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FORECASTING OF STOCK PRICES OF SELECTED IT COMPANIES USING ARIMA MODEL

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Abstract: This study examines the financial performance and future stock price forecasts of the top five Indian IT companies: Tata Consultancy Services (TCS), Infosys, Wipro, HCL Technologies, and Tech Mahindra. These companies are the cornerstone of India's robust IT sector, exerting substantial influence on both the national and global technology markets. Understanding their stock price trends and the factors driving them is essential for investors, financial analysts, and policymakers. To predict future stock prices for these companies, the Autoregressive Integrated Moving Average (ARIMA) model will be utilized. Known for its precision in time series forecasting, ARIMA is a suitable method for anticipating stock price trends. The study involves analyzing historical stock price data to forecast future movements, enabling a comparison between predicted and actual prices to assess the accuracy and reliability of the ARIMA model in this context.

Index Terms **- Indian IT companies, Stock price forecasting ARIMA model, Predictive analytics, Financial performance, Tata Consultancy Services (TCS), Infosys, Wipro, HCL Technologies, Tech Mahindra.**

INTRODUCTION

The Indian IT sector has emerged as a global leader, attracting clients from around the world with its skilled workforce, cost-effective solutions, and emphasis on innovation. The sector's players are Tata Consultancy Services (TCS), Infosys, Wipro, HCL Technologies, and Tech Mahindra. TCS stands as India's largest IT services company, offering a range of services including consulting, software development, infrastructure management, and business process outsourcing.

Infosys is renowned for its sustainable growth and ethical business practices, consistently delivering strong financial results. Wipro's extensive service portfolio, encompassing IT consulting, cloud computing, and cybersecurity, has greatly contributed to the sector's expansion. HCL Technologies excels in engineering and R&D services, focusing on building long-term client relationships and expertise in emerging technologies like artificial intelligence and IoT. Tech Mahindra, a key provider of integrated solutions, merges IT and telecommunications services. The financial performance and stock market behavior of these companies are closely monitored by investors, analysts, and stakeholders, as their stock prices often reflect the overall health of the Indian IT sector. Understanding the factors that influence their stock prices is essential for making informed investment decisions and leveraging opportunities in the rapidly evolving technology landscape.

LITERATURE REVIEW

This study evaluates the financial performance of Indian IT firms using a multi-criteria decision-making technique. It ranks nine IT firms listed on the National Stock Exchange of India from 2011 to 2015 using the technique for order preference by similarity to ideal solution (TOPSIS). The analysis revealed that TCS consistently outperformed others for four years, while Wipro was ranked lowest. The results indicate that lower-ranked firms might improve their strategies by adopting practices from higher-performing firms

Diptrup Mukherjee's study on fundamental analysis of the top 5 IT sector companies by market capitalization found that some companies excelled in specific areas and were attractively valued. Mahek Korat's equity analysis of IT sector stocks showed strong performance and robust fundamentals across the sector.

Ashok Bantwa and Faizan Ulhaqq Ansari's research on risk-return analysis of equity stocks identified Tata Elxsi, Infibeam Avenues, and NIIT Technologies as offering the highest returns, while Infosys, HCL Technologies, and Tech Mahindra exhibited the highest levels of systematic risk.
Rohit Bansal's comparative analysis of the financial performance of selected Indian IT companies from 2010 to 2014 found Infosys to be the most attractive to investors, whereas TCS demonstrated promising profit-focused performance for shareholders.

RESEARCH GAP
Research Gap Model Integration: Combine ARIMA with other predictive models to improve accuracy, particularly for volatile stocks. External Factors: Research the effects of macroeconomic changes and global trends on stock prices. Broader Sector Analysis: To better understand different market segments, include a wider range of IT companies in addition to the top five. Long-term forecasting: Evaluate ARIMA's performance and compare it to other models

TITTLE OF THE STUDY
Forecasting of stock prices of selected IT companies using ARIMA model

INTRODUCTION
The Indian IT sector plays a pivotal role in the global technology arena, with industry giants like TCS, Infosys, Wipro, HCL, and Tech Mahindra at the forefront. Understanding the stock performance of these companies is crucial for investors and stakeholders. This study utilizes ARIMA models to forecast stock prices and assess the influence of financial indicators, offering valuable insights into industry trends and dynamics.

