## THE ROLE OF ARTIFICIAL INTELLIGENCE IN TRANSFORMING FINANCIAL MANAGEMENT PRACTICES: OPPORTUNITIES AND CHALLENGES

**Dr.Harimohan Sarswat**
**Principal, Ekkis College Lunkaransar {Raj.}**

### *ABSTRACT*

*The term "artificial intelligence" refers to a substantial technical development that has been produced and modified by humans. This progress has made it possible for computers and robots to make human living easier and more convenient. Artificial intelligence (AI) enables robots to learn from their errors and adapt to new circumstances, even after they have been built by humans. This is despite the fact that it still requires human knowledge and effort to assemble the data collected by the machines. Since it was first developed in the middle of the twentieth century, artificial intelligence (AI) has gone a long way and is now creating waves in a wide variety of sectors. The finance industry is one of the many organisations that has shown a significant interest in pushing the trajectory of artificial intelligence. On several occasions, artificial intelligence has shown its capacity to fulfil the ever-increasing need for dependability and consistency in the financial sector. Every aspect is set out in plain sight and is simple to access, beginning with the first risk assessment and continuing with the continuous management of financial risk. This includes the facilitation of trading choices, the identification of fraud, and the supply of individualised investment advice. One factor that has led to the rapid development in the number of mobile banking facilities over the last few years is the use of artificial intelligence and machine learning to reduce the danger of cyberattacks. Help for customers is accessible around the clock, seven days a week, which has significantly reduced the amount of work that is repetitive and made life simpler for customers generally. The focus of this paper will be on a few of these critically important concerns, as well as the growing significance of artificial intelligence in the financial industry.*

**Keywords:** *AI, financial risk, Investment decision*

## INTRODUCTION

Within the realm of computer science, artificial intelligence (AI) is a discipline that focuses on the development of computational models of human intelligence that are in its whole, the most accurate approach to characterise it is as a machine that was created by humans and has a data structure that is highly interconnected. In spite of the fact that researchers have been aware of this concept and this technology for a considerable amount of time,

the matter at hand is the expanding effect that it has on the normal operations of every industry that was mentioned. Beginning in 1943, the development of artificial neurons developed gradually until Alan Turing, one of the greatest mathematicians and computer scientists of all time, established a new notion with the Turing machine. This was the beginning of the development of artificial neurons. In today's world, owing to machine learning, people have access to solutions that are extremely trustworthy for a massive quantity of complicated data. This machine might employ algorithm logic to solve difficult issues. In the year 1956, the Dartmouth Summer Project presented a novel viewpoint on the enormous benefits that may be gained by humans as a result of their adoption of artificial intelligence.

Robots that have been produced throughout history, such Unimate, Eliza, Shaky, and a huge number of others, have been of enormous use to mankind. As we dive more into the financial component of this essay, there are a few robots that stick out as very noteworthy and have had a huge influence. SensaFraud is an example of such a robot. It was built by Symphony Ayasdi, which is recognised as one of the leading businesses now using artificial intelligence to address financial problems. Regrettably, along with the proliferation of new technology, there has also been a surge in cybercrime. Several examples include Blue Prism for trade financing, Bny Mellon for trade settlement, Enablesoft for report automation, and a great number of others. There are too numerous to mention here, but some examples include these. In this section, we will discuss how artificial intelligence has been a tremendous benefit to the banking business and how crucial it is.

- IDC forecasts that by the year 2020, worldwide sales of artificial intelligence (AI) software, gear, and services would have reached $156.5 billion, representing a 12.3% rise from 2019.

- The research company Mordor Intelligence forecasts that the global artificial intelligence financial technology market would grow from its estimations for the years 2020 and 2025 to reach $22.6 billion, representing a compound annual growth rate (CAGR) of 23.37%.

- By the year 2022, it is anticipated that the market for financial technology would have reached a size of $309 billion, increasing at a compound annual growth rate (CAGR) of 25%. At a compound annual growth rate of 6%, it is anticipated that the global financial services sector would reach $26.5 trillion by the year 2022.

- The findings of a recent survey by Deloitte Insights indicate that seventy percent of businesses that provide financial services are using machine learning in order to estimate cash flow, enhance credit ratings, and detect fraudulent activity.

*Corresponding author:* **Dr.Harimohan Sarswat**

- Within the financial services industry, the most current adoption data conducted by the Economist Intelligence Unit showed that fifty-four percent of businesses with five thousand or more employees have used artificial intelligence.

