5. CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter is proposed to present the findings of the research and appropriate suggestions, insightful conclusions and scope for further research.

The atomic cross examinations of the primary and secondary data disclose the some interesting results. Primary and secondary data are explored absolutely to determine the important factors of the study, to discover the awareness level, barriers for algorithms, acceptance of algo, and perception for machine based trading, influence and reasons of algorithmic trading on investors for investing in stock market. The changes in the attitude of investors were noticed after the technology automation and fast growing internet facilities in India. Now the investors possess greater awareness through brokers, