

A Study on Role of AI in transforming the financial sector

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Abstract: Finance has always been driven by numbers, but in the age of Artificial Intelligence (AI), it is increasingly being driven by intelligence itself. Artificial Intelligence (AI) is reshaping finance across retail and corporate banking, capital markets, insurance, payments and central banking. AI systems — from classical machine learning to large language models and agentic systems — improve decision speed and scale, personalize services, automate routine work, and enable novel risk models. At the same time, AI creates new operational, model, concentration and systemic risks that require governance, robust data and regulatory coordination.

Artificial Intelligence (AI) is no longer just a futuristic idea — it is already changing how money moves, how loans are approved, how fraud is caught, and how customers interact with banks. This study explores how AI is reshaping the financial sector, from automating routine tasks to offering faster, fairer decisions in lending and investments. It looks at real-life examples where AI has improved fraud detection, enhanced customer service through chatbots, and made back-office processes more efficient.

At the same time, the study highlights important challenges — like the risk of biased decisions, over-reliance on technology, and the need for human oversight. By combining insights from research papers, industry reports, and case studies, the paper aims to provide a clear picture of both the opportunities and the risks. The findings suggest that AI can make finance more inclusive, efficient, and secure if implemented responsibly, with strong governance and ethical guidelines.

Key Words: Artificial intelligence, Finance, Technology, Opportunities, and Challenges.

I. INTRODUCTION

Artificial Intelligence (AI) is playing a big role in changing how the financial sector works today. Many banks, insurance companies, and financial institutions are using AI tools to make their work faster, smarter, and more accurate. Through technologies like

Chatbot's, credit scoring, fraud detection, and algorithmic trading, AI helps in improving the quality of financial services. It also helps financial organizations understand customer needs better and make quick decisions based on real-time data. With the help of AI, both customers and financial institutions can save time and reduce errors in daily operations.

AI is not only improving efficiency but also making financial services more accessible to everyone. It helps people in rural and remote areas connect to digital banking and other financial services easily. This promotes financial inclusion, which means giving equal access to finance for all. Moreover, AI supports regulators by monitoring financial risks and fraud, ensuring that the system remains safe and stable. Thus, AI has become a key technology that brings innovation, accuracy, and growth to the financial sector.

II. REVIEW OF LITERATURE

1. Rajat Bhattacharjee, Aruna Dev Roy (2024).

The study aims to explore the potential of artificial intelligence (AI) in enhancing operations within the financial sector. The primary focus is on identifying functions that could be improved through the adoption of AI technologies.

2. Manjula Devi Chithiraikannu, Gobinath Arumugam, Padma Priya Sundara Moorthy, Keerthi Srinivasa Kannan, Rajeswari Packianathan. (2025)

Artificial intelligence (AI)-driven automation and intelligence optimize operational processes and enhance customer experiences. By leveraging AI technologies, financial institutions can streamline customer onboarding processes, improve risk assessment and transaction processing, and deliver

personalized services tailored to individual preferences and behaviors.

3. Zorica Golic. (2019)

Artificial intelligence (AI) system is something that “learns” from the data it stores, in order to perform tasks and solve problems that typically require human intelligence – either with the help of a human expert or independently. The area of AI is an interdisciplinary field, which has been designated as a strategic area in the European Union (EU) approach and a key driver of economic development that can bring solutions to many social challenges and problems.

4. Vinay Kumar Kasula.(2023)

The financial sector saw the rise of its transformation with the influx of various technology adoption innovations, including artificial intelligence. This research discusses how AI is being used in the banking industry to increase customer satisfaction through operational efficiency and the possibilities of financial services.

5. Syed Zahiruddin Bin Syed Musa.(2025)

Artificial Intelligence (AI) has significantly impacted the financial sector, transforming regulatory practices, ethical governance, central banking, financial products, and institutional management. This study systematically reviews recent literature to explore these transformations. It evaluates AI's role in financial regulations, its ethical implications, and how governance structures adapt to emerging AI technologies.

6. Rahul Jain, Dhiren Prajapati, Amit Dangi.(2023)

The financial technology (fintech) industry has experienced rapid growth in recent years, driven by advancements in technology and changes in consumer behavior. This has led to the emergence of new trends that are shaping the future of finance. One of the most significant trends in fintech is the increased adoption of Artificial Intelligence (AI) and Machine Learning (ML) technologies.

