

FACTORS AFFECTING ALGORITHM TRADING IN NEPAL

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CERTIFICATION OF AUTHORSHIP

I hereby confirm that I have researched and submitted the final draft of dissertation entitled “**A Study on Factors Affecting Algorithm Trading in Nepal**”. The work of this dissertation has not been submitted previously for the purpose of conferral of any degrees nor has it been proposed and presented as part of requirements for any other academic purposes.

The assistance and cooperation that I have received during this research work has been acknowledged. In addition, I declare that all information sources and literature used are cited in the reference section of the dissertation.

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June, 2024

REPORT OF RESEARCH COMMITTEE

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ABBREVIATIONS

ANN	: Artificial Neural Networks
ATS	: Automated Trading System
BFI	: Banking and Financial Institution
CDS	: Central Depository System
DEMAT	: Dematerialization
DPS	: Dividend per Share
EPS	: Earning Per Share
ETF	: Exchange Traded Fund
GDP	: Gross Domestic Product
HFT	: High Frequency Trading
IPO	: Initial Public Offering
NEPSE	: Nepal Stock Exchange
NOTS	: NEPSE Online Trading System
NRB	: Nepal Rastra Bank
ROA	: Return on Assets
SEBON	: Security Board of Nepal
SEC	: Security Exchange Center

ABSTRACT

The primary objective of this study was to investigate the variables that affect algorithmic trading in Nepal and to examine the correlation between the variables and performance metrics. This study uses a causal and descriptive research strategy to study relationship between variables and discover relationships between them. The quantitative data gathered from respondents through questionnaire distribution served as the foundation for the research findings. All parties involved in the financial markets are included in the population. 109 stakeholders of the Nepalese financial markets were selected as a sample from the overall population. The primary data used in the study were gathered through the use of a structured questionnaire technique. The SPSS software version was used to show and analyze the data that had been gathered.

The results indicated a strong correlation between performance metric and the factors influencing algorithmic trading, such as market indicator, algorithmic strategy, market microstructure, economic indicators, technological infrastructure and regulatory environment. Every independent variable had a statistically significant effect on the choice of any individual investor. Additionally, market indicator, algorithmic strategy, market microstructure, economic indicators, technological infrastructure and regulatory environment all had a significant role in forecasting the algorithmic trading performance metric.

Keywords: *Algo trading, HFT, Online Trading, Automated Trading,*

CHAPTER I INTRODUCTION

1.1 Background of the study

One of the earliest types of business is the exchange of products, an activity that dates back thousands of years. To get what they desired or needed that they were unable to generate on their own, humans started exchanging items. Trade first appears in the Stone Age, when humans traveled great distances to exchange tools and other products. Humans created new means of trading commodities and services when communities and trade progressed to a higher level. Bartering was one of the first types of trade in which products and services were swapped for one another. For many centuries, this system was effective, but it was frequently hard to locate someone who was interested in what you had to offer or who possessed what you desired. In order to get around this issue, people started using a wide range of objects as money. These might include valuable items that were generally acknowledged to have value, such as shells, gold, and other precious metals.

People started to create more advanced financial systems as trade expanded and cultures grew more complicated. The rise of banking in ancient societies like Babylonia is among the first instances of this (Armstrong, n.d.). Temple priests served as bankers, accepting deposits from traders and merchants in exchange for products and cash. This method made it possible to exchange commodities and services and to store wealth in a secure manner. During the Middle Ages, trade and banking both grew, and guilds were established to control trade and safeguard merchants' interests. Modern banking emerged as a result of the expansion of international trade in the 16th and 17th centuries, which necessitated a safe means of money transfers between nations. As a result, the first stock exchange, where shares of the Dutch East India Company were traded, was founded in Amsterdam in 1602 (Beattie, 2024).

The financial market is the mechanism or platform on which different investors' trade different kinds of financial assets. Stocks, bonds, currencies, derivatives, commodities, etc. are examples of financial assets. These kinds of platforms are important for moving money from places of excess to those in need. The efficient distribution of capital and financial resources is the fundamental role of the financial markets in maintaining a healthy and functional economy. Investors can also take part in capital gains through the

market over time. The state of the economy, investor mood, and other external factors are reflected in the frequent fluctuations of the financial markets. They are fundamental components of a modern economy, encouraging resource efficiency as well as the growth of enterprises and economies.

The financial system is critical in any economy because it promotes economic growth and has an impact on economic performance and well-being. This is made possible by financial infrastructure, which transfers funds from companies with money to those who can put it to better use (Mwange, Kafwabulula, & Marebesa, 2022)

Financial markets are smart and complex nowadays, offering a vast array of trading tactics and products. They are essential to the global economy because they make it easier for capital to move across borders and give companies the money they need to expand and innovate. Since the earliest days of bartering and selling, financial markets have advanced significantly, and they will continue to do so as new and innovative modern technologies are developed.

Broadly there are two types of markets, Capital Markets and Money Market:

Capital Market: Markets where long term financial assets are traded is known as Capital Markets. Capital Markets comprises stock Market, Bond Market, Currency Markets, derivative Markets, where assets having duration of more than one year are traded

Money Market: Markets where financial instrument having duration less than a year are traded. The instruments traded in Money Markets are T – Bills, Commercial Papers, and Certificate of Deposits, etc.

The basic function of the financial markets is to efficient allocation of the capital and financial assets to run the economy smoothly and effectively. The market also allows the investors to participate in capital gain over the time. Financial markets change often to reflect changes in the economy, investor sentiment, and other external variables. They are essential elements of a contemporary economy, promoting the effective use of resources and the expansion of businesses and economies.

The application of algorithms in financial markets has grown recently. These algorithms search through enormous volumes of financial data for patterns and trends using statistical analysis and intricate mathematical models. They can be applied to a number of tasks, such as trade execution, risk management, and market analysis. Algorithms are

utilized in the financial markets, among other things, to help traders make judgments. Traders can create trading strategies that automatically execute trades in response to particular market conditions, including price changes or the occurrence of particular events, by using algorithms. For example, an algorithm may initiate a buy order when a stock reaches a particular price. While machine learning algorithms hold immense potential, they are most effective when combined with human expertise and domain knowledge (Paranjape, 2023).

Acquiring stock is similar to purchasing a business, as stock purchases involve acquiring a stake in a particular company (Cagan, 2016). The sole stock exchange in Nepal where government bonds and corporate securities are listed is the Nepal Stock Exchange (NEPSE). Through its members and market intermediaries like brokers and market makers, NEPSE makes transactions easier on its trading floor. Their online page provides daily trading information, and many commentators make predictions about the share market based on changes in daily prices. A stock's value fluctuates, and forecasting its price is a challenging task due to the numerous variables at play, including psychological aspects and both irrational and rational behavior. These elements combine to make stocks unpredictable and volatile. Even yet, stock prediction remains a popular topic, with many research articles using both artificial neural networks (ANN) and conventional financial models to predict stocks with a high degree of accuracy (Gaire, 2019), (Saud & Shakya, 2021); (Shrestha, et al., 2020).

Finding the variables influencing algorithm trading in financial markets is a key focus of this study. For the purpose of analyzing the variables influencing algorithm trading, the data are based on the stock price that is reported on the Nepal Stock Exchange (NEPSE).

1.2 Financial Markets in Nepal

With the establishment of Nepal Bank Limited on 1937 AD under Nepal Bank Act 1937, financial markets in Nepal were formally started. Later, Nepal Rastra Bank (NRB) was established as a central Bank of Nepal in 1956 and all the banks and all the Financial Institution are regulated by Nepal Rastra Bank. In 1976 Security Exchange Center (SEC) was established with the objectives to mobilize and manage the transaction of financial securities in the Market as security market intermediaries. Its major activities were purchase, Underwrite and Sale the securities directly or through its licensed Brokers.

Before the establishment of Security Exchange Center, altogether 36 public enterprises were established during company act. In 1983, Security Exchange Act 1983 made it obligatory to trade the securities through recognized exchange center of licensed brokers and opened its floor for secondary trading of the stock from 1984. After 1984 the formal trading of the securities in the financial markets is started. After establishment of Security Board of Nepal (SEBON) in 1993 as a regulatory body for the regulation of capital market, Security Exchange Center has been converted into Nepal Stock Exchange (NEPSE) as a trading platform to investors for trading of securities in secondary market

1.3 Phases of Trading Method in Nepal

With the establishment of security exchange center in 1976, it facilitates the enterprises to issue and underwrite the securities in Market and Security Exchange Act 1983 make it obligatory to trade the securities from recognized exchange center or licensed Broker. Since the formation of the NEPSE, Nepal's stocks trading procedures have seen considerable changes, switching from conventional manual trading systems to modern computerized trading platforms. Here's an overview of how securities trading practices in Nepal have grown:

1.3.1 Manual Trading (1990)

When the Nepal Stock Exchange (NEPSE) was founded in 1994, trading was performed using a manual open-outcry technique. Brokers and traders were physically present on the trading floor, yelling out bids and offers to complete trades. This method of trading exists till 2007.

1.3.2 Introduction of Electronic Trading (2007)

In 2007, NEPSE began using electronic trading instead of the conventional open-outcry mechanism. This upgrade significantly increased the market's efficiency, transparency, and accessibility, and marked a significant shift in how equities were traded in Nepal.

1.3.3 Dematerialization of Securities (2011):

In 2011, NEPSE implemented the Central Depository System (CDS) and dematerialized securities. This replaced traditional physical share certificates with electronic records, streamlining the process of purchasing, selling, and transferring securities electronically.

1.3.4 NEPSE Online Trading System (NOTS):

NEPSE introduced the NEPSE Online Trading System (NOTS) in 2018 to facilitate electronic trading of securities. Investors could place orders and execute trades electronically through brokerage firms, making the trading process more efficient and accessible. This allows investors to trade and settle securities electronically from anywhere within the NEPSE trading time frame.

1.3.5 Automated Trading (Algorithm Trading):

In recent years, there have been efforts to modernize Nepal's trading infrastructure. This includes the creation of more advanced automated trading platforms and systems known as algorithm trading. This type of system is not fully implemented but practice separately for data analysis. On the basis of data provided by system the investor/trader trade the stock in secondary market.

Algorithm method is latest method of trading of financial securities from Financial Markets. It automates the buying and selling process of securities from markets and ensure the return to investors from trading. Currently this method of trading is not implemented and practice in Nepal, however various investors are practice to use certain tools to analyses the movements of securities price and develop entry and exit strategies accordingly.

1.4 Automated Trading (Algorithm Trading)

Algorithms are being used more frequently on financial markets. These algorithms search through enormous volumes of financial data for patterns and trends using statistical analysis and intricate mathematical models. They can be applied to a number of tasks, such as trade execution, risk management, and market analysis. Algorithms are utilized in the financial markets, among other things, to help traders make judgments. Traders can create trading strategies that automatically execute trades in response to particular market conditions, including price changes or the occurrence of particular events, by using algorithms. For example, an algorithm may initiate a buy order in response to a stock reaching a particular price or a particular news event. The usage of algorithmic trading has increased significantly over the past 20 years. It gained popularity in the early 2000s and contributed over 25% of the total volume by 2005. After a decade, it held roughly 85% of the total market share in the USA. Similar growth has reportedly occurred in the Swedish markets, according to Swedish media. In a 2011 poll conducted by the Swedish

Financial Supervisory Authority, more than 80% of the questioned companies stated that they employ algorithms in their investing plans, despite the fact that it is challenging to verify the precise involvement of algorithms in trading volume (Hagg, 2023)

Real-time market data analysis is the foundation of algorithmic trading, which uses pre-established rules and algorithms to make trading decisions. Algorithms used in algorithmic trading range in complexity from straightforward rules-based algorithms to more advanced algorithms that leverage machine learning and artificial intelligence methods. A trader must first create and develop an algorithm, or collection of algorithms, that will be utilized to execute trades before they can begin algorithmic trading. Numerous elements, including technical indicators, basic data, current events, and sentiment analysis, might serve as the foundation for these algorithms.

The first electronic trading platforms appeared in the 1970s, making the history of algorithmic trading relatively recent. However, over the past few decades, as technological advancements have made it faster and easier to assess market data and execute transactions automatically, the use of algorithms to automate trading choices has rapidly evolved. A team of financial engineers at Morgan Stanley created the first algorithmic trading system in the early 1980s. The "Portfolio Systematic Trading" (POSIT) system leveraged statistical models to detect market mispricing's and automatically execute trades to profit from them. Due to its success, the system served as a model for numerous other algorithmic trading systems that came after. Algorithmic trading has grown to be a vital tool for many traders nowadays, especially those who need to execute trades fast and precisely or who trade in huge numbers. The availability of trading platforms and APIs that let users create and implement their own algorithms has also made algorithmic trading more accessible to ordinary traders.

1.5 Problem Statement

Nepal has very short history in the Capital Market and trading of financial securities in secondary market. With the establishment of NEPSE, it started with the open-outcry method and reach online trading system till date. With the technological advancement, investors developed various techniques and strategies using new technology and system to ensure the return on Investment reducing associated cost, time and human error. The investors can perform their trading using online trading platform via computers and mobile device in just few clicks. Within the short history, Nepalese investors are quite

friendly in adopting new technologies for analyzing the stock and develop trading strategies accordingly. The major changes took place after the establishment of central depository system (CSD) in 2067 BS. CDS and clearing started the work of making the stock market more paperless in the field of technology (Investopaper, 2020)

Currently some investors such as Merolagani, Chukul, Sharesansar, etc. are using different system and software for Technical and Fundamental analysis of securities trading in Nepal Stock Markets. This platform is not fully automated for the trading due to lack of infrastructure and regulatory restriction but provides the different fundamental and technical information for trading of securities. This study will be concentrating on finding a solution for following problems:

- i. What types of financial instruments are available for trading in the Nepalese financial markets?
- ii. Is infrastructure for algorithmic trading established and available in Nepal?
- iii. What does an investor think about algorithmic trading, and how does it influence the way they respond to investing?

