

Market Reaction to AI-Related Announcements in the Indian Stock Market: An Event Study Approach

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Abstract: Artificial Intelligence (AI) has been a game-changing technology with immense influence on the strategies and operations of the firms in the corporate world. The rise in usage of Artificial Intelligence by top players has attracted the interest of many investors, who are concerned about the issue of whether Artificial Intelligence news makes immediate value to their stockholders. This paper studies the stock market reaction to Artificial Intelligence news in the Indian stock market using the event study approach.

The analysis looks at the effect of AI news announced by four major companies in India, that is, Tata Consultancy Services (TCS), Infosys, Reliance Industries, and HCL. Daily stock returns and NIFTY 50 Index returns have been used to determine abnormal returns using the market model. An event window of (-5, +5) days is taken into account to assess the stock market reaction to the announcement.

It can be observed that there is no consistent impact on the stock markets based on the information provided by AI companies. Infosys has had a positive cumulative abnormal return, which implies favorable investor perception, whereas TCS, Reliance Industries, and HCL have all had negative cumulative abnormal returns. Based on the above calculations, it can be concluded that the overall CAAR of -0.008564635 is slightly negative during the event period. However, significance test results imply that the abnormal returns are insignificant for any of the selected companies.

The analysis reveals that AI announcements have a different impact on investor sentiment, but abnormal stock returns remain insignificant.

Keywords: Artificial Intelligence, Event Study, Abnormal Returns, Cumulative Abnormal Return, Stock Market Reaction, Indian Stock Market.

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I. INTRODUCTION

Innovations in Artificial Intelligence (AI) have had an impact on the decision making process, efficiency, innovative capacity and competitive strategies of businesses in the current global business environment. Companies are integrating AI technologies for purposes of increased productivity, product and service development and establishment of competitive advantages. Over the past few years, artificial intelligence has become a popular topic in investment circles as announcements on the adoption of AI can give investors information about the future of the business and its strategy.

Financial markets react to new information by reflecting expectations of investors in the stock price of the company. As per the Efficient Market Hypothesis, publicly available information affects the stock prices immediately as the security prices reflect publicly available information within a short time of receiving the information. Hence, studying the effect of technology announcement on stock price movement gives a glimpse of investors' perception of the economic value of the innovation.

AI-based announcements fall under the category of important firm-specific information since they could be indicative of future efficiencies in operations, revenue

creation, and competitive edge. Nevertheless, the market reaction to these types of announcements may not necessarily be positive. On the one hand, investors will see the adoption of AI technology by a company as an investment opportunity; however, worries about high costs of implementation, uncertainty about profitability, regulatory issues, and disruption potential could affect the investors' attitude towards AI adoption.

The stock market of India presents a unique case study for this kind of research question. First of all, India is now seen as a hub for technology and digital services, and leading firms have made significant investments into artificial intelligence. The firms like Tata Consultancy Services (TCS), Infosys, Reliance Industries, and HCL Technologies have made different AI announcements in order to improve their technology and to develop their digital offerings.

Although existing literature has extensively examined the impact of corporate announcements, technological innovations, and information disclosures on stock prices, limited empirical evidence exists regarding the immediate stock market reaction to AI-related announcements, particularly in emerging markets such as India. Most previous studies have focused on broader technology adoption, innovation announcements, or firm performance outcomes rather than short-term investor response to AI-specific announcements.

This study attempts to address this research gap by examining the stock market reaction to AI-related announcements by selected Indian companies using an event study approach. The study estimates abnormal returns around the announcement dates and evaluates the cumulative impact through Cumulative Abnormal Return (CAR) and Cumulative Average Abnormal Return (CAAR).

While past studies have studied extensively about the effects of corporate announcements, technology development, and information releases on stock prices, there is a lack of evidence about how the stock market responds immediately to any AI-based announcements, especially in the emerging countries like India. Past researches have concentrated on wider technology development, innovation-based news, or the performance of firms rather than immediate response to AI announcements.

The present study seeks to fill this gap by studying the stock market response to the announcements made by selected Indian companies about AI. This study makes use of the event study method for this purpose. The study measures the abnormal returns surrounding the date of announcements and analyzes their cumulative effects through CAR and CAAR methods.

