



# Examining The Disruption And Development Of Financial Markets And Management By Artificial Intelligence (AI)

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## **ABSTRACT:**

The evolutionary progression of artificial intelligence (AI) in the global financial domain depicts a trajectory of transformative advancements accompanied by noteworthy discoveries and discernible implications.

Specifically, the Asia Pacific region emerges as a pivotal hub for the burgeoning growth of AI, propelled by substantial investments and widespread adoption across diverse industries encompassing automotive, healthcare, retail, and food and beverages. Forecasts signal an exceptional surge in the worldwide AI market, catapulting from a valuation of USD 454.12 billion in 2022 to an astounding USD 2,575.16 billion by 2032, demonstrating a commendable compound annual growth rate (CAGR) of 19% spanning from 2023 to 2032.

However, this upward force is coupled with significant economic considerations. The assimilation of AI initiates a shift in occupational roles, necessitating the augmentation of skill sets within the workforce while potentially precipitating job displacement. Comprehensive surveys conducted by esteemed entities, such as the World Economic Forum, indicate the potential replacement of 9% of financial services jobs with AI by 2030, concurrently envisaging a robust 19% workforce expansion in FinTech enterprises. This transition is expected to impact sectors like investment management, predicting a prospective reduction of 10% in employment numbers within five years and a substantial 24% decline over a decade.

Concerns regarding algorithmic biases, transparency, and ethical implications necessitate meticulous navigation. Concurrently, a diverse array of global financial institutions showcase multifaceted applications of AI. From J.P. Morgan Chase and Goldman Sachs, employing AI for fraud detection and risk assessment to forward-thinking entities like Trading Technologies and Sigmoidal leveraging AI for market analysis and asset allocation, respectively, these instances underscore AI's extensive utility in revolutionising conventional financial practices.

However, the rapid proliferation of AI in finance also presents inherent risks. Limitations in programming codes pose a challenge in capturing the intricate dynamics of financial markets, potentially leading to inaccuracies. Furthermore, the finance sector confronts amplified virtual threats and data biases, necessitating stringent protocols against cybersecurity threats and biases perpetuated by AI's data interpretation. The intricate interplay between AI's transformative potential and associated challenges underscores the imperative need for a nuanced approach to harnessing AI's prowess within the financial landscape.

**INDEX TERMS** - Artificial Intelligence, AI, Financial Markets, Transformation, Impact Analysis, Algorithmic Biases, Market Volatility, Case Studies, Ethical Considerations, Financial Institutions, Investor Insights, Policy Implications, Job Displacement, and Technological Disruption.

## **I. INTRODUCTION**

In today's evolving landscape characterised by the ongoing advancements of the Fourth Industrial Revolution, we are witnessing unprecedented changes. The rise of Artificial Intelligence (AI) has become an influential force fundamentally reshaping the finance industry. Its integration across sectors within finance including trading strategies, risk assessment and customer service marks a shift in the field. This research explores the relationship between AI and financial markets shedding light on how AI technologies impact the stability, efficiency and competitiveness of financial systems. The combination of AI and finance represents

an alliance that enhances decision-making abilities and automates tasks. However, it also raises concerns regarding risks, transparency and the role of human expertise. This paper examines the aspects of this transformative partnership. It investigates how AI-driven trading methods, predictive analytics and algorithmic trading have permanently changed financial market dynamics. Additionally, it delves into the regulatory challenges that have emerged alongside the use of AI in finance and their potential consequences for market participants, policymakers and society, as a whole. Our research not only explores the development of AI, in finance but also predicts its future direction. As we consider the possibilities and challenges brought by AI in markets, this study aims to provide an understanding of the technological progress shaping the future of finance and how it impacts economies worldwide.

## II. OBJECTIVE OF THE STUDY

This research study aims to comprehensively analyse the impact of artificial intelligence (AI) on financial markets and management. It seeks to provide insights into the transformation of financial markets driven by AI technologies, including their potential advantages, challenges, and ethical considerations. The study intends to enhance understanding of the implications of AI adoption in finance and inform various stakeholders, such as investors, financial institutions, policymakers, and the general public.