1.6 Objectives of the Study

In recent days, trading is not limited only on buying and selling of securities to book a profit on the basis of movement of security price. Over the time, it adopts advanced technologies to develop the strategies and trading of securities. After experimenting with various strategies and platforms, global Financial Markets is competing in developing and implementing Algorithm Trading with high-tech systems and infrastructure to ensure profit while considering all micro factors that affect trading profit margins. While algorithmic trading has become an essential of global financial markets, it is still in its beginning in Nepal. Hence, the objectives of this studies are:

- i. To identify the factors affecting algorithmic trading in Nepal.
- ii. To examine the relationship between Factors affecting algorithmic trading and the profitability.
- iii. To investigate the impact of algorithmic trading on Nepalese financial market.

1.7 Rational of the Study

Over the years, Nepal's financial markets have undergone significant changes. With the establishment of the Nepal Stock Exchange (NEPSE) and the liberalization of financial policies, interest in capital market activities has grown. With the introduction of online

trading platforms and increased participation from retail investors, Nepal's financial landscape has taken on new dimensions.

While algorithmic trading has become a staple of global financial markets, it is still in its early stages in Nepal. The potential for algorithmic trading in Nepal, however, cannot be exaggerated as financial markets evolve and technology becomes more accessible. It is critical for market participants, regulators, and policymakers to understand the role and impact of algorithmic trading in Nepal's financial ecosystem.

Studying algorithmic trading in Nepal's financial markets is not only suitable, but also critical for shaping the country's capital markets' future. It provides an opportunity to capitalize on technological advancements, improve market efficiency, and contribute to Nepal's financial ecosystems overall growth and stability. This section explains why studying algorithmic trading is important in Nepal, highlighting the specific trends, challenges, and opportunities that make it an important area of research and development in the country's financial markets.

CHAPTER II

LITERATURE REVIEW

Under this section, every possible effort has been made to grasp the current knowledge and information from official documents, books and magazines, articles, journals, etc. to identify and analyze the Factors that affects algorithm trading. The first section will include conceptual review for critically understanding the algorithm trading and factors affecting algo trading. The Second section will include previous research work and article analysis, which provides certain ways of looking at the concept and practices of financial market.

2.1 Theoretical review

A theoretical review provides a thorough overview and critical review of the present state of knowledge by integrating existing ideas and concepts linked to a particular topic. It points up gaps, conflicts, and directions for more study. This kind of review aids in emphasizing important concepts and provides the background for further research.

Stock Markets

The public markets used for the issuance, purchase, and sale of stocks that are traded over-the-counter or on stock exchanges are referred to as the stock market. Equities, or stocks, are investible assets that represent a portion of a company's ownership. Investors can purchase and sell stocks on the stock market. Since it enables businesses to easily obtain capital from the public, a well-functioning stock market is seen as essential to economic growth. Rjumohan (2019) defines stock market as an aggregation of buyers and sellers of stock and need not be a physical location or a discrete entity. Stock markets are also known by different names as share markets and equity markets.

The stock market fulfills two crucial functions. The first is to give firms capital so they can finance and grow their operations. Giving stock buyers the chance to participate in the earnings of publicly traded corporations is the stock market's secondary function. There are two ways that stock purchases might benefit investors. A certain amount of money is paid out as dividends on certain equities on a regular basis to shareholders. Alternatively, investors may turn a profit on their stock purchases by selling it at a higher price than when they bought it.

A new investment model emerged as a result of the East India Company's founding in London. Importing firms began to offer stocks that, in essence, represented a fractional

ownership interest in the business. As a result, investors were able to earn returns on their investments from all of the voyages the company funded, rather than just one. Companies were able to rapidly expand the size of their shipping fleets by requesting bigger contributions per share thanks to the new business model. Because investors could make enormous returns on their investments, they were highly popular when they invested in these firms, which were frequently shielded from competition by royally-issued charters. Although investors might swap company shares with one another through paper issuance, there were no regulated exchanges until the London Stock swap (LSE) was established in 1773. Even though there was a great deal of financial unrest immediately after the LSE was founded, exchange trading as a whole continued to thrive throughout the 1800s.

Many people regularly trade stocks on the stock market. When a firm intends to offer stock shares in order to become publicly traded, investment banks handle the initial public offering (IPO) of stock. In addition to buying and selling stock for their clients who could be ordinary or institutional investors stock brokers often act as consultants. Investment banks, hedge funds, mutual fund companies, and stock brokerage firms are employers of equity research analysts. These are people that conduct research on publicly listed firms in an effort to predict whether the price of the company's shares will increase or decrease. Due to their extensive stock market buying and selling, fund managers, also known as portfolio managers, comprise hedge fund managers, mutual fund managers, and exchange-traded fund (ETF) managers. The mere fact that a well-known mutual fund chooses to make a large investment in a given stock can frequently increase demand for the stock by a considerable amount and raise its price.

Stock Market Index

Typically, a number of stock market indexes follow and reflect the overall performance of the stock market. A collection of equities chosen to represent the overall performance of stocks makes up stock indexes. The actual stock market indices are traded as futures and options contracts, which are also traded on regulated exchanges. In the financial markets, indexes function as benchmarks for a variety of reasons. The Dow Jones Industrial Average, Nasdaq Composite, and S&P 500 are the three most widely used U.S. indices, as previously indicated. The NEPSE has three price indices the float index, the sensitive price index, and the NEPSE index that show the direction of the market. Because the regular NEPSE index is constructed using a "Market Capitalization-Weighted" methodology, the value of the index is very susceptible to changes in the prices of the

stocks that have the largest market capitalization. Investors are given an inaccurate picture of the overall performance of the market because the NEPSE index accounts for all promoter shares, government holdings, strategic shares, employee shares, and all other locked-in shares when computing the index. Float index and sensitive float index were thus established by NEPSE to provide investors with a more accurate view of market performance.

The term "free-float methodology" describes an index development process that, in calculating the index and allocating weight to individual stocks within it, solely considers a company's free float market capitalization. Since it only includes shares that are issued to the general public or that are available for trading on the market, a free float index more accurately represents market trends. Promoters' holdings, government holdings, strategic holdings, and other shares that are locked in, such as staff shares, are not included. Each company's market value is decreased to the degree of its easily tradable market shares, which also lessens the concentration of the top few firms. Large corporations with sizable amounts of shares locked in are thus included as well, avoiding their disproportionate influence on the index. The excessive impact of a high number of shares that are locked in is examined. It will increase investors' confidence by providing a clearer picture of the actual market.

Algorithm Trading

Using computer algorithms to automatically create and carry out deals in financial markets is known as algorithmic trading. These algorithms can be programmed to automatically execute trades based on established rules and criteria. They are intended to analyse market data and discover trading opportunities. Many different types of market participants employ algorithmic trading, including hedge funds, investment banks, and individual traders. It can be used for a variety of financial assets, including stocks, bonds, currencies, and futures. Due to recent technological advancements, the abundance of data, and advantages like faster execution and the capacity to trade in big volumes without the need for human interaction, algorithmic trading has grown in popularity.

Bias, Foucault, & Moinas (2012) Show that HF traders can generate gains not only from trade but also from adverse selection, due to their faster access to information. However, a social planner would only consider gains from trade; as a result, HF traders overinvest in technology, a strategy leading to socially undesirable outcomes. Overall, existing

theoretical models agree that HFT has undesirable consequences for liquidity traders, informational efficiency, and volatility, and these effects may well result in lower social welfare

Davey (2018) Algorithms have strict definitions. The program will advise you to go long if it detects a long setup today. It will advise you to go long again if it notices the same configuration the next day. The algorithm simply examines the data that it was designed to examine. It doesn't give any consideration about the news, what the Fed believes, or the fact that Jim Cramer declared last night that a particular stock was a buy until, of course, you incorporate those kinds of rules into your algorithm. The algorithm adheres to the rules in a consistent manner.

Factors Affecting the Stock Trading in Nepal

Pradhan (1993) research on the behavior of the stock market in a tiny capital market in the context of Nepal. According to the research, a number of variables, including market equity, returns, risk, book value, and price-to-earnings ratio, could limit the total worth of stocks. The author concluded that the turnover, leverage, and liquidity of the stock value were all directly correlated with market equity, book value, dividends, and price earnings. The author claimed that stocks with higher book values also had lesser liquidity and greater price-to-earnings ratios. Lower interest coverage and profitability were associated with smaller dividends. Larger equities showed an upward tendency than smaller stocks, according to the author's pattern.

2.2 Conceptual Review

Pradhan & Upadhyay, (2006) conducted research to The Efficient Market Hypothesis and the Behavior of Share prices in Nepal. After conducting a survey to gather the opinions of Nepalese financial experts, the author's preliminary study revealed that retained earnings, rights issues, bonus shares, and dividends all had an impact on share price. The authors emphasized that the stock index by itself was insufficient to determine the stock value and argued that the random walk hypothesis had no bearing on share prices. Following the methodology, the authors concluded that share price series would be more useful for testing the random walk hypothesis than index series. The testing resulted in a rejection of the null hypothesis, which claimed that share prices were randomly distributed. The authors concluded that the primary factors influencing the share price were retained earnings, rights issues, bonus shares, and dividends. The authors also concluded that

publicly accessible data, including share price series, was pertinent and helpful in identifying securities.

Khanal (2009) concluded the study with that the efficiency and effectiveness of NEPSE are found to be impacted by a number of factors, including weak governance, unstable political environments, a lack of strong, enforceable laws, a lack of commitment to putting the policies into action, and a lack of investor knowledge. In order for the securities market to grow quickly and become a necessary component of the nation's economic development, the obstacles and problems must be quickly resolved.

Lu (2016) Developed an automated trading system using machine learning algorithms for the study. The machine learning algorithms predict the target stock's returns for the upcoming day based on past price data. Ning Lu uses data spanning three months, from February 1, 2016, to May 1, 2024, for automated trading system testing and analysis. It was discovered when the results were analyzed that a company's historical stock price alone was insufficient to forecast its future returns. An improved approach would have been to consider the target company's whole industry and use past pricing data of all participating companies to forecast the target's return the next day. Predicting stock prices could also benefit from variables pertaining to macroeconomic concerns like interest rates, currency rates, and jobless reports, as well as corporate fundamentals like revenues and earnings. In the end, automated trading shouldn't be limited to algorithms, programming, and math; a working knowledge of fundamental market and macroeconomic concepts is also required in order to determine whether the automated trading system's back test results indicate future success.

England (2018) Published a supervisory statement in 2018 that included several regulatory provisions for algorithmic trading governance and risk management. The declaration included provisions for the algorithm's approval procedure according to a set format. The proprietors of the algorithm should be designated and responsible for its operation. As part of this responsibility, it is made sure that the algorithm has been properly designed, put into practice, tested, and deployed. The algorithm should incorporate "kill-switch" controls, which are manual and automatic mechanisms that halt trade or block user access and require human intervention to resume trading.

AI has been accelerating significantly in recent years, and as a result, it is now being used in real-world applications, such as business and stocks trading. In the same way, from less than \$500 million in 2007 to more than \$6 billion in 2017, investments in AI businesses have

grown recently. AI has many applications in a variety of industries, including business, to boost production and efficiency. Nevertheless, there are also additional difficulties. The source and reliability of the data present the biggest obstacles. The Algorithm uses the available data to give statistical facts, which may not be accurate for every individual. In contrast to humans, algorithms are designed to deal with particular issues according to predefined formats; they are not emotionally intelligent or capable of contextualizing information. Because of this, if something goes wrong, there are a lot of challenges and conflicts with regard to responsibility. (Meunier, International Banker, 2018)

Lee & Schu (2021) Was discussed how investors may seek damages for their losses and how regulators may hold algorithmic trading venues and corporations accountable for breaking the law. We talk about the firm's liability as well as the possibility of regulators being held accountable for errors. Since statutory immunity laws shield regulators from liability in most jurisdictions, unless they act in ill faith or unlawfully, they cannot be held accountable for mistakes made by market players.

Shen (2021) Presented an overview of the state of play and difficulties facing contemporary algorithmic trading. The study focused on algo trading technological aspects that traders should pay closer attention to, like connection stability, data server robustness, the efficiency of contemporary data analytics, and ultra-low latency trading systems. Trading institutions will ultimately succeed if they are dedicated to investing more in data analytics, technology, and control systems.

(Ozenbas, Schwartz, Pagano, & Weber, 2021) Has concentrated on the essential knowledge and abilities related to technology applications in financial markets in this chapter. The fundamental elements of IT systems were discussed, as well as concerns about risk management and market regulation. In addition to streamlining operations and cutting expenses for established institutions, the author pointed out how IT gives entrepreneurs and start-ups a chance to challenge established giants in the market. The author also emphasizes the importance of scalability, open architecture, and system reliability for improved system performance.

Gyawali (2022) examines the impact of DPS, EPS, P/E ratio, ROA, GDP, and inflation on MPS According to this study's use of descriptive and inferential statistics, the stock price is significantly and favorably impacted by DPS, EPS, and PE ratios. GDP and ROA have a little but positive impact on stock price, while inflation has a small but negative impact on market price per share. The study's results corroborate the theory that the price-

earnings ratio, dividend per share, and earnings per share all significantly and favorably affect stock prices. The idea behind the research is not supported by GDP or inflation.

