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Impediment in Adaptation of Algorithm Trading: A Case of Frontier Stock Exchange

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Abstract

The global financial markets have been significantly affected by the rapid change in technology. The study is an attempt to get to know the barriers to not adopting algorithmic trading in conventional stock exchanges. This research aims to plan and analytically proposed a model for explaining the reasons why frontier stock exchange traders and investors are hesitant to adopt algorithmic trading as a tool. The research includes variables; Lack of awareness, Trust, Lack of Government interest, unemployment, and unnecessary investment, which were extracted from previously available literature based on the theory of reason and technology acceptance model (TAM). A sample of 50 traders/investors from Pakistan stock markets was taken by using convenience sampling. Data was collected through a questionnaire and analyzed using correlation and linear regression techniques. The results show trust factor is the biggest hurdle in implementing Algorithm Trading which means countries like Pakistan which are following conventional methods for trading in stock markets have great doubts about the efficiency of Algorithm base trading because of the less human interaction and dependency on machines. Fear of miscalculation and the inexperience of data engineers are also one of the reasons conventional stock exchanges are reluctant to adopt algorithm trading. Similarly, variables like Lack of Government interest, unnecessary investment, and employment have a significant effect on the implementation of algorithm trading. Moreover, lack of awareness is the least significant factor, which shows the traders and investors in the Pakistan Stock Exchange are well aware of algorithm trading but the results cannot be generalized to the population due to a limited sample size of the study.

Keywords: Algorithm, Stocks, Sentiments, Trading, Automation & Investors

1. Introduction

Algorithm trading is one of the most prominent transformations of financial markets trading that have undergone advances in technology which is faster and cheaper and increased network connectivity among market users. Investopedia defines Algorithm trading as the method of using computer programs that follow predefined instructions (an algorithm) that place a trade to make a profit at a great speed and accuracy with such frequency that cannot be matched by

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any human trader. Lower transaction costs, speedy executions of traders, and humongous trades are the advantages of this type of financial technology. With every technology, some unwanted consequences come with it [8].

The way industries are operating and competing has dramatically transformed due to the proliferation of data and the transformation of technology and its complexities. Daily approx. 2.5 quintillion bytes of data are being generated that tells 90 Percent of the world's data that can surely be called big data, Structured and unstructured data are analyzed by the rapid growth and storage of this big data that creates opportunities for collection, and processing. The competitive advantage of today's industry is the adaptation of big data. In financial services the adaptation of big data analysis to make better and more informed investment decisions with consistent returns and minimizing risk. With the combination of big data, Algorithm trading can maximize portfolio returns by using huge historical data with complicated mathematical patterns. However, with the benefits that come with big data usage, some challenges remain to detain the increasing volume of data ability [11].

In the past years the financial markets have undergone the phase of computerization, automated computer algorithms have replaced the days in which human traders were all around the financial markets. Humans developed this algorithm, and the algorithm decides on its own when to buy or sell securities that are automatically executed through comprehensive technological infrastructure that connects them to various exchanges where they are trading [10]. In the financial markets, the method of transaction has gone through from traditional methods to online trading and automated trading. An automated trading system also called a mechanical trading system provides a platform for traders to customize transaction rules according to their specific requirements or strategy. With the use of a machine learning algorithm, computers can directly process the transaction automatically. The algorithm set of rules is based on timing, price, quantity, or any other mathematical model [9]. The study has found the problem which is asymmetric information between algorithm trading investors and non-algorithm trading investors in a stock market that uses algorithm trading as one of the trading options. Therefore authorities should be well aware of the consequences and should set up a protective policy and design a secure computerized trading system to prevent such kinds of problems [7].

In the global stock markets, every step or process that takes place from order entry to trading venues to bank office work is now handled by automation, which surely has some great benefits such as reducing the cost of transactions and increase of market liquidity and efficiency. According to Wall Street, the volume of algorithm trading in developed markets is around 70-80 percent. However, the conventional stock exchanges of some developing countries still feel reluctant to implement or adopt algorithm trading. This research plans to design and analytically estimate the barriers that are playing their role in not accepting algorithm trading. The theoretical framework is based on the theory of reasoned action and the technology acceptance model. According to the literature review, there are barriers to adaptation of algorithm trading in conventional stock

exchanges: behavior intention, and technology acceptance. Which affects the decision on whether to adopt or not algorithm trading. Conventional stock exchanges are willing to adopt algorithm trading but still have concerns about it the liability and profitability of this new stock trading technique [6].