## III. SCOPE OF THE STUDY

This research project will encompass various aspects of AI in financial markets, with a specific focus on the following key areas:

- I. ***Comprehensive Examination of AI Influence:*** Conduct an in-depth exploration of how artificial intelligence (AI) is shaping and influencing financial markets, management and the economy. Analyse the role of AI across multiple dimensions of financial markets, spanning trading, risk management, customer service and investment strategies.
- II. ***Analysing Drawbacks and Challenges:*** Examine the drawbacks and challenges associated with AI in financial markets and the potential consequences of excessive reliance on AI-driven trading strategies. Investigate risks concerning market volatility and potential disruptions.
- III. ***Case Studies and Real-world Examples:*** Provide case studies and examples of financial institutions and market players that have successfully implemented AI solutions. Highlight instances where AI technologies have led to significant improvements or sparked controversies in financial markets, and examine case studies based on media and reports of relevant financial institutions.

## IV. LITERATURE REVIEW

Financial markets and systems play a pivotal role in the global economy, and the integration of artificial intelligence (AI) has brought about significant transformations in this sector. This literature review explores the multifaceted impact of AI on financial markets and systems, shedding light on its applications and prospects. The digital economy has become the prevailing standard in financial markets, with advancing computing power ushering in fresh opportunities for enterprises to harness emerging technologies like artificial intelligence, machine learning, and the Internet of Things (IoT). This, in turn, accelerates the expansion and metamorphosis of the digital economy.

Many believe that artificial intelligence-driven models have the potential for use in upcoming research to predict various financial data, as well as for practical applications by financial professionals. Furthermore, Research supports the idea that abnormal returns can be generated in financial markets through the estimation of stock market indices and CDS spreads, along with other daily changing factors.<sup>[1]</sup>

The recent success of deep reinforcement learning (DRL) in tackling complex decision-making problems has greatly benefited research in automated trading. However, it's essential to acknowledge that formulating the stock trading problem within a DRL framework remains an active research area due to various factors. The ultimate goal is for artificial intelligence to interact effectively with financial markets, comprehending their dynamics. Importantly, the model should run efficiently on a standard personal computer with a multi-core CPU or GPU, ensuring practicality in terms of execution time.<sup>[2]</sup>

Financial expertise and experience are pivotal in shaping quantitative investment models, resulting in a relatively slow and human-influenced development and update process. These quantitative models are formulated using vast datasets and intelligent algorithms. They assess the market in alignment with investor risk preferences, facilitating the intelligent allocation and management of assets and the automated execution of strategic trading services.<sup>[3]</sup>

At present, artificial intelligence serves various purposes in the financial sector. It aids in detecting discrepancies in transactions, tailoring personalised recommendations for customers, and creating solutions to eradicate human errors. Additionally, the implementation of artificial intelligence can lead to decreased manual tasks and a lesser requirement for back-office operations within the financial domain.<sup>[4]</sup>

The forecast from Goldman Sachs, indicating the automation of up to 300 million jobs through generative AI. This prediction carries implications on labour markets, economies, and the very fabric of societies, necessitating an in-depth examination. It calls for strategies to navigate these changes and ensure a balanced transition into an increasingly AI-driven future.<sup>[5]</sup> AI is revolutionising financial transactions by enhancing credit assessments, refining marketing strategies, improving quantitative analysis, and bolstering economic risk management within the financial sector. In terms of security, AI excels in encryption and monitoring suspicious activities, granting clients the flexibility to choose loan amounts at favourable interest rates. Through continuous evolution, AI is steadily reducing concerns about banking security, and when used adeptly, it can provide robust encryption and substantially expedite various processes.<sup>[6]</sup>

## V. RESEARCH METHODOLOGY

The main objective of this paper is to underscore the significant role of artificial intelligence (AI) in shaping financial markets. Specifically, it aims to highlight the advantages of utilising AI for forecasting financial market trends and the potential benefits associated with various AI technologies.