III. STATEMENT OF THE PROBLEM

Artificial Intelligence is being used widely in the financial sector, there is still a lack of clear understanding about how effective it truly is. Many

banks and companies are using AI for fraud detection, credit assessment, and customer service, but the real impact on performance and customer satisfaction is not always measured properly. Some institutions face difficulties in implementing AI because of limited knowledge, technical challenges, or lack of skilled workers.

Another problem is the risk of bias and data privacy issues that can arise when using AI systems. Without proper control, AI decisions can sometimes be unfair or unreliable. There are also no fixed guidelines or common standards for how AI should be used safely in finance. Therefore, the main problem this study aims to address is understanding how AI is being adopted in various financial areas and whether it truly improves efficiency, risk management, and customer experience while promoting financial inclusion.

IV. OBJECTIVE OF THE STUDY

1. To analyze how Artificial Intelligence (AI) is being adopted across different areas of the financial sector — including banking, insurance, payments, capital markets, and regulatory supervision.
2. To identify the major AI-driven innovations (such as credit scoring, fraud detection, algorithmic trading, Chatbots, RegTech solutions) and evaluate their contribution to efficiency, risk management, and customer experience.
3. To examine the potential benefits of AI in improving financial inclusion, operational productivity, and decision-making accuracy.

V. NEED FOR THE STUDY

There is a strong need to study how AI is being adopted in different areas of the financial sector such as banking, insurance, payments, and capital markets. As financial institutions continue to depend on technology, it is important to understand how AI is helping them become more efficient and customer-friendly. The study is needed to identify how AI tools contribute to improving decision-making and reducing risks in financial operations.

It is also important to explore how AI helps in promoting financial inclusion by making services available to more people, especially those who were earlier outside the financial system. At the same time,

the study will help in identifying challenges like lack of awareness, data security issues, and high costs involved in implementing AI. Therefore, this research is needed to provide insights that can help organizations use AI more effectively and responsibly in the financial field.

VI. RESEARCH METHODOLOGY

This study uses a descriptive and exploratory research design to understand how Artificial Intelligence (AI) is transforming the financial sector and to explore future possibilities, challenges, and implications.

Research Design:

This study uses a descriptive and exploratory research design to understand how AI is currently used in the financial sector and to explore its future potential. The descriptive part explains existing applications like fraud detection, automation, and customer service, while the exploratory part examines emerging trends, opportunities, and challenges. This combination helps provide both clarity of current practices and insight into future transformation.

Sources of Data:

This study is based mainly on secondary data collected from research articles, industry reports, government publications, financial institution case studies, and reputable online sources. These sources provide information on AI applications, benefits, risks, and trends in the financial sector. Using secondary data helps in gaining reliable and up-to-date insights.

Interpretation:

AI is being widely adopted across the financial sector to increase efficiency, manage risk, and enhance the customer experience.

❖ Banking

AI is a core component of digital transformation in banking, with institutions using it to streamline back-office operations and revolutionize front-end interactions.

Customer service: Chatbots and virtual assistants handle a high volume of routine inquiries 24/7, providing instant support and freeing human agents for more complex tasks.

Credit risk and lending: AI-driven models analyze extensive alternative data, such as utility payments and social media activity, to assess creditworthiness more accurately. This allows for faster loan approvals and can expand credit access to underserved populations.

Operational efficiency: AI and generative AI (GenAI) automate complex, repetitive processes like loan processing and data extraction from financial documents. For example, JPMorgan Chase's COIN system reviews commercial loan agreements, saving thousands of hours of manual work.

Security: AI and machine learning (ML) are continuously monitoring network traffic and analyzing transaction patterns to detect and prevent cyberattacks and fraud.

❖ Insurance

AI is fundamentally reshaping the insurance industry, shifting the focus from a reactive "detect and repair" model to a proactive "predict and prevent" strategy.

Risk assessment and pricing: By analyzing large datasets from connected devices, wearables, and telematics, AI can more accurately assess risk for policyholders. This allows for dynamic and hyper-personalized pricing models that offer fairer premiums based on individual behavior.

Claims management: Insurers use AI, including computer vision and NLP, to automate and expedite claims processing. For example, AI can analyze photos of vehicle damage to generate rapid assessment reports.