The purpose of this research is to find the barriers that are making it difficult to adopt algorithm trading in conventional stock exchanges. How perceived behavior, perceptions, and control are affecting the decisions of investors and conventional stock exchange. Despite its numerous benefits, algorithmic trading is not without challenges. The speed and complexity of algorithmic trading systems can introduce operational risks, such as system glitches and erroneous trades. Additionally, algorithmic trading has raised concerns regarding market stability, as high-frequency trading activities have been associated with episodes of extreme volatility and flash crashes [15]. These concerns have prompted regulators worldwide to implement measures aimed at monitoring and regulating algorithmic trading activities to maintain market integrity and protect investors.

The purposes of the research are as follows:

- To analyze the barriers that are creating resistance to the adaptation of algorithm trading in conventional stock exchanges.
- To evaluate the reason for the adaptation of algorithm trading in conventional stock exchanges taking longer time.
- To study the behavior of investors towards the adaptation of Algorithm trading in conventional stock markets.

2. Literature Review

Automated trading systems and internationalization have introduced new tide events in Nigeria's stock exchange to enable the development quickly. The investors' confidence and transparency have been enhanced. A high rate of dematerialization has been achieved. With the introduction of the Automated Trading System, the volume of stock cleaned has significantly increased, and the general level of operational efficiency has been enhanced [9]. Advancements in technology have been instrumental in the growth of algorithmic trading. The literature explores topics such as low-latency trading systems, high-speed connectivity, and the use of artificial intelligence and machine learning techniques in algorithmic trading. Additionally, the study highlights challenges related to market data quality, algorithmic complexity, system resilience, and cyber security [12]. It is important for the traders of India to get to know the presence of algorithm trading in India and should feel to adopt the change and respect the technological development in the field of financial markets. Traders in India should understand the technical orientation and believe that justifiable and technological advancement will help them in the long run and not create any problems. Unaffordable technology and unnecessary investment should not be considered burdens for the brokers for hiring technology experts in the field that must be sorted before the implementation of Algorithm trading [3]. Also, research has examined the effectiveness of different regulatory

frameworks in ensuring market integrity, fairness, and stability in the context of algorithmic trading. The paper highlights the importance of monitoring and regulating algorithmic trading activities, addressing issues such as market manipulation, algorithmic errors, and potential conflicts of interest [16].

Considering weak and strong points in the existing literature that can help identify research gaps: Limited Sample Size; some studies in the literature may suffer from a small sample size, limiting the generalizability of the findings and potentially leading to biased conclusions. This weakness calls for larger-scale studies to provide more robust and representative results. Lack of Longitudinal Studies; many existing works focus on cross-sectional analysis, providing a snapshot of the relationship between variables at a particular point in time. However, a lack of longitudinal studies that examine the changes and trends over time hinders a comprehensive understanding of the dynamics and evolution of algorithmic trading adoption. Furthermore, Neglecting Behavioral Aspects; some literature may overlook the behavioral aspects that influence the adoption of algorithmic trading in conventional stock exchanges. Understanding the psychological factors, decision-making processes, and cognitive biases that impact market participants' acceptance of algorithmic trading can be a research gap worth exploring [15].

Robust Methodological Approach, strong works in the literature employ rigorous quantitative methodologies, such as econometric modeling, panel data analysis, or experimental designs, to establish causal relationships and control for potential confounding factors [6]. These studies provide a strong methodological foundation for future research. Moreover, analysis of market Performance; Certain studies assess the impact of algorithmic trading on market efficiency, liquidity, volatility, or price discovery. These analyses contribute to understanding the broader implications of algorithmic trading adoption and can guide future research in evaluating its effects on market outcomes [4].

By being specific in identifying weak points such as limited sample size, lack of longitudinal studies, and neglecting behavioral aspects, researchers can pinpoint research gaps that require further exploration. Likewise, recognizing strong points such as robust methodologies, in-depth case studies, examination of regulatory frameworks, and analysis of market performance helps build upon existing strengths and advance knowledge in specific areas.

