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An Analytical Study on Impact of AI on Stock Prices of IT Sector

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Abstract

Examining how AI has affected IT stock prices is the focus of this research study. Investors, analysts, and lawmakers must comprehend the consequences of artificial intelligence (AI) on stock prices as these technologies continue to infiltrate many sectors, including the financial sector and the stock trading industry. A concise synopsis of the study's methods, main results, and implications is given in this abstract. Using state-of-the-art analytical approaches, this research uses a vast dataset of stock prices and AI-related news and developments to look at how AI progress affects IT stock price fluctuations. The study examines the effect on stock prices of AI-related variables, including AI adoption by IT businesses, AI-driven developments, and market attitude towards AI technology, using machine learning algorithms and statistical models.

There are substantial relationships between AI-related events and changes in the stock values of IT businesses, according to the study's results. In particular, stock prices are correlated with positive developments in artificial intelligence (AI), such as advances in AI research, effective AI deployments, and supportive regulatory policies towards AI. In contrast, stock prices are correlated with negative events, like AI failures or ethical controversies. Additionally, the study investigates how market circumstances, firm attributes, and investor sentiment moderate the association between AI and stock prices. Investors looking to take advantage of AI-related possibilities in the IT sector will benefit greatly from the study's findings, which highlight critical aspects that affect the size and direction of AI's effect on stock prices.

Beyond the world of stock trading, the study has ramifications that guide the strategic decision-making of IT corporations, lawmakers, and regulators. Companies may improve their resource allocation, risk management, and utilisation of AI technology to boost

competitiveness and shareholder value by gaining a deeper knowledge of the relationship between AI breakthroughs and stock prices. Ultimately, this study adds to our knowledge of how AI affects IT stock prices and provides useful information for those involved in bridging the gap between digital finance and technology.

Keywords – Artificial Intelligence (AI), Stock prices, Data analysis, Machine learning, Market sentiment

Introduction

An area of intense interest for investors, analysts, and industry players in the rapidly changing world of finance and technology is the relationship between AI and stock prices in the IT sector. The stock markets are becoming more and more shaped by artificial intelligence (AI) technologies, which include machine learning algorithms, natural language processing, and predictive analytics. These technologies impact investment choices and market behaviours. In order to grasp the relevance of studying the effect of AI on IT stock prices, this introduction lays the groundwork.

An ideal setting for the implementation of AI would be the information technology industry, because to its penchant for groundbreaking innovations and disruptive technologies. The use of artificial intelligence (AI) in a variety of financial market solutions, such as algorithmic trading systems and sentiment research tools, is opening up new possibilities for profit making and risk management. While AI has great potential for improved insights and streamlined processes, the impact of AI on stock prices is still a complicated and ambiguous topic.

This study sets out to unravel these knotty problems by providing an in-depth evaluation of the complicated interplay between AI and IT stock prices. Finding out how AI affects stock prices and what that means for investors and market players is the goal of this research, which makes use of a large dataset including past stock prices, AI-related news, and market sentiment indicators.

The primary goal of this study is to determine how advancements in artificial intelligence (AI) have affected IT stock prices; secondary goal is to determine how market circumstances, company-specific variables, and investor sentiment have moderated the relationship between AI and stock prices. This research aims to fill a gap in our knowledge

by analysing the impact of AI on stock market dynamics and investing strategies using quantitative data, machine learning techniques, and qualitative insights.

In addition, policymakers in charge of regulations and the IT sector as a whole, as well as those working on investment plans driven by artificial intelligence, may anticipate far-reaching consequences from this study. This research seeks to improve the investing ecosystem by illuminating the relationship between AI developments and stock prices. By doing so, it hopes to educate stakeholders about the advantages and disadvantages of AI in the financial markets.

Essentially, this research is a first step in understanding how artificial intelligence (AI) affects IT stock prices. It will also help with future studies and strategic efforts to use AI's transformational power for financial and technological innovation and growth.