The objectives of the study are:

- To examine the impact of AI-related announcements on the stock returns of selected Indian companies.
- To measure abnormal returns generated around AI announcement dates using an event study methodology.

- To analyse whether AI announcements create statistically significant short-term market reactions.

In summary, this paper has made an important contribution to the existing body of knowledge by providing empirical insights into the response of investors to AI announcements in the Indian equity market. This information can be useful for investors, firm managers, and researchers alike.

II. REVIEW OF LITERATURE

The connection between corporate announcements, information dissemination, and stock market responses has been extensively analyzed using event study method. Existing literature shows that financial markets react to new information by changing the security prices according to the expectation of investors regarding future cash flows and risks.

Efficient Market Hypothesis (EMH) was proposed by Fama (1970). According to EMH, security prices take into account all information and adjust to new information quickly. EMH is the basis of event studies in which abnormal returns are analyzed to understand if some events cause significant market responses.

Brown and Warner (1985) discussed the usefulness of event study technique in analyzing the impact of corporate events on stock prices. Their research proves that abnormal return models allow effectively measuring the market reaction to information announcements and are widely applied in finance.

Chaney et al. (1991) analyzed stock market reaction to technological innovations and revealed that announcements about innovations might affect the expectation of investors regarding growth opportunities. Therefore, markets assess innovations taking into account expected economic outcomes but not innovation per se.

According to Hirschey & Richardson (2004), an analysis of the relationship between innovation and firm value has found that innovations associated with technology may have a considerable effect on shareholder wealth. Nevertheless, the market reaction to an innovation is contingent upon a variety of aspects such as credibility, the ability to implement an innovation, and possible financial effects.

Ding et al. (2021) analyzed the effect of innovations associated with technologies on financial markets and found out that digital transformation programs affect the investors' expectations about the competitiveness and growth of firms through signaling effects.

Recent studies of the effects of adopting Artificial Intelligence in businesses have revealed that AI can bring about benefits to operational efficiency, innovation, and performance. The effects of market reactions associated with AI innovation are not thoroughly studied; particularly, there

is no evidence of short-term stock market reactions to AI innovations.

Thus, the current study aims at filling this gap by analyzing the immediate response of the stock market to announcements related to AI by chosen Indian firms through an event study approach. This study provides empirical evidence about the effect of AI announcements on abnormal returns and investor sentiment in the Indian stock market.

However, despite increasing interest in Artificial Intelligence, little empirical evidence is available regarding how capital markets react to AI-related announcements from companies. Literature available today mostly focuses on the implications of adopting AI in terms of strategy, operations, and productivity. Little research is available regarding the immediate effects of AI-related announcements on stock prices and investor behavior. Also, there is little research that examines the effect of AI announcements on abnormal returns of firms in tech-savvy sectors. Thus, this study tries to address the above research gap through event study.

III. RESEARCH METHODOLOGY

➤ Research Design

This study employs an event study approach in order to analyze the effect of the AI related announcements on the stock returns of selected Indian firms. An event study is one of the most common methods used in finance to test whether a particular corporate event causes any abnormal change in the stock prices. The assumption here is that if there is any value-related information in the announcement, then it will be incorporated into the stock prices by the investors, which causes abnormal return around the announcement date.

The study assesses the abnormal return (AR), Cumulative abnormal return (CAR) and Cumulative average abnormal return (CAAR) of the selected firms during the event window.

➤ Sample Selection

This study uses four leading Indian firms which issued announcements related to AI during the selected time period. The sample companies and announcement dates are presented below:

Table 1 The Sample Companies and Announcement Dates

Sl. No.	Company	Stock Symbol	AI Announcement Selected (Event)	Announcement Date (Day 0)
1	Tata Consultancy Services (TCS)	TCS	Launch of TCS Generative AI offering through expanded partnership with Google Cloud for enterprise AI solutions	22-May-2023
2	Infosys	INFY	Launch of Infosys Topaz , an AI-first suite of services, solutions and platforms using Generative AI	23-May-2023
3	Reliance Industries Ltd.	RELI	Partnership with NVIDIA to build AI infrastructure and develop AI applications, including foundation AI models	08-Sep-2023
4	HCL Technologies	HCL	Launch of HCLTech AI Force , a Generative AI platform for software development and engineering lifecycle	05-Mar-2024

Company	Announcement Date
Tata Consultancy Services (TCS)	22-May-2023
Infosys	23-May-2023
Reliance Industries	08-Sep-2023
HCLTech	05-Mar-2024

Daily closing prices of the chosen stocks and the corresponding prices of the NIFTY 50 Index are used in the analysis. The NIFTY 50 Index is used as a market proxy to compute expected returns.