2.1 Theory of Reasoned Action (TRA)

The Theory of Reasoned Action (TRA) is defined as a person’s behavior towards their intention to perform that specific behavior and that intention is considered as the behavior and subjective norms as the function of their attitude [5]. The theory of reasoning is taken to determine the factors that affect individuals in the adaptation of technology, they have focused on attitude, which may be defined as a negative or positive thought of an individual towards the implementation of a specific behavior, The execution of that specific behavior is determined by the behavior intention

as a measurement of the strength of an individual's intention [4]. The theory of reasoned action (TRA) is a well-defined intention model that is considered to be effective in analyzing and forecasting behavior in a lot of fields. Because TRA is so comprehensive, "considered to explain any aspect of human behavior" [1], It should be satisfactory to take TRA for finding the factors that influence computer usage intention among the individual.

2.2 Technology Acceptance Model (TAM)

The technology acceptance model (TAM) is the model that explains the behavior of users in the acceptance and usage of technology. It is defined as information system theory, which considers actual system use by the end user. The main factor that influences people to use technology is behavior intention. TAM is a version of TRA which was proposed by [4]. It is specially constructed to design a model for the acceptance of information systems by the users. TAM is designed to deliver a common perspective of the reasons for computer adoption that are competent in understanding the user behavior in a vast range of end-users in computer technology and user statistics while considering both economical and theoretically explained. In an exemplary world, TAM would be suitable not only for the finding but also for the explanation of why a system could be undesirable and also allow academics and practitioners to explain and take necessary remedial action. How the external condition can affect internal beliefs, attitudes, and intentions is explained by TAM. The main attempt to adopt TAM is to develop objectives that can find some kind of variables from the previous research on the analytical causes of computer acceptance, the theoretical relationship of variables is made using TRA. Based on these TAM aims, many adjustments to the fundamental TRA methodology were established, backed by available theory and evidence [4].

2.3 Empirical Reviews

Empirical works provide evidence that Nigeria's capital market is in weak condition. Only using the computer as a medium of information could be effective. Global stock markets in our contemporary society have already been altered by modern technological innovation. [1] Recalled MKO Abiola's "Statement the environment that flourishes the Stock Exchange market consists of telephone, fax, and telex work efficiently. In our contemporary society, a highly automated and conducive environment will create a desirable efficiency in the stock exchange. In the Nigerian Capital Market, the introduction of computers into operation did not come until 1997 [2].

The extension and evolution of an economy are only possible if the economy is facilitated by technological innovation to create a fast-growing capital market. The Global Stock market has been largely influenced by computer networks. It is concluded that the latest transformation and accompanying freedom of the global market have influenced the other conventional markets. The computer network has replaced the older trading systems and the relationship among the traders unable the trader to communicate globally and use microwaves and optical fibers for trading [9]. Indian market act as a conventional market that thinks the adoption of Western technology does

not make the Indian market more effective than the international market. Algorithm trading can lead to unemployment as is the labor-intensive economy India opposed the idea of converting from a conventional financial market to an automated financial market. In addition, the model of foreign markets is different from the Indian market as the Indian market is liquidity driven which is operate from the emotional behavior of traders [3]. Awareness and publicity of the re-orientation of people towards capital market investment should take place. The government, regulatory authorities, operators, and other stakeholders of the capital market should create an awareness pool and spread awareness about the benefits of automation in the capital market. For that, there is a need to arrange more workshops and publicity on the different mediums of communication. The benefits of automation of the capital market such as automation can enhance stock clearance, access to the stock position; certification, etc. should also be made known by people [9].

Algorithm prediction work is heavily dependent on the quality of input data, and in France, data reconciliation is already difficult; additionally, this can have a significant impact on the outcome. The result cannot be completely trusted; hence, it raises questions, or the result may contain hidden biases that are harder to identify. To avoid distractions, diagnosing and addressing algorithm mistakes is extremely difficult. Emotional intelligence is lacking in Al-related techniques and algorithms. They are well to particular issues and tasks [14]. The negative sentiments of traditional traders towards adapting algorithms are not only concerned about the reluctance to adopt the technology. The other main reason behind this is the lack of government interest in taking the initiative to promote algorithm trading which requires little flexibility from the government side towards the adoption of automation of the financial market [3]. The literature has also examined the potential market impact and systemic risk associated with algorithmic trading. High-frequency trading, a subset of algorithmic trading, has received particular attention in this regard [2].

