Artificial Intelligence in Finance: Challenges and Opportunities

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Abstract

Manuscript Type: Conceptual **Purpose:** In recent years, artificial intelligence (AI) and machine learning have been widely used in many areas of the financial field, and their applications have had a significant impact on financial markets, institutions, and regulations. The purpose of this paper is to review the development and implementation of artificial intelligence and machine learning in financial systems, as well as their challenges and opportunities in the field of financial services. **Design/methodology/approach:** This research paper focuses on qualitative research. A literature survey of AI and financial services cannot ignore to study the application aspects and their implications. **Findings:** Financial institutions and governments around the world are embracing and expanding the use of artificial intelligence tools in the formal financial market. The research shows that the implementation of various artificial intelligence technologies in the financial services sectors greatly benefits towards flat performing of financial services to the clientele. **Originality/value:** This study is one of the qualitative studies in the field of management. It examines the impact of artificial intelligence on financial services through cross-border literature reviews. **Practical implications:** The results of this research can help regulators, policymakers, and companies develop artificial intelligence and financial strategies for future emergency preparedness and response.
Keywords: Artificial intelligence, Financial sector, AI in the financial sector, Machine learning, Technology, Business organizations

Introduction

Artificial intelligence is having a huge impact on the financial industry, giving birth to a series of new financial services, such as smart advice, smart finance, monitoring and alerting, and smart on-demand customer service. In recent years, artificial intelligence has brought forward innovations in financial services. Improved technology, professionally designed hardware, facility of big data, the invention of cloud computing term, are the main driving forces of the latest artificial intelligence innovation.

Machine learning (ML) and AI skills support the growth of the evolving FinTech market. AI works similarly to the human brain because it can think more precisely and make decisions based on the data provided.Artificial Intelligence (AI) is increasingly used in today's business world. The financial industry uses artificial intelligence in a novel way that saves time and money. Financial services departments such as banks use algorithms to produce accurate results, which will help improve customer service and increase sales

performance to generate profits.Machine learning and deep learning are two types of artificial intelligence that can help eliminate errors caused by emotional and psychological factors. One of the most important functions of artificial intelligence is to extract key information from large amounts of data and draw conclusions. New technologies have significant advantages in improving consumer interests and improving organizational efficiency and effectiveness.AI is intelligence displayed by computers, with intelligence defined in terms of what we consider intelligence to be in humans (**Shieber, 2004**). It is a great concern to involve the people at the ground level of the pyramid in the financial sector, direct use of AI opens up access to financial institutions in financial activities and both banking and non-banking king institutions(**Arner*et al.*, 2018).**The term fin-tech describes a variety of innovative business models relating to the financial services industry that have the prospect of altering it(**Muneeza*et al.*,2018). (Schuetz and Venkatesh, 2020b)**point out that financial technology plays a vital part in an assortment of financial services the use of the internet in the financial sectors. Machine learning (ML), robotics, symbolic logic, audio processing and other AI technologies that can be used to assist financial services were also discussed.(**Luiand and Lamb, 2018**)explore howtechnologies like Machine learning (ML), Artificial Intelligence (AI) and coherent computing might be leveraged to support finance technology newcomers and incumbents.(**Alameda, 2021**) point out that the most significant issues in traditional banking are present consumers who are not digital, but the changes are being brought to the traditional banking industry with the advent of the fourth industrial revolution, which was founded on paper and physical currency allocation throughout the industrial revolution.

(**Wang and He, 2020**) their research points out that digital financial inclusion denotes, person's ability to access and use financial services while being excluded or underserved.Digital financial services provide limitless benefits to the customers, but it also brings some problems due to the adoption of new technologies used by non-financial companies in this process(**World Bank, 2020;Sarkar and Thapa, 2021).** Banks and non-banking institutions are using artificial intelligence (AI) to increase access to people who were previously served by formal financial institutions, building on digital methods that have been in use for years (**Alameda 2021;Arner*et al.*, 2018).**Mobile phones and other digital technologies, such as artificial intelligence are extensively employed; hence, the mounting fin-tech services are remarkable (**Arner*et al.*,2018b; Bill and Melinda Gates 2019).**The financial services industry is increasingly employing artificial intelligence (AI) in data mining, market analysis, personal finance, wealth and asset management, insurance, customer service, credit scoring, retail lending, process automation, and other areas to improve customer experience by providing imaginative services with the help of cutting-edge technology.