➤ Event Window

For this study, the event window used is (-5, +5). It entails 11 trading days including 5 days prior to the announcement of the AI news, the announcement day itself, and another 5 days after the announcement of the news.

This window was selected with the aim of taking into account information leakage and delayed investor reaction before and after the announcement of the news respectively.

➤ Estimation of Returns

The daily stock returns and market returns are estimated using the logarithmic return method, as it provides continuously compounded returns and minimizes the effect of extreme price fluctuations. The daily stock returns and market returns are calculated using the logarithmic return approach:

$$R_{it} = \ln \left(\frac{P_t}{P_{t-1}} \right)$$

Where:

- R_{it} = Daily return of company i on day t
- P_t = Closing price on day t
- P_{t-1} = Closing price on the previous trading day

The market return is calculated using the NIFTY 50 index prices using the same method.

➤ Market Model

The Market Model is employed to estimate the normal or expected return of each stock during the estimation window. It assumes a linear relationship between the return of an individual stock and the return of the market index. The model is expressed as: The expected return of each stock is estimated using the market model:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \epsilon_{it}$$

Where:

- R_{it} = Actual return of stock i on day t
- R_{mt} = Market return of NIFTY 50 on day t
- α_i = Intercept term
- β_i = Stock sensitivity to market movements
- ϵ_{it} = Error term

The estimated expected return is compared with the actual return to calculate abnormal returns.

➤ Calculation of Abnormal Returns

Abnormal Return (AR) represents the excess return earned by a stock due to an event after removing the normal market-related return. Abnormal Return (AR) represents the difference between the actual return of the stock and the expected return estimated through the market model.

$$AR_{it} = R_{it} - E(R_{it})$$

Where:

- AR_{it} = Abnormal return of stock i on day t
- R_{it} = Actual stock return
- $E(R_{it})$ = Expected return based on the market model

➤ Calculation of Cumulative Abnormal Return (CAR)

The cumulative abnormal return is calculated by summing abnormal returns over the event window.

$$CAR_i = \sum_{t=-5}^{+5} AR_{it}$$

Where:

- CAR_i = Cumulative abnormal return of stock i
- AR_i = Abnormal return of stock i on day t
- $t = -5$ to $+5$ = Event window consisting of five trading days before the event day, the event day (0), and five trading days after the event

CAR measures the total abnormal return generated by each company during the event period.

➤ Calculation of Cumulative Average Abnormal Return (CAAR)

To assess the overall market reaction across all sample companies, the Cumulative Average Abnormal Return (CAAR) is computed by averaging the cumulative abnormal returns of all firms included in the study.

$$CAAR = \frac{1}{N} \sum_{i=1}^N CAR_i$$

Where:

$CAAR$ = Cumulative Average Abnormal Return

CAR_i = Cumulative Abnormal Return of company i

N = Total number of companies included in the sample

➤ Hypothesis of the Study

The study tests the following hypothesis:

➤ Null Hypothesis (H_0):

AI-related announcements do not have a significant impact on the stock returns of selected Indian companies.

➤ Alternative Hypothesis (H_1):

AI-related announcements have a significant impact on the stock returns of selected Indian companies.

The statistical significance of abnormal returns is evaluated using t-statistics and p-values at a 5% significance level.

IV. RESULTS AND DISCUSSION

➤ Descriptive Statistics

Table 2 presents the descriptive statistics of daily stock returns for Reliance Industries, TCS, Infosys, HCL and the Nifty 50 index during the study period from 1 July 2022 to 31 December 2025.