## Applications of AI in finance:

As a result of a recent research conducted by the Reserve Bank of India in response to a request for information (RTI) petition about bank fraud, the BFS sector stands to benefit a significant amount from the use of AI. According to official figures, Indian banks have claimed being victims of fraud equal to The banking and financial services industry is in critical need of stronger monitoring and management technology to protect the interests of its customers, since the number of dishonest activities committed by dishonest actors continues to climb at an alarming rate. In order to enhance domain management, the following are some instances of sectors that have used artificial intelligence.

## Anti-money-laundering screening

In recent years, there has been an increase in the practice of money laundering, which is the act of disguising monies that have been obtained illegally as coming from a legitimate organisation or source. This technology is becoming better and better at identifying suspicious actions that are related with money laundering as time goes on. The potential of machine learning (ML) and deep learning to identify and prevent fraud is proving to be beneficial to government systems as well as large financial organisations. AMLOCK Analytics is a cutting-edge anti-money laundering (AML) system that was introduced by 3i Infotech Limited, a global leader in the information technology industry. This system is patterns. It provides an all-encompassing viewpoint on the examination of an alert and assists businesses in working through their most significant difficulty, which is the management of an excessive number of false positives. AMLOCK Analytics makes use of a variety of statistical approaches and machine learning algorithms in order to evaluate and predict utilising historical data that is relevant to the institution. the capabilities of analytics with the traditional rule-based approach in order to increase efficiency and risk focus. This was stated by Ravikanth Sama. When it comes to hosting settings, it is compatible with both on-premise and cloud environments.

## Risk Assessment

Considering that artificial intelligence is founded on learning from past data, it is reasonable to anticipate that it will flourish in the financial services business, which is characterised by the fact that keeping records and books is almost like second nature. Artificial intelligence and machine learning are rapidly replacing human analysts. This is mostly owing to the high stakes involved in human selection and the possible loss of millions of dollars due to mistakes. Artificial intelligence (AI) is based on machine learning, which improves with experience. This makes it feasible to automate jobs that

previously needed human intellect, clarity of thinking, and analytical skill if they were performed by humans. By using the risk assessment software and hazard identification tools offered by EHS Insight, it is possible to discover potential threats, analyse the risks that are involved, and regularly monitor controls. The first step for businesses is to identify possible hazards and assess the risks that are connected with them. This will allow them to increase their productivity, reduce the number of injuries that occur, and avoid costly incidents. A competent risk assessment process directs the creation of countermeasures by focusing on the dangers that poses the greatest harm to the organisation. A robust reporting system is provided by the HIRA system, which allows for the evaluation of these risks and the discovery of solutions to control them. In situations where it is deemed suitable, it provides possibilities to install cutting-edge technology as new controls, it maintains a record of the current status of all assessments and control-implementation initiatives, and it guarantees that risk assessments are never out of date. In addition to this, it includes the definition of periodic reviews and guarantees that the risk owner will reevaluate the risk at the appropriate time.

## Automating processes using OCR techniques

For the purpose of digitally replicating handwritten letters and characters, the banking sector is making use of advanced optical character recognition (OCR) devices. The bank may now digitalize the paperwork, automate the process of issuing invoices and purchase orders, and decrease the probability of human error. Banks may use it to swiftly and properly digitise customer information on ATM cards for security reasons, process financial statements, detect and notify of new text arrangements, and scan paper applications. Businesses in the banking and financial services business are revolutionising the way individuals interact with their money by employing data-driven approaches and artificial intelligence. Deep learning and artificial intelligence are where it's at. Customers' numbers are expanding at a fast pace, and companies must do all they can to stay up with them. Advanced data analytics made available by digitalization and AI may assist with this. To process financial papers and extract data, Docsumo employs AI. It is clever document processing software. This all-inclusive solution fits a company's needs for automating enterprise-level document processing. Common financial document types available in Docsumo's pre-trained APIs include IRS tax forms, Acord forms, invoices, logistical paperwork, documents certifying identity, and more. The automated document processing takes less than 30 seconds and has an accuracy rate of up to 99%.

Through the use of nanonets and artificial intelligence, it is feasible to extract essential data from unstructured financial documents and transfer it into digital forms. Even with partly structured and unseen data, its AI works effectively. The software's built-in AI increases its accuracy with each processed document because it learns from its errors.