The main purpose of this research paper is to study how artificial intelligence (AI) can be used in many industries, especially the financial industry.The qualitative research method of literature analysis is used to answer these questions.

This research also addresses the following research questions: What role does artificial intelligence play in the financial field? What are the benefits and drawbacks of artificial intelligence? What impact will artificial intelligence have on the financial industry? What is the future of artificial intelligence?

Revolution of Artificial Intelligence and Financial Industry

Although artificial intelligence has a long history of more than fifty years, its capabilities have been significantly expanded in today's society. Artificial Intelligence (AI) is a powerful tool that has been widely used in the financial services industry. If companies use it cautiously, cautiously, and prudently, it has great potential. It can improve efficiency and productivity through automation, reduce human bias and errors caused by psychological or emotional factors, and improve the quality and conciseness of management information by detecting abnormalities or long-term trends that are difficult to detect by current reporting methods.

(Hassani*et.al.*, 2020)clearly stated that artificial intelligence has multiple definitions as a result not a single definition is defined for that.(Joghataie,2020) marked, artificial intelligence is a general analytical capability of mental expertise that includes logical strength, problem-solving, and intellect of continuous learning. (Cantwell, 2020)discussed that psychologists and educational experts with expertise in intelligence testing answered a questionnaire that covered a wide range of subjects surrounding the IQ debate. Experts are generally enthusiastic about the validity and utility of IQ and aptitude tests.(Gottfredson,1997)defined AI as emphasizing the need for quick learning and competence of erudition from earlier experience. (Hassani*et al.*, 2020)hasopined that AI is an intelligent system that uses information, analyzes it, as well as performs specific activities without the need for programming.AI is a broad phrase that refers to technological developments that enable machines to become intelligent. Machine learning, picture recognition, natural language processing (NLP), cognitive computing, cognitive augmentation, machine augmented intelligence, and augmented intelligence are just a few of the names used to describe AI(Ebbage, 2018).Artificial intelligence aims to create an intelligent and independent system. Artificial intelligence works in a symbolic and data-driven way. But ML is a subset of AI that enables machines to learn and extend their understanding without the need for explicit programming. Machines can learn in a wider range of dimensions and derive patterns from large amounts of high-dimensional data (Wooldridge, 2020).Financial technology refers to innovatively created business models, having great prospects to change the pecuniary service industry absolutely(Mamoshina*et al.*, 2017).The traditional banking sector has millions of customers with thousands of years of history, and most of its customers might be billionaires(Alameda, 2021; Peric, 2015).Fin-tech start-upsare having a strongdigital revelation; still gaining client confidence is a significant challenge. According to the World Bank, more than 80 nations have introduced financial services digitally, and using mobile phones for this purpose is one of them. (The World Bank 2020; SeoandYoo, 2020).(Muneeza*et al.*,2018)specified that blockchain and crowdfunding such innovations in binary technology are demonstrating novel long-term approaches for helping the disadvantaged.

The financial services industry is undergoing major changes after the application of AI. Artificial intelligence will play a key role in how the financial industry operates and provides services, as well as its competitiveness and success.According to consulting firm Accenture, by 2025, the contribution of artificial intelligence and advanced technologies to the profits of global financial services companies is estimated to reach 140 billion U.S. dollars.

In the current situation, the financial industry is rapidly adopting artificial intelligence in a variety of ways, such as:

Customer interface
Through artificial intelligence, customer identification and due diligence can be reduced from hours of manual investigation to minutes. Financial companies can use artificial intelligence to improve the customer experience by making things go smoothly. Several companies have used chat bots with conversational AI capabilities to answer customer questions, manage customer inquiries, and make product recommendations.

