



TECHNICAL INDICATORS AND THEIR EFFECTIVENESS IN STOCK TRADING

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ABSTRACT

The article "Technical Indicators and their Effectiveness for Stock Trading" deals with analyzing certain types of indicators that can be used to analyze stocks and make investment decisions for investors on behalf of them within Indian stock market. The study focuses on five major Indian companies, namely HDFC Bank, State Bank of India (SBI), ICICI Bank, Reliance Industries Limited, and Bharti Airtel Limited, using historical stock price and trading volume data covering the period from FY 2021-22 to FY 2025-26.

The study evaluates five widely used technical indicators: Exponential Moving Average (EMA) Cross, Volume Analysis, Volume Weighted Average Price (VWAP), Fibonacci Retracement, and Relative Strength Index (RSI). They help to identify trends, momentum support/resistance levels; strength of trading; entry/exit points.

These results are more accurate as they reflect better trading signals from several indicators rather than just one. Cross of EMA helped to identify trends, RSI was used for identifying overbought and oversold levels, VWAP provided an average price level for trading, Volume Analysis confirmed strength of price movement, Fibonacci Retracement helped identify key support and resistance levels. By integrating these together, we can improve trading analysis; reduce false signals; and make better investment decisions.

KEYWORDS: EMA, VWAP, Volume Analysis, Fibonacci Retracement, RSI, Stock Market

1. INTRODUCTION

Stock trading has gained significant popularity among both individual and institutional investors due to its potential for attractive returns and wealth creation. However, the inherently dynamic and volatile nature of stock markets shaped by factors such as economic conditions, investor sentiment, company performance, and global geopolitical events makes effective trading decisions challenging. To address this complexity, investors employ a range of analytical techniques to decode market behavior and identify profitable trading opportunities in an ever-changing environment.

Among these techniques, technical analysis stands out as a prevalent and practical approach, focusing on historical price movements, trading volumes, and market trends to forecast future price directions. This method relies heavily on technical indicators such as the Exponential Moving Average (EMA) Cross for spotting trend reversals, Volume Analysis for gauging the strength of price movements, Volume Weighted Average Price (VWAP) for setting fair price benchmarks, Fibonacci Retracement for identifying critical support and resistance levels, and the Relative Strength Index (RSI) for measuring momentum and detecting overbought or oversold conditions.

This study investigates the effectiveness of these selected technical indicators in stock trading for leading Indian companies including ICICI Bank, HDFC Bank, SBI, Reliance Industries, and Bharti Airtel. By analyzing historical stock price data spanning the financial years FY 2021-22 to FY 2025-26, the research aims to provide actionable insights into how the combined use of these indicators can improve trading accuracy and performance. Ultimately, the findings seek to empower investors with systematic, well-informed trading strategies that enhance decision-making and maximize returns in the complex and competitive stock market landscape.

2. RESEARCH PROBLEM

The stock market's inherent volatility and uncertainty make it challenging for investors and traders to consistently achieve profitable trading outcomes. While many technical indicators exist to analyse market trends and forecast price movements, selecting the most effective ones for reliable trading signals remains a significant challenge.



Relying on a single indicator often leads to misleading signals, but the combined effectiveness of multiple indicators is not sufficiently studied, especially in the context of the Indian stock market. This gap in understanding creates difficulties for investors seeking to improve their trading accuracy and performance.

Therefore, this study focuses on evaluating the practical usefulness of selected technical indicators Exponential Moving Average (EMA) Cross, Volume Analysis, Volume Weighted Average Price (VWAP), Fibonacci Retracement, and Relative Strength Index (RSI) in enhancing stock trading effectiveness.

The research uses historical stock price data from FY 2021–22 to FY 2025–26 for prominent Indian companies such as ICICI Bank, HDFC Bank, SBI, Reliance Industries, and Bharti Airtel to address this issue.