Table 2 Descriptive Statistics of Daily Stock Returns for Reliance Industries

Variable	Mean	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Probability
Reliance	0.000417	0.012590	0.126223	6.374578	414.1628	0.0000
TCS	-0.000010	0.012444	0.387464	5.378826	226.3789	0.0000
Infosys	0.000108	0.015160	-0.246768	7.839741	855.9446	0.0000
HCLTech	0.000587	0.014370	-0.157584	7.136491	622.4242	0.0000
Nifty 50	0.000583	0.007663	-0.461143	9.221217	1430.542	0.0000

• Interpretation

As is evident from the descriptive statistics, all selected firms have achieved relatively high daily average returns close to zero, as usual with daily return on stocks. HCL demonstrated the highest average daily return of 0.000587,

and Nifty 50 0.000583; while TCS had marginally negative average return (-0.000010).

Among the companies selected for the study, the highest volatility 0.015160, was demonstrated by Infosys followed by

HCL 0.014370. Meanwhile, the Nifty 50 proved the lowest volatility 0.007663.

It can be observed from the skewness coefficients that the distribution of the returns is different; Reliance and TCS have positively skewed returns, whereas Infosys, HCL Technologies, and the Nifty 50 have negatively skewed returns.

All of the selected variables have kurtosis coefficients significantly higher than three, meaning their distribution is leptokurtic, i.e., has fat tails, implying that extreme stock price changes occurred. Additionally, the Jarque-Bera

probability coefficients for all of the time series are lower than 0.05, implying that the stocks do not follow normal distribution.

In summary, it can be concluded that the selected stocks have all typical features of financial return series.

➤ *Abnormal Return Analysis*

In order to test for the market reaction to AI-related announcement of companies, abnormal returns of firms were calculated within the event period. Significance of abnormal returns was tested using one-sample t-test.

Table 3 Significance of Abnormal Returns was Tested Using One-Sample T-Test

Company	Mean AR	t-value	p-value	Decision
TCS	-0.000096	-0.038499	0.9700	Not Significant
Infosys	0.003497	1.589574	0.1430	Not Significant
Reliance	-0.002419	-1.552636	0.1516	Not Significant
HCL	-0.000462	-0.144914	0.8874	Not Significant

• *Interpretation*

However, the abnormal return calculation shows that there is no significant abnormal return on all four AI-related news at the 5 percent significance level.

TCS had a very low negative abnormal return of -0.000096 with a p-value of 0.9700, which implies that there was no significant reaction of investors to TCS's AI news.

There was a positive abnormal return of 0.003497 for Infosys, which implies a favourable reaction of the stock market to this news. However, the p-value of 0.1430 is greater than 5 percent, which implies that the positive reaction of the stock market is not statistically significant.

There was a negative abnormal return (-0.002419) of Reliance Industries, but the p-value of 0.1516 implies that there was no significant reaction of the market to the AI partnership news.

In the same way, there was a very low negative abnormal return (-0.000462) of HCL Technologies with a p-value of 0.8874, which implies that there is no significant abnormal return.

➤ *Cumulative Abnormal Return (CAR) Analysis*

The cumulative abnormal return (CAR) was calculated for (-5, +5) event window to evaluate the total market reaction surrounding each AI announcement.

Table 4 Cumulative Abnormal Return (CAR) Analysis

Company	Event Date	CAR (-5,+5)
TCS	22-May-2023	-0.0010565
Infosys	23-May-2023	0.03846376
Reliance	08-Sep-2023	-0.066118
HCLTech	05-Mar-2024	-0.0055478

- *Interpretation*

Analysis of the CAR outcomes shows varied market reactions among the chosen firms.

Infosys exhibited the greatest positive CAR (0.038464). It means that investors positively assessed the AI move and were expecting future advantages from using AI-driven services in the business.

The CAR for TCS is -0.0010565 and it implies that the market almost did not react to the news. It can mean that the AI move was already expected by investors.

The greatest negative CAR is shown by Reliance Industries (-0.066118) which means that the investors reacted adversely to the AI move and might be concerned about costs, uncertainties, and delayed profits.

Finally, the negative but slightly negative CAR was shown by HCL Technologies (-0.0055478).

The findings show that the investors' reaction to every AI move was determined by individual expectations and did not depend on one pattern.