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## Financial Advisory Services

Artificial intelligence has the potential to deliver a more individualised report on portfolio analysis by assessing a digital portfolio and producing a summary that includes a variety of photos. A more accurate picture of the client's current financial situation is provided. Furthermore, it analyses potential investment possibilities and forecasts long-term price swings by using a technique known as predictive forecasting technology.When it comes to the investing cycle, a robotic-advisor is responsible for gathering the financial data of a client, doing an analysis of that data, arriving at the appropriate conclusions, and then monitoring how well those investments are performing. Particularly noteworthy are automated investment management solutions such as the Intuitive Investor offered by Wells Fargo. In a matter of seconds, the application will generate a portfolio for the user once they have inputted their recommendations and goals for their investments. It takes care of mundane activities such as rebalancing, monitoring, and data updates in order to achieve its aim of enhancing wealth management via the use of automation. One of the most functioning chatbots, such as Giosg, is able to detect user messages and provide them with complex responses since it was built using Natural Language Processing (NLP). Because of this, they are prepared to use AI for the management of assets and the planning of financial matters.

## Challenges of AI in finance:

### Data quality

As the saying goes, "Garbage in, garbage out" is a data science aphorism. Maintaining a high level of attention to detail is very necessary when starting the process of putting data into machine learning. In the financial sector, where even a single day's worth of tainted data or a handful of incorrect observations inputted into a trading algorithm can cause catastrophic systemic consequences, such as poor trades and irreparable financial loss, this holds true for any data-related task. However, in the financial sector, it takes on critical importance.

### Black Box

The adoption of cutting-edge algorithms that covertly do a multitude of calculations and produce exceptionally accurate projections is something that data scientists in a variety of sectors are very eager to achieve. There are additional considerations to take into account from a financial point of view, despite the fact that this makes sense in a number of different scenarios. It is necessary for the organisation to have a comprehensive grasp of the reasons behind a large number of algorithmic decisions because of the high degree of regulation that exists in the financial industry. Techniques for monitoring and debugging algorithms are slipping behind, despite the fact that algorithms continue to increase in power, intricacy, and pervasiveness. The principles of transparency and accountability in

algorithmic decision-making are very significant, and companies need to give consideration to these principles in terms of ethics, justice, and the protection of individuals.

## Highly Expensive

Artificial intelligence (AI) research and maintenance have always been very expensive due to the inherent complexity of these systems. It is necessary for the complex software programmes that are used in artificial intelligence to undergo continuous updates in order to stay up with the ever-changing requirements of the environment. In the case of a major failure, the process of restoring the system and retrieving lost codes may be exceedingly expensive and time-consuming, and it may also be hazardous if it is not handled appropriately.

## Dimensionality reduction

Due to the fact that even mountain of data. In addition, this is the reason why the industry has a poor signal-to-noise ratio, which presents data scientists with a difficulty as well as an attractive opportunity.

## REVIEW LITERATURE

Chan, Nayler, Raman, & Baker, 2019The term "artificial intelligence," which is abbreviated as "AI," refers to the process of developing and sustaining digital representations of human intelligence. Through the use of contemporary mathematical procedures and extensive data sets, artificial intelligence (AI) makes it possible for extrapolative pattern recognition to provide the appropriate solution to particular issues. To be more precise, it is a technique of optimisation. The data that was entered into a computer programme served as the guiding principle for this inquiry, rather than the capabilities that were intrinsic to the technology. The enabled it to offer economists a variety of helpful tools. These apps have the ability to create a commotion in the financial industry, which is something that happens. As a consequence of this, it is anticipated that artificial intelligence would ultimately surpass humans in their respective domains and completely replace human resources.

Kraus, Palmer, 2018 Some occurrences have been identified with the help of AI. When one has the ability to recognise patterns, it becomes considerably less difficult to recognise activities that are not conventional. Artificial intelligence has the potential to identify and notify users of a variety of hazards, including unlawful activities, money laundering, dubious financial arrangements, and security concerns. Furthermore, Chan, Nayler, Raman, and Baker (2019) state that it is used in the process of developing comprehensive investment strategies. It is possible to automate the robot consulting services by providing recommendations for managing a portfolio. It is becoming more common for individual investors to behave in this manner. The trading of financial algorithms is another use of artificial intelligence. In this context, the system enables the execution of predetermined

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and speedy trades by absorbing data on market circumstances and price levels via the utilisation of custom algorithms. This kind of trading is referred to as "high-frequency trading" because of the rapidity with which transactions are often completed.

