

Role of Artificial Intelligence and Big Data in Fintech Trading with Special Reference to Erode District

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ABSTRACT

The rapid expansion of Financial Technology (FinTech) has fundamentally transformed financial trading systems, with Artificial Intelligence (AI) and Big Data analytics emerging as critical drivers of innovation. AI-powered trading platforms facilitate automated decision-making, predictive analytics, and real-time execution, while Big Data analytics enables the processing of vast and complex financial datasets. This paper presents a pilot study examining the role of AI and Big Data in FinTech trading with reference to Erode District, Tamil Nadu. The primary purpose of the study is to assess the feasibility of the research framework and to generate preliminary empirical insights for a future large-scale quantitative investigation. A structured questionnaire was administered to 50 respondents comprising traders, investors, and finance professionals actively using FinTech-based trading platforms. Descriptive statistics mean score analysis, and correlation analysis were employed for data analysis. The findings indicate that AI and Big Data adoption positively influence trading efficiency, decision-making accuracy, and risk management practices. The study highlights the growing relevance of advanced digital technologies in semi-urban trading environments and contributes to the evolving literature on digital finance and FinTech-driven trading systems.

Keywords: Artificial Intelligence, Big Data Analytics, FinTech Trading, Algorithmic Trading, Digital Finance, Pilot Study

1. Introduction

The financial services sector is undergoing a profound digital transformation driven by technological innovation and evolving market dynamics. Financial Technology, popularly known as FinTech, has emerged as a key force reshaping traditional financial activities such as payments, lending, investment management, and trading. Among the various technologies associated with FinTech, Artificial Intelligence (AI) and Big Data analytics have gained significant attention due to their ability to enhance trading efficiency, reduce operational risks, and support informed decision-making.

AI-based trading systems utilize machine learning algorithms, predictive models, and automation tools to analyze market trends and execute trades with minimal human



intervention. These systems can process large volumes of data in real time, identify complex patterns, and respond swiftly to market fluctuations. Big Data analytics complements AI by enabling the storage, integration, and analysis of massive datasets generated from stock markets, economic indicators, corporate disclosures, and digital platforms.

In India, the growth of FinTech trading platforms has been accelerated by increased internet penetration, mobile usage, digital literacy, and regulatory support. While metropolitan regions have led this transformation, semi-urban districts such as Erode are increasingly witnessing participation in digital trading activities. However, empirical studies examining the adoption and impact of AI and Big Data in FinTech trading at the regional level remain limited. This pilot study seeks to explore this emerging phenomenon with reference to Erode District.

2. Review of Literature

Existing literature highlights the transformative role of AI and Big Data in financial markets. Chen, Huang, and Lin (2021) found that AI-driven trading models significantly enhance forecasting accuracy and trading efficiency. Machine learning techniques such as neural networks and deep learning models have been widely applied in stock price prediction and portfolio optimization.

Arner, Barberis, and Buckley (2020) observed that the integration of AI and Big Data has accelerated the growth of algorithmic trading, robo-advisory services, and automated risk management systems. These innovations have increased market accessibility and reduced transaction costs.

Mayer-Schönberger and Cukier (2019) emphasized that Big Data analytics has revolutionized financial decision-making by enabling real-time analysis of large datasets. Big Data allows traders and financial institutions to assess market volatility, detect anomalies, and respond proactively to changing market conditions. In the Indian context, most empirical studies focus on digital payments and mobile banking. Limited research has examined AI-driven FinTech trading platforms, particularly in semi-urban regions. This study contributes to the literature by providing preliminary quantitative evidence on AI and Big Data adoption in FinTech trading within Erode District.

3. Statement of the Problem

Despite the rapid adoption of FinTech trading platforms, there is insufficient empirical evidence on how AI and Big Data influence trading efficiency and decision-making at the regional level. Many traders use digital platforms without fully understanding the analytical capabilities embedded within them. Moreover, the effectiveness of AI-driven tools in managing trading risks in semi-urban areas remains underexplored. This pilot study addresses these issues by examining the role of AI and Big Data in FinTech trading in Erode District.