Literature review

To predict KSE's stock market volatility, Usmani et al. (2016) employed a mix of characteristics and Artificial Neural Networks. For its analysis, this research used artificial neural networks including SVM, RBF, and single and multi-layer perceptrons. Factors that formed the basis of this research include commodity prices, market history, news, worldwide currency rates, gold and silver prices, among others. The inputs were the news and Twitter feed, and the outputs were good and negative. In addition to finding that fuel price was the most important factor in evaluating KSE performance, this research found that foreign currency had no impact on KSE performance and that the multi-Layer perceptron algorithm performed the best of the algorithms tested.

Sharma, Bhuriya, and Singh (2017) surveyed the state of the art in effective regression models for forecasting stock market values using historical data. The survey used a variety of regression approaches, including logistic regression (LR), sigmoid regression, polynomial regression, and RBF regression. It follows that the multiple regression analysis could benefit from a broader set of variables.

Using supervised learning methods such as SVM, KNN, Naïve Bayes, random forest (RF), and SoftMax, Kumar et al. (2018) were able to forecast stock prices. Several machine learning models were merged with technical indicators in this investigation. For feature extraction, 10- and 50-day moving averages were considered. Various indicators, such as

the Relative Strength Index (RSI), which shows if the stock is overvalued or oversold, the rate of change (RoC), volatility, which shows how returns for a specific firm are spread out, the Disparity Index (DI), which compares a selected moving average to the most recent closing price, the stochastic oscillator, which shows where the trading session is in relation to the relative high-low range, momentum indicator Williams % R, which shows how much higher or lower the final closing price is relative to the highest point, volume price trend, and the Commodity Channel Index (CCI) are computed to find the current price level in relation to the median price over a certain time period. Amazon, Bata, Bosch, Cipla, and Eicher motor's historical data over the last 5-10 years was used for the study. Evaluation criteria like as F-measure, recall, accuracy, and precision were used to assess the models' performance. The research shows that when it comes to large datasets like Amazon, Bata, and Bosch, the RF model is the most accurate, but when it comes to smaller datasets like Cipla and Eicher, the Naïve Bayes method yields the best results. The research found that algorithms' ability to forecast stock market movement decreased as the quantity of statistical characteristics decreased.

Mankar et al. (2018) and colleagues performed a comparable systematic literature review using Twitter sentiment analysis. This classification analysis used Naïve Bayes and SVM. Conditional recurrence and characteristic frequency are computed using Python's Natural Language Toolkit (NLTK) as part of the preprocessing in this work. The best and most practical way to predict stock market movements based on social feelings was found to be support vector machines (SVM).

In order to forecast stock market values using past data, Sadia et al. (2019) provide a framework. For their investigation, the researchers in this study used RF classifiers, SVM classifiers, and an RF algorithm. Furthermore, a confusion matrix has been created to evaluate the performance of the models. The RF algorithm was determined to be the best appropriate for stock market prediction using a variety of data points extracted from previous stock data after the accuracy was measured. The efficacy of random forest in forecasting stock prices using sentiment analysis-based logistic regression is examined by Kompella, Chilukuri, and Kalyana (2019). The inputs consist of stock data from the past and news headlines. Sentiment analysis is used to compute the polarity score. Additionally, the algorithm's efficacy was measured using a number of error measures, including variance score, Mean Absolute Error (MAE), Mean Squared Error (MSE), and Mean

Squared Log Error (MSLE). It has been determined that when it comes to sentiment categorization for stock market forecasting, the RF algorithm performs better than logistic regression.

Hiransha et al. (2018) used deep learning models to predict the performance of stocks listed on the NSE and NYSE. Based on the prediction of five stock prices listed in the two indexes, this research discovered that neural network models outperformed linear models, namely ARIMA. The closing price prediction analysis in the research by Vijh et al. (2020) (Vijh et al., 2020) was conducted on five NYSE-listed major capitalization equities. In order to conduct their analysis, they used machine learning techniques including ANN and RF. Evaluation tools such as root mean square error (RMSE) and mean absolute percentage error (MAPE) were used to examine the models' performance. In terms of accurately predicting stock values, ANN did better than RF, according to the data.