3. REVIEW OF LITERATURE

1. **Lixing Lin, Zhen Zhang & Yiqing Wang (2026)**: A Volume-Price-Adjusted MACD Trading Strategy with Sensitivity Calibration for U.S. Equity Indices. Proposed VP-MACD by integrating volume, volatility and intraday price data into MACD. The strategy improved profitability, risk-adjusted returns and downside-risk performance.
2. **Varun Narayan Kannan Pillai (2026)**: Generating Alpha: A Hybrid AI-Driven Trading System Integrating Technical Analysis, Machine Learning and Financial Sentiment for Regime-Adaptive Equity Strategies. Developed a hybrid system combining technical indicators, machine learning and financial sentiment. The approach improved forecasting precision, returns and adaptability across market conditions.
3. **Akash Deep & Aboutaleb Shirvani (2025)**: Risk-Adjusted Performance of Random Forest Models in High-Frequency Trading. Evaluated Random Forest models with technical indicators for high-frequency trading. The models captured nonlinear patterns effectively, although indicator performance declined during extreme volatility.
4. **Melda & Mira (2025)**: Analysis of the Effectiveness of RSI and MACD Indicators in Addressing Stock Price. Compared RSI and MACD for identifying overbought, oversold and reversal conditions. Their combined use produced more accurate signals and helped reduce trading risk.
5. **Seyed Mostafa Mostafavi (2025)**: Key Technical Indicators for Stock Market Prediction. Examined momentum, trend, volatility and volume indicators using machine-learning models. Selecting relevant indicators improved prediction accuracy and reduced forecasting errors.
6. **Javier H. Ospina-Holguín & Ana M. Padilla-Ospina (2025)**: Reinforcement Learning Meets Technical Analysis: Combining Moving Average Rules for Optimal Alpha. Combined reinforcement learning with moving-average trading rules to improve trading strategies. Results showed better adaptability to changing market conditions and improved investment performance.
7. **Alberto Agudelo Aguirre & Néstor Duque-Mendez (2025)**: Artificial Intelligence in Stock Market Investment Through the RSI Indicator. Integrated RSI with artificial intelligence techniques for stock-price prediction and trading signals. AI-enhanced RSI models achieved higher accuracy than traditional technical analysis.
8. **Zatwarnicki & Marek Krzysztof Zatwarnicki (2025)**: Timing Usage of Technical Analysis in the Cryptocurrency Market. Studied the timing and application of technical indicators in volatile cryptocurrency markets. Indicator effectiveness depended on market timing and price trends, supporting better entry, exit and risk decisions.
9. **Jency Jose & Varshini P (2024)**: Integrating Technical Indicators and Ensemble Learning for Predicting the Opening Stock Price. Combined technical indicators with ensemble learning to predict stock opening prices. The model achieved 91.45% accuracy, with Moving Average and MACD effectively identifying market trends.
10. **Monica Andrea Arauco Ballesteros & Elio Agustín Martínez Miranda (2024)**: Stock Market Forecasting Using a Neural Network Through Fundamental Indicators, Technical Indicators and Market Sentiment Analysis. Developed a neural-network model combining fundamental and technical indicators with market sentiment. The integrated approach achieved 86.89% forecasting accuracy and improved prediction performance.
11. **Lichun Huang (2024)**: NEAT Algorithm-Based Stock Trading Strategy with Multiple Technical Indicators Resonance. Used the NEAT algorithm to optimize trading rules based on multiple technical indicators. The strategy improved prediction accuracy and profitability compared with conventional methods.
12. **Jonathan M. Baker & Siddharth Dangwal (2024)**: VarSaw: Application-Tailored Measurement Error Mitigation for Variational Quantum Algorithms. Focused on reducing measurement errors in variational quantum algorithms through advanced computational techniques. The findings demonstrated improved computational accuracy and reliability for complex prediction systems.
13. **Le Hoang Anh, Nguyen Van Nhat & Nguyen Luu Tuyen (2024)**: Applying Machine Learning Method in Stock Trading by Indicator. Developed an automated trading system using machine learning and indicators such as SMA, Bollinger Bands, RSI and MACD. The SMA strategy produced strong returns while managing risk through portfolio optimization.
14. **Arjun Singh Saud & Subarna Shakya (2024)**: Technical Indicator Empowered Intelligent Strategies to Predict Stock Trading Signals. Integrated technical indicators with machine-learning techniques to improve stock-signal prediction. The framework identified profitable opportunities and reduced false signals, supporting investment decisions.