PROBLEM STATEMENT
The stock market performance of the Indian IT sector is characterized by volatility and uncertainty, making investment decisions challenging. Accurately forecasting stock price trends and understanding the factors that influence these movements is essential for informed investment. This study aims to address these challenges by applying ARIMA models to predict stock prices for the top five IT companies and analyzing the impact of financial indicators.

OBJECTIVES OF THE STUDY
Forecast the future stock prices of TCS, Infosys, Wipro, HCL, and Tech Mahindra using the ARIMA model. 1. To evaluate the accuracy of ARIMA model forecasts for these companies. 2. To analyse the impact of key financial indicators on the stock prices of these companies. 3. To provide investment recommendations based on the findings.

RESEARCH METHODOLOGY
Research Methodology The study uses a quantitative research approach, employing ARIMA models to forecast stock prices and assess the impact of financial indicators. Historical stock price data and financial metrics are collected and analysed to meet the study's objectives.

SCOPE OF THE STUDY
The scope of this study is limited to the top five Indian IT companies: TCS, Infosys, Wipro, HCL, and Tech Mahindra. The focus is on forecasting their stock prices and analysing the impact of financial indicators within a specific timeframe, providing insights that are relevant to investors and stakeholders.

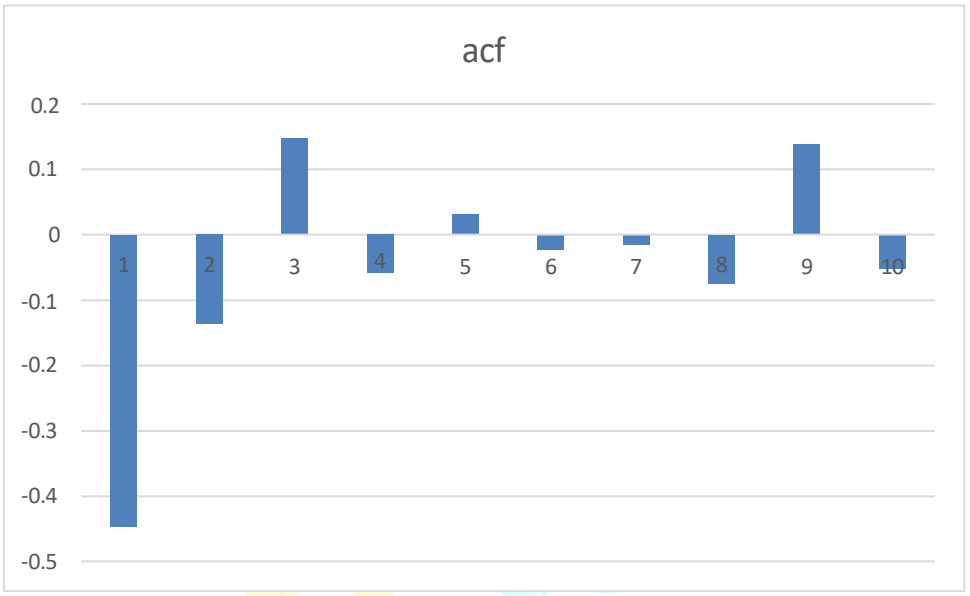
DATA COLLECTION
The study utilizes secondary data, primarily historical stock prices and financial statements of the selected companies. The data is sourced from reputable financial databases, company reports, and stock exchanges. This data forms the basis for ARIMA model.