The financial industry has seen significant change due to the rapid progress of technology, and algorithmic trading leading this charge. In addition to facilitating quick price adjustments, algorithmic trading, if improperly regulated, has the potential to increase price swings and cause market instability. When trading tactics are based on inaccurate or insufficient information, the prevalence of algorithms in price discovery raises questions regarding the trustworthiness and accuracy of market pricing. Future developments for algorithmic trading will be greatly influenced by ethical and regulatory factors. To handle the particular difficulties brought out by algorithmic trading, regulators have realized that new frameworks are required. Ensuring market integrity and protecting investors involves the implementation of risk management systems, market transparency efforts, and methods to detect market manipulation. Algorithmic trading systems' capabilities are changing as a result of technological developments like big data analytics, machine learning, and artificial intelligence. This progress has both advantages and disadvantages; ongoing study, cooperation, and regulatory framework modification are necessary. In short, technology developments in algorithmic trading have revolutionized the financial markets, improving price discovery, liquidity, and market efficiency. Algorithmic trading does, however, also bring with it issues with volatility, market fairness, and the moral application of algorithms. The promotion of innovation while maintaining systemic stability, investor protection, and market integrity must coexist in regulatory frameworks. A thorough and flexible strategy is required to handle new issues and encourage morally and responsibly conducted algorithmic trading as technology develops and algorithmic trading changes. (Garg, 2023)

Bamigbola (2024) The financial industry has undergone a transformation because to algorithmic trading, which offers quick and effective trade execution. It has benefits like lower costs and faster order fulfillment, but it also has drawbacks like the possibility of flash crashes. Artificial intelligence and machine learning will have a significant impact on algorithmic trading in the future as technology develops, underscoring the necessity of continual regulatory monitoring and alertness.

Future developments in regulations, dynamically changing markets, and fast technical progress will all shape Forex algorithmic trading. In order to remain competitive in the quick-paced and increasingly intricate Forex market, traders will need to adjust as AI, big data analytics, and HFT technologies continue to advance. In the dynamic world of Forex

algorithmic trading, traders can set themselves up for success by embracing new trends, innovations, and moral considerations (Forex GDP, n.d.)

2.3 Empirical Review

Analyzing a prior thesis involves evaluating its argument strength, consistency, and organization. This requires evaluating the concepts' coherence, the study methodology's strength, and the thoroughness and applicability of the literature review.

Chen, Roll, and Ross (1986) Identified four macroeconomic factors as the basic macroeconomic dynamics affecting stock market returns: changes in industrial production, changes in expected and unexpected inflation, changes in risk premium, and changes in term structure. In the US stock market, they discovered a long-term equilibrium link between stock prices and related macroeconomic indicators, spanning from 1953 to 1984. The analysis showed that the cross-section of stock returns might be considerably explained by macroeconomic conditions.

Karmi (2009) Study on the prospect and challenges of stock market development in Nepal. Only a tiny percentage of shares are traded actively, and the rest are either exchanged rarely or in smaller quantities, which results in low market turnover and weak liquidity. The corporate debt instrument market is still in its early stages. Due to a number of factors influencing the debt securities market, the general investor has responded poorly to the recently issued debenture. However, due to factors including stock market volatility, poor investment returns, a lack of financial market instruments, and insufficient information, investor confidence in the Nepalese stock market is very low. To give investors the impression that their money is secure, the government should foster an environment suitable to investment. Hence, the researches emphasis on formulating and implementing the required rules and regulation form the concerned regulator authority to develop the financial markets and more financial instrument to trade in the market

Zhang (2010) study was one of the first to look at HFT's effects on price discovery and volatility. It found that HFT increases volatility, particularly for equities with less liquidity. Instead of using market price returns as the basis for their volatility evaluation, they use the stock's fundamentals. Regression analysis is performed using the variables of earnings surprise volatility (sdROE), sales growth volatility (sdSGR), and analyst forecast dispersion. Proxies for news, such as earnings revision, are used to measure price discovery. For a quarter month, the price of the stock is compared to this proxy. They

concluded that HFT raises volatility, particularly for companies with significant institutional holdings and in uncertain periods. The market overreacts when news is fundamental and when HFT s are trading heavily.

Gautam (2010) The sound judgment of investors in the efficient stock market and the information that is now accessible are completely reflected in share prices. Information plays a crucial role in security pricing. Rumor and whims have been major factors in share price movements and investments in common stocks due to a lack of relevant information. Brokers can be very strict when it comes to offering their clients extra services. Their goodwill and moral obligation to investors are mostly derived from the quality of the information which results the better performance in stock trading. Hence, brokers should thus play a significant and accountable role in the growth of the securities market and absolutely refrain from getting involved in stock market problems.

Thapa (2014) was found that the primary issues preventing expansion of the financial markets in Nepal were unsuitable laws, regulations, and investor trust. Malpractices such as organized runs, cornering, warehousing, wash sale, and pooling are causing uncertainty in the stock price and weakening the trust of regular investors. In the same way, investors' primary motivators for purchasing stocks are dividends. The national economy is reflected in the financial markets. Therefore, the government and regulatory agencies should have a greater share of the responsibility for the stock market's sustainable growth, which ultimately benefits the nation's GDP and economy as a whole.

Huang, Huan, Xu, Zheng, & Zou (2018) The survey on Automated Trading Systems Statistical and Machine Learning Methods and Hardware Implementation was carried out. They emphasize that the financial market is heavily correlated with various sources of information, and that in order to make intelligent decisions, as much useful information as possible is considered. To meet the demand for real-time trade, dedicated hardware must be implemented to ensure accelerated computation and secure real-time communication. Meanwhile, increased sophistication in detailed subareas, such as the development of more sensitive indicators, fine-grained analytical methods in information extraction, and so on, will improve the system. Techniques such as network encryption security should therefore be further explored and exploited in the future for the purpose of data security.

Karki (2018) A study examining the variables influencing stock market price revealed that macroeconomic variables—such as GDP, interest rates, inflation, and the money

supply—had a greater impact. Karki's empirical investigation showed that these elements have a beneficial impact on the stock market's performance. However, the author discovered that additional investigation and testing revealed that the variables that resembled macroeconomic issues were not really responsible for the swings in stock prices. The author concluded that the Random Walk Hypothesis was followed by the Nepalese stock market. The author concluded that the variables appeared entirely random and lacked any pattern.

Burgess (2019) Discuss on both opportunities and challenges on using Algorithm trading in the trading Industries. There are a lot of opportunities for using machine learning and new technologies to generate the superior returns. With the increase in uses of technologies in trading, increase in trading Volume, increase in market sophistication decrease the profit margin from trading. To maintain the level of profit margin, it needs continuous up gradation of system, increase on reliable data sources, fast and efficient data processing system, strategies implementation speed and other technological and informational infrastructure. Hence the cost to maintain and keep the trading system up-to-date with the evolving market is the biggest challenges for all the investors.

Cheng, Huang, Chen, Meng and Li (2019) Investigate the factors influencing stock valuation, using an automated trading system. Automated trading has received a lot of attention in developed countries such as the United States as a new computer technology to help maximize return in security exchange markets. It implies that the appearance of ATS may influence stock price volatility, as previous research found that news media content had a significant impact on stock prices and could predict stock market movements. The design and execution of investment strategies have evolved from those that did not use ATS. These strategies can be defined as a systematic sequence of actions performed automatically by computer programs without the intervention of human emotions. An advanced ATS is expected to handle complex tasks such as data collection, screening, evaluating, archiving, and retrieval using appropriate analytical models and prediction techniques to assist users in making decisions and improving fund performance; adapting to market variations; and reacting as quickly as possible. The program employs a set of rules that are designed and combined to determine the timing, price, and trading volume. Massive amounts of information gathered and stored in the cloud are used to realize and execute entry and exit positions. To some extent, the speed of trade, which is important in trading, particularly for institutional investors, is

determined by the quality, reliability, speed and capacity of the server hardware and other infrastructure.

Upadhaya (2020) found that majority of investors believe that information leaks, logical decision-making, and herding are significant factors influencing investor behavior. All of the above—herding, information leaks, and sound judgment—have a favorable correlation with trading in investments. The study demonstrates that rational decision-making and information leakage have a favorable impact on investment trading, but herding behavior has a significant influence. The majority of investors agree with logical decisions, whereas a significant portion of them disagree with herding behavior. According to the survey, investors who responded showed signs of herding. One factor influencing their investment trading process was their wish to fit in with others.

Napate and Thakur (2020) stated on their research “Algorithmic Trading and Strategies”, that the algorithmic trading is the combination of core statistical data and advanced information technology. On the absence of either factor, algo trading is not possible and even cannot imagine about it. The researcher explorer two different in a time series data i.e. Simple Moving Average (SMA) and Exponential Weighted Moving Average (EWMA). After testing different time series data, the study concluded that relatively simple strategies are more useful in generating profits and analysis the market data for investors.

Maharjan (2021) Measures the impact of technology acceptance determinants on adoption intention of online stock trading of Nepalese investors on her research. Nepalese investors are more concerned on risk matters and easily influenced by the social groups regardless of having them capacity to use and control over the system. Hence the research conclude that Nepalese investors are more rely on social, emotional and psychological aspects which ultimately influence the implementation of the system and reliability on its outcome.

Bao, Nekrasova, Neugebauer and Riyanto (2021) Examines the empirical studies investigating the relationship between algorithmic and human trading in test markets. This means that the market environment and the asset's fundamental value process determine how effective algorithmic trading is. Further it also concludes that the implementation of algorithmic trading is depend on the intention of the traders. If it is implemented with the motive of price manipulation, it should be closely monitored and banned by the regulator.

Moradi, Appolloni, Zimon, Tarighi and Kamali (2021) Discovered how macroeconomic factors affected the likelihood of a stock market collapse in Iran's unstable economy. The 152 Iranian companies that are registered on the Teheran Stock Exchange make up the

entire sample of the study. The time frame for the study was 2014–2019. The primary factors are GDP, exchange rates, unemployment rates, and inflation. The findings indicated that while the GDP and exchange rates have a negative correlation with crash risk, there is a positive correlation between inflation, unemployment, and stock price crashes. Additionally, it seems that investors prefer to purchase company shares in order to maintain the purchasing power of their money when the exchange rate rises.

Agrawal and T (2022) Conduct the research on algorithm trading and its impact on market. According to the researcher, some stakeholders see algorithmic trading as the future of stock market trading methods. It is advantageous for traders who manage the trading on high volumes and various strategies. Retail traders, on the other hand, cannot afford the costs associated with running an algorithm, and it is even more difficult for them to exit or enter using a similar approach, despite the fact that the algorithm is significantly faster and more accurate. Similar to regulate these trading activities, adequate safeguards should be put in place to ensure that they benefit all types of investors and that, in order to avoid inequality, trading can take place concurrently and at the same time wherever the traders are.

Breedon, Chen, Ranaldo and Vause (2022) Investigate how algorithmic trading reacts to an extreme event on the forex market, such as the Swiss Franc. According to their findings, algo trading contributed to the decline in market quality of currency pairs that were directly affected on the event day and afterwards. Human traders, on the other hand, have taken over as the primary contributors to liquidity provision and efficient pricing.

Chugh, Agrawal, Shetty and Guruprasad M. (2024) examine the effects—both good and negative—of algorithmic trading on market volatility on their study. Anyone may now trade from the comfort of their home with online brokers, and when the system becomes smart enough to push orders, it's known as algorithmic trading. It is a very useful tool for automating large market players' use of order execution and timing. However, algo trading's development led to worries about how it may affect market volatility. Algorithmic trading operates according to preset rules; it is incapable of understanding the sentiment of the market like humans do. Therefore, by identifying weaknesses, the algorithm created to run the system may always be tweaked.