- 15. Porselvi R & Dr. Meenakshi A (2024):** A Study on the Effectiveness of Moving Average Convergence and Divergence (MACD). Examined MACD for identifying trends, momentum changes and buy/sell signals. The study found that combining MACD with other indicators improves trading accuracy and reduces false entries.
- 16. Jaydip Sen & Hetvi Waghela (2024):** A Performance Analysis of Technical Indicators on the Indian Stock Market. Analyzed RSI, MACD, Moving Average, Bollinger Bands and Stochastic Oscillator in the Indian market. The study emphasized comprehensive technical analysis for identifying trends and trading opportunities.
- 17. Shanmukh Kali Prasad & Vadlamani Madhav (2023):** Optimal Technical Indicator-Based Trading Strategies Using NSGA-II. Developed an optimized multi-indicator trading strategy using the NSGA-II evolutionary algorithm. The approach balanced investment returns and risk, providing a robust framework for trading strategy development.
- 18. Ba Chu (2023):** Technical Analysis with Machine Learning Classification Algorithms: Can It Still 'Beat' the Buy-and-Hold Strategy?. Compared machine-learning trading strategies using technical indicators with traditional buy-and-hold strategies. The results showed that machine learning could capture complex market patterns and improve performance under suitable conditions.
- 19. Fuwang He (2023):** The Best Combination of Indicators for the U.S. Stock Market. Compared single, double and multiple indicator combinations using return, drawdown and risk-adjusted measures. Combinations including Bollinger Bands, RSI, Money Flow Index and ADX performed strongly with lower risk.
- 20. Ajit Singh (2022):** Effectiveness of Technical Indicators in Short-Term Trading. Examined common technical indicators for short-term stock trading and price-movement prediction. The study found that properly selected indicators can generate useful signals when applied with disciplined trading.
- 21. Pat Tong Chio (2022):** A Comparative Study of the MACD-Based Trading Strategies: Evidence from the U.S. Stock Market. Compared different MACD-based trading strategies under varying market conditions. Appropriate entry and exit rules improved profitability, while combining MACD with other indicators reduced false signals.
- 22. Mehran Taghian & Ahmad Asadi (2021):** A Reinforcement Learning Based Encoder-Decoder Framework for Learning Stock Trading Rules. Proposed a reinforcement-learning framework that learns trading rules from historical data and technical indicators. The approach improved prediction and trading performance while adapting to changing market conditions.
- 23. Yufeng Han & Guofu Zhou (2021):** Technical Analysis in the Stock Market: A Review. Reviewed major technical-analysis theories, strategies and empirical evidence. The study highlighted the usefulness of moving averages, momentum indicators and trend-following strategies when appropriately applied.
- 24. Omer Berat Sezer & A. Murat Ozbayoglu (2017):** An Artificial Neural Network-Based Stock Trading System Using Technical Analysis and Big Data Framework. Developed an artificial-neural-network trading system using technical analysis and large historical datasets. The study found that combining big-data analytics with technical indicators can improve identification of profitable opportunities.
- 25. Shah Nisarg Pinakin & Patel Taral Manubhai (2015):** A Comparative Study on Technical Analysis by Bollinger Band and RSI. Compared Bollinger Bands and RSI for identifying overbought and oversold conditions. The study found that combining the indicators provided stronger confirmation and improved the reliability of trading signals.

5. RESEARCH METHODOLOGY

The study adopts a descriptive and analytical research design with a technical analysis approach to examine the effectiveness of selected technical indicators in stock trading.

The study is based on secondary data collected from reliable sources such as the (NSE), Yahoo Finance, Investing.com, and Trading View.

Purposive sampling is used to select five Indian companies, namely HDFC Bank, State Bank of India (SBI), ICICI Bank, Reliance Industries Limited, and Bharti Airtel Limited.

The study covers the period from FY 2021–22 to FY 2025–26. Five technical indicators—Exponential Moving Average (EMA) Cross, Volume Analysis, Volume Weighted Average Price (VWAP), Fibonacci Retracement, and Relative Strength Index (RSI).

The analytical techniques include candlestick chart analysis, comparative analysis, and interpretation of technical indicators to evaluate trends, momentum, support and resistance levels, and potential trading opportunities.

6. DATA INTERPRETATION

6.1 HDFC (RSI, Fibonacci retracement, EMA Cross, Volume Analysis and VWAP)



HDFC Bank is currently showing a short-term corrective and bearish trend.