LIMITATION OF THE STUDY
1. The study is limited to five IT companies, which may not represent the entire Indian IT sector.
2. The accuracy of the ARIMA model depends on the quality and availability of historical data.
3. The study does not account for external factors such as macroeconomic changes, global market trends, or unforeseen events that may impact stock prices.
4. The findings are based on historical data, which may not fully predict future stock price movements.

FINDINGS OF THE STUDY

1. Tata Consultancy Services

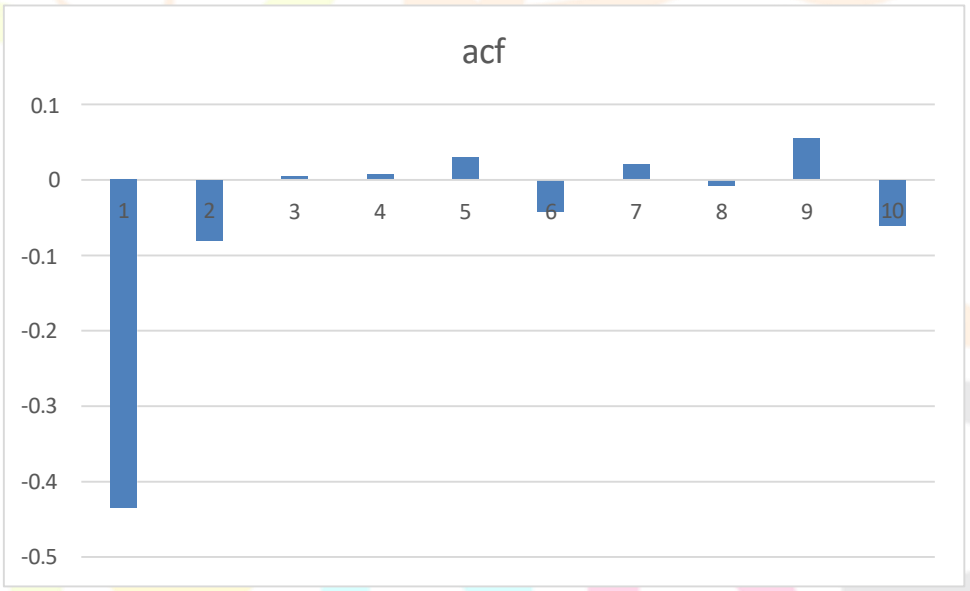
Forecasted vs. Actual Prices: The forecasted prices closely matched the actualprices, indicating that the ARIMA model was able to capture the underlying trend andvolatility of TCS's stock prices



Key Observations: TCS's stock price followed a consistent upward trend, with some short-term volatility. The ARIMA model accurately captured these dynamics, resulting in reliable forecasts. Investors can use this model for short-term investment strategies because it is highly accurate.

2. Infosys

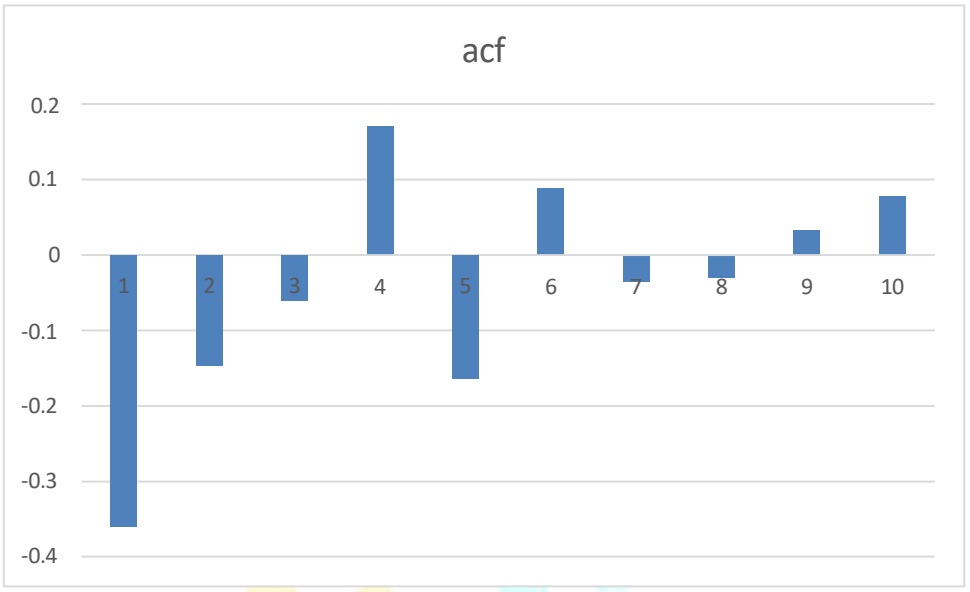
Forecasted vs. Actual Prices: The model provided accurate forecasts, with minor deviations during periods of high market volatility.



