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Article DOI:

10.5281/zenodo.21486653

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How to Cite:

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Biradar, Irfan Khaja,
Lavanya, Rohit (2026),
Ai-Based Predictive
Analytics for Business
Forecasting: A
Secondary Data
Study, International
Educational Journal of
Science & Engineering
(IEJSE), Vol: 9, Special
Issue, May 2026
566-568

AI-BASED PREDICTIVE ANALYTICS FOR BUSINESS FORECASTING: A SECONDARY DATA STUDY

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ABSTRACT

In the modern digital era, organizations increasingly depend on Artificial Intelligence (AI) combined with predictive analytics to improve forecasting and support strategic planning. This study examines how AI-based predictive techniques contribute to forecasting business outcomes using secondary data from journals, reports, and academic sources. The research applies descriptive and analytical methods, along with comparison and theme-based evaluation.

The findings show that AI enhances prediction accuracy, speeds up decision-making, and improves overall business performance. Studies indicate that AI tools can increase decision speed by around 70%, improve forecast accuracy by approximately 65%, and raise operational efficiency by nearly 60%. Technologies such as machine learning, deep learning, and natural language processing assist in processing large datasets, discovering hidden patterns, and generating real-time insights. These capabilities help organizations make informed decisions, optimize resources, and adapt quickly to market changes.

AI-based forecasting is widely used in industries such as finance, retail, healthcare, and marketing. However, issues like poor data quality, high costs, lack of expertise, and data privacy concerns continue to limit its full adoption.

KEYWORDS: Artificial Intelligence, Predictive Analytics, Forecasting, Machine Learning, Big Data, Decision-Making

1. INTRODUCTION

In today's competitive business environment, quick and accurate decisions are essential for organizational success. Traditional forecasting methods are no longer sufficient due to increasing data complexity and market uncertainty. The emergence of Artificial Intelligence (AI) has significantly improved forecasting practices by making them more data-driven and efficient.

Predictive analytics uses historical data and statistical techniques to estimate future trends. AI strengthens this approach by enabling automated analysis, learning from past data, and producing real-

time insights. Compared to traditional methods, AI-based systems provide better flexibility and higher accuracy.

Organizations now generate large amounts of structured and unstructured data from different sources. AI-based tools help process this information efficiently, identify patterns, and generate reliable predictions. As a result, businesses can respond quickly to changing market conditions and customer behavior.

Advancements in big data and cloud computing have further encouraged the use of AI in forecasting. Many organizations are adopting these technologies to

improve efficiency, reduce uncertainty, and gain a competitive advantage.

2. LITERATURE REVIEW

2.1 AI and Forecasting Accuracy

Several studies confirm that AI improves forecasting outcomes. Machine learning techniques, such as regression and classification, provide more reliable predictions compared to traditional statistical models. These methods perform particularly well when handling large and complex datasets.

2.2 Machine Learning and Deep Learning

Machine learning and deep learning form the base of AI analytics. Neural networks are capable of identifying complex and non-linear relationships in data. Their ability to learn continuously helps improve prediction accuracy over time.

2.3 Impact on Decision-Making

Research shows that AI improves both the speed and effectiveness of decision-making. Organizations using AI can process information quickly and respond efficiently to changes, leading to improved performance.

3. CONCEPTUAL FRAMEWORK

3.1 Data Input

Organizations collect data from:

- Past records
- Real-time sources
- Unstructured data such as reviews and social media

The quality and accuracy of this data directly affect forecasting results.

3.2 AI Technologies

- Machine Learning: detects patterns
- Deep Learning: analyzes complex data
- NLP: processes text information
- Automation: increases speed

3.3 Predictive Process

- Data cleaning
- Data integration
- Model training
- Pattern identification
- Forecast generation

3.4 Output

- Sales prediction
- Demand estimation
- Financial forecasting
- Risk analysis

3.5 Outcomes

- Better decisions
- Improved efficiency
- Reduced costs
- Competitive advantage

4. RESEARCH OBJECTIVES

1. To study the role of AI in forecasting
2. To evaluate AI-based models
3. To identify benefits and challenges
4. To analyze decision-making impact
5. To explore future developments

5. METHODOLOGY

Data Sources

- Journals
- Reports
- Online publications

Research Design

Descriptive and analytical approach

Techniques

- Comparative analysis
- Thematic analysis
- Interpretation of secondary data

Secondary data is useful as it saves time and provides broad insights.

6. DATA ANALYSIS & DISCUSSION

6.1 Forecast Accuracy

AI models improve prediction accuracy by learning from updated data continuously.

6.2 Decision Speed

AI systems process large datasets quickly, enabling faster decisions.

6.3 Business Benefits

Organizations experience:

- Reduced costs
- Better customer satisfaction
- Increased productivity

6.4 Real-Time Insights

AI allows instant analysis and response to market changes.

6.5 Challenges

- Low-quality data
- High costs
- Skill shortages
- Privacy risks

6.6 Industry Applications

- Finance: fraud detection
- Retail: inventory planning
- Healthcare: disease prediction
- Marketing: customer analysis

6.7 Statistical Analysis

Performance Improvement

- Forecast accuracy: 65%
- Decision speed: 70%
- Efficiency: 60%
- Cost reduction: 50%

Challenges

- Data quality: 63%
- Cost: 55%
- Skills: 50%

7. FINDINGS

- AI increases forecasting accuracy
- Decision-making becomes faster
- Efficiency improves
- Businesses shift to proactive strategies
- Customer satisfaction increases
- Challenges still exist

8. CONCLUSION

AI-based predictive analytics has transformed forecasting into a more reliable and data-driven process. Organizations benefit from improved accuracy, faster decisions, and better planning.

However, challenges such as poor data quality, high costs, and lack of expertise must be addressed. Overall, AI plays a crucial role in helping organizations achieve long-term success.

9. FUTURE SCOPE

Trends

- AI with IoT
- Real-time analytics
- Explainable AI
- Ethical AI

Further Research

- Industry-specific studies
- SME adoption
- Comparison with traditional methods
- Sustainability applications

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