rather than a pure and utter replacement for human judgment.

The report conceptually divides AI adoption on a maturity spectrum of intelligence from assisted and automated intelligence to augmented and autonomous AI. Crucially in even at more matured stages, humans still have a structural role to play, especially in regulated, high-risk, but trust-based financial tasks (credit underwriting, fraud resolution, compliance oversight, wealth advisory), such as complex financial processes, to be integrated with the trust- and authority-based domain. This implies the evolution of AI in Financial Services has evolved from a human-in-the-loop model to one that encourages accountability, explainability and ethical governance while also providing scale and speed through automation, the organizational level witnessing the collaboration of AI and humans that are institutionalised via AI Centres of Excellence (CoEs) and business unit-driven analytics teams.

More than 80% of financial institutions say they have a clear AI strategy, but only about two-thirds say they are more advanced through implementation, report survey findings. This divide emphasizes the necessity of human coordination, management ability and cross-functional coordination to convert AI strategy into concrete results. AI systems produce understanding, but humans are responsible for interpretation, for contextualising AI decisions and for providing AI outputs in accordance with regulation and business needs.

On a sectoral scale, AI-human partnership appears differently to be implemented in banking, insurance, NBFCs, payments and wealth management. In banking, AI-powered fraud detection and credit scoring systems in place to identify anomalies and risk trends and validate decisions on final decisions by human officers. Regarding insurance, AI is involved in automatic claims triaging and damage assessment, while humans take care of complex/high-value cases. Similarly, in the field of wealth management, robo-advisory software enables better portfolio optimisation, while people play a

central role in client trust and strategic financial planning. These case studies illustrate how AI enhances human performance and that humans maintain trust, fairness, and customer relationships which is central to a robust digital financial ecosystem. Therefore AI–human collaboration is an essential ingredient of the digital economy in financial services. This dual function does more than just drive efficiency and enhance the customer experience, it guarantees that digital finance develops responsibly, inclusively, and sustainably [24].

IV. COMPONENTS OF AI CHALLENGES IN FINANCIAL SERVICES

The rise of AI in the FSI does raise several issues including scarcity of human resources, biases in the choice of AI tools, compatibility with existing technologies used for AI deployments, and the scope of AI applications. Robo-advisory software is used in the domain of wealth management to optimise portfolios; but people, at the heart of client trust and strategic financial planning, are all key players. Advantages of a system of AI are directly correlated to the availability of training data and training time on that data. Data training involves training an application to conduct correctly defined tasks which results from a consistent providing of datasets to the respective application to improve tasks success [25]. If the training data is less than high quality and worse, then in forecasting a customer's creditworthiness, for example, there is more possibility of biased decision. This emphasizes the need for AI to operate on data sources that might fall outside traditional frameworks. Also, AI systems are constructed and implemented manually by human beings, therefore in that sense there are always shortcomings. For example, algorithms could use a person's educational background as an indicator of their creditworthiness on the basis of identifying spelling mistakes in internet searches to predict their level of creditworthiness. So, if women possess lower educational attainments compared to men, the AI decisions may unintentionally perpetuate indirect gender-based discrimination. These can unintentionally lead to unethical and unlawful outputs and results [26]. The expectations regarding what the AI would take over are far above people's real-life results. They might, for example, have trouble understanding what users are asking or what are they hoping for. If artificial intelligence can automate well, it can cover a decent chunk of the work that we humans do but cannot make those complex determinations and require human judgment. The real idea of AI shouldn't be to replace humans rather than help humans, reduce all the limitations of humans and unlock the potential of AI. Unfortunately, shortage of people with necessary skills in order to properly use AI tools have arisen

[27].

V. RESULT AND DISCUSSION

AI/ML has been integrated less rapidly into the banking industry than into investment management. While banks played an early role in the development of technologies such as ATM technology, internet banking, and electronic card payments. But, the uniqueness and privacy-related character of financial information have somewhat inhibited the rapid adoption of AI/ML. However, the adoption of artificial intelligence (AI) and machine learning (ML) in banking have been growing steeply in recent years. This shift will be fueled in part by increased competition from fintech firms and fintech lenders. Apart from driving the recent implementation of ML, the capability of ML to enhance product positioning, assist back-office workings, bolster risk management programs, and optimize credit underwriting have also driven recent push towards its use. Examples of these are chatbots and ML-supported mobile banking. With AI/ML technology changing along with the changing dynamics in financial and various other sectors of the industry, consumers, technology vendors, developers and even regulators do not have an understanding of its full potential or weaknesses. Consequently, there may exist unforeseen obstacles that have not yet surfaced, requiring tight monitoring and cautious control by nations to cope with these potential complications.

VI. CONCLUSION

The goal of this paper was to build on what is available to understand AI applications currently in use in the Financial Services Industry (FSI). The existing corpus of AI literature is notably lacking in empirical study of its usage in FSI. In seeking to achieve this goal, the study sought to map out notions, applications, benefits, and hindrances of AI in the field of financial services. The key points of the study indicate the pervasive influence of AI applications on all areas of financial operations, including front-office, middle-office and back-office departments. Examples of such applications include predictive analytics, virtual assistants, conversational user experiences, process and application automation. Advantages of such applications are better customer experience, enhanced satisfaction, reinforcing trust-based relationships, reduced operational expenses, and increased operational efficiency. At the same time the work highlighted important issues, which deserve discussion. These include deficiencies in training data, the potential for bias in AI systems as well as scarcities of expertise that make effective use of AI technology difficult. The knowledge from this study, and in particular about AI's uses, advantages, and issues is likely to serve as a guide for aspiring tech start-ups as they approach technology moving forward. This information is invaluable in knowing so

much about what AI will open for the FSI.

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