Table 1:

Summary of Empirical review

Author	Title	Objectives	Methodology	Findings
Chen, Roll, & Ross, 1986	Economic Forces and the Stock Market	To tests whether innovations in macroeconomic variables are risks that are rewarded in the stock market.	Time Series Analysis, Correlation Analysis	The author discovered a long-term equilibrium link between stock prices and related macroeconomic indicators. The analysis showed that the cross-section of stock returns might be considerably explained by macroeconomic conditions.
Karmi, 2009	Prospect and Challenges of Stock Market Development in Nepal	To evaluate the current situation of the Nepalese stock market, as well as the obstacles it faces and its future development potential.	Mean, Standard Deviation and Coefficient of Variance	Due to factors including stock market volatility, poor investment returns, a lack of financial market instruments, and insufficient information, investor confidence in the Nepalese stock market is very low. To overcome this situation the regulator should formulate and implement required rules, regulation and policies which increase the availability of financial instruments in Market and build the

				investors' confidence in Market.
Khanal, 2009	Analysis of securities trading system In Nepal	To analyze trend and prospective Security trading in Nepal	Ratio of Analysis, Correlation Coefficient and Time Series analysis.	The security trading is impacted by numbers of factors such as weak governance, political instability, lack of reliable information and other infrastructure. Hence for the sustainable development of the financial markets regulator must formulate appropriate policies which address the mentioned issues and develop the investors' confidence.
Gautam, 2010	Brokering service in Nepalese stock market	To examine the Brokerage Service, their performance and investors satisfaction towards the brokerage service	Percentage Analysis, Arithmetic Mean and Range	Due to the lack of relevant information, investors perform the transaction on the basis of rumors and whims. Hence, the brokers must be more responsible to disseminate the correct information to the investors with additional service as per the market requirement to stabilize a security price, rather than involving in price

				manipulation.
Zhang, 2010	High Frequency Trading, stock Volatility and Price Discovery	To examines the impact of high-frequency trading (HFT) on the U.S. capital market.	Descriptive analysis	The researcher concludes that HFT raises volatility, particularly for companies with significant institutional holdings and in uncertain periods.
Thapa, 2014	Examine the securities market performance in Nepal (A case study of Nepal stock exchange)	To detect problems and prospects of Security Market and examine the existing rules and regulation and their relevance in current situation	Ratio Analysis, Mean, Standard Deviation and Coefficient of Variation.	Due to the unsuitable rules and regulation, financial markets are struggling to take the pace of development. Further malpractice such as stock pumping and dumping, cornering, insider trading is causing the uncertainty in the stock price and market growth which ultimately weakening the trust and confidence of investors
Huang, Huan, Xu, Zheng, & Zou, 2018	Automated trading systems and statistical machine learning methods and hardware implementatio	To evaluate the advantages and disadvantages of technical analysis, High Frequency Trading and assess their future prospects	Qualitative Research approach	This study emphasize that the financial market is heavily correlated with various sources of information, and that in order to make intelligent decisions, as much useful information as

	n: a survey			possible is considered. To meet the demand for real-time trade, dedicated hardware must be implemented to ensure accelerated computation and secure real-time communication
Karki, 2018	Stock Market Responses to Macroeconomic Dynamics: Testing for Long-Run Equilibrium in Nepal	To analyzes the co-integrating relationship between stock prices and macroeconomic variables	This study use Long Run Equilibrium Analysis, Descriptive Correlation Analysis and Regression analyze a data	The study doesn't find long run- equilibrium relationship between macro- economy and stock prices and conclude that the macroeconomic variables could not explain the variation in stock prices in the long-run.
Burgess, 2019	An Introduction to Algorithmic Trading: Opportunities & Challenges within the Systematic Trading Industry	To identify the opportunities and challenges of Algorithmic trading in the trading industry	Theoretical analysis	There is a lot of opportunities to generate superior retunes Using machine learning and new technologies, however the cost to maintain and keep the trading system up-to-date with the evolving market is the biggest challenges for all the investors.

Cheng, Huang, Chen, Meng, & Li, 2019	An Investigation on Factors Affecting Stock Valuation Using Text Mining for Automated Trading		qualitative research and the text mining method	It implies that the appearance of ATS may influence stock price volatility, as previous research found that news media content had a significant impact on stock prices and could predict stock market movements.
Napate & Thakur, 2020	Algorithmic Trading and Strategies	To discuss the SMA and EWMA/EMA cross-over trading strategies in time series data and understanding trading strategies in quantopian environment which appears to be a good compromise between smoothness of data and analyze the stock price	Descriptive analysis	It was concluded that the algorithmic trading is the combination of core statistical data and advanced information technology and absence of either factor, algo trading is not possible and even cannot imagine about it. After testing different time series data, the study concluded that relatively simple strategies are more useful in generating profits and analysis the market data for investors.
Upadhaya, 2020	The impact of individual behavior of investors on stock market	The main objective of the study was to analyze the individual investors' behavior in Nepalese Stock	Descriptive Analysis, Correlation Analysis, Regression	Study concludes that, rational decision making and information leakage have favorable impact

	of Nepal	market. T	Analysis	on investment trading, however herding behavior has a significant influence. Wish to fit with others is one of the major factors which influence the trading process of the investment.
Bao, Nekrasova, Neugebauer, & Riyanto, 2021	Algorithmic Trading in Experimental Markets with Human Traders: A Literature Survey	To study the relationship between algorithmic and human trading in the market	Empirical Review	It was concluded that the implementation of algorithmic trading is depend on the intention of the traders. If it is implemented with the motive of market manipulation, it should be closely monitored and take required action by the regulator.
(Maharjan, 2021)	Technology Acceptance Determinants and Adoption Of Online Stock Trading In Nepal	To examine the behavioral intention of individual investors to adopt online stock trading in Nepal.	Descriptive Analysis, Structural Model	Research conclude that Nepalese investors are more rely on social, emotional and psychological aspects which ultimately influence the implementation of the system and reliability on its outcome.
Moradi, Appolloni, Zimon, Tarighi, &	Macroeconomic Factors and Stock Price Crash Risk	to investigate the effects of macroeconomic variables on stock	Descriptive Analysis, Coefficient of Variance,	The findings indicated that while the GDP and exchange rates have a negative correlation

Kamali, 2021		price crash risk in the economically uncertain conditions of Iran's market		with crash risk, there is a positive correlation between inflation, unemployment, and stock price crashes. Additionally, it seems that investors prefer to purchase company shares in order to maintain the purchasing power of their money when the exchange rate rises.
Agrawal & T, 2022	Algorithmic Trading and its Impact on the Market	To examine the impact of algorithmic trading in market.	Theoretical analysis	Algorithmic trading is advantageous for high volume traders with different strategies. Proper safeguard should be put in place to ensure the safeguard of retail trader and avoid inequality. Further the system should fast and accurate enough to implement the strategy effectively
Breedon, Chen, Ranaldo, & Vause, 2022)	Algorithmic trading around the Swiss franc cap removal	Examine how algorithmic trading reacts to an extreme event on the forex market, such as the Swiss Franc.	Descriptive Analysis	Author found that, algo trading contributed to the decline in market quality of currency pairs that were directly affected on the event day and afterwards.

Chugh, Agrawal, Shetty, & Guruprasad M., 2024	Algo Trading and its impact on Stock Market	To Investigate the impact of algorithmic trading on market volatility considering both positive and negative effect	Regression Analysis, Time Series Analysis and qualitative analysis	Both positive and negative part of algorithmic trading of Market volatility was examined on their study. They found that the execution timing and frequencies are the strong parts of algorithmic trading however it can be manipulated using the weakness of market which is the major concern in the trading market.
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The algorithm prediction world is highly dependent on the quality of the input data and finance, and data rapprochement is already problematic. Furthermore, this can have a significant impact on the outcome. The results cannot be completely trusted, which raises concerns, or the results may contain hidden biases that are difficult to detect. Diagnosis and correction of algorithmic errors to avoid distractions and significantly complicates. Emotional intelligence is lacking in AI-related tools and algorithms. They can be well-suited to particular problems and tasks only.

2.4 Research Gap

While algorithmic trading has grown in popularity in global financial markets, its implementation and application in Nepal's financial ecosystem may present unique challenges and opportunities. Market size, technological infrastructure, regulatory environment, and investor behavior are all factors that could have a significant impact on the feasibility and effectiveness of algorithmic trading in Nepal. It is critical for market participants, regulators, and policymakers to understand these factors in the context of Nepal. It enables the development of strategies and policies that are in line with the specific dynamics of Nepal's financial markets, ultimately contributing to the country's financial ecosystem's growth and stability.

With the advancement in technology and its easy access to various investors, Nepal's stock market has undergone substantial changes in recent years. Till date algorithm trading has not been practiced in Nepalese capital market, but various investors are attracted towards it and tries to adopt it as a supporting tool to analyses and develop the trading strategies. No any research was conduct regarding the factors affecting Algorithm Trading in the context of Nepalese capital Market. Hence, this study will focus on finding the factors that affect implementation of Algorithm Trading in the context of Nepalese Capital Market.

CHAPTER III

RESEARCH METHODOLOGY

3.1 Research design

The full process of preparing and performing a research study is referred to as research design. It acts as a road map, assisting researchers as they gather, examine, and evaluate data in order to find answers to their research questions or validate hypotheses. A Convenience Sampling research design was employed in order to meet the study's objectives. In this study, data was gathered by self-administered online and offline forms using a pre-defined questionnaire. The quantitative data gathered from the respondents through questionnaire distribution served as a foundation for the research findings.

3.2 Population and Sample Procedure

The population includes all the investors who are engaged in investing and trading in the various financial instruments available on Nepalese capital market. As we are not aware about the population size, we are using following Formula to calculate the sample size for the research:

$$\text{Sample Size} = \frac{(Z)^2 \times \sigma(1 - \sigma)}{e^2}$$

Source: WikiHow (2024)

Where,

Sample Size = Required number of responses distributing the research questions

Z = Z-Score

σ = Standard Deviation

e = Margin of Error

To calculate the sample size, we have assuming the confidence level of 90%, Standard Deviation 0.5, and Margin of Error +/- 10

$$\text{Sample Size} = \frac{(1.65)^2 \times 0.5(1 - 0.5)}{0.1^2}$$

$$\text{Sample Size} = 68.0625 \approx 68$$

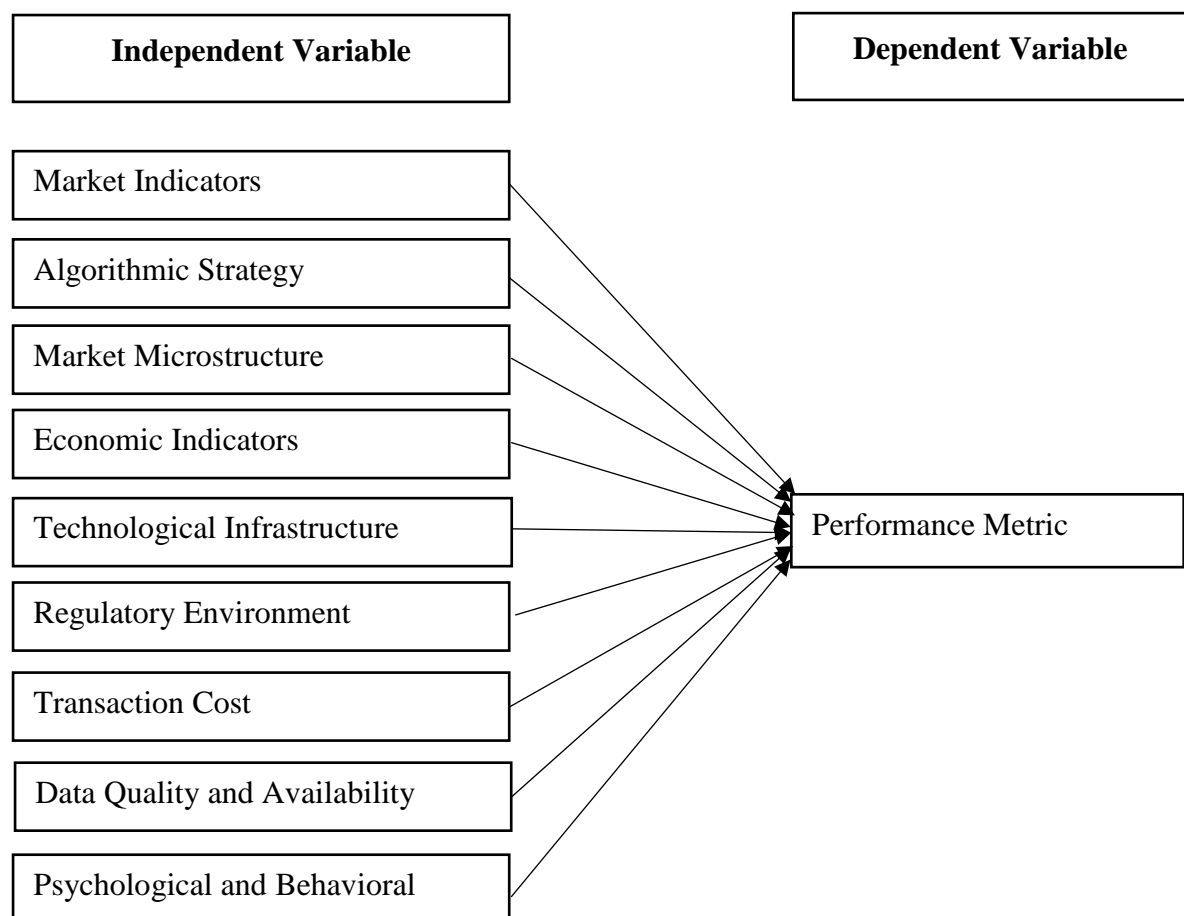
Utilizing the sample size formula, a total of 68 respondents are required for the sample. We have given out 100 sets of questionnaires for the study to various stakeholders and investors along with appropriate information regarding the topic and goal of the research. All of the participants have responded to the questionnaire that was sent. The response rate was 100% as a result.

3.3 Nature and Source of Data collection

The primary data used in the study was gathered from a variety of people through the use of a structured questionnaire technique. Likert scale questions with five points, ranging from one to five (Strongly Disagree to Strongly Agree), are included in the questionnaire. Participants who expressed interest in participating were given the questionnaire online, and responses were gathered.

3.4 Research framework and definition of variables

This study will define the relationship between following independent and dependent variables:



Source: Banerjee (2023), Srihith, Rajitha, Thriveni, Donald, & Blessy (2023)

3.4.1 Independent Variables

Independent variables are those that are thought to influence the dependent variable. They are variables or the inputs that can be changed or observed. The dependent variable changes as a direct result of changes in the independent variable. It is assessed and recorded how the influence affects the dependent variable.

Market Indicators Variable

Market-related variables can be critical independent variables. Stock prices, trading volumes, volatility, and other market indicators may be included. uTrade algos (2024) defines the market indicators as a statistical analysis applied to price and volume data of financial instruments, that are targeting to interpret past price movements and forecast future price direction. For example, to see how the algorithm performs under different market conditions, you could use daily stock returns as an independent variable.