**I *Data Sources:*** This study relies on secondary data sources. These sources encompass scholarly journals, books, as well as reputable websites and government reports accessible on the internet. Scholarly journals offer research findings that have undergone peer review and contain expert insights, ensuring the trustworthiness and credibility of the information.

**II *Data Collection and Analysis:*** The data compiled from these sources are qualitatively examined. This entails the systematic review and consolidation of pertinent literature, case studies, and illustrations. This paper is based on desktop research aimed at exploring the impact and influence of AI on the present and future of the financial sector. The study employed non-intrusive research methods to impartially examine the effects of AI on financial markets and management. These methods involved conceptual and documentary analyses of peer-reviewed journals, reports, and authoritative documents focusing on AI and its role in enhancing the development of the financial sector.

**III *Qualitative Approach:*** A qualitative research approach was chosen to delve into the intricate connection between artificial intelligence and financial markets and its further impact on the economy.

**IV *Case Study Methodology:*** The case study methodology is utilised to furnish readers with a thorough understanding of the topic within specific contexts. By focusing on particular cases or instances where AI technologies have impacted financial markets and services, this research aims to exemplify real-world applications and outcomes.

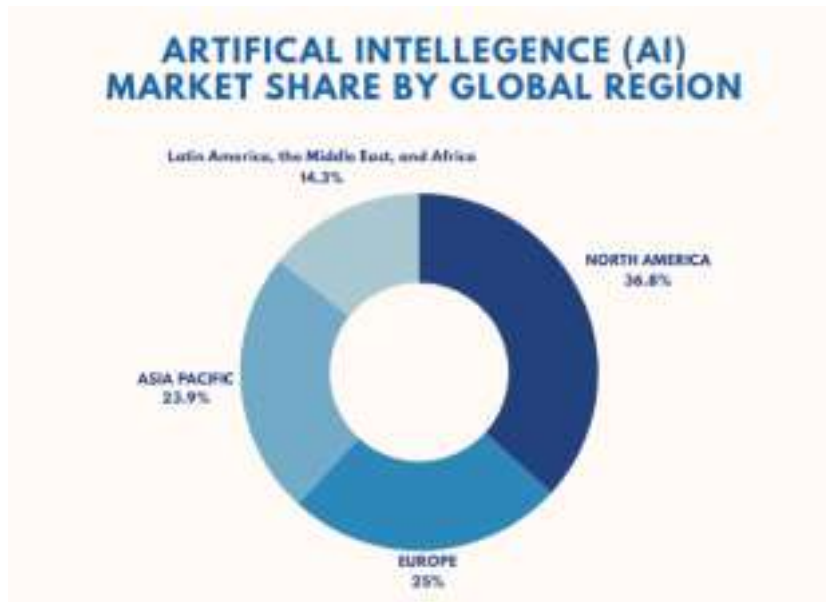
In summary, this research methodology combines qualitative analysis with a case study approach to provide a comprehensive exploration of artificial intelligence's influence on financial markets. It leverages various reputable secondary data sources to establish a strong basis for its findings and insights.