Khan et al. (2020) developed a methodology to predict the future direction of a stock market using certain external factors, such as news and social media postings. The research found that pre-processing steps, such as feature selection and the removal of spam tweets, improve the accuracy of stock projections. Another research that compared several approaches and their advantages and disadvantages was carried out by Rao, Srinivas, and Mohan (2020) to examine stock movement. Stocks in the Nifty 50 index were predicted using eight different supervised machine learning models, which were evaluated and compared (Singh, 2022). The research used data collected over the last quarter of a century. Since linear dependent data is better handled by regression than by support vector machines and gradient descent, the research showed that neural networks were not as effective as linear regression. The researchers looked at the NYSE stock price movements using a linear regression model with three-month moving averages and exponential smoothing predictions (Umer, Awais & Muzammul, 2019). The results showed that exponential smoothing performed better than linear regression and three-month moving averages in making predictions.

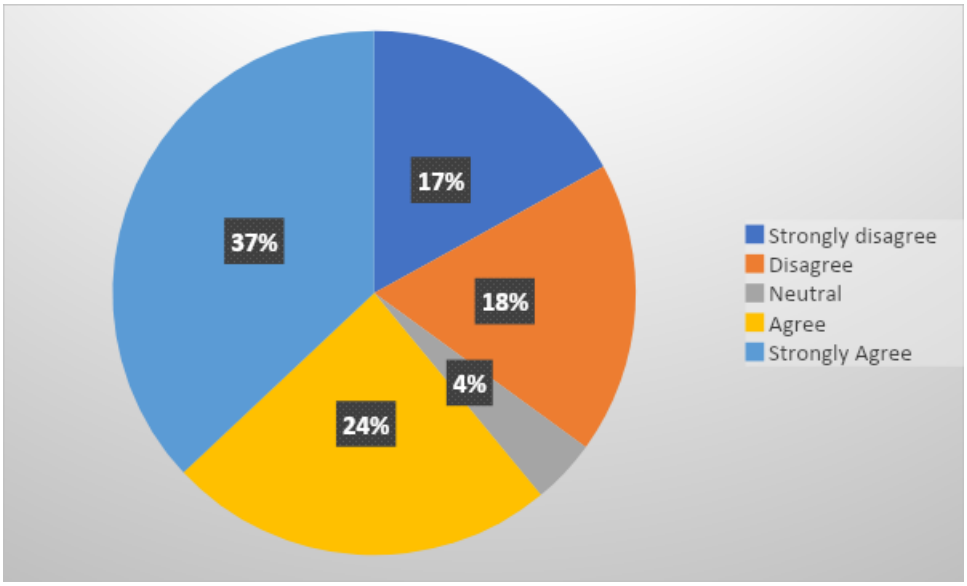
Objectives of the study

1. To analyze historical stock price data alongside AI-related news and developments to quantify the direct influence of AI advancements.
2. To investigate how market conditions, company-specific factors and investor sentiment moderate the relationship between AI and stock prices.
3. To identify and prioritize key factors driving the magnitude and direction of AI's impact on stock prices.

Research methodology

Pulled out announcements, press releases, articles, and stock price histories pertaining to artificial intelligence (AI) and IT firms from the appropriate stock exchanges. Gathered extensive datasets across a specified time frame by using web scraping tools, financial databases, and news aggregators. Conducted quantitative study to investigate the direct influence of AI on stock prices inside the IT industry. Used statistical tools to measure the impact of AI-related news on stock price changes, including regression and correlation analysis as well as event research methodology.