Algorithmic Strategy Variables

The algorithm's parameters can be independent variables. For example, the look-back period for moving averages, risk tolerance, or other parameters such as trading frequency, signal generation frequency that can be configured. Algo strategies are trading intensive and the profitability from the selected strategy, directly depends upon the price and the impact of its execution (Gatev, Goetzmann, & Rouwenhorst, 1999)

Market Microstructure Variables

The dynamic process of price formation and the mechanisms by which assets are traded in financial markets are referred to as market microstructure. Microstructure strategies attempt to exploit the mechanics of electronic markets. The design of some markets permits data to be extracted and represented upon in a way that is difficult to reach without the help of an algorithm, for e.g. electronic limit order book. This information gives a knowledge about the supply and demand in the market at different prices and how the balance changes over time (Christiansen, 2009)

Economic Indicators variable

Fundamental analysis in algo trading depend on on a range of economic indicators to scale the health of an economy and predict future market trends. Traders use these indicators to update their algorithms, which in turn implement trades based on the predicted effects of economic changes (Metzger, 2024). Incorporating economic indicator

such as GDP, Inflation rate, interest rate etc. as independent variables can aid in capturing the larger economic context.

Technological Infrastructure Variables

The technological infrastructure is critical in the world of algorithmic trading for smooth and efficient execution. Low-latency exchange connectivity, robust and scalable hardware, and high-performance execution platforms are all critical factors. As technology remains to advance and algorithmic trading grows, a comprehensive and adaptive approach is needed to address emerging challenges and promote responsible and ethical practices in algorithmic trading (Garg, 2023). Overall, the backbone of successful algorithmic trading systems is a well-architected and strong technological infrastructure.

Regulatory Environment variables

The regulatory environment is critical in shaping algorithmic trading strategies, with variables such as compliance requirements, market structure regulations, and reporting obligations. The risks linked with algorithms do not only affect the firm that uses them but can have significant adverse effects on the whole market and even create a systemic risk (Lee & Schu, 2021). To ensure market integrity and investor protection standards, also traders must navigate rules imposed by regulatory bodies.

Data Quality and Availability

The availability and quality of data are essential for algorithmic trading to be successful. Traders can improve trading performance by developing more efficient algorithms and optimizing execution by having access to timely, accurate, and comprehensive data. Napate & Thakur (2020) defines trading is the mixture of core statistical methods and information technology. In the absence of either core statistical methods or information technology, such program of trading is not possible and cannot be executed. To tackle issues pertaining to data expenses, latency, and integration, calculated technological expenditures and collaborations with dependable data sources are necessary.

Transaction Cost

All costs incurred during the execution of transactions, such as brokerage fees, bid-ask spreads, and market effect costs, are included in transaction costs in algorithmic trading. These expenses have a big impact on how profitable trading techniques are. Transaction costs are a critical factor to consider as they influence the efficiency of market operations

and can impact the attractiveness of various investment opportunities (Foolish Java, 2024). In algorithmic trading, retaining a competitive advantage and overall profitability requires accurate estimation and a reduction in transaction costs.

Psychological and Behavioral

Emotional influences such as fear and greed are psychological and behavioral elements in algorithmic trading that can cause traders to unreasonably tamper with algorithms. The self-image and firm image coincidence, accounting information, advocate recommendation and personal financial needs factors had significant impact on the psychology of investors while making investment decision in stock market (Pandey, Risal, & Chauhan, 2020). Excessive risk-taking can arise from overconfidence in algorithms, and early trade exits due to loss aversion are potential consequences.

3.4.2 Dependent Variable

The outcome or result that you are attempting to explain or predict is known as the dependent variable. This could be a performance metric or measure of success for an algorithmic trading strategy in the context of algo trading research.

Performance Metric

In algorithmic trading, the performance metric serves as a quantitative measure to assess the effectiveness and efficiency of a trading strategy. Total returns, which assess the strategy's overall profitability; the Sharpe ratio, which considers risk-adjusted returns by factoring in volatility; maximum drawdown, indicating the greatest peak-to-trough decline; and metrics like the information ratio, which capture the strategy's ability to outperform a benchmark, are examples of common performance metrics. Other variables, such as win-loss ratios and average trade duration, aid in determining the consistency and efficiency of the strategy. The choice of performance metrics is determined by the trader's specific goals and risk tolerance, and it guides the ongoing optimization and refinement of algorithmic trading strategies.

3.5 Analysis tools

Data collection is meaningless until it is processed and examined. They are able to report results and provide interpretations thanks to data analysis technologies. The project's goals and the kinds of data gathered determine which tools are best for data analysis. The

reliability test, percentage frequency distribution, correlation coefficient analysis, and casual comparative analysis are the foundations of this study's qualitative data.

3.5.1 Reliability Test

Measurement or observation stability and consistency are referred to as reliability. The purpose of the reliability test is to evaluate the degree to which a specific instrument or measure yields reliable and consistent results. Testing for dependability is done to make sure that the information gathered is reliable and that errors or inconsistencies did not affect the results. The validity of the research findings may be compromised if a measure or instrument is faulty, which could result in incorrect conclusions.

For this study's reliability test, we have used internal consistency tool for assessing reliability used to analyze the data gathered for this research. This evaluates how well a test's or questionnaire's items measure the same underlying construct. Cronbach's alpha, sometimes referred to as the coefficient of reliability for scale-based measures, is a common metric. It is used to assess the dependability and internal consistency of assessments that took the form of continuous variables, such as the 5-point Likert scale. The degree of agreement is measured using Cronbach's alpha, which uses a uniform 0–1 scale. Greater agreement between the items is indicated by higher values.

Reliability test for the collected data is as follows:

Table 2:
Test of Reliability

	Variables	Cronbach Alpha	Number Of Items
1	Market Indicators	0.9038	4
2	Regulatory Environment	0.9259	4
3	Technological Environment	0.9571	4
4	Economic Indicators	0.9541	4
5	Market Microstructure	0.9085	5
6	Algorithmic Strategy Variables	0.9212	5
7	Transaction Cost variable	0.8696	5
8	Data Quality and Availability	0.9122	5
9	Psychological and Behavioral Factors	0.9077	5

10	Performance Metric	0.8860	5
11	Overall	0.7946	10

The criteria of Cronbach alpha for establishing the internal consistency are Excellent ($0.9 \leq \alpha$), Good ($0.7 \leq \alpha < 0.9$), Acceptable ($0.6 \leq \alpha < 0.7$), Poor ($0.5 \leq \alpha < 0.6$), Unacceptable ($\alpha < 0.5$).

The Overall value of Cronbach alpha for all study variables was more than 0.7, as shown in Table 3.1, supporting the idea that the study was reliable. The variable in this study with the highest Cronbach's alpha value is the Technological Environment Variable (0.9571). The data was highly reliable in terms of internal consistency, as demonstrated and followed by Market Microstructure Variable (0.9085), Economic Indicator (0.9541), Regulator Environment Variable (0.9259), Algorithmic Strategic Variable (0.9212), Market Indicator Variables (0.9038), Transaction cost Variable (0.8696), Data Quality and Availability (0.9122) psychological and Behavioral (0.9077) and Performance Metric (0.8860). This indicates that the question has the highest level of reliability.

3.5.2 Percentage Frequency Distribution

Data that show the proportion of observations for each data point or collection of data points is called a percentage frequency distribution. It is frequently used to convey additional data, such as the relative frequency of survey replies.

3.5.3 Descriptive Statistic

A group of methods used to list and arrange a data set's attributes is known as descriptive statistics. Descriptive statistics aid in our understanding of the distribution, central tendency, and variability of the data when undertaking quantitative research. The replies' average values were utilized to calculate the respondents' predisposition toward the specific attitude and entrepreneurial orientation. In a similar vein, the statistics indicating how much the whole answer varied from the mean values were ascertained using the standard deviation.

3.5.4 Correlation Coefficient Analysis

The degree of linear alignment between the data points of two variables is measured by the Pearson correlation coefficient. It has a range of 0 (no linear relationship) to 1 (perfect positive correlation), with -1 denoting perfect negative correlation.

$$r = \frac{n\sum xy - \sum x \sum y}{\sqrt{n\sum x^2 - (\sum x)^2} \sqrt{n\sum y^2 - (\sum y)^2}}$$

Where,

r = correlation coefficient

n = no. of year

$\sum x$ = Sum of series X

$\sum y$ = Sum of series Y

$\sum xy$ = Sum of the product X and

$(\sum x)^2$ = Sum of squares of series X

$(\sum y)^2$ = Sum of squares of series Y

3.5.5 Multiple Regression Analysis

Multiple regression is a statistical method that forecasts a response variable's value using a number of explanatory variables. It is a progression of linear regression, a method for predicting a variable's value when that value is dependent on another variable. Modeling the linear relationship between the explanatory (independent) factors and response (dependent) variables is the aim of multiple linear regression.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \dots + \epsilon_i$$

Where,

Y = Algorithmic Strategy Variables

β_0 = Constant parameter

$\beta_1, \beta_2, \beta_3$ and β_4 are the parameters to be estimated

X_1 = Economic Indicator Variable

X_2 = Market Indicator Variable

X_3 = Regulatory Environment Variable

X_4 = Economic Indicator

X_5 = Market Microstructure

ϵ = the models error term

The units change in the dependent variable as a result of a unit change in the corresponding independent variable are represented by the values β_1 , β_2 , β_3 , β_4 , and β_5 , which indicate the proportion of positive effect. It was decided to evaluate the multiple correlation coefficient for significance. The hypothesis that each independent variable would have an impact on the dependent variable was tested in order to determine the significance of the entire regression model.

CHAPTER IV

RESULTS AND DISCUSSION

The analysis of the findings from the data collection process is covered in this chapter. This study examines the examination and clarification of primary data obtained from 109 participants using questionnaires. Data were examined in light of the prior chapter's description of the research's goal. This chapter's main goals are to provide the questionnaire survey findings and evaluate and explain the data that was gathered. The results obtained from the data analysis satisfied the primary goal of this research project. As a result, this chapter provided and discussed the study's findings. Five scales Likert questionnaire were used ranging from five to one; where 5 represents strongly agree, 4 agree, 3 Neutral, 2 Disagree, and 1 Strongly Disagree. Regression analysis was employed in the study to evaluate the impact of the independent variable on the dependent variable. In order to gather data for the study, 109 questionnaires were given to people. All of the completed surveys were legitimate and included data for additional analysis.

4.1 Demographic Background of the Respondents

This part included the respondents' demographic information. The respondents' personal profiles were examined in terms of their understanding of algorithmic trading, experience with financial markets, age, gender, educational background, and experience. To characterize the respondents, descriptive statistics were run on the demographic variables. Furthermore, a statistical test was performed to examine the distinction between the impact of different factors of Algorithmic Trading and Performance Metric.

Table 3:

Demographic characteristics of the respondents

SN	Dimension	Frequencies	Percent
A	Age OF the Respondent		
1	Under 25 Years	13	11.93
2	25 to 35 Years	56	51.38
3	35 to 45 Years	21	19.27
4	45 to 55 Years	15	13.76
5	Above 55 Years	4	3.67
	Total	109	100.00

B Gender of Respondent			
1	Male	77	70.64
2	Female	32	29.36
3	Others	0	-
Total		109	100.00
C Education Background			
1	School Level	0	-
2	Intermediate Level	8	7.34
3	Bachelor's Degree	60	55.05
4	Master's Degree	40	36.70
5	Ph.D. or equivalent	1	0.92
Total		109	100.00
D Experience in Financial Market			
1	Beginner	32	29.36
2	Intermediate	51	46.79
3	Advanced	24	22.02
4	Expert	2	1.83
Total		109	100.00
E Knowledge of Algo Trading			
1	Limited	66	60.55
2	Moderate	43	39.45
3	High Expert	0	-
Total		109	100.00

Table 3 show the demographic characteristics of the respondents. The demographic characteristics was measured by age, Gender, Education Level, Experience in Financial Markets and Knowledge regarding the Algorithmic Trading. Each characteristic was further categorized into different groups. Age of the respondents was categorized into Under 25 Years, 25 to 35 Years, 35 to 45 Years, 45 to 55 Years, and Above 55 Years. The numbers of the respondent were 13, 56, 21, 15 and 4 respectively. The percentage of the respondent as per the age group is 11.93%, 51.38%, 19.27%, 13.76% and 3.67% respectively. Gender was grouped as Male, Female and Others. The frequency of Gender

is 77, 32 and 0 whose percentage was 70.64%, 29.36% and 0% respectively. Educational Background was categorized under School Level, Intermediate Level, Bachelor Level, Master Level and PHD or Equivalent. The frequency of the respondent under education level is 0, 8, 60, 40, and 1 respectively. The percentage is 0%, 7.34%, 55.05%, 36.70% and 0.92 % respectively. Experience in Financial markets is grouped as Beginner, Intermediate, Advanced and Expert with the frequency of 32, 51, 24, and 2 respectively. The percentage was 29.36%, 46.79%, 22.02% and 1.83 respectively. Similarly, Knowledge of Algo Trading was categorized as Limited, Moderate and High Expert with the frequency of 66, 43, and 0 respectively. The percentage of the received numbers of response is 60.55%, 30.45% and 0% respectively.

4.2 Descriptive Statistics of Dependent and Independent Variables

For a sample of data, a variable or variables are summarized and described using descriptive statistics. Additionally, descriptive statistics can be applied to analyze associations between two variables (bivariate analysis), three variables or more (multivariate analysis), or simply one variable at a time (univariate analysis). The rest of this page describes univariate, bivariate, and multivariate analysis methods that use and present descriptive statistics.