## IV. FINDINGS

### IV.I MARKET ANALYSIS

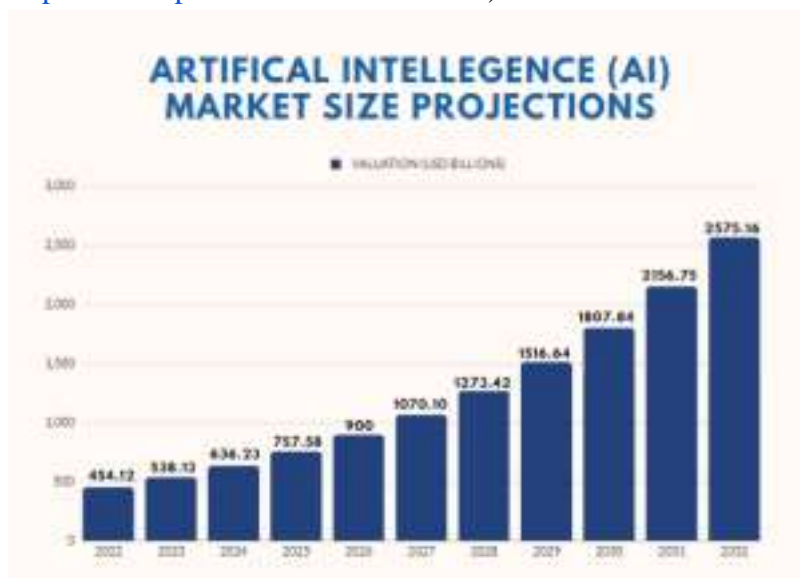
The Asia Pacific region demonstrates the highest projected growth within the artificial intelligence market due to increased investments by various entities. This burgeoning demand for artificial intelligence technologies stems from extensive adoption across key industries such as automotive, healthcare, retail, and food and beverages within the region, thereby fueling the market's expansion.

Fig 1.0: Artificial intelligence (AI) Market Share by Global Region (source: <https://www.precedenceresearch.com>)



The global market for artificial intelligence (AI) attained a value of USD 454.12 billion in 2022. Projections indicate a substantial escalation, with an anticipated increase to roughly USD 2,575.16 billion by 2032. This trajectory reflects a compounded annual growth rate (CAGR) of 19% spanning the period from 2023 through 2032.

Fig 1.1: Artificial intelligence (AI) Market Size Projections (source: <https://www.precedenceresearch.com>)

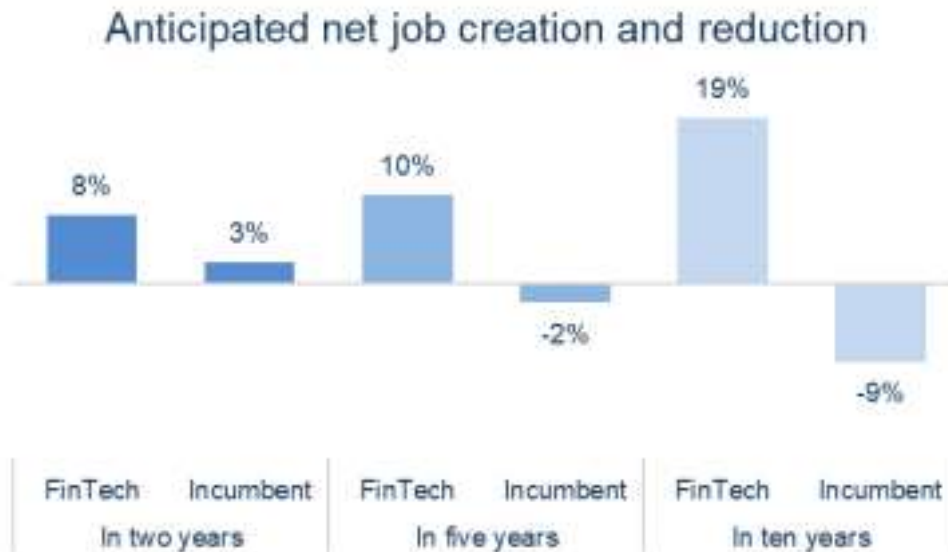


## IV.II ECONOMIC IMPACT OF AI

- I. **Labour and Jobs:** The integration of AI leads to a transformation in job roles by automating routine tasks and introducing novel opportunities that necessitate distinct skill sets. This transformation has substantial implications for employment, prompting the need for workforce upskilling while potentially causing job displacement in select sectors. A survey conducted by the World Economic

Forum, suggests that AI might replace approximately 9% of existing jobs in the financial services sector by 2030. Concurrently, FinTech companies envision a 19% expansion in their workforce during the same period. Projections indicate that the most significant reductions in job numbers are anticipated in investment management. Participants foresee a decline of 10% within five years and a substantial 24% decrease within a decade.