The RSI below 30 indicates an oversold condition, suggesting a possible price recovery.

The stock is trading below the 9-EMA and 26-EMA, confirming short-term weakness.

However, it remains above the long-term VWAP, indicating relatively stronger long-term support. Higher trading volume reflects selling pressure and cautious investor sentiment.

6.2 SBI (RSI, Fibonacci retracement, EMA Cross, Volume Analysis and VWAP)



SBI consistently respects the 50% and 61.8% Fibonacci retracement levels, offering strong support during corrections. The RSI near 70 indicates strong bullish momentum, though short-term profit booking may occur. The stock is trading above the 9-EMA, 26-EMA, and VWAP, confirming a bullish trend. Steady trading volume further supports positive market sentiment and trend continuation.

Overall, SBI remains in a strong long-term uptrend with possible temporary pullbacks.

6.3 ICICI (RSI, Fibonacci retracement, EMA Cross, Volume Analysis and VWAP)



The Fibonacci retracement levels provide strong support during market corrections. The RSI remains near the neutral zone, indicating balanced buying and selling pressure. The stock is trading above the 9-EMA, 26-EMA, and VWAP, confirming a bullish trend. Stable trading volume supports positive market sentiment. Overall, the stock shows potential to continue its long-term uptrend.

6.4 RELIANCE INDUSTRIES (RSI, Fibonacci retracement, EMA Cross, Volume Analysis and VWAP)



Reliance Industries has consistently respected the 50% and 61.8% Fibonacci retracement levels, providing strong support during corrections. The RSI around 43 indicates weak to neutral momentum, with the stock remaining outside overbought and oversold zones. The stock is trading close to the EMA and VWAP, indicating a stable overall trend. Recent price movement suggests consolidation with moderate trading activity. Overall, the stock shows long-term stability with potential for future recovery.

6.5 BHARTI AIRTEL (RSI, EMA Cross, Volume Analysis and VWAP)



The overall analysis indicates that Bharti Airtel is maintaining a stable long-term trend, with the price trading close to the EMA and VWAP levels. Trading volume remained consistent, reflecting steady investor participation throughout the study period. The RSI is around the 48 level, indicating neutral momentum without overbought or oversold conditions. Overall, the technical indicators suggest consolidation with the potential for continuation of the long-term bullish trend.



FINDINGS AND SUGGESTIONS

Findings

1. The combined use of RSI, EMA Cross, VWAP, Fibonacci Retracement, and Volume Analysis generated more reliable trading signals than the use of individual indicators.
2. Using multiple indicators together improves decision-making by confirming trends and reducing false signals.
3. The chosen indicators effectively identified trend direction, momentum, support and resistance, and entry/exit points during the study.
4. Technical indicators work best when combined and used with proper risk management rather than relying on a single indicator.

Suggestions

1. For better trading accuracy, use a combination of RSI, EMA Cross, VWAP, Fibonacci Retracement, and Volume Analysis.
2. It's important that multiple indicators confirm market trends to help reduce false buy and sell signals.
3. Analyse trend direction, momentum, support/resistance levels, and entry/exit points before investing.
4. Combine technical analysis with risk management and fundamental analysis for informed investment decisions.

CONCLUSION

The study titled "Technical Indicators and Their Effectiveness in Stock Trading" examined how selected technical indicators analyse stock price movements and support investment decisions in the Indian stock market. It focused on five major companies ICICI Bank, HDFC Bank, State Bank of India, Reliance Industries Limited, and Bharti Airtel Limited—using historical price data and five popular indicators: Relative Strength Index (RSI), Exponential Moving Average (EMA) Cross, Volume Weighted Average Price (VWAP), Fibonacci Retracement, and Volume Analysis. These indicators were chosen for their widespread use in identifying market trends, momentum, support/resistance levels, and trading opportunities.

The findings reveal that each indicator contributes unique insights into stock price behavior. RSI detects overbought and oversold conditions, EMA Cross signals prevailing trends, VWAP assesses average trading price levels, Fibonacci Retracement highlights key support and resistance zones, and Volume Analysis confirms price movement strength. The analysis also showed that indicator effectiveness varies with market conditions, volatility, and volume, emphasizing the need for collective interpretation.

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