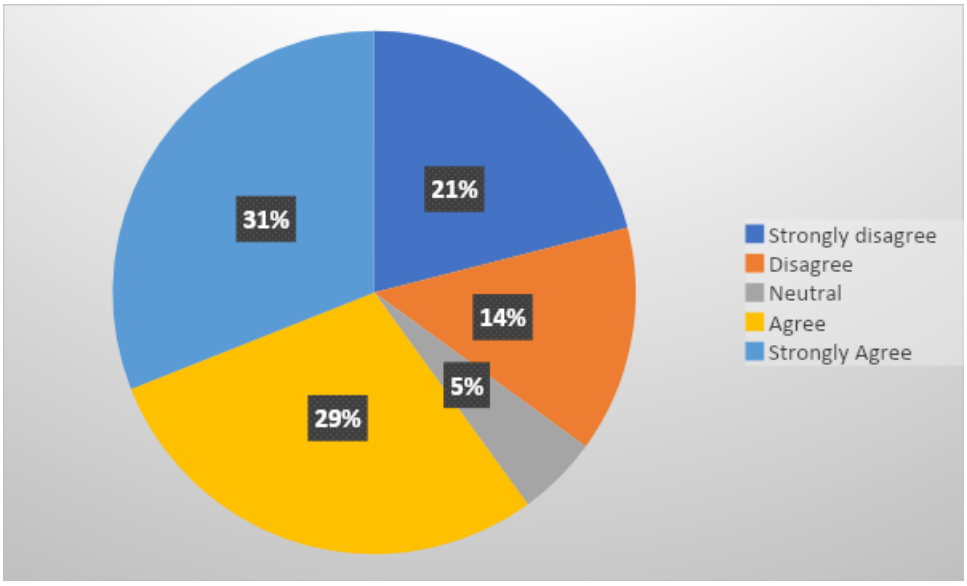
Data analysis and discussion



Graph 1 - The Impact of Artificial Intelligence on Traditional Equity Businesses

Nearly two-thirds of those who took the survey agree or strongly believe that AI will open up new trading possibilities for established stock companies. What this means is that most

people think AI will greatly improve and revolutionise stock market trading. It would seem that there is not a lot of doubt about how AI will affect conventional equity firms, given the small percentage of those who strongly disagree or disagree. It is important to mention that 22% of the respondents do not have an opinion or are unsure about the statement, suggesting that there is some scepticism or ambiguity among some respondents. Almost all respondents expect more trading possibilities made possible by AI, which bodes well for the future of conventional equities trading firms, according to the research. The increasing acknowledgment of AI's revolutionary capacity to revolutionise stock trading and the financial markets is reflected in this hopeful outlook.

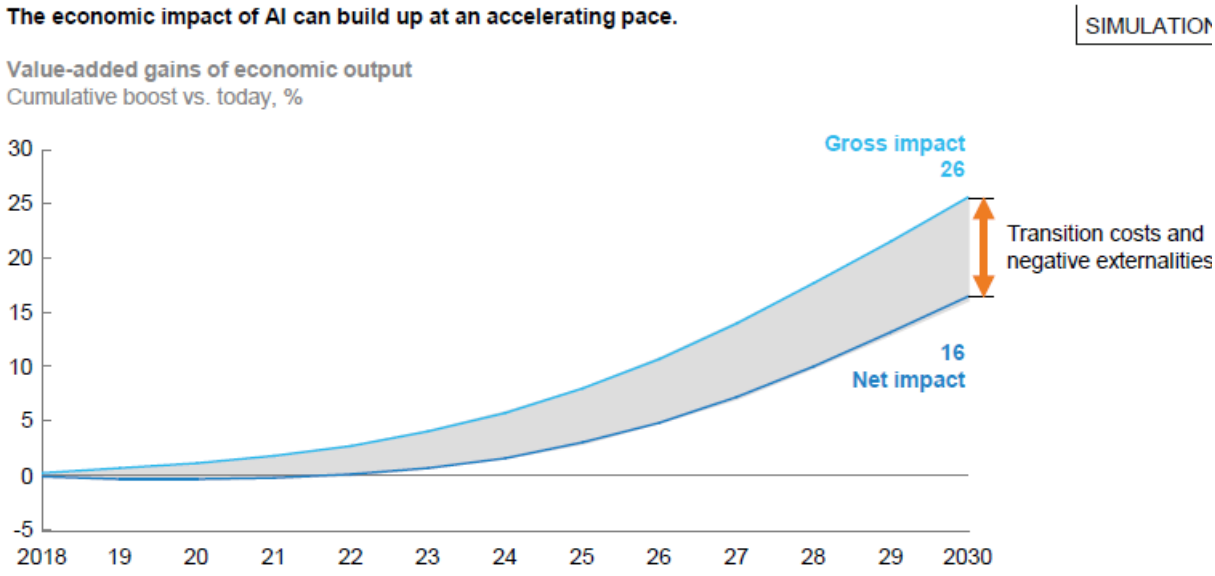


Graph 2 - Artificial Intelligence is expected to lower the expenses associated with trading.