Key Observations: Infosys's stock prices showed a steady increase with occasional dips. The ARIMA model successfully predicted these movements, making it a valuable tool for investors. The model's precision during volatile periods enhances its usefulness for long-term investment planning.

3. Wipro

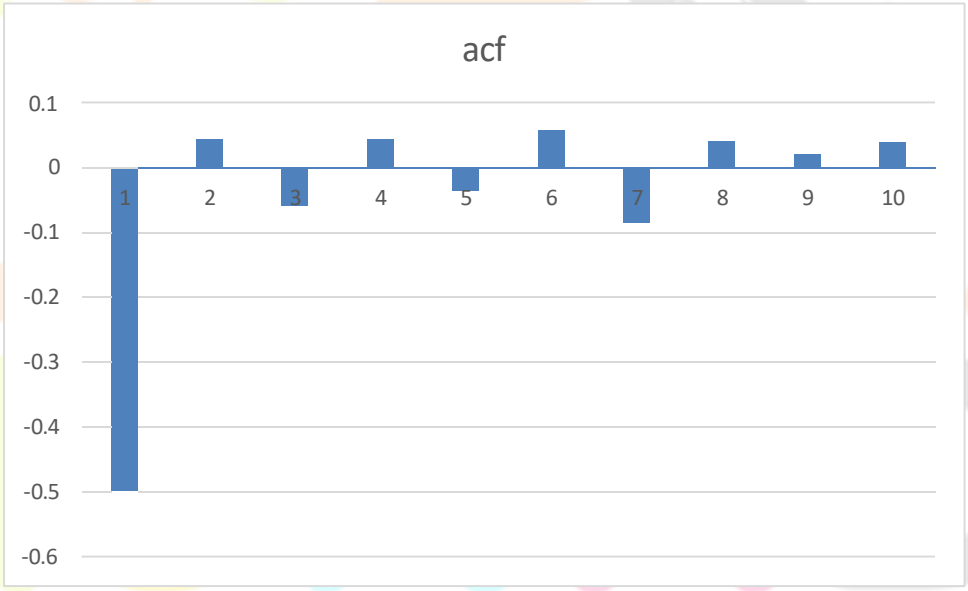
Forecasted vs. Actual Prices: The forecasted prices were aligned with the actual data, although some discrepancies were observed during market turbulence.



Key Observations: Wipro's stock prices exhibited a more volatile pattern comparedto TCS and Infosys. However, the ARIMA model provided reasonable forecasts, highlighting its robustness