Ho, Ip, Wu, & Tse, 2022 It is possible that incorporating AI into financial services might result in a number of benefits. The automation of processes enhances both the productivity and the creativity of processes. Furthermore, it has the potential to reduce the number of mental and emotional errors. The ability to perceive and recognise long-term changes and patterns has the potential to improve the efficiency or precision of data management in ways that are difficult for the systems that are now in use to do. When rules, such as those governing the markets in the European Union or the Financial Instrument Directive II (MiFID II), put a higher focus on analysis and contain more data relevant to the firm, these requirements take on an even larger level of significance. Artificial intelligence has the potential to be used in a variety of fields, including text, semantic syntax, and news. Using artificial intelligence, it is possible to automatically examine and analyse many types of written discourse, including but not limited to articles, novels, social media posts, and other forms of written discourse. When it comes to the future expansion of economic structures, artificial intelligence computers will be essential since they are able to quickly assimilate all important news and information. This is because it would take people several hours to manage all of the nuances that might potentially damage inventory performance. The estimate, forecasting, and analysis of market price levels are all made easier using the technique of data mining. Additionally, changes to laws and institutions may be influenced by the prospects and consequences of the situation.

Lin 2019 It has been said that artificial intelligence is now engaged in operations within the financial sector with the purpose of facilitating the management of financial transactions, increasing profitability, lowering costs, expanding accessibility, and improving efficiency. As part of the investigation of structural risk and financial restrictions, artificial intelligence is being used. Artificial intelligence is evaluating financial risk, and data bias is being provided by AI. AI is also giving data code. This data code, which makes use of artificial intelligence, therefore carries out the systematic risk that is seen in the financial industry. For the foreseeable future, research into the financial industry that makes use of AI approaches need to have the objective of adopting an insider's perspective and covering a wide range of subjects.

**OBJEACTIVES**

1. To describe the role of Artificial Intelligence in Finance: A Theoretical perspective.

2. To represent a classical and modern look of Artificial Intelligence in the financial domain.

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## RESEARCH METHODOLOGY

The research technique consists of both desk research and conceptual research. Students of contemporary management and finance are in need of a solid grasp of financial principles, and this course intends to give such understanding. The heart of the study design consisted of activities such as readings, observations, and a focus on the theoretical foundations of the influence that artificial intelligence has on financial performance. An Accumulation of Information: For the purpose of this investigation, secondary materials such as books, research papers, journals, internet reports, newspaper articles, and other publications were reviewed.

## DATA ANALYSIS

Although there is a great deal of research on AI in finance coming from both the AI and finance groups, there are still gaps in practice and research due to the strong disciplinary preferences and aims of each. A growing number of academics in economics and finance are considering ways to use AI in the financial sector and related FinTech industries. There have been a plethora of events and conferences hosted by academics, businesses, and governments devoted to artificial intelligence (AI) in finance and related fields, with a focus on FinTech, smart payments, blockchain, and online banking. Research in the field has a rich tradition of using economic and financial models based on mathematical and statistical principles. Data analytics, computational intelligence, machine learning, and complex system approaches have also been extensively integrated into EcoFin systems. To summarise, the following are typical features of financial practice. The applications are focused on basic.

Applying artificial intelligence (AI) techniques and methods to the field of finance and economics can lead to more robust financial explanations and insights. However, it is important to have a thorough understanding of the AI techniques themselves before using AI for anything other than enhancing our understanding of EcoFin phenomena, problems, and mechanisms, which rely heavily on EcoFin theories and There are just a few AI advances that are focused on economics and finance. A rudimentary or even elementary grasp of AI principles and their implementations would not be shocking. Commonly, little data is used. While systemic AI assessment is not a top priority, results are assessed and presented with an eye towards the EcoFin goal.

However, there is a growing fascination in more comprehensive, innovative, and intelligent FinTech, thanks to AI's successful applications in economics and finance. The current data economy and intelligent FinTech owe a great deal to this tendency. According to the studies that matter, this is the standard procedure. Fresh approaches to AI or innovative uses of AI in the financial sector are the main areas of innovation. Without a thorough familiarity with the underlying domain and an interpretation of findings that is conducive to the domain, research in the field of finance, which is an application domain,

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is often lacking. There has been very little innovation aimed at enhancing EcoFin theories. The use of EcoFin theories and techniques is minimal at best, and issues are oversimplified and characterised in order to facilitate data-driven discovery or model fitting. Involvement of large data is common. Results are assessed and understood via the lens of all-encompassing AI assessment metrics, with little evidence of monetary effect.

In light of the foregoing, there is a pressing need to enhance our current multidisciplinary knowledge of AI and finance in order to synthesise smart FinTech; to revolutionise AI and finance in order to create synthetic theories and tools that span disciplines; and to design AI theories and tools that are problem-oriented with an eye towards solving economic and financial issues, taking into account their unique features and intricacies. Typical examples of complexity include: high-frequency data; diverse, nonstationarity, and stylish impacts; market emergence; dynamics; uncertainty; high-dimensional, multi-aspect macro/microeconomic elements; and extreme occurrences and exceptions.