Fig 2.0: Artificial intelligence (AI) Market Size Projections



II. **Productivity and Efficiency:** AI significantly augments productivity through process automation, extensive data analysis, and the provision of valuable insights. This heightened efficiency often results in cost efficiencies and enhanced productivity across diverse industries.

According to research conducted by Amer Awad Alzaidi on the impact of Artificial Intelligence on the performance of the banking industry in the Middle East, the majority of participants, accounting for 72%, believe that Artificial Intelligence is primarily used for process automation.

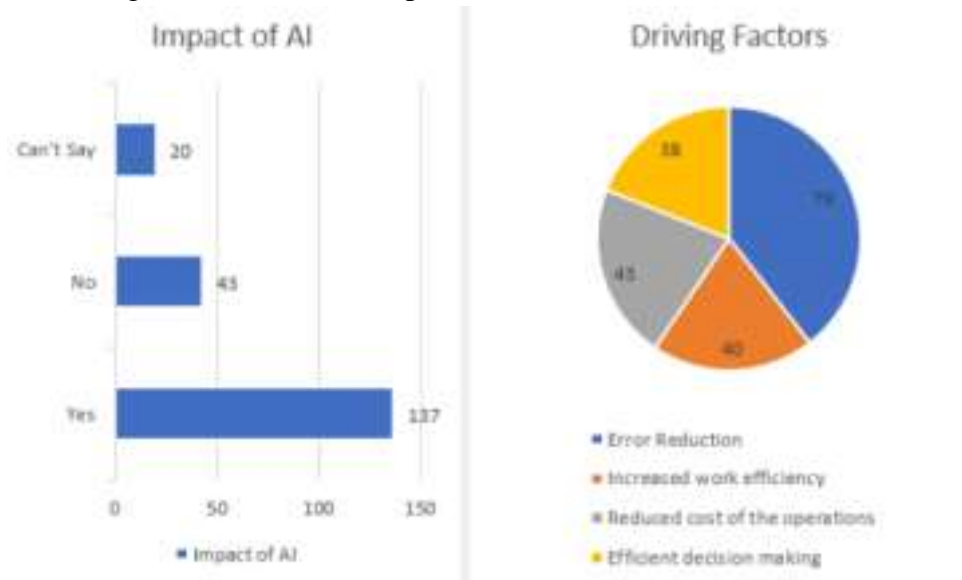
Approximately 17.5% and 17% of respondents, respectively, indicated that AI is applied for minimising human error and for personalising services. These findings align with secondary research, where the prevailing studies also emphasise

AI's application in banking for automating processes, reducing manual labour, minimising errors, and delivering personalised services to customers.

In the same survey, Among the 200 participants, 68.5% expressed a positive anticipation of significant impacts from artificial intelligence systems on banking performance. Conversely, 21.5% held the belief that AI systems would not notably affect banks, while 10% remained undecided.

Regarding the catalysts driving AI adoption in banks, 79% of participants cited the primary factor as the reduction of human error. Additionally, 21.5% highlighted cost reduction in services, 20% emphasised the efficient operation of AI systems, and 19% attributed the success of AI adoption in banking to the effective decision-making abilities of AI systems. These findings align with secondary research, emphasising the pivotal role of reducing manual errors as the predominant driver for AI adoption in the banking and finance sector.

Fig 2.1: Impact of AI and Driving Factors



III. **Innovation and New Markets:** AI catalyses innovation, enabling the creation of innovative products, services, and business models. It acts as a precursor to the emergence of entirely new markets, driving industry transformations and fostering opportunities for economic expansion.

According to a survey conducted by NVIDIA, respondents highlighted the top three areas where AI had an impact on their companies. These areas included generating more accurate models (42 per cent), establishing a competitive edge (41 per cent), and developing new products (34 per cent).