4.2.1 Market Indicators Variable

Through descriptive analysis, the several scenarios of the Market Indicators Variable are presented in this section. The Market Indicators variable of the Algo Trading in this study comprises four distinct statements that were assessed using a five-point Likert scale, Strongly Disagree to Strongly Agree (1 to 5)

Table 4:

Descriptive Statistics of Market Indicator Variable

S. N	Statements	Mean	Std. Deviation
1	Technical Indicators such as Relative Strength Index (RSI), Moving average convergence divergence (MACD), Bollinger Bands (BB) etc. plays significant role for designing, developing and implementing the algorithmic trading strategies.	4.44	.517
2	Interpreting indicator signals accurately is crucial for successful algorithmic trading	4.52	.502
3	Incorporating historical price patterns into algorithmic trading models enhances their predictive capabilities	4.53	.501
4	Market indicators play a crucial role in generating trading signals for my algorithms	4.52	.520
5	Overall	4.51	.449
6	Valid N (listwise)	109	

Table 4 shows the descriptive statistics of the market Indicators variable which includes different four statements where the overall mean was 4.51 with the standard deviation of 0.449. Among the four statement, “Technical Indicators such as Relative Strength Index (RSI), Moving average convergence divergence (MACD), Bollinger Bands (BB) etc. plays significant role for designing, developing and implementing the algorithmic trading strategies]” has lowest mean (i.e. 4.44) with the standard deviation of 0.517 and statement “Incorporating historical price patterns into algorithmic trading models enhances their predictive capabilities” has highest mean (i.e. 4.53) with the standard deviation of 0.501. Similarly, the statement “Interpreting indicator signals accurately is crucial for successful algorithmic trading” and “Market indicators play a crucial role in generating trading signals for my algorithms” were mean value of 4.52 and 4.52 with the standard deviation of 0.502 and 0.520. Here all the respondents were in between strongly agreed (5) and strongly disagree (1). Thus, this section presents the Market Indicator variable on Performance metric through descriptive analysis was good.

4.2.2 Regulatory Environment Variable

Different Policies and control mechanism implemented by different regulatory Body impact the execution of algo trading in actual market and ultimately affect the profit metric. This study aims to identify whether the regulatory environment impact on performance metric. The regulatory environment variable consists four distinct statements that were assessed using a five-point Likert scale, Strongly Disagree to Strongly Agree (1 to 5)

Table 5:

Descriptive Statistics of Regulatory Environment

SN	Statements	Mean	Std. Deviation
1	Changes in regulatory requirements have a significant impact on the development and implementation of algorithmic trading strategies	4.49	.502
2	Overly strict regulations on algorithmic trading could hinder innovation and market efficiency	4.54	.501
3	Algorithmic trading can spread societal biases and lead to unfair outcomes for certain investors	4.50	.502
4	Collaborative efforts between regulators, exchanges, and technology providers are needed to improve data access	4.54	.501
5	Overall	4.52	.454
6	Valid N (listwise)	109	

Table 5 describes the descriptive statistics of the Regulatory Environment variables. Among the four statements “Overly strict regulations on algorithmic trading could hinder innovation and market efficiency” and “Collaborative efforts between regulators, exchanges, and technology providers are needed to improve data access” were equal mean value i.e. (4.54) which also the highest with the equal standard deviation of 0.501. Statement “Algorithmic trading can spread societal biases and lead to unfair outcomes for certain investors” was mean value of 4.50 with standard deviation of 0.502. In the same way statement “Changes in regulatory requirements have a significant impact on the development and implementation of algorithmic trading strategies” was least mean value i.e. 4.49 with the standard deviation of 0.502.. Here all the respondents were in between strongly agreed (5) and strongly disagree (1). The overall mean value was 4.52 with the

standard value of 0.454 which represent the independent factor (i.e. Regulatory Environment) on Dependent Factors (i.e. Performance metric) through descriptive analysis was good.

4.2.3 Technological Environment Variable

Algorithmic trading is totally depending on the technology that are adopted during the development of system or platform. The performance, execution speed, source and analysis of data and algorithms used for systems directly impact the performance metric. In this study the Technological variable includes four different statements that were measured in five-point likert scale Strongly Disagree to Strongly Agree (1 to 5)

Table 6:

Descriptive Statistics of Technological Environment

SN	Statements	Mean	Std. Deviation
1	Success of Algorithmic trading is highly depending on the investment and development of infrastructure such as server speed, Connectivity, Compatibility of device etc.	4.50	.502
2	Success of your algorithmic trading strategies is highly depending on the source of data	4.53	.501
3	Back testing of algorithmic trading strategies ensures the efficiency of trading in real environment	4.54	.501
4	The cost of data acquisition can be a significant barrier to entry in algorithmic trading]	4.55	.500
5	Overall	4.53	.472
6	Valid N (listwise)	109	

Table 6 shows the descriptive statistic of Technological Environment Variable in different four statements. Among the four statements “Success of your algorithmic trading strategies is highly depending on the source of data” and “Back testing of algorithmic trading strategies ensure the efficiency of trading in real environment” were mean value of 4.53 and 4.54 with standard deviation of 0.501 and 0.501 respectively. Similarly, statement “Success of Algorithmic trading is highly depending on the investment and development of infrastructure such as server speed, Connectivity, Compatibility of device etc” has least mean value of 4.50 with the standard deviation of 0.502 and statement of “The cost of data acquisition can be a significant barrier to entry

in algorithmic trading” was highest mean value of 4.54 with the standard deviation of 0.500. The respondents were in between the strongly agree (5) and strongly disagree (1) with the overall mean value and Standard Deviation of 4.53 and 0.472 respectively. Thus, this section presents that the independent factor (i.e. Technological Environment) on Performance metric through descriptive analysis was not bad.

4.2.4 Economic Environment Variable

Economic environment Variable play a crucial role in algorithmic trading for the optimization of performance metric. This study aims to study whether the economic environment variable impact on performance metric. The economic environment variable consists four distinct statements that were assessed using a five-point Likert scale, Strongly Disagree to Strongly Agree (1 to 5)

Table 7:

Descriptive Statistics of Economic Environment

SN	Statements	Mean	Std. Deviation
1	I believe economic indicators play a significant role in influencing market movements	4.50	.502
2	Changes in interest rates can affect borrowing costs and investment decisions, influencing market movements	4.53	.501
3	Economic indicators significantly influence the design and formulation of algorithmic trading strategies	4.52	.502
4	Algorithmic trading models should be adapted based on changes in the economic environment	4.54	.501
5	Overall	4.53	.470
6	Valid N (list wise)		

Table 7 presents the descriptive statistic of the Economic Environment variable, which is one of the dependent variables of the study. Among the four statements “Changes in interest rates can affect borrowing costs and investment decisions, influencing market movements” and “Economic indicators significantly influence the design and formulation of algorithmic trading strategies” were mean value of 4.53 and 4.52 with standard deviation of 0.501 and 0.502 respectively. The statement “I believe economic indicators play a significant role in influencing market movements” was the least mean value of

4.50 with standard deviation of 0.502 and statement “Algorithmic trading models should be adapted based on changes in the economic environment” was highest mean value of 4.54 with standard deviation of 0.501. Here all the respondent was in between the strongly agree (5) and strongly disagree (1) with overall mean value and Standard Deviation of 4.53 and 0.470 respectively. Thus, this section shows that the level of Economic Environment through descriptive analysis was good.

4.2.5 Market Microstructure variable

This section presents the scenario of Market Microstructure Variable through descriptive analysis. In this study, the Market Microstructure variable includes five different statements that were measured in five-pointed Likert Scale: 1- Strongly Disagree to 5- Strongly Agree.

Table 8:

Descriptive Statistics of Market Microstructure

SN	Statements	Mean	Std. Deviation
1	The bid-ask spread significantly impacts the profitability of algorithmic trading strategies	4.52	.502
2	The size of price movement (tick size) affects the accuracy of execution of orders	1.14	.346
3	The impact of tick size varies depending on the type of algorithmic strategy used	4.54	.501
4	The speed of order execution is a critical factor in algorithmic trading success	4.53	.501
5	Sentiment analysis of news and social media is an essential factor in algorithmic trading decision-making]	4.57	.498
6	Overall	3.86	.405
7	Valid N (listwise)	109	

Table 8 shows the descriptive statistics of the Market Microstructure variable, which includes different five statements having overall mean value of 3.86 and standard variable of 0.405. Among the five statements “The bid-ask spread significantly impacts the profitability of algorithmic trading strategies” was mean value of 4.52 with standard deviation of 0.502, statement “The impact of tick size varies depending on the type of algorithmic strategy used” was mean value of 4.54 with standard deviation of 0.501 and

statement “The speed of order execution is a critical factor in algorithmic trading successes” was mean value of 4.53 with standard deviation of 0.498. The Statement “The size of price movement (tick size) affects the accuracy of execution of orders” was least mean value of 1.14 with standard deviation of 0.346 and the statement “Sentiment analysis of news and social media is an essential factor in algorithmic trading decision-making” has highest mean value of 4.57 with standard deviation of 0.498. All the respondents were in between the strongly agree (5) and strongly disagree (1). Thus, this section presents that the independent factor (i.e. Market Microstructure Variable) on Performance metric through descriptive analysis was not bad.

4.2.6 Algorithmic Strategy Variables

Algorithmic strategy variables are one of the crucial variables in algorithmic trading. Success and failure of the algo trading is highly depends on the strategy adopted in the system. This section presents the scenario of Market Microstructure Variable through descriptive analysis. In this study, the Algorithmic Strategy variable includes five different statements that were measured in five-pointed Likert Scale: 1- Strongly Disagree to 5- Strongly Agree.

Table 9:

Descriptive Statistics of Algorithmic Strategy Variables

SN	Statements	Mean	Std. Deviation
1	The choice of algorithmic trading strategy significantly influences the overall performance of an algorithmic trading operation	4.49	.502
2	Machine learning-based algorithms are more effective in adapting to changing market conditions compared to rule-based algorithms	4.50	.502
3	Incorporating multiple timeframes in algorithmic trading strategies enhances their robustness and effectiveness	4.52	.502
4	Risk management techniques play a crucial role in the success of algorithmic trading strategies	4.54	.501
5	Constant monitoring and adaptation of algorithmic trading strategies are necessary to ensure their continued effectiveness	4.51	.502
6	Overall	4.51	.438
7	Valid N (listwise)	109	

Table 9 presents the descriptive statistics of the algorithmic strategy variable, which includes different five statements. Among five statements “Machine learning-based algorithms are more effective in adapting to changing market conditions compared to

rule-based algorithms” was mean value of 4.50 with standard deviation of 0.502, statement “Incorporating multiple timeframes in algorithmic trading strategies enhances their robustness and effectiveness” was mean value of 4.52 with standard deviation 0.502 and statement “Constant monitoring and adaptation of algorithmic trading strategies are necessary to ensure their continued effectiveness” was mean value of 4.51 with standard deviation of 0.502. In the same way statement “The choice of algorithmic trading strategy significantly influences the overall performance of an algorithmic trading operation” was least mean value of 4.49 with standard value of 0.502 and statement “Risk management techniques play a crucial role in the success of algorithmic trading strategies” was highest mean value of 4.54 with standard deviation of 0.501. All the respondents were in between the strongly agree (5) and strongly disagree (1) and the overall mean value and standard deviation was 4.51 and 0.502 respectively. Thus, this section presents that the independent factor (i.e. Algorithmic Strategy Variable) on Performance metric through descriptive analysis was not bad.

4.2.7 Transaction Cost Variable

Transaction costs are a crucial factor in algorithmic trading that can have a big impact on the effectiveness and profitability of trading methods. All of the costs associated with purchasing and selling financial instruments are included in transaction costs. In this study, the Transaction cost variable includes five different statements that were measured in five-pointed Likert Scale: 1- Strongly Disagree to 5- Strongly Agree.

Table 10:

Descriptive Statistics of Transaction cost Variables

SN	Particular	Mean	Std. Deviation
1	Transaction fees have a big effect on how successful my trading methods are.	4.48	0.502
2	I've put in place sensible plans to cut down on transaction expenses.	4.59	0.495
3	I am completely aware of every cost and commission related to my trades.	4.57	0.498
4	My trading methods are determined by the amount of transaction costs.	4.51	0.502
5	I constantly evaluate and modify my trading practices in order to minimize transaction costs.	4.51	0.502

Table 10 depict the descriptive statistics of transaction cost variable, which includes different five statement. Among the five statement “I've put in place sensible plans to cut down on transaction expenses.” Was the highest mean value of 4.59 with standard deviation of 0.495. Similarly, statement “Transaction fees have a big effect on how successful my trading methods are” was the least mean value of 4.48 with standard deviation of 0.502. In the same way statement “I am completely aware of every cost and commission related to my trades” was mean value of 4.57 with standard deviation of 0.498, statement “My trading methods are determined by the amount of transaction costs” was mean value of 4.51 with standard deviation of 0.502 and statement “I constantly evaluate and modify my trading practices in order to minimize transaction costs” was mean value of 4.51 with the standard deviation of 0.405. All the respondents were in between the strongly agree (5) and strongly disagree (1) and the overall mean value and standard deviation was 4.53 and 0.405 respectively. Thus, this section presents that the independent factor (i.e. Transaction cost variable) on Performance metric through descriptive analysis was not bad.