Fraud detection and risk management
Machine learning can reduce biases, interpretations, and discover patterns, thereby reducing false positives and reducing costs, while improving the quality of the screening process. Know your customer (KYC) and anti-money laundering regulations to asset management guidelines, AI can "learn", remember, and comply with all applicable laws.

Transaction process transformation

AI is no longer just a new source of transaction processes; it can now be used in every step of the transaction process, from transaction tracking and procurement to due diligence, execution, and post-transaction integration. An artificial intelligence-driven transactionprocess search engine can help executives improve the effectiveness and efficiency of the transaction process. Even if theframework conditions change and evolve, the AI-driven transaction flow search engine can provide actionable insights and trends.

Due diligence process

The AI platform can be used instead of large teams to quickly review thousands of uploaded employment contracts, supplier and customer contracts. Artificial intelligence can speed up the time-consuming and difficult discovery and analysis process of mergers and acquisitions, allowing analysts to have a deeper understanding and understanding of the business or industry they are investigating.

The world's first steam engine was launched in 1784, marking the beginning of the first revolution. The second time was the invention of electricity in 1870. The third time was in 1969when the world was introduced to IT, the fourth time was the current artificial intelligence revolution. The contemporary revolutionary era is characterized by a high degree of automation and global networking, both of which require artificial intelligence(Spector, 2006).The first industrial revolution used water and steam capabilities to automate production, and the second industrial revolution used electricity to produce large quantities of goods on a large scale. But the computerized generation, i.e., the third innovation using electronics and data is currently growing, in the mid-19th century. It is characterized by the fusion of technological progress, which blurs the boundaries between physics, computers, and the biosphere(Schäfer, 2018).

Literature Analysis

In this literature study, we discussed artificial intelligence and machine learning and their various applications in the financial services industry. We summarize the current academic, practical, and policy-related AI literature, which draws on business, financial, and computer science literature as well as regulatory documents.Artificial intelligence (AI) is very useful in corporate financing because it can better predict and evaluate credit risk. As accountants, analysts, financial executives, and investors strive for long-term prosperity; artificial intelligence plays an important role in reducing financial crimes through better fraud detection and abnormal activity detection.Artificial intelligence has brought many problems that may damage customer trust, and the application of artificial intelligence in the banking industry is subject to prejudice and discrimination against certain races and genders (Luiand Lamb, 2018).Artificial intelligence (AI) is increasingly used in the banking and financial services industry to determine loan amounts by evaluating customer data(Hill, 2020)scope and expense of AI channel planning initiatives(Chia, 2019; Ebbage, 2018)financial institutions use third-party artificial intelligence models to develop their organizations and focus on the benefits that artificial intelligence brings to the financial services industry.(McDonough, 2020) emphasize the importance of establishing an ethical learning environment, identifying biases in algorithms, overcoming moral difficulties, and setting higher moral standards in artificial intelligence systems.(Cantwell, 2020)study the role of artificial intelligence in business development, provide consumers with tailor-made advice and services, and integrate artificial intelligence into the digital ecosystem of the financial services industry.(TalwarandKoury, 2017b)discussed the role of artificial intelligence (AI) in preventing cybercrime in the financial services industry and improving customer experience, as well as the possibility of AI's involvement in rising cyber-attacks.(Zarpalaand Casino, 2021) expressed that the bitcoin blockchain is making better approaches of executing with security without the requirement for a mediator and resource proprietorship for people gettingthe value-based accounts. When blockchain has been utilized, it is not having the impediment relating to the centralization of control. (Zarpalaand Casino, 2021)in addition, it is believed that, in the evolution of blockchain,responding to the changed vitality and cultural values quickly, the global