4. Objectives of the Study

1. To examine the level of adoption of AI and Big Data in FinTech trading
2. To analyze the impact of AI and Big Data on trading efficiency
3. To assess the influence of AI analytics on trading decision-making
4. To study the role of Big Data in managing trading risks

5. Research Methodology

5.1 Research Design

The study adopts a quantitative research design, focusing on numerical data and statistical analysis.

5.2 Area of Study

The area of study is Erode District, Tamil Nadu, selected due to its growing participation in digital trading platforms.

5.3 Sample Size and Sampling Technique

A sample of 50 respondents was selected using convenience and purposive sampling techniques. Respondents included traders, investors, and finance professionals actively using FinTech trading platforms.

5.4 Data Collection

Primary data were collected using a structured questionnaire based on a five-point Likert scale ranging from “Strongly Disagree” to “Strongly Agree.”

5.5 Tools for Analysis

- Descriptive statistics
- Mean score analysis
- Correlation analysis
- Regression Analysis
- ANOVA

6. Data Analysis and Interpretation

The analysis of data collected from 50 respondents in Erode District was carried out using descriptive statistics, mean score analysis, correlation analysis, and preliminary regression analysis. As this study is exploratory and pilot in nature, the results are interpreted cautiously to assess trends, relationships, and the feasibility of a large-scale empirical investigation.

6.1 Demographic Profile of Respondents

Table 1: Demographic Profile of Respondents

Variable	Category	No. of Respondents	Percentage
Gender	Male	32	64%
	Female	18	36%
Occupation	Traders / Investors	28	56%
	Finance Professionals	22	44%
Trading Experience	Below 3 years	20	40%
	3–5 years	18	36%
	Above 5 years	12	24%

Interpretation:

The demographic profile indicates that the majority of respondents are male (64 percent), while female respondents constitute 36 percent, reflecting the existing participation pattern in FinTech trading within the study area. Traders and investors form the larger occupational

group (56 percent), followed by finance professionals (44 percent), ensuring representation of both practical trading experience and professional financial knowledge. With regard to trading experience, respondents are fairly distributed across experience levels, with 40 percent having below three years of experience, 36 percent having three to five years, and 24 percent having more than five years of experience. This distribution enables the study to capture varied perspectives on the adoption and effectiveness of AI and Big Data tools in FinTech trading.

6.2 Adoption Level of AI and Big Data in FinTech Trading

Table 2: Mean Score Analysis of AI and Big Data Adoption

Variable	Mean Score	Standard Deviation
AI Adoption Level	3.92	0.61
Big Data Usage	3.85	0.58

Interpretation:

The mean scores indicate a high level of adoption of AI-driven features such as automated trading signals, predictive analytics, and algorithmic execution. Similarly, Big Data tools are widely used for market trend analysis and data-based trading decisions. The relatively low standard deviation values indicate consistency in respondents' perceptions.

6.3 Impact of AI and Big Data on Trading Performance

Table 3: Mean Score Analysis of Trading Performance Variables

Variable	Mean Score	Standard Deviation
Trading Efficiency	4.02	0.55
Decision-Making Accuracy	4.10	0.49
Risk Management	3.88	0.63

Interpretation:

Trading efficiency recorded the highest mean score, suggesting that FinTech platforms powered by AI and Big Data significantly improve execution speed and operational effectiveness. Decision-making accuracy also shows strong agreement, indicating reduced emotional bias and improved analytical judgment. Risk management exhibits a moderately high mean score, reflecting the usefulness of Big Data analytics in identifying and mitigating market risks.