4.2.8 Data Quality and Availability

The availability and quality data are crucial for algorithmic trading to be successful. Efficient trading algorithms can only be developed and implemented with the help of timely, accurate, and high-quality data. Accurate testing and implementation of algorithms is ensured by dependable access to comprehensive historical and real-time data, which reduces errors and maximizes profitability. Resolving data-related issues like latency and costs requires a strong technological foundation and reliable suppliers in order to preserve trade performance and obtain a competitive edge. This study measures different statements in five-point Likert scale: 1- Strongly Disagree to 5- Strongly Agree.

Table 11:

Descriptive Statistics of Data quality and availability Variables

SN	Particular	Mean	Std. Deviation
1	The historical data I use for back testing is reliable and comprehensive.	4.52	0.502
2	My real-time data feeds are accurate and timely.	4.59	0.495
3	Low latency in data feeds is critical for my trading performance.	4.57	0.498
4	The accuracy of the data used by my algorithms is satisfactory.	4.62	0.489
5	I have no issues integrating various data sources into my trading algorithms.	4.54	0.501
6	Overall	4.57	0.427
7	Valid N (listwise)	109	

Table 11 depict the descriptive statistics of data quality and availability variable, which includes different five statement. The statement “My real-time data feeds are accurate and timely.” was the mean value of 4.59 with the standard deviation of 0.495, statement “Low latency in data feeds is critical for my trading performance” was the mean value of 4.57 with the standard deviation of 0.498 and statement “I have no issues integrating various data sources into my trading algorithms” was mean value of 4.54 with standard deviation of 0.501. Similarly, the statement “The accuracy of the data used by my algorithms is satisfactory” was the highest mean value of 4.62 with standard deviation of 0.489 and statement “The historical data I use for back testing is reliable and comprehensive” was least mean value of 4.52 with standard deviation of 0.502. Here, all the respondent was in between the strongly agree (5) and strongly disagree (1) with overall mean value and Standard Deviation of 4.57 and 0.427 respectively. Thus, this section shows that the level of Data quality and availability through descriptive analysis was good.

4.2.9 Psychological and Behavioral Factors

Behavioral and psychological aspects have significant effects on algorithmic trading. Emotions like fear and greed can influence traders' decision-making and cause them to

make illogical decisions. Excessive risk-taking may result from overconfidence in algorithms, whereas premature departures due to fear of loss can occur. Behavioral biases can distort changes in approach, such as confirmation bias. Effective algo trading necessitates reducing these influences with systematic strategies, ongoing observation, and utilizing the objectivity of algorithms to reduce emotional influence from people and improve consistency in decision-making.

Table 12:

Descriptive Statistics of Psychological and Behavioral Variables

S. N	Particular	Mean	Std. Deviation
1	I trust my trading algorithms to make accurate and profitable decisions without my intervention.	4.56	0.499
2	I maintain emotional discipline and do not let my emotions influence the trading decisions made by my algorithms.	4.58	0.496
3	I believe incorporating market sentiment analysis (e.g., news and social media) improves the performance of my trading algorithms.	4.54	0.501
4	I have effective strategies in place to manage the stress associated with monitoring and adjusting my trading algorithms.	4.59	0.495
5	I am able to learn from past trading errors and adapt my algorithms to avoid repeating the same mistakes.	4.53	0.501
6	Overall	4.56	0.423
7	Valid N (listwise)	109	

Table 12 presents the descriptive statistics of the Psychological and Behavioral Variable. Performance metric is dependent variable which includes different five Statements. Among five, statement “I have effective strategies in place to manage the stress associated with monitoring and adjusting my trading algorithms” has highest mean value of 4.59 with the standard deviation of 0.495 and statement “I am able to learn from past trading errors and adapt my algorithms to avoid repeating the same mistakes” was the least mean value of 4.53 with the standard deviation of 0.501. Likewise statement “I trust my trading algorithms to make accurate and profitable decisions without my intervention”

was the mean value of 4.56 with standard deviation of 0.499, Statement “I maintain emotional discipline and do not let my emotions influence the trading decisions made by my algorithms” was mean value of 4.58 with standard deviation of 0.496 and statement “I believe incorporating market sentiment analysis (e.g., news and social media) improves the performance of my trading algorithms” was mean value of 4.54 with standard deviation of 0.501. Overall mean value of 4.56 with standard deviation of 0.423. All the respondents were in between the strongly agree (5) and strongly disagree (1). Thus, this section presents that the Psychological and Behavioral through descriptive analysis was not bad.

4.2.10 Performance Metric variable

Performance metric is one of the dependent variables of this study. In this study, the performance of the algorithmic system was measured different 5 statements in five-pointed Likert Scale: 1- Strongly Disagree to 5- Strongly Agree.

Table 13:

Descriptive Statistics of Performance Metric Variables

SN	Particular	Mean	Std. Deviation
1	Algo trading system is highly capable to manage an associated risk.	4.50	0.502
2	Algorithm effectively executes trades, considering factors like slippage and transaction costs.	4.49	0.502
3	The algorithm adapts well to changing market conditions.	4.50	0.520
4	Algorithm is highly capable to generate consistent profits over time.	4.47	0.519
5	The algorithm efficiently executes trades without significant delays.	4.41	0.531
6	Overall	4.48	0.427
7	Valid N (listwise)	109	

Table 13 presents the descriptive statistics of the Performance Metric Variable. Performance metric is dependent variable which includes different five Statements.

Among five, statement “Algorithm effectively executes trades, considering factors like slippage and transaction costs.” Was mean value of 4.49 with standard deviation of 0.502 and statement “Algorithm is highly capable to generate consistent profits over time.” was mean value of 4.47 and standard deviation of 0.519. Statement “Algo trading system is highly capable to manage an associated risk.” And “The algorithm adapts well to changing market conditions” was equal highest mean of 4.50 with standard deviation of 0.502 and 0.520 respectively. Similarly, statement “The algorithm efficiently executes trades without significant delays.” Was least mean value of 4.41 with standard deviation of 0.531. Here overall mean value was 4.48 with standard deviation 0.427. All the respondents were in between the strongly agree (5) and strongly disagree (1). Thus, this section presents that the Performance metric through descriptive analysis was not bad.

4.2.11 Summary of all Variables

This section presented the scenario of all variable of the study that are dependent variable (Performance Metric) and independent variables (Market Indicator, Regulatory Environment, Technological Environment, Economic Indicators, Market Microstructure, and Algorithmic Strategy) through descriptive study. In this study summary of all the variables were presented which were calculated from different statements measured in five-pointed Likert scale 1- Strongly Disagree to 5- Strongly Agree.

Table 14:

Overall summary of variables

SN	Statements	Mean	Standard Deviation
1	Market Indicators	4.51	.449
2	Regulatory Environment	4.52	.454
3	Technological Environment	4.53	.472
4	Economic Indicators	4.53	.470
5	Market Microstructure	3.86	.405
6	Algorithmic Strategy Variables	4.51	.438
7	Transaction cost variables	4.53	.405
8	Data quality and Availability	4.57	.427
9	Psychological and Behavioral	4.56	.423
10	Performance Metric	4.48	.427

Table 14 present the summary data of all variables of the study through descriptive statistical analysis. The mean value of performance metric was 4.48 with the standard deviation of 0.427. Among the different independent variable “Data quality and Availability” variable was highest mean value of 4.57 with standard deviation of 0.427 followed by “Psychological and Behavioral” with the mean value of 4.56 and standard deviation of 0.423. Likewise, “Technological Environment” and “Economic Indicator” and “Transaction Cost” variable was equal mean value of 4.53 with standard deviation of 0.472, 0.470 and 0.405 respectively followed by “Regulatory Environment” with mean value of 4.52 where standard deviation of 0.454”. Similarly, “Market Indicator” variable was mean value of 4.51 with standard deviation of 0.449, and variable “Algorithmic Strategy” was mean value of 4.51 with standard deviation of 0.438. Variable “Market Microstructure” has least mean value of 3.86 with standard deviation of 0.405.

4.3 Correlation Analysis

In this study we are required to test the relationship between various independent variable and the level of Performance Metric of the algorithmic trading. The test was done through Correlation Coefficient and regression analysis. Pearson correlation coefficient was run to establish how the variables were related to each other in this part the study established the statistical relationship between independent variables and dependent variables

We must investigate the relationship between the different independent variables and the algorithmic trading's performance metric level in this study. Regression analysis and the correlation coefficient were used to conduct the test. In this section of the study, the statistical relationship between independent (Market Indicators, Regulatory Environment, Technological Environment, Economic Indicators, Market Microstructure and Algorithmic Strategy Variables, Transaction Cost, Data Quality and Availability & Psychological and Behavioral) and dependent variables (Performance Metric) was established by the use of the Pearson correlation coefficient.

Table 15:

Karl Pearson's Correlation Coefficient

Variables	Performance Metric		
	Pearson Correlation (r)	Sig. (2-tailed)	N
Performance Metric	1		109
Market Indicators	.668**	<.001	109
Regulatory Environment	.743**	<.001	109
Technological Environment	.801**	<.001	109
Economic Indicators	.804**	<.001	109
Market Microstructure	.749**	<.001	109
Algorithmic Strategy Variables	.761**	<.001	109
Transaction Cost	.914**	<.001	109
Data Quality and Availability	.950**	<.001	109
Psychological and Behavioral	.950**	<.001	109

** . Correlation is significant at the 0.01 level (2-tailed).

Table 15 presents the level of impact on dependent variable (Performance Metric) due to the changes on independent variable (i.e. Market Indicators, Regulatory Environment, Technological Environment, Economic Indicators, Market Microstructure and Algorithmic Strategy Variables). In this study number of respondents N were 109 and the significant level is 0.01. The Karl Pearson's Coefficient of Correlation measure the output range from between -1 to 1. Positive values indicate a positive relationship between the variables, whilst negative values indicate a negative relationship.

Considering the data depicted in Table 15 there was significant positive relationship between Market Indicators ($r = .668$, $\text{Sig} = .001$), Regulatory Environments ($r = .743$, $\text{Sig} = .001$), Technological Environment ($r = .801$, $\text{Sig} = .001$), Economic Indicators ($r = .804$, $\text{Sig} = .001$), Market Microstructure ($r = .749$, $\text{Sig} = .001$), Algorithmic Strategy variable ($r = .761$, $\text{Sig} = .001$), transaction Cost Variable ($r = .914$, $\text{sig} = .001$), Data quality and Availability ($r = .950$, $\text{sig} = .001$), Psychological and Behavioral ($r = .950$, $\text{sig} = .001$) With the Performance Metric. The purpose of the table is to determine the correlation between different independent variables that affect algorithmic trading with Performance Metric. The outcome had advised us that there was a positive relationship between the factors of algo trading and (Market Indicators, Regulatory Environment, Technological

Environment, Economic Indicators, Market Microstructure and Algorithmic Strategy, Transaction Cost, Data Quality and Availability and Psychological and Behavioral variable) with performance Metric.

4.4 Multiple Regression Analysis

A statistical method for determining the association between two or more independent variables and a dependent variable is multiple regression analysis. In this study multiple regressions were conducted to examine the relationship between Market Indicators, Regulatory Environment, Technological Environment, Economic Indicators, Market Microstructure and Algorithmic Strategy with performance metric. In this section, the regression between the independent variables and performance metric was analyzed in stepwise method.

Table 16:

Regression Analysis results

SN	Model	Beta	t	sig
1	(Constant)		-3.161	.002
2	Market Indicators	.094	2.035	.044
3	Regulatory Environment	.213	4.388	<.001
4	Technological Environment	.247	4.823	<.001
5	Economic Indicators	.215	4.019	<.001
6	Market Microstructure	.244	5.263	<.001
7	Algorithmic Strategy Variables	.145	2.808	.006
8	Transaction Cost Variable	.155	3.049	0.003
9	Data Quality and Availability	.424	7.844	<.001
10	Psychological and Behavioral	.431	8.004	<.001
11	R Square			.885
12	Adjusted R Square			.879
13	F Value			131.201
14	P-value of F Statistic			<.001

1. Dependent Variable: Performance Metric

2. Predictors: (constant), Market Indicators, Regulatory Environment, Technological Environment, Economic Indicators, Market Microstructure, Algorithmic Strategy Variables.

Table 16 display the result of multiple regression analysis from the data collected from different individuals related to the financial markets. As per the mentioned result, value of the R – Squared Statistics and the adjusted R squared statistics of the Model were 88.5% and 87.9% respectively. The result explains that the changes in independent variables (i.e Market Indicators, Regulatory Environment, Technological Environment, Economic Indicators, Market Microstructure, Algorithmic Strategy Variables) results 87.9 % changes in dependent variable. R square is the percentage of the variance in the dependent variable (the desired result) that can be explained by the independent variable (the explanatory or predictive variable). Put more simply, it indicates the quality of fit, or how well the data matches the regression model. Above table calculating the effect of independent variable on level of performance metric had a regression value of 17.069, while the residual value of 1.958. The F value for the calculation is 131.201. The study shows a significant statistical relationship with the P value of $0.001 < 0.05$.

Table 16 depict coefficient value of different independent variable. The coefficient value of Market indicators variable was 0.094. The value 0.094 (9.4%) means that when all other independent variable remains constant, profitability of algo trading increase by 9.4% when there is 100% improvement in Market Indicator Variables. The outcome was statically significant ($0.044 < 0.05$), which means market indicator variable was making contribution to the profitability of algo trading.

The coefficient value of Regulator Environment variable was 0.213. This means that all the things being equal, if the other independent variables were held constant, profitability of the algo trading increase by 21.3%, if there are 100% changes in Regulator environment. This was statistically significant ($0.001 < 0.05$) i.e. the variable was making significant contribution to the prediction of dependent variable (Performance Metric Variable)

The coefficient variable of Technological Environment was 0.247. The value 0.247 (24.7%) means, if all other independent variable remains constant, profitability of the algo trading increase by 24.7% if there are 100% changes in the Technological Environment Variables. The result was statistically significant ($0.001 < 0.05$) which

means the variable is making significant contribution to the prediction of the dependent variable i.e. Performance Metric.