The Research framework has been derived from literature, including variables: awareness, trust, lack of government interest, unemployment and unnecessary investment are the factors that

affect conventional market traders towards the adoption of Algorithm trading. The process of working on the model can be described as follows:

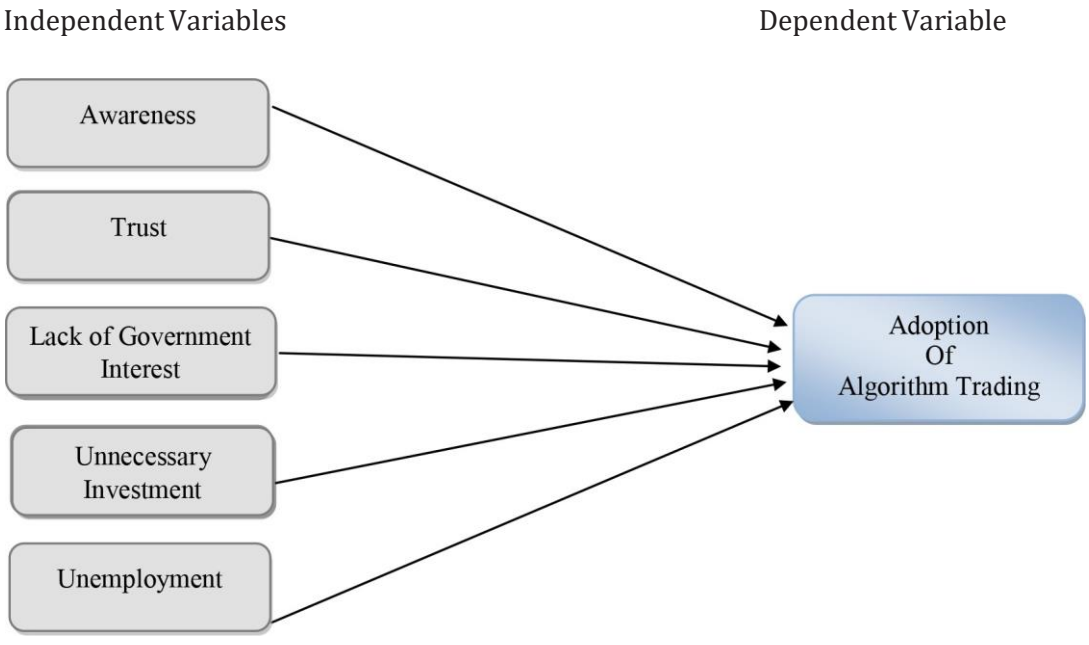

Figure 1: The Proposed Model

The proposed model (Figure 1) aims to investigate the relationship between the dependent variable, Adoption of Algorithm Trading (AT), and several independent variables, namely Lack of Awareness (LOA), Trust (Tr), Lack of Government Interest (LOGI), Unemployment (Unem), and Unnecessary Investment (Ui). The working of the model includes Formulation of the Hypotheses, Questionnaire Design, Data Collection, Data Analysis, Interpretation of Findings, Conclusion, and Recommendations. In short, based on the results and interpretations, the research concludes the impact and relationships between the variables.

2.4 Hypothesis Development

The proposed model includes five hypotheses that examine the impact of different independent variables on the dependent variable, the Adoption of Algorithm Trading (AT), in conventional stock exchanges. The hypotheses can be summarized as follows:

H1: There is a significant impact of awareness on the adaptation of algorithm trading in conventional stock exchanges. This hypothesis suggests that the level of awareness regarding algorithm trading will have a significant influence on its adoption in conventional stock exchanges.
H2: There is a significant impact of trust on the adaptation of algorithm trading in conventional stock exchanges. This hypothesis posits that trust, either in the technology or the system facilitating

algorithm trading, will significantly affect its adoption in conventional stock exchanges.
H3: There is a significant impact of lack of government interest on the adaptation of algorithm trading in conventional stock exchanges. This hypothesis implies that the extent of government interest or involvement in algorithm trading will have a significant effect on its adoption in conventional stock exchanges.