financial institutions will have to work hard.**(Lee and Shin, 2018)** discuss additional challenges confronted by startup financial innovation firms and financial innovation depends upon lower directions. Financial innovation firms confront of kind challenges in the present situation.**(Treleaven*et al.*, 2017)** discussed that how administrative change can give more opportunity for fintech firms and cybercrime within the financial service industry and it enhances client involvement additionally the probability of AI's potential association in expanding cyber-attacks.**(Daníelsson*et al.,* 2021**) discussed the adoption of cloud, social media, mobiles, and big data is referred to as digital transformation in financial services. To address the rapidly expanding needs of customers, various financial services providers in India have begun to implement new technology.**(McDonough, 2020)**investigative AI can be programmed to achieve almost any goal, which is both a risk and an opportunity. Artificial intelligence has many malicious uses, and there are also many ways in which it may be unintentionally used unfavorably, such as: through algorithmic deviation. We need to understand how to ensure that the AI system achieves the goals we want without causing damage during its learning process.**(Giudici, 2018)**discussed that the goal of artificial intelligence in the financial field is to create a collaborative and innovative environment that is conducive to regulators and regulated institutions. Fintech solutions using big data analysis, artificial intelligence and blockchain are being launched at an unprecedented speed. These new technologies are changing the financial system and opening up a series of new ways for more people to obtain financial services.

Research Objectives
The objective of this research is to know how artificial intelligence is affecting the financial services sectors as well as to examine the role of artificial intelligence in finance. The research study also analyzes the obstacles and prospects of artificial intelligence.

Research Methodology
This research uses qualitative research methods to look at the application and influence of artificial intelligence on financial services. Qualitative techniques are used to estimate materials and show how they are combined and clustered to produce observable results. The qualitative research method of document analysis is used to answer these questions.

Artificial Intelligence Implementation in Finance
Artificial Intelligence in Finance is changing the way we handle funds and helping the financial industry simplify and optimize the process from credit decision-making to quantitative trading and financial risk management. Artificial intelligence (AI) methods are increasingly used in the financial sector, such as asset management, algorithmic trading, credit underwriting, and blockchain-based finance, which benefit from abundant available data and affordable computing power. Machine learning (ML) models use big data to automatically learn and improve predictability and performance through experience and data without manual programming. The application of artificial intelligence in the financial field aims to help financial companies increase efficiency by reducing costs and increasing productivity, as well as improving the quality of services and products provided to customers, thereby gaining a competitive advantage. The emerging bankers, traders, insurers, risk managers, wealth managers in finance are now well versed with these applications unbelievable benefits of AI apps in financial services attract the customers in the financial sector**(BogojevicArsic, 2021)**blockchain, virtual, and augmented reality, storage and transmission, new computing technologies and so on are the new inventions adding to financial services**(ZengandKlabjan, 2019).**Innovation in AI transformed financial inclusion to digital financial inclusion and has been well accepted that for inclusive action in finances (**Wang and He 2020**). AI is grabbing the attention of the people around the world for finance, banking through everyday invented technologies and apps **(Rella, 2019).**AI has been quickly adopted in the financial industry, and hence, every day new applications of AI and machine learning can be found in

financial services (**Hamdy and Hussein, 2016**). Fin-tech, the term used for financial technology, is being used to describe different advanced and creative business strategies embedded with Artificial Intelligence and is changing the face of the financial service industry (**Mamoshina***et.al* **2017**). Big Fin-tech firms require automated customer services because they have a large client base and top executives have embraced the technological application(**Breidbach, 2020**).Financial institutions are using artificial neural network systems to detect abnormal changes and flag them for further investigation, reducing human error and systemizing knowledge(**Oloniyo, 2020).**Financial data is the most sensitive and crucial factor, hence organization should protect their customers. The main role of AI identifies the fraud by investigating the past data which lowers financial crimes (**Frank, 2019**).Various artificial intelligence technologies that can be applied to financial technology to promote inclusive finance include knowledge representation, audio processing, expert systems, speech-to-text, natural language processing, deep learning, machine learning (ML), symbolic logic, and robotics(**Ozili, 2021).** Artificial intelligence and big data use alternative sources of information to calculate credit scores, such as transaction records, online behavior patterns, etc.(**RB and KR, 2021).** Artificial intelligence has been providing open and accessible functions for risk management, fraud prevention, strategies for the target market, granting instantaneous credit to inside or outside personnel (**Sapovadia, 2018).**A recent novel financial innovation, Fintech, is filling the gap among unbanked, under-banked and developed society. It guides the fair development of societies(**Arner***et al.,* **2018b**).