Similarly, the coefficient value for Economic Indicators was 0.215. This means that all things being equal, when the other independent variables remain constant, profitability of the algo trading changes by 21.5%, when there is 100% changes in the Economic Indicator variable. The value was statistically significant ($0.001 < 0.05$) i.e the variable, Economic Indicator is making significant contribution to prediction of the dependent variable (Performance Metric)

The independent variable Market Microstructure was the coefficient value of 0.244. value 0.244 (24.4%) refers that, all things being equal, when the other independent variables remain constant, profitability of the algo trading increase by 24.4% if there is 100 % changes in Market Microstructure variable. The value was statistically significant ($0.001 < 0.05$) which means that the variable Market Microstructure making significant contribution to prediction of the dependent variable i.e. Performance Metric.

Lastly the coefficient variable of Algorithmic Strategy Variables was 0.145. This means that all things being equal, if the other independent variables were held constant, profitability of the algo trading increase by 14.5% when there is 100 changes in the Algorithmic Strategy Variable. This was statistically significant ($0.006 < 0.05$), this means that the algorithmic strategy variable was making significant contribution to prediction of the dependent variable (Performance Metric)

The independent variable Transaction Cost was the coefficient value of .155. value 0.155 (15.5%) refers that, all things being equal, when the other independent variables remain constant, profitability of the algo trading increase by 15.5% if there is 100 % changes in Transaction Cost variable. The value was statistically significant ($0.001 < 0.05$) which means that the variable Transaction Cost making significant contribution to prediction of the dependent variable i.e. Performance Metric

In the same way, the coefficient value for Data Quality and Availability was 0.424. This means that all things being equal, when the other independent variables remain constant, profitability of the algo trading changes by 42.4%, when there is 100% changes in the Data Quality and Availability. The value was statistically significant ($0.001 < 0.05$) i.e. the variable, Data Quality and Availability is making significant contribution to prediction of the dependent variable (Performance Metric)

Lastly, the coefficient variable of Psychological and Behavioral was 0.431. The value 0.431 (43.1%) means, if all other independent variable remains constant, profitability of the algo trading increase by 43.1% if there is 100% changes in the Technological Environment Variables. The result was statistically significant ($0.001 < 0.05$) which means the variable is making significant contribution to the prediction of the dependent variable i.e. Performance Metric.

4.5 Discussions

The factors influencing algorithmic trading in Nepal were the main focus of the study. Demographic factors in this study included gender, age, educational background, and experience in the financial markets as well as amount of understanding regarding algorithmic trading.

In Nepal, the influence of independent variables on the algo trading success indicator is quite strong. Data quality and availability was a highest mean of 4.57 among the other factors influencing algo trading followed by "Data Quality and Availability", "Technological Environment" and "Economic Indicator", "Transaction Cost", "Regulatory Environment," "Market Indicators," and "Algorithmic Strategy Variables," in that order. In a similar vein, the independent variable with the lowest mean value was "Market Microstructure." The study uses descriptive analysis to show the independent and dependent components, which was good. According to the study, there was a positive correlation between the dependent variable, performance metric, and the independent variables, market indicators, regulatory environment, technological environment, economic indicators, market microstructure, algorithmic strategy factors Transaction Cost, Data quality and availability and Psychological and Behavioral factors. The regression's coefficients are implied by the outcome. The results showed that every independent variable was important in predicting the performance of algo trading. The study's reliability was supported by the fact that the Cronbach's Alpha value for all of the study's variables was higher than 0.7.

The study analyses the relationship between various factors affecting algo trading and its performance metric in the context of Nepalese financial markets and suggests there was significant relationship between independent and dependent variables as the P value is significant at 5% level of significance ($p < 0.05$)

CHAPTER V

SUMMARY AND CONCLUSION

In this study we looked into a number of variables that have an impact on algorithmic trading and how it affects performance metrics. The study summary, conclusion, and implications are presented in this chapter based on the goals of the research.

5.1 Summary

This study looks at the several elements that affect algorithmic trading in Nepal and analyzes how algorithmic trading performance relates to the Nepalese financial sector. In order to identify correlations between the variables and examine their relationship, this study used a casual and descriptive research methodology. Data for the study was gathered using a separate questionnaire that was self-administered. The quantitative data gathered from the respondents served as the foundation for the study's conclusions.

The population consists of all investors in the financial market of Nepal. For the purpose of the study, 68 respondents were needed while using probability sampling. As a result, 109 people with information pertaining to financial markets were included in the sample, and this study employed the judgment sampling method. Questionnaires were distributed to 109 individuals in total, along with appropriate information on the study's goal and the procedure for submitting the forms. Primary data served as the study's primary source. The strategy of using structured questionnaires was used to acquire primary data. Five-point Likert scale questions, from One for strongly disagree to five for strongly agree, are included in the questionnaire.

A set of questionnaires was used to gather data on demographic factors such gender, age, income level, kind of work, and educational attainment. After being informed of the study's goal, respondents were invited to complete a series of questionnaires. Five scales, from five to one, were used in the questionnaire's development; five stands for highly agree, four for agree, three for neutral, two for disagree, and one for severely disagree. Regression analysis was employed in the study to evaluate the impact of the independent variable on the dependent variable. A total of 109 questionnaires were issued to investors for the study; of those, 109 (i.e. 100%) were deemed legitimate and utilized for analysis. SPSS software was used to show and evaluate the gathered data.

The dependent variable, performance metric, showed a substantial positive link with the independent components, market indicators, regulatory environment, technological

environment, economic indicators, market microstructure, algorithmic strategy variables Transaction Cost, Data quality and availability and Psychological and Behavioral Factors. The purpose of this study was to ascertain whether there was any relationship between the profitability of algorithmic trading and the factors influencing it. All of the hypotheses were accepted based on the results, which indicated a high association between the algo trading parameters and performance metrics.

The study projects how independent variables, such as market indicators, technological, regulatory, economic environments, as well as market microstructure, algorithmic strategy variables, transaction cost, data quality and availability and psychological & behavioral factors would affect the outcome. Additionally, a substantial value that presents a statistically meaningful association was developed at the level of performance metric. Finally, the study's reliability is supported by the fact that the Cronbach's alpha value for all of the study's variables is higher than 0.7.

5.2 Conclusion

This study's main goals are to determine and examine the factors that affect algorithmic trading in the Nepalese financial market and to evaluate the effects of these factors on performance measures. The effectiveness and profitability of algorithmic trading, which uses computer algorithms to execute deals at high speeds and frequencies, can be impacted by numerous factors. Gaining an understanding of these factors is essential to enhancing trading tactics and raising market performance as a whole. The study looks at a number of important independent variables, such as market indicators, technological, regulatory, and economic environments, market microstructure, algorithmic strategy, transaction cost, data quality and availability and psychological & behavioral factors.

Stock prices, trading volumes, and trends are examples of market indicators that show the general state and direction of the market. The set of guidelines and norms that make up the regulatory environment by financial regulators who have the power to help or impede trading activities. The availability and sophistication of technology utilized in trading, including as cutting-edge software and fast internet, is referred to as the technological environment. Macroeconomic variables that affect market conditions, such as GDP growth, inflation rates, and interest rates, are included in economic indicators. The finer points of the market's operation, such as the kinds of orders that are employed, tick size, bid ask spread and the effectiveness of trade execution, are all covered under the term

"market microstructure." The specific strategies that algorithms use, such as the utilization of machine learning models, historical data, and risk management approaches, are known as algorithmic strategy variables. The cost, commission, taxes, services charge etc incurred during the trading of security falls under transaction cost variables. Similarly, the data, information required to execute the algorithm and its reliability covers under the data quality and availability. Lastly the confidence and the risk tolerance, sentiments and their perception towards the price and market performance are covered under Psychological and behavioral variables.

The study uses descriptive analysis to give a thorough understanding of these variables, offering in-depth information about the independent and dependent variables (performance metrics). This study provides a comprehensive view of the properties and distributions of the data, serving as a basic step. Significantly, all of the variables under analysis had Cronbach's Alpha values more than 0.7, indicating strong reliability for the study. The high reliability of the measures demonstrates their consistency and dependability, which adds validity to the study's conclusions. The main conclusions show a strong positive link between the independent factors and algorithmic trading performance indicators. This positive association suggests that when variables related to algorithmic strategy improve, too do market indicators, the regulatory environment, the technology environment, economic indicators, and market microstructure. Algorithmic trading also tends to do better. This suggests that advantageous circumstances in certain regions may result in superior trading results.

All independent variables are significant predictors of algorithmic trading performance, according to additional regression analysis. This analysis emphasizes how important a role each aspect has in deciding how successful algorithmic trading techniques are. Technological developments in trading, for example, have the potential to improve overall performance by enabling faster and more precise transaction executions. Similar to this, an atmosphere that is favorable for algorithmic trading can be created via a supportive regulatory framework, which will lower obstacles and increase efficiency. A robust market is generally indicated by positive economic indicators, which promote trading and investment. Trade profitability can be directly increased by market microstructure characteristics such as effective order execution tick size, and bid ask spread. Furthermore, better performance metrics can be achieved by algorithmic

techniques that make use of big data, machine learning, and predictive analytics to find profitable trading opportunities and efficiently manage risks.

The study concludes with strong evidence that the performance of algorithmic trading in the Nepalese financial market is heavily influenced by a range of factors. Stakeholders can optimize trading tactics and improve market efficiency by identifying and comprehending these elements and making well-informed decisions. This study emphasizes that in order to fully reap the rewards of algorithmic trading, there needs to be a strong technological and legal foundation in place in addition to a thorough comprehension of market dynamics. As a result, these observations can aid in the formulation of plans and policies that support Nepal's financial industry in becoming more resilient and effective.

5.3 Implication

Before making an investment decision, investors should thoroughly consider all of the investment considerations utilizing their reasonable business knowledge. Since they affect the profitability of trading in financial markets, investors should be able to analyze market indicators, economic indicators, regulatory provisions, technological updates, Data quality, and transactional cost. It was believed that the study's findings would be useful in identifying and analyzing the variables influencing algorithmic trading. The readers of this research were investors, traders in financial instruments, system developers, and policy makers. Only if the research had been carried out in the remaining regions of the country's cluster could the research findings be made generally.

This thesis "Factors Affecting Algorithmic Trading" investigates a number of factors that affect the efficacy and efficiency of algorithmic trading systems. This research has a wide range of consequences.

Market Efficiency: By improving the algorithms' ability to make quicker and more accurate trading decisions, an understanding of these characteristics can assist increase market efficiency. By doing this, prices may more precisely reflect their actual value and arbitrage opportunities may be decreased.

Risk Management: Improved risk management techniques are made possible by identifying critical components. Traders have the ability to create algorithms that reduce the risks related to systemic risks, liquidity problems, and market volatility.

Regulatory Insights: Regulatory agencies can learn from the results about the possible effects of algorithmic trading on financial markets. This may result in more sensible laws that strike a balance between fairness and innovation and market stability and stability.

Technological Advancements: The study emphasizes how crucial technology infrastructure is to algorithmic trading's performance, including processing power and data analytics. This may encourage additional technological expenditures to support sophisticated trading platforms.

Competitive Advantage: Businesses can obtain a competitive edge by comprehending and utilizing the variables influencing algorithmic trading. By optimizing their algorithms, they can enhance their trading performance and more effectively adjust to changing market conditions.

Market Participant Behavior: The theory offers valuable insights into the ways in which various market participants, including high-frequency traders and institutional investors, employ algorithmic trading. Players in the market may collaborate and develop more intelligent strategies as a result of this insight.

Ethical Considerations: The study might also draw attention to moral issues, such the possibility of market manipulation or how high-frequency trading affects conventional investors. It is essential that these issues are resolved in order to preserve market integrity.

All things considered, the thesis offers a thorough examination of the variables influencing algorithmic trading, providing insightful information to traders, regulators, and tech developers hoping to improve the efficiency and stability of financial markets.

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ABSTRACT The primary objective of this study was to investigate the variables that affect algorithmic trading in Nepal and to examine the correlation between the variables and performance metrics. This study uses a causal and descriptive research strategy to study relationship between variables and discover relationships between them. The quantitative data gathered from respondents through questionnaire distribution served as the foundation for the research findings. All parties involved in the financial markets are included in the population. 109 stakeholders of the Nepalese financial markets were selected as a sample from the overall population. The primary data used in the study were gathered through the use of a structured questionnaire technique. The SPSS software version was used to show and analyze the data that had been gathered. The results indicated a strong correlation between performance metric and the factors influencing algorithmic trading, such as market indicator, algorithmic strategy, market microstructure, economic indicators, technological infrastructure and regulatory environment. Every independent variable had a statistically significant effect on the choice of any individual investor. Additionally, market indicator, algorithmic strategy, market microstructure, economic indicators, technological infrastructure and regulatory environment all had a significant role in forecasting the algorithmic trading performance metric. Keywords: Algo trading, HFT, Online Trading, Automated Trading, ii

CHAPTER I INTRODUCTION 1.1 Background of the study One of the earliest types of business is the exchange of products, an activity that dates back thousands of years. To get what they desired or needed that they were unable to generate on their own, humans started exchanging items. Trade first appears in the Stone Age, when humans traveled great distances to exchange tools and other products. Humans created new