H4: There is a significant impact of unemployment on the adaptation of algorithm trading in conventional stock exchanges. This hypothesis suggests that the level of unemployment in the market will significantly influence the adoption of algorithm trading in conventional stock exchanges.

H5: There is a significant impact of unnecessary investment on the adaptation of algorithm trading in conventional stock exchanges. This hypothesis posits that the presence of unnecessary or inefficient investment practices will have a significant effect on the adoption of algorithm trading in conventional stock exchanges.

These hypotheses aim to examine the relationships between the independent variables (awareness, trust, lack of government interest, unemployment, and unnecessary investment) and the dependent variable (AT) within the context of conventional stock exchanges. The subsequent data analysis and regression modeling will help determine the statistical significance and direction of these relationships.

2.5 Research Contribution

The research paper makes several significant contributions to the field. These major contributions include:

1. Exploration of Algorithm Trading in Conventional Stock Exchanges: The paper contributes by focusing on the adoption of algorithm trading specifically in conventional stock exchanges. By examining this context, it provides insights into the application of algorithmic trading strategies in traditional trading environments, which has practical implications for market participants and policymakers.
2. Empirical Analysis of Impact Factors: The paper empirically investigates the impact factors influencing the adaptation of algorithm trading in conventional stock exchanges. It contributes by analyzing the relationships between variables such as awareness, trust, lack of government interest, unemployment, and unnecessary investment with the adoption of algorithm trading. This empirical analysis fills a gap in the literature and enhances our understanding of the dynamics involved.
3. Insights into Awareness and Trust: The paper sheds light on the importance of awareness and trust in the adoption of algorithm trading. It explores how these factors affect decision-making processes and the willingness of market participants to embrace algorithmic trading strategies. This contribution deepens our understanding of the psychological and

behavioral aspects that drive the adoption of innovative technologies in financial markets.

4. Examination of Government Involvement: The paper examines the role of government interest and involvement in algorithm trading adoption. By considering the impact of government policies, regulations, and initiatives, it provides insights into the influence of the broader institutional environment on the acceptance and implementation of algorithmic trading in conventional stock exchanges.
5. Consideration of Unemployment and Investment Practices: The paper investigates the impact of unemployment and unnecessary investment on the adoption of algorithm trading. It contributes by highlighting how these economic factors can shape market participants' perceptions and decisions regarding algorithmic trading strategies. This contribution adds to our understanding of the wider economic implications and considerations related to algorithmic trading adoption.

By offering empirical analysis and insights into these factors, the research paper contributes to the existing literature on algorithmic trading and provides valuable knowledge for practitioners, policymakers, and researchers in the field of finance and capital markets.

3. Methodology

The research is quantitative in nature and based on primary data which is collected from different brokers and investors available in Pakistan Stock Exchanges. Quantitative Techniques like Multiple Standard Regression Model Correlation were used to measure the effect of factors that are driven by previous literature on the adaptation of algorithm trading in conventional stock exchanges. The targeted population of the study encompasses Brokers and investors of conventional stock exchanges using the conventional method for trading and is reluctant to adopt algorithm trading. Purposive sampling is used to draw samples from the population, taking a sample size of 50 respondents who are either brokers or investors in the stock exchanges. A pilot survey (6 respondents) was conducted before to check the reliability and validity of the constructs. The study utilized a physical-based survey methodology, in which a questionnaire was administered to collect data. The questionnaire consisted of two parts: one focused on capturing the characteristics of the respondents, while the other employed a Likert scale measurement to assess the latent variables within the proposed framework. To ensure the attainment of the study objectives, the percentage of questionnaires to be completed was determined through logical reasoning. This approach aimed to optimize the data collection process.

To evaluate the validity and reliability of the measured variables, the proposed model relied on a five-point Likert scale questionnaire. The validity was assessed through exploratory factor analysis, which helps identify the underlying factors or dimensions within the questionnaire items. Reliability, on the other hand, was examined using Cronbach's alpha coefficient, which measures the internal consistency of the questionnaire items. Overall, these validation and

reliability measures were employed to ensure the robustness and accuracy of the data collected through the questionnaire and to support the credibility of the proposed model.