Fig 2.2: Impact of AI and Driving Factors

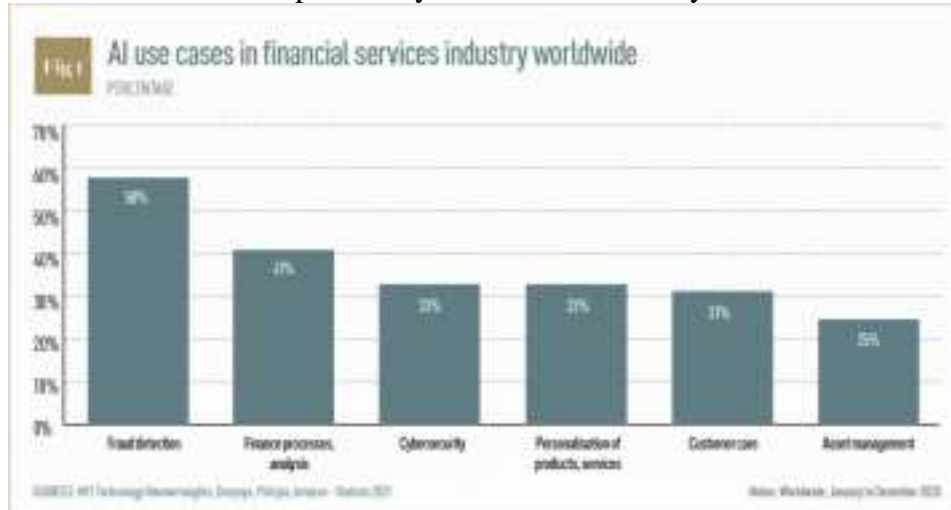


IV. **Ethical and Societal Implications:** The economic ramifications of AI encompass ethical considerations beyond financial metrics. These include concerns regarding data privacy, algorithmic bias, and the societal repercussions of job displacement, necessitating the establishment of regulatory frameworks and responsible deployment of AI technologies.

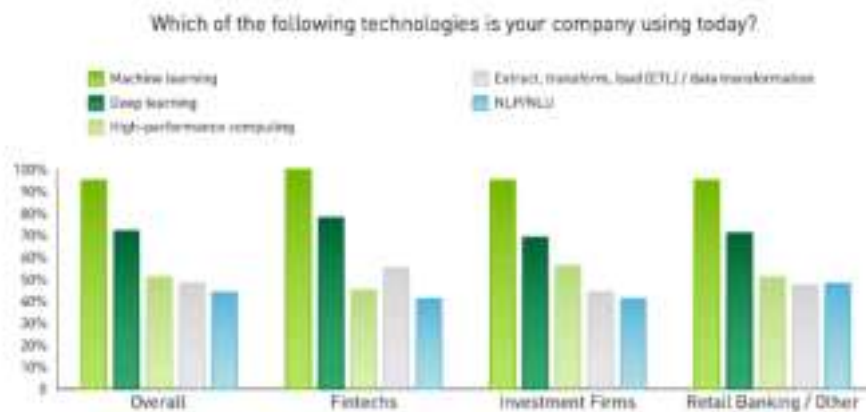
V. **Global Economic Influence:** The impact of AI transcends national borders and industry boundaries. It exerts influence on global trade, geopolitical relations, and economic competitiveness, thereby reshaping the dynamics of international interactions and competitive strategies among nations in the global market landscape.

### IV.III USE CASES OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING ALGORITHMS

I. According to Pendergast and Auerswald, the fast adoption of AI applications is fundamentally innovating how corporations operate both externally and internally. Externally, AI allows for faster and more economical job completion. Internally, it influences how firms engage with their consumers, other businesses, and society at large. The pandemic and the help of AI technology have propelled the banking sector's digital evolution, leading many financial institutions to quickly implement cloud-based technologies to improve client services. An increasing number of financial institutions are leveraging different technologies; to provide online digital services that had previously been offered by established companies in the finance sector.



I. In a Recent NVIDIA survey, respondents from various sectors highlighted their primary AI investments. For fintechs and investment firms, the focus lies on portfolio optimisation and algorithmic trading, aiming to maximise client returns. Conversely, commercial and retail banks prioritise AI investments in fraud detection across payments, transactions, and anti-money laundering, emphasising the protection of sensitive financial data for their customers.