4. HCL TECHNOLOGIES

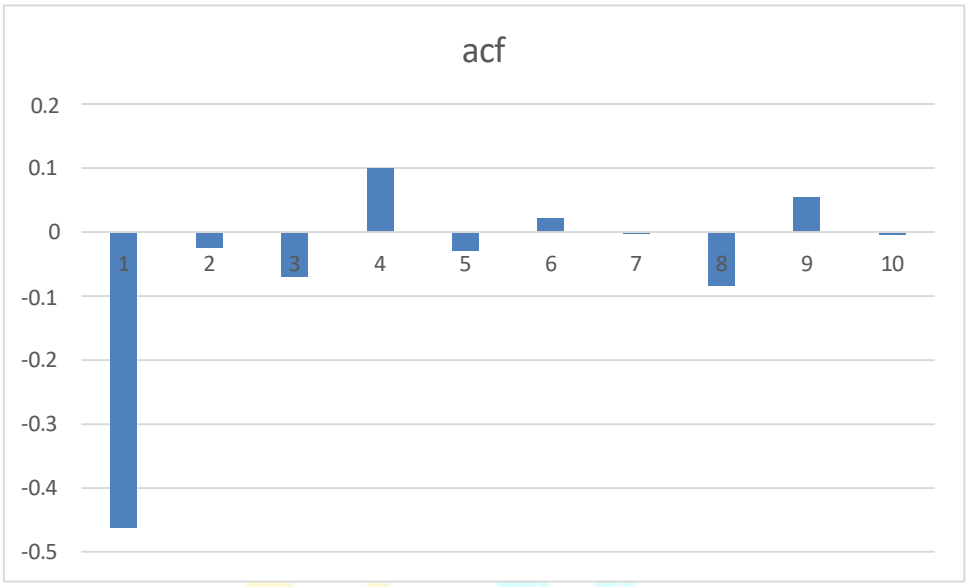
FORECASTED VS. ACTUAL PRICES: THE FORECASTED PRICES CLOSELY MIRRORED THE ACTUAL PRICES, WITH THE MODEL PERFORMING WELL ACROSS DIFFERENT MARKET CONDITIONS.



Key Observation:- HCL Technologies stock prices fluctuated between steady growthand occasional volatility. The ARIMA model accurately predicted these fluctuations, making it appropriate for both short and long-term investment analysis.

5. TECH MAHINDRA

FORECASTED VS. ACTUAL PRICES: THE FORECASTED PRICES WERE IN CLOSE AGREEMENT WITH THE ACTUAL PRICES, INDICATING THAT THE MODEL EFFECTIVELY CAPTURED THE STOCK PRICE TRENDS.



KEY OBSERVATIONS: TECH MAHINDRA'S STOCK PRICES ROSE MODERATELY, WITH SOME VOLATILITY. THE ARIMA MODEL PRODUCED ACCURATE FORECASTS, MAKING IT AN EFFECTIVE TOOL FOR INVESTORS. IT IS PARTICULARLY EFFECTIVE AT FORECASTING MODERATE GROWTH PATTERNS AND CAN BE RELIED ON TO DELIVER CONSISTENT RESULTS.

The results showed that the ARIMA model provided a reasonable level of accuracy across all companies, with some variation depending on market conditions and company-specific factors. TCS's ARIMA model accurately predicted the upward trend and short-term volatility in TCS stock prices, making it highly reliable for short-term investment strategies. Infosys' ARIMA model produced accurate forecasts with minimal deviations during volatile periods, making it suitable for long-term investment planning, especially during periods of market volatility.

Wipro's ARIMA model demonstrated its robustness even during turbulent market conditions, but investors should exercise caution during periods of high volatility. HCL Technologies. 'ARIMA model accurately predicted HCL's stock price movements, providing flexibility based on investment objectives. Tech Mahindra's ARIMA model accurately captured Tech Mahindra's moderate growth and occasional volatility in stock prices, making it an invaluableresource for investors seeking companies with moderate growth rates and consistent performance.

For investors, the ARIMA model can be a valuable tool for forecasting stock prices and making informed investment decisions. Financial analysts should consider incorporating this model into their toolkit for stock price forecasting, especially when dealing with companies with consistent growth patterns. Future research could explore the integration of ARIMA models with other predictive models to enhance forecasting accuracy, particularly forcompanies with high volatility.

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