4. Data Analysis and Result

This data has been collected from the participants regarding the topic of impediments in the adaptation of algorithm trading from various brokers, traders, and persons who have active participation in Pakistan stock exchange activities, and who can comprehend the importance of implementing algorithm trading in conventional stock exchanges.

Table 1: Demographic Analysis Age

Age					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-25	6	12.0	12.0	12.0
	26-33	22	44.0	44.0	56.0
	33-40	1	2.0	2.0	58.0
	34-40	15	30.0	30.0	88.0
	More than 40	6	12.0	12.0	100.0
	Total	50	100.0	100.0	

The Table 1 presents the distribution of respondent ages. An analysis was conducted to examine the variation in the ages of those who completed the questionnaire. Age analysis provides a holistic picture of the investor's base which generally includes young and middle-aged personnel. Out of the total 50 respondents, 6 fell within the age range of 18-25, accounting for 12% of the sample. Similarly, 22 respondents were between the ages of 26-33, representing 44% of the total. Only 1 respondent, or 2%, fell within the age range of 33-40. Additionally, 15 respondents, or 30%, were between the ages of 34-40, and 6 respondents, or 12%, were over the age of 40.

Table 2: Demographic Analysis of Gender

Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	11	22.0	22.0	22.0
	Male	39	78.0	78.0	100.0
	Total	50	100.0	100.0	

Table 2 provided, illustrates the distribution of genders among the respondents. The analysis examined the variation in gender among those who completed the questionnaire. This analysis

provides a psychological aspect of decision-making based on gender. Out of the total of 50 respondents, 39 were male, representing 78% of the sample. On the other hand, 11 respondents were female, accounting for 22.2% of the total respondents.

Table 3: Demographic Analysis Education

Education					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Graduate	22	44.0	44.0	44.0
	Intermediate	6	12.0	12.0	56.0
	Other	4	8.0	8.0	64.0
	Postgraduate	18	36.0	36.0	100.0
	Total	50	100.0	100.0	

The Table 3 findings outline the educational backgrounds of the respondents. The majority of respondents, specifically 22 out of 50, held a graduate degree, accounting for 44% of the total. Additionally, 18 out of 50 respondents had completed a postgraduate degree, constituting 36% of the total. These results indicate that the largest portion of respondents possessed education at or above an undergraduate level. However, 12% of the 50 individuals had an intermediate education level, while less than 4% had non-academic educational backgrounds.

Table 4: Demographic Analysis Years of Experience

Years of Experience					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-1 Years	4	8.0	8.0	8.0
	2-3 Years	12	24.0	24.0	32.0
	4-5 Years	9	18.0	18.0	50.0
	More than 5 Years	25	50.0	50.0	100.0
	Total	50	100.0	100.0	

The provided Table 4 results outline the years of experience of the respondents. The majority of respondents, specifically 25 out of 50, had more than 5 years of experience, accounting for 50% of the total. Furthermore, 12 out of 50 respondents had 2-3 years of experience, representing 24% of the total. Additionally, 9 out of 50 respondents had 4-5 years of experience, constituting 18%. The smallest group of respondents had 0-1 year of experience, comprising 8% of the total.

Table 5: Descriptive Statistics

	Descriptive Statistics		
	N	Mean	Std. Deviation
Lack_Of_Awareness	50	4.0550	.78130
Trust	50	3.5400	.80236
Lack_Of_Government_interset	50	3.8000	.63084
Unemployment	50	3.2200	.80597
Unnecessary_Investment	50	3.3250	.71115
Algo_Trading	50	3.6900	.62792
Valid N (listwise)	50		

The Table 5 presents a descriptive analysis of the data. The analysis indicates that all of the variables exhibit responses that are predominantly in the Agreeing range. The questionnaire utilized a Likert scale, which included response options ranging from 1, representing "Strongly Disagree," to 5, representing "Strongly Agree."