II. Many companies in the financial sector have started using AI to enhance their operations and services. Here are a few notable examples:

II.i **J.P. Morgan Chase:** JPMorgan Chase has been actively using AI in various aspects of its business, including fraud detection, risk assessment, and trading strategies.

II.ii **Goldman Sachs:** Goldman Sachs has invested in AI technology for trading, risk management, and investment analysis, aiming to improve its financial services.

II.iii **BlackRock:** BlackRock utilises AI and machine learning to undertake investment decisions and portfolio management, seeking to optimise asset allocation and risk management.

II.iv **Wells Fargo:** Wells Fargo has employed AI for customer service, chatbots, and personalization of financial products, enhancing the overall customer experience.

II.v **American Express:** American Express leverages AI to identify fraudulent transactions and tailor rewards

programs to individual cardholders.

- II.vi **Looking Glass Investments-(Milwaukee, Wisconsin):** They employ AI to discover alternative fixed-income investment opportunities for clients, such as family offices, institutional investors, and accredited investors
- II.vii **Trading Technologies-(Chicago):** It recognizes intricate trading trends and mitigates the potential for regulatory compliance issues.
- II.viii **Sigmoidal-(Poland):** It leverages AI as an intelligent asset allocation system, utilising deep learning techniques to forecast the performance of each asset within a specific portfolio.
- II.ix **Epoque-(Switzerland):** AI serves as the order engine, generating orders and executing operational tasks, while machine learning (ML) is employed to enhance its overall performance.
- II.x **EquBot-(San Francisco):** The company streamlines the investment process to establish a comprehensive understanding of market dynamics, corporate entities, and management practices by aggregating data from various sources.
- II.xi **Auquan- (London):** It employs algorithmic trading techniques to address investment-related challenges, potentially saving substantial costs that would otherwise be spent on acquiring in-house expertise.
- II.xii **AITrading-(London, U.K.):** The company employs blockchain-based smart contracts for market scanning, aiming to enhance its revenue generation.
- II.xiii **WOA: War of Attrition-(London):** They employ AI for real-time market analysis to enhance profits for clients engaged in fund-to-fund and hedge fund investments.
- II.xiv **Trade Ideas-(San Diego):** They utilise a self-learning robot-trading platform that employs a criteria-based approach, focusing on stocks with a profit factor of 2:1 or higher and a track record of at least 60% success.
- II.xv **Imperative Execution Inc.-(Stanford):** They employ IntelligentCross, an AI-based system composed of a team of seasoned traders, analysts, and engineers, to enhance the optimization of U.S. equities trading.
- II.xvi **Infinite Alpha-(London):** They utilise AI to facilitate crypto-asset trading while prioritising the security of trading professionals. This includes offering advanced authentication, encryption, hardware security modules, and other protective measures.
- II.xvii **Techtrader-(San Francisco):** They utilise a completely autonomous stock trading system that operates without the need for human intervention, adjustments, or even updates. This system is employed for the management of hedge funds.

#### IV.III RISKS AND LIMITATIONS OF AI IN THE FIELD OF FINANCE:

Financial AI (artificial intelligence) presents some serious risks and challenges despite its exponential growth and progress made by rapid technological advances. Particularly in the areas of programming codes, virtual threats and data Bias

##### *I. Programming codes:*

AI (artificial intelligence) programs in finance are limited by their ability to capture all the requisite information from and about the market including but not limited to all the human elements of financial markets.

- i There are vast amounts of information that is far too complex to be captured accurately and sufficiently by artificial intelligence in lines of code.
- ii Computer models and artificial intelligence use simplified or oversimplified inferences and presumptions about the functioning of a financial market, to make precise predictions which



garner high value.