➤ *Cumulative Average Abnormal Return (CAAR)*

The cumulative average abnormal return across all four companies was calculated to assess the overall market reaction to AI-related announcements.

Table 5

Measure	Value
CAAR	-0.008564635

- *Interpretation*

The CAAR value of -0.008565 implies that the AI news, on average, has generated slight negative abnormal returns during the event window period. It can be implied that the Indian investors had an approach of caution towards AI news.

Since although AI is considered a disruptive innovation, the investors might have had concerns about the implementation costs, uncertainties associated with commercialization, competitiveness, and also the long-run benefits that it might bring. The positive CAR value of Infosys reflects that the investors give good returns to companies whose AI news has a commercial potential.

➤ *Hypothesis Testing*

- *Null Hypothesis (H_0)*

AI-related announcements do not have a significant impact on the stock returns of selected Indian companies.

- *Alternative Hypothesis (H_1)*

AI-related announcements have a significant impact on the stock returns of selected Indian companies.

- *Decision*

Since the p-values for all companies are greater than the 5 percent significance level, the null hypothesis cannot be rejected.

- *Interpretation*

According to the empirical findings, there was no statistically significant abnormal return due to the AI-related announcements made by these firms during the chosen event windows. Even though Infosys had a positive abnormal return and Reliance had a relatively large negative CAR, there was no statistical significance. Therefore, the AI announcements have not generated consistent excess returns for the investors.

From these findings, it can be inferred that the Indian stock market was either expecting the AI announcements or they were absorbing the information gradually. The investors seem to appraise AI projects depending on the strategy involved in the long run.

This version will be appropriate for use in an MBA dissertation or research thesis.

V. CONCLUSION AND IMPLICATIONS

This research focuses on the reactions of the stock market to AI announcements made by selected firms in India through the use of the event study technique. This study will test whether such announcements create abnormal returns for stocks and add value immediately for the stockholders of these firms. The research is performed on four big Indian firms, namely Tata Consultancy Services (TCS), Infosys, Reliance Industries, and HCLTech, using the window of (-5,+5) around the announcement date.

It was found out that the selected Indian companies have experienced different market reactions to the AI announcements. Infosys had a positive CAAR, which implies positive perceptions of the investors with regard to the company's AI-related efforts. On the other hand, the CAARs of TCS, Reliance Industries, and HCLTech were negative, implying that investors viewed AI announcements from the selected firms with some caution. Overall, the negative CAAR of -0.008564635 signifies a slightly negative average market response to the AI announcements.

Moreover, the results of the statistical significance tests indicate that abnormal returns are not significant for any of the chosen firms. As all the p-values are greater than the 5% level of significance, the null hypothesis cannot be rejected, which implies that AI announcements do not have a significant effect on stock returns in the short run. The results imply that despite being significant, AI announcements are not translated into abnormal returns.

VI. IMPLICATIONS OF THE STUDY

The conclusions reached from the research have far-reaching effects on the various stakeholders in the field of investment and financial management. To investors, the findings suggest that while an AI announcement should not be assessed only based on the announcement, it should rather be evaluated against the company's strategy, execution capability, and financial advantages in the long run.

Corporate managers will also learn from the research that an AI announcement is not enough to generate immediate shareholder value; it needs to be communicated strategically with clearly communicated objectives and benefits of such AI investments.

In addition, the findings will provide some useful information on how companies operating in emerging markets with technological focus can benefit from AI in their organizations, considering that AI is becoming necessary for competitiveness but market response depends on how investors perceive such AI initiatives.

VII. LIMITATIONS AND FUTURE RESEARCH SCOPE

The analysis has been conducted using a small sample of just four firms and AI-specific announcements, which might pose a problem for the generalization of results. Second, the study considers the short-run response of stock market only and fails to analyze the long-run effect of AI adoption on the financial health of the firm.

Further research might consider expanding the sample size, including other companies and multiple AI-related events. Future studies could also consider the relation between AI adoption and long-run firm performance indicators like profitability and productivity.

Overall, the study contributes to the growing body of literature on AI and stock market performance and proves that AI announcements affect the sentiment of investors but do not cause any abnormal returns.

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