Table 6: KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.799
Bartlett's Test of Sphericity	Approx. Chi-Square	115.293
	Df	15
	Sig.	<.001

The KMO (Kaiser-Meyer-Olkin) and Bartlett's test are used to assess the suitability of data for structure detection. For the KMO test, a value above 0.7 is generally considered acceptable, indicating a high level of correlation in the data. In the table provided, the KMO value is 0.799, which exceeds the recommended threshold of 0.7. This suggests that there is a substantial correlation in the data, indicating its suitability for structure detection. The significance level for Bartlett's test should typically be below 0.05 to indicate a significant relationship between variables. In the table, the significance value is reported as 0.001, which is below the 0.05 threshold. Therefore, this also suggests a substantial correlation in the data, further supporting its suitability for structure detection.

Table 7: Reliability Analysis

Constructs	N	Cronbach Alpha
Algo Trading	50	0.71
Lack of Awareness	50	0.81
Trust	50	0.72
Lack of Govt interest	50	0.72
Unemployment	50	0.77
Unnecessary investment	50	0.71
Overall Reliability	6	0.88

The table provided 7 presents the reliability analysis of each construct as well as the overall reliability of the instrument. The overall reliability of the questionnaire is reported as 0.88, indicating that the instrument is reliable for various statistical analyses. According to reference [11], a Cronbach Alpha value of less than 0.7 is considered excellent. Therefore, the questionnaire, consisting of 23 statements, is deemed excellent and suitable for further analysis. Furthermore, the individual reliability of each construct is reported to be less than 0.7, indicating that each construct is considered good for different statistical analyses. This suggests that the scale questions within each construct are aligned with each other, exhibiting satisfactory reliability.

Table 8: Correlation Table

Correlations							
		LOA	Tr	LOGI	Unem	UI	AT
LOA	Pearson Correlation	1	.454**	.276	.465**	.468**	.576**
	Sig. (2-tailed)		<.001	.052	<.001	<.001	<.001
	N	50	50	50	50	50	50
Tr	Pearson Correlation	.454**	1	.341*	.438**	.484**	.714**
	Sig. (2-tailed)	<.001		.015	.001	<.001	<.001
	N	50	50	50	50	50	50
LOGI	Pearson Correlation	.276	.341*	1	-.035	.108	.381**
	Sig. (2-tailed)	.052	.015		.811	.455	.006
	N	50	50	50	50	50	50
Unem	Pearson Correlation	.465**	.438**	-.035	1	.538**	.586**
	Sig. (2-tailed)	<.001	.001	.811		<.001	<.001
	N	50	50	50	50	50	50
UI	Pearson Correlation	.468**	.484**	.108	.538**	1	.619**
	Sig. (2-tailed)	<.001	<.001	.455	<.001		<.001
	N	50	50	50	50	50	50
AT	Pearson Correlation	.576**	.714**	.381**	.586**	.619**	1
	Sig. (2-tailed)	<.001	<.001	.006	<.001	<.001	
	N	50	50	50	50	50	50

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

*. Correlation is significant at the 0.05 level (2-tailed).

Table 8 presents the correlation analysis between the variables. The correlation values range between -1, 0, and 1, indicating the degree of correlation between the variables. A correlation of 1 represents a perfect positive correlation, while a correlation of -1 signifies a perfect negative correlation. In this table, the variables are abbreviated as follows: LOA (Lack of Awareness), Tr (Trust), LOGI (Lack of Government interest), Unem (unemployment), Ui (Unnecessary investment), and AT (Adaptation of Algorithm Trading).

The results indicate that most of the variables show a positive correlation, with many of them approaching a Pearson Correlation of 1. The dependent variable, AT, has a correlation coefficient of 0.01 (1-tailed), indicating the significance of the variables. The correlation matrix suggests that all the independent variables have a positive influence on the dependent variable. Consequently, the null hypothesis is rejected, and the alternative hypothesis is accepted, indicating that these variables are indeed related to the dependent variable. However, further analysis and additional tests will be conducted to examine the hypothesis more thoroughly.

Table 9: Model Summary

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. The error in the Estimate**
1	.837a	.701	.667	.36261

a. Predictors: (Constant), UI, LOGI, LOA, Tr, Unem

According to the model summary Table 9, the model can explain 66.7% of the variance, as indicated by the Adjusted R Square value. The Adjusted R Square is a measure that represents the proportion of variance in the dependent variable that can be accounted for by the independent variables included in the model. In this case, the model explains 66.7% of the variability in the dependent variable, suggesting that the independent variables have a moderate level of explanatory power about the dependent variable.