- iii However, they end up having large areas of gap due to the oversimplification of the functioning of the financial markets which opens them up to limitations.
- iv An Example of such a limitation would be the cause of the 2008 Financial crisis, which was intensified by the dependency of institutions on smart devices and programs to such an extent that they were unable to account for the limitations of these programs in predicting the future in terms of the booming and busting business cycle of the real estate market.
- v Uncertainty of outcomes, repercussions of decisions and wit of humans can never be perfectly or accurately coded or programmed into computers due to the simple unpredictability of humans.
- vi AI-related to finance is limited to a great extent due to the inherent incapability of computer coding to capture the complete essence of a marketplace.

## **II. Virtual threats :**

- i In 2019, a study conducted by IBM found that the Insurance and Finance industry was the most attacked and vulnerable industry concerning cybersecurity and virtual threats.
- ii Some threats identified are Terrorist organisations, Hacker groups, Competitors, enemy Countries, cybercriminals, cyber mercenaries, rogue Employees, corporate espionage, etc,
- iii Deep fakes such as the ones posted on the Associated Press's Twitter account were hacked into, leading people to believe there was an attack on the white house which caused a \$136 Billion crash in the American stock markets.
- iv The threats faced by the technology companies are now faced by Finance companies due to the growing similarity in the two industries, opening up a whole new world of technological and virtual threats that the Financial Industry must adapt to survive

## **III. Data Bias:**

- i Most, if not all, artificial intelligence programs require vast quantities of data to be fed into it to teach the system to recognise and analyse the relevant patterns and details to make further decisions and predictions. Ideally, Artificial intelligence can go through millions of data sets and data points to shed light upon new insights and understandings. Artificial intelligence can also multiply the effect of past harmful and biased data, it must be able to understand the context of the data it is collecting and learning and only then will it be able to assess the risks of utilising the information.
- ii An example of the same would be if a case were to occur if an individual has fed all the data regarding white collar jobs in the United States during the 1940s to 1970s to predict the future workforce demographics, the answer or prediction delivered by the artificial intelligence system would likely be white males of middle age.
- iii This is not an accurate representation of the algorithm or code as it is not intentionally biased, but is due to the bias present in the data which was fed into it of harmful practices of a bygone era.

## **IV. Job losses:**

- i A recent report from Goldman Sachs estimates around 300 million jobs could be affected by generative AI, meaning 18% of work globally could be automated; with more advanced economies heavily impacted than emerging markets.
- ii Job reductions and layoffs could occur as AI replaces human labour in various tasks such as data entry, risk evaluation, credit scoring, algorithmic trading, customer support, and bookkeeping.

## **VI. CONCLUSION AND RECOMMENDATIONS**

As this study concludes on the impact of Artificial Intelligence (AI) within financial markets, it unravels a landscape characterised by significant evolution coupled with concurrent challenges. The analysis illuminates a thriving AI market exhibiting remarkable growth projections across diverse sectors. These findings emphasise the delicate balance between the promising potential of AI and the need for wise management to navigate its complexity within the financial sector.

The following outlines strategic recommendations crafted to navigate the intricate relationship between AI integration and the stability of financial markets.

- I. **Foster Collaborative Research:** Advocate for joint research efforts involving academia, industry, and regulators to manage evolving AI impacts in finance and minimise associated risks.
- II. **Prioritise Ethical AI Development:** Give precedence to creating ethical AI structures that guarantee transparency and equity in data collection, model training, and decision-making processes.
- III. **Strengthen Cyber Security Protocols:** Bolster security measures and invest in cutting-edge technologies to counter virtual threats faced by financial institutions.
- IV. **Enhance Workforce Skills:** Concentrate on improving workforce skills to align with changing job demands caused by the integration of AI in finance, addressing skill gaps created by this technological shift.
- V. **Adapt Regulatory Frameworks:** Develop flexible regulatory frameworks capable of adapting to AI advancements, ensuring responsible deployment of AI in financial systems.

While AI presents vast prospects for innovation and efficiency in finance, addressing associated risks through collaborative research, ethical implementation, reinforced cybersecurity, skill enhancement for the workforce, and adaptive regulatory measures is crucial for its sustainable and responsible assimilation into the financial domain.

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