Nearly two-thirds of those who took the survey agree or strongly believe that AI will make trading cheaper. The majority of respondents believe that AI has great promise for reducing trading costs via increased efficiency, better decision-making, and automation. A large majority of respondents anticipate savings in trade processes made possible by AI technology, however a sizeable percentage of respondents (35%) either do not agree or have indifferent thoughts. This hopeful view is in line with the larger story of how AI is changing the financial markets, where algorithmic trading and automation are becoming more commonplace.

There does not seem to be a great deal of doubt about the possibility of AI to reduce trade costs, given the smaller percentages of respondents who either strongly disagree or

disagree. Nevertheless, it is crucial to recognise that a small number of responders, as shown by the indifferent and disagreeing replies, have some doubt or ambiguity. Taken as a whole, the numbers support the general belief that the financial sector will see lower trading costs as a result of AI-driven efficiency. Further advancements in AI and its incorporation into trading processes could bring about the anticipated savings in costs, which should spur even more innovation and acceptance of algorithmic trading in the financial technology sector.



Graph data show that AI has both positive and negative effects on the economy, with positive benefits and negative externalities occurring at the same time:

Value-added benefits: The anticipated increase in economic production is a reflection of AI's revolutionary capacity to drive development, innovation, and productivity improvements across a wide range of industries and sectors. We may anticipate that artificial intelligence (AI) will play an ever larger role in driving economic growth and prosperity as these technologies develop further. Negative externalities and transition costs: There are costs and hurdles to managing the shift to economies powered by AI, notwithstanding the advantages of AI. Possible biases in AI systems, invasions of privacy, wealth disparity, and the loss of jobs are all examples of such issues. Proactive governmental initiatives, funding for reskilling and education programmes, and ethical guidelines for AI research and implementation are necessary to mitigate these externalities and costs of transition. In sum, the graph shows how AI's economic effects are very

dynamic, highlighting the necessity for a comprehensive strategy to reap the most advantages while minimising the dangers and difficulties of AI-driven changes. Policymakers, corporations, and society as a whole may make the most of AI's capabilities to promote long-term, equitable economic development by gaining a better grasp of and responding to these processes.

Conclusion

Research into AI's potential monetary effects has shown a complex scene, full of possibilities and threats. The estimated cumulative rise in economic production reaching 30% by 2030 demonstrates the significant potential of AI technologies to promote economic development, innovation, and productivity increases. This potential will only increase as these technologies mature. It is critical to recognise the existence of transition costs and negative externalities linked to the adoption and integration of AI, in addition to these value-added advantages. Addressing the issues of transition costs and negative externalities is crucial, notwithstanding the upward trend of value-added gains, which highlights the revolutionary potential of AI to increase economic performance and competitiveness. Proactive governmental interventions, investments in education and reskilling programmes, and the creation of ethical frameworks for AI deployment are necessary to address these difficulties, which include job displacement, economic disparity, privacy concerns, and ethical considerations.

To successfully navigate AI's economic effect, lawmakers, companies, and society as a whole must strike a balance between maximising AI's advantages and minimising its dangers and difficulties. This calls for the promotion of responsible AI research and deployment, the creation of an environment conducive to AI innovation, and the guarantee of fair access to the possibilities brought about by AI-driven innovations. To tackle the intricate dynamics of AI's economic effect, it is essential for stakeholders to work together and communicate. Collectively, stakeholders can exploit AI's potential to generate sustainable and equitable economic development by supporting openness and accountability in AI governance, exchanging best practices, and creating multi-stakeholder collaborations.

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