Customer experience: AI-powered chatbots and virtual assistants provide instant support for policy servicing, from renewals to claims reporting. Conversational AI platforms like Avaamo can communicate in over 100 languages, boosting customer satisfaction.

Underwriting: AI models assist underwriters in evaluating applications and determining policy eligibility faster and with greater accuracy by processing data from various sources.

❖ Payments

In the payments industry, AI is a crucial tool for enhancing speed, security, and the customer

experience, with the global AI in payments market expected to reach nearly \$190 billion by 2030.

Fraud detection and prevention: AI algorithms analyze real-time transaction data to detect unusual patterns and flag suspicious activity, reducing fraud losses. For instance, PayPal uses AI to keep its fraud rate significantly lower than the industry average.

Automated processes: AI automates back-office tasks like invoice processing, transaction reconciliation, and reporting. In the B2B sector, AI can reconcile payments with invoices to confirm records.

Personalization: AI analyzes consumer behavior and spending patterns to offer personalized payment options, discounts, and rewards.

Risk assessment: AI models evaluate data points like transaction history and spending habits to generate accurate credit scores and risk assessments for lenders.

❖ Capital markets

In capital markets, AI is used to increase efficiency, improve decision-making, and automate complex processes.

Algorithmic trading: High-frequency trading firms use AI algorithms to execute trades in milliseconds by analyzing historical data, market trends, and news sentiment to predict price movements. Hedge funds like AQR Capital Management have transitioned to AI-driven trading strategies.

Investment research: GenAI and large language models (LLMs) are used to rapidly process and analyze vast datasets and financial documents, providing analysts with actionable insights for valuation models.

Risk management: AI provides real-time insights into market, credit, and operational risks by uncovering non-obvious correlations and predicting potential market disruptions.

Post-trade processing: AI automates manual tasks such as transaction matching, settlement, and clearing, reducing operational costs and risks.

The Second Objective aims to deeply examine the most important AI-driven innovations in the financial sector and measure how much value they actually

create using real data and statistics. For example, AI-based credit scoring models use thousands of data points and have been shown to reduce default rates by up to 30% compared to traditional scoring methods (McKinsey, 2023), while also helping banks approve 10–20% more loans to eligible borrowers. In fraud detection, AI and machine learning systems can analyze millions of transactions per second and have helped banks reduce fraud losses by nearly 40% (IBM Report, 2024). In algorithmic trading, AI-driven hedge funds outperform traditional funds with an average return improvement of 5–10%, and over 60% of stock market trades today are executed by AI algorithms. AI-powered chatbots and virtual assistants handle over 70% of customer queries in leading banks like Bank of America and HDFC, resulting in 50% lower customer service costs and higher customer satisfaction scores. Meanwhile, RegTech solutions using AI have helped financial institutions cut compliance costs by 30–50% and detect suspicious activities more accurately, reducing false positives in AML (Anti-Money Laundering) systems by up to 25%. These statistics clearly show that AI innovations not only increase efficiency, but also improve risk management and enhance customer experience, making financial services faster, safer, and more personalized.

AI makes the financial sector better in three main ways. First, AI helps financial inclusion by allowing banks and fintech companies to give loans and services to people who don't have credit history or live in rural areas, using alternative data like mobile usage or payment history. Second, AI improves operational productivity by automating routine tasks such as customer service, document checking, and transaction processing, which saves time and reduces costs. Third, AI increases decision-making accuracy by analyzing large amounts of data and giving more accurate predictions in areas like credit risk, investments, and fraud detection. In simple terms, AI helps banks reach more people, work faster and cheaper, and make smarter decisions.

VII. CONCLUSION

Artificial Intelligence is playing a powerful role in changing how the financial sector operates. It is helping banks, insurance companies, and fintech firms work faster, serve customers better, and make smarter decisions using data. AI tools like credit scoring, fraud

detection, chatbots, and algorithmic trading have improved efficiency, reduced risks, and increased accuracy in financial operations. Most importantly, AI is also promoting financial inclusion by allowing access to services for people who were previously ignored by traditional banking systems.

However, the study also explains that AI comes with challenges such as data privacy issues, bias in algorithms, lack of transparency, and dependency on technology. To gain full benefits, financial institutions must adopt AI responsibly with proper governance, human oversight, and regulatory support. Overall, AI has the potential to completely transform the financial sector in a positive way, but its success depends on how carefully and ethically it is implemented.

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