Chatbots and instant messaging services, artificial intelligence products, answering customers, solving their problems and inquiries, underwriting, detecting fraud by analyzing their patterns, robot regularity, suggestions, compliance, prediction, etc. are all solved by artificial intelligence(**Murugesan and Manohar, 2019).** AI chatbots are useful because they provide a 24-hour service making function of the company more safe-secure and effective (**Sundblad, 2018**). Today, the financial function program has been carefully designed to integrate the collective wisdom and understanding of many people. In order to unleash the full power of artificial intelligence, managers must be able to restructure their processes freely (**Mhlanga, 2020**). In the financial industry, artificial intelligence can be used to check currency accounts, credit accounts, and investment accounts to assess the overall financial situation. Artificial intelligence can also be used to provide automated financial advice, new tools, more accurate forecasts, automated transactions, data management, poverty alleviation, and new ethical dilemmas in the financial sector.

Private Finance and AI

Consumer's desire for financial independence and the ability to manage their own financial health is the driving force behind the introduction of artificial intelligence into personal financial management.Artificial intelligence is essential for any financial institution that wants to become a top player in the industry and it is through natural language processing or through insights from customized wealth management products.

Consumer Finance and AI

The capacity of AI to avoid fraud and cyber assaults is one of the most important business cases for AI in banking. Consumers seek out banks and other financial services that offer secure accounts, especially because Insider Intelligence estimates that annual online payment fraud losses will reach $48 billion by 2023. AI can examine and identify abnormalities in patterns that would otherwise go unnoticed by humans.

Company Finance and AI

Artificial intelligence (AI) is very useful in corporate financing because it can better predict and assess credit risk. Artificial intelligence technologies such as machine learning can help companies increase value by improving loans and reducing financial risks. As auditors, analysts, finance executives, and investors strive to

achieve long-term prosperity, artificial intelligence can also reduce financial crime through better fraud detection and abnormal behavior.

The Opportunities of AI in Financial Services

Artificial intelligence is improving the security of the financial industry by detecting and preventing fraud. Artificial intelligence and intelligent process automation (IPA) are gaining popularity in the global financial services industry. With increasing customer demand, financial services companies can gain a competitive advantage through automated customer service.

AI rapidly headed to more streamlined methods for procures the most financial rewards and improved Company's profile**(Oloniyo, 2020).**Artificial intelligence improves business performance in the areas of predictive maintenance and is an effective tool in customer service management**(Daníelsson*et al.*, 2021).**Financial institutions can reap significant benefits by using artificial intelligence to develop new competitive patterns in their value chains system. Innovations in AI enable the overall business to be improved by using existing products more effectively**(Perwej*et al.,* 2019)**.The advantages of artificial intelligence can be summarized as innovation, effectiveness, speed and scalability. These benefits will have a significant impact on the economy, workers, consumers and communities (**Agarwal and Verma, 2020**).AI in the financial services sector are helping to overcome obstacles that impede the extension of AI software can easily analyze information and data points on the web within a short period (**Anantharaman, 2019**). With the advent of artificial intelligence, it has become easier to identify and manage risks, measure fraud, and protect customers. The artificial intelligence system can verify and identify the correct user before the transaction**(ZengandKlabjan, 2019).**Bitcoin and the blockchain, both recent technologies that are gaining popularity, allow for secure transactions without the use of an intermediary. If the blockchain uses a ledger to verify and record entity identity and asset ownership for transactional accounts, then it is legitimate and trustworthy**(Killeen and Chan, 2018)**. Currently, every financial segment is using AI to gain the benefits like time-saving, reduction in cost, the addition of values, detection of frauds and risk management, better service to the consumers, improved performance & increasing revenues **(G. Harkutand Kasat, 2019).** Having a robust capability of building a strong foundation for support and decision making with the help of perceptions and outcomes, composed of huge and multifaceted sets of huge data, AI compacts it in an adaptable measure **(Hassani*et.al.,* 2020).**

The Challenge of AI in Financial Services

Artificial intelligence (AI) investment has flooded into financial services, raising new concerns about data security and transparency. The amount of captured data (including sensitive and confidential information) is one of the main obstacles to artificial intelligence in financial services, requiring additional security measures.