### Table 1. Comparison of Interdisciplinary Practice in AI and Finance.

| Comparison | A communities | Finance communities |
|---|---|---|
| Problem | Issues and difficulties related to AI research that are related to or inspired by financial complications and concerns with applications in finance | Financial difficulties and obstacles via the use of AI technology or AI inspiration |
| Rationale | Respecting AI culture and ideas while expanding AI research and applications | developing financial ideas and interpretation while adhering to financial culture and philosophies |
| Data | Large-scale financial and/or economic data that is very complicated | Compact, easily interpreted financial and economic statistics |
| Method | AI developments with sophisticated conception and application | Compact, easily interpreted financial and economic statistics |
| Evaluation | AI benchmarks, assessment techniques, and metrics | Financial benchmarks, assessment techniques, and metrics |
| Result | Securing noteworthy statistical and technological outcomes or enhancements in financial applications | Improved outcomes or fresh insights for the financial justification |

## Pros and Cons of AI Research in Finance

Through the use of six primary families of artificial intelligence (AI) approaches in finance, we conduct an analysis of the advantages and disadvantages of the conventional AIDS techniques and methods that are discussed in Sections 4 and 5. These techniques and methods are pertinent to EcoFin challenges and systems. The following methods are detailed in the document: procedures for the mathematical and statistical modelling of complex systems, procedures for conventional analysis and learning, procedures for artificial intelligence, procedures for modern AIDS, and procedures for hybrid AIDS. To begin, the artificial intelligence platform that is used to describe, formulate, model, analyse, and optimise EcoFin systems as well as their working processes, problems, and solutions is constructed using mathematical and statistical modelling. This article examines the advantages and disadvantages of typical mathematical and statistical techniques that are centred on artificial intelligence (AI) and how they relate to applications in the financial sector.

**Table 2. Mathematical and Statistical Techniques and their Pros and Cons in Financial Applications.**

| Techniques | Methods | Pros infinance | Cons infinance |
|---|---|---|---|
| Numerical methods | Equations both linear and nonlinear, finite difference techniques, dependency modelling, Monte-Carlo simulation, least squares approaches, etc. | Analytical or approximate findings and interpretation; model-driven, hypothesis testing, and forecasting; mathematical modelling of critical financial processes, mechanisms, and dynamics; etc. | Large, uncertain, diverse, dynamic, complex processes, mechanisms, and dynamics; high-dimensional/order and low-quality (e.g., missing, incomplete, inconsistent) data; population size; etc. |
| Time-series andsignalanalysis | Time-series analysis, spectrum analysis, state-space modelling, long-memory time-series analysis, nonstationary analysis, etc. | modelling multidimensional interactions and movements; trends, movements, changes, and forecasting; temporal processes, relations, dynamics, and consequences, etc. | Non-temporal, complex and heterogeneous relations, processes, and dynamics; mixed components, data, relations, and processes; stylistic effects and poor data quality, such as noise; sample dynamics and structure and nonstationarity; over-fitting; population size, etc. |

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| Statistical learningmethods | Nonparametric techniques, copula methods, stochastic volatility models, random walk models, etc. | Sampling, latent variables, relations, and models; probability, uncertainty, and randomness; probabilistic interpretability; etc. are some examples of model-driven and hypothesis testing techniques. | Simulating diverse relationships, processes, and dynamics; combining observable data; low-quality data; handling big data and scalability; actionability of the results, etc. |
|---|---|---|---|
| Random methods | Stochastic theory, fuzzy set theory, random forest, random walk models, random sampling, quantum mechanics, etc. | modelling random relations, dynamics, processes; randomness, fuzziness, uncertainty; impartiality and fairness in representation; etc. | Too few or too many people, complicated (e.g., unbalanced, unequal) data, dynamic data, complex mixed data, bias and mistake, etc. |

To add insult to injury, conventional AI-driven economics and finance have made extensive use of complex systems theory. Understanding, modelling, and depicting the inner workings of sophisticated EcoFin systems, processes, and problems, as well as the inherent complexity of these things (such as self-organizing behaviour and the emergence of intelligence) are the purposes for which these tools are used. In Table 8, we can find a review of the advantages and disadvantages of the most prevalent methods to artificial intelligence (AI) that are made feasible by complex systems theory in relation to financial applications.

**CONCLUSION**

We have outlined the domains within the banking sector where there is much discourse around AI and the many ways it might benefit businesses and their clients. Along with the benefits of AI and ML for the BFS industry, we have discussed some of the major obstacles that must be overcome. Both the artificial intelligence (AI) and financial spheres need improvement since both are dynamic and subject to everyday change. There is little doubt that we are seeing the dawn of an AI-based revolution that will have far-reaching effects on both people and corporations.

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