6.4 Relationship between AI Adoption, Big Data Usage, and Trading Outcomes

Table 4: Correlation Matrix of Key Variables

Variables	AI Adoption	Big Data Usage	Trading Efficiency	Decision Accuracy	Risk Management
AI Adoption	1.00	0.54	0.62	0.68	0.55
Big Data Usage	0.54	1.00	0.58	0.63	0.60
Trading Efficiency	0.62	0.58	1.00	0.65	0.57
Decision Accuracy	0.68	0.63	0.65	1.00	0.59
Risk Management	0.55	0.60	0.57	0.59	1.00

Interpretation:

The correlation results reveal moderate to strong positive relationships among AI adoption, Big Data usage, and trading performance indicators. AI adoption shows the strongest association with decision-making accuracy ($r = 0.68$), while Big Data usage is more closely related to risk management ($r = 0.60$). These results suggest a complementary role of AI and Big Data in enhancing different dimensions of FinTech trading.

6.5 Preliminary Regression Analysis: Impact on Trading Efficiency

To examine the directional influence of AI and Big Data on trading efficiency, a simple multiple regression model was applied.

Table 5: Regression Results – Dependent Variable: Trading Efficiency

Variable	Beta Coefficient	t-value	Significance
Constant	1.214	3.02	0.004
AI Adoption	0.421	3.88	0.000
Big Data Usage	0.356	3.21	0.002
R ²	0.52		
F-value	25.46		0.000

Interpretation:

The regression results indicate that both AI adoption and Big Data usage significantly influence trading efficiency. AI adoption exhibits a slightly stronger impact compared to Big Data usage. The R² value of 0.52 suggests that 52 percent of the variation in trading efficiency is explained by AI and Big Data adoption, which is substantial for a pilot study.

6.6 Experience-wise Perception of AI and Big Data Effectiveness

Table 6: Mean Trading Performance Scores by Experience Level

Experience Level	Trading Efficiency	Decision Accuracy	Risk Management
Below 3 years	3.88	3.95	3.72
3–5 years	4.05	4.12	3.89
Above 5 years	4.18	4.25	4.02

Interpretation:

Experienced traders exhibit higher mean scores across all performance dimensions, particularly in decision-making accuracy and risk management. This indicates that effective utilization of AI and Big Data tools improves with experience, highlighting the importance of user training and data literacy in FinTech trading environments.

6.7 Summary of Analytical Results

The expanded analysis demonstrates that AI and Big Data analytics play a significant and complementary role in FinTech trading. AI adoption strongly enhances decision-making accuracy and trading efficiency, while Big Data usage contributes substantially to risk management and market analysis. The statistical results provide robust preliminary evidence supporting the feasibility and relevance of a large-scale quantitative study.



7. Findings

- Adoption of Artificial Intelligence and Big Data analytics has a positive and statistically meaningful influence on trading efficiency, leading to faster execution and improved operational performance.
- AI-based analytical tools significantly enhance trading decision-making accuracy by supporting data-driven and predictive insights.
- Big Data analytics plays a crucial role in identifying, monitoring, and managing trading risks, particularly under volatile market conditions.
- Traders and finance professionals in Erode District show a growing level of acceptance and usage of FinTech trading platforms incorporating AI and Big Data technologies.
- The pilot study validates the research framework and confirms the feasibility of conducting a large-scale quantitative study using advanced statistical techniques.

8. Suggestions

- FinTech platform providers should offer structured training and awareness programmes on AI-driven trading tools to improve effective utilization.
- Traders should enhance data literacy and analytical skills to fully leverage Big Data-based trading insights.
- Policymakers and regulatory bodies should frame clear guidelines to ensure ethical, transparent, and responsible use of AI in financial trading.
- Future studies may employ larger samples and advanced statistical models such as structural equation modelling to gain deeper insights.

9. Conclusion

The pilot study underscores the growing importance of Artificial Intelligence and Big Data analytics in FinTech trading, particularly in enhancing trading efficiency, decision-making accuracy, and risk management practices. The findings reveal a gradual transition among traders and finance professionals in Erode District from traditional trading approaches towards technology-driven and data-oriented trading systems. The study also highlights that the adoption of AI-enabled FinTech platforms is extending beyond metropolitan regions into semi-urban areas. Importantly, the results confirm the suitability of the proposed research framework and provide a strong foundation for undertaking a large-scale quantitative investigation.

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