Although artificial intelligence is promising and helpful in promoting digital pecuniaryinsertion and services, ensuring the distinguished gains of smart algorithms is a real threat. Most financial institutions are not ready to give complete autonomy to robots because of their unpredictable behavior**(Deloitte, 2018b)**.The need to implement artificial intelligence technology and the quality of the data used as input has a significant impact on the predictive ability of the algorithm. Even if the data is of good quality, it sometimes hides the distortion**(Sundblad, 2018)**.The predictive power of AI is highly dependent on the availability of quality data; however, the limited availability of data in the right quantity and quality can hamper AI performance**(G. Harkut and Kasat, 2019).**Term AI is predicated on the existence of a data-quality program as well asthe deployment of an intelligent device that poses a liability risk**(BogojevicArsic, 2021).**Many a time, they incline to have a natural person as a supervisor for verifying key activities of machines and for taking decisions such as blocking as well as unblocking the payment to and of the customersbecause AI acts solely on algorithms rather than human emotions (**Sundblad, 2018**).In addition to the challenge of finding staff with expertise the capacity

of artificial intelligence applications to detect possible problems at financial institutions depends on the quality and extensiveness of the data used to train the algorithms(**Perwej***et al.,* **2019**).In many developing and underdeveloped countries, the customers are not techno-savvy (**Alameda, 2020**). Fintech startups are having a strong vision in the digital era, still gaining the belief and winning the confidence of the consumers is a difficult task. Many people don't know about new data terms, also they are ignorant about contemporary safety and privacy norms(**The World Bank, 2020**).Ease and user-friendly e-commerce transactions have grown in popularity, but they have also increased the number of online frauds, which are difficult to regulate or prevent (**Alameda, 2021**). The complete automation of the system, i.e., AI in finance, could be dangerous. AI in the field of finance is constantly updated by monitoring human behavior. In finance, AI entails continual learning, pattern recognition, data collection, analysis, and development, all of which take time(**Oloniyo, 2020).**In empowering financial services, AI has been proved to be quite advantageous. Stillin obtaining those advantages from smart algorithms, many challenges crept in(**Deloitte, 2018a**).When adopting artificial intelligence technology, many challenges are related to statistical quality and accountability requirements(**BSFI, 2019**).

Findings, Conclusions, and Future Directions

In this paper, we show how artificial intelligence changes the financial industry, especially explaining it in the financial field, and explaining the application, challenges, opportunities, and impact of artificial intelligence on financial services businesses. The study uses qualitative methods to collect information about the application and impact of artificial intelligence in the financial sector. It turns out that artificial intelligence is making progress in a wide range of financial institutions, and major changes have taken place from traditional practices to radical practices. In the financial sector, artificial intelligence is transforming business operations and is used for regulatory compliance, fraud detection, and personal credit checks.Artificial intelligencehas promoted revenue growth and cost savings in the financial services sector. Accordingto the results of this research,artificialintelligencemaychange the global financial system. Artificialintelligence applicationssuchas fraud detection and risk management, credit decision-making, and algorithmic trading can achieve more effective business processes, provide personalized services, and help achieve broader goals, such as financial services. Despite many advantages, the development of artificialintelligence in the financial field still faces manyproblems, including the lack of skilledpeople,the availability of data, and the cost ofimplementation. Research shows that automation and artificialintelligence willinevitably affect human employment. Compared with transaction processing, the financial industryspends more time on insight and action. The next generation will rely heavily on artificial intelligence. Fintech will promote new business models, and digitalization will become the mainstream. This research report shows that financial professionals need to adapt to the ever-changing technological environment, and the financial sector needs to adapt to new transformation processes technologies.

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