Table 10: Multiple Regression Analysis

Coefficients						
Model	**Unstandardized Coefficients**		**Standardized Coefficients**		**t**	**Sig.**
		B	**Std. Error**	**Beta**		
1	(Constant)	.187	.405		.461	.647
	LOA	.107	.083	.133	1.285	.206
	Tr	.286	.083	.366	3.460	.001
	LOGI	.204	.092	.204	2.209	.032
	Unem	.196	.084	.252	2.348	.023
	UI	.196	.094	.222	2.091	.042

a. Dependent Variable: AT

The regression analysis examines the impact of independent variables (Tr, LOGI, Unem, and Ui) on the dependent variable, the Adoption of Algorithm Trading (AT). The unstandardized coefficients indicate that when all other variables are held at zero, the dependent variable is estimated to be 0.187. This means that the dependent variable will have a baseline value of 0.187 when all independent variables are absent. In terms of the effects of the independent variables, for every 1% change in the independent variable Tr, the dependent variable AT is predicted to change by 28.6%. Similarly, the variables LOGI, Unem, and UI are expected to have effects of 20.4%, 19.6%, and 19.6%, respectively, on the dependent variable.

Additionally, the Table 10 information on the significance level and model fit. The t-value and Sig-value are crucial in assessing the nature and significance of the relationship between the independent and dependent variables. In this analysis, all the independent variables (Tr, LOGI, Unem, and UI) have a positive relationship with the dependent variable (AT), as indicated by their positive t-values. Moreover, the Sig-values show that all variables have a significant relationship with the dependent variable, as their values are above 0.05. However, the variable LOA does not show a significant relationship, as its Sig-value is greater than 0.05.

Trust in machines has a higher percentage which is 28.6% which means countries like Pakistan which are following conventional methods for trading in stock markets have great doubts about the efficiency of Algorithm base trading because of the less human interaction and dependency on the machine. Fear of miscalculation and the inexperience of data engineers are one of the reasons conventional stock exchanges are reluctant to adopt Algorithm trading.

5. Discussion and Conclusion

In conclusion, this research explored the impediments faced in the adaptation of algorithmic

trading within the context of the Frontier Stock Exchange. The study aimed to identify the key challenges that hinder the implementation and utilization of algorithmic trading strategies in this specific market. Through an in-depth analysis of the literature and empirical data, several important findings have emerged. Firstly, it became evident that the lack of technological infrastructure poses a significant obstacle to the successful adoption of algorithmic trading in the Frontier Stock Exchange. The absence of awareness, lack of government interest, unemployment, robust and reliable connectivity, high-speed data feeds, and efficient execution systems limit the effectiveness and reliability of algorithmic strategies [15]. This suggests that significant investments in infrastructure development are necessary to facilitate the smooth integration of algorithmic trading in such markets. Secondly, regulatory constraints emerged as another crucial impediment to the adaptation of algorithmic trading. The Frontier Stock Exchange might lack comprehensive regulations and guidelines specifically tailored to algorithmic trading, leading to uncertainty and hesitancy among market participants. The establishment of clear and appropriate regulatory frameworks is vital to ensure fair and orderly markets, mitigate potential risks, and enhance investor confidence in algorithmic trading systems. Furthermore, the research identified a lack of skilled human resources and expertise in algorithmic trading as a significant hurdle. The development and implementation of algorithmic strategies require a deep understanding of quantitative finance, computer science, and statistical modeling [9]. Enhancing the education and training programs related to algorithmic trading in the Frontier Stock Exchange would be instrumental in building a pool of qualified professionals capable of leveraging algorithmic trading to its full potential.

In conclusion, the impediments to the adaptation of algorithmic trading in the Frontier Stock Exchange are multifaceted, ranging from technological and regulatory challenges to human resource constraints and cultural factors. Addressing these barriers requires a collaborative effort from market participants, regulatory bodies, educational institutions, and industry stakeholders. By overcoming these challenges, the Frontier Stock Exchange can unlock the potential benefits of algorithmic trading, such as increased market efficiency, liquidity, and improved price discovery, thereby fostering growth and development in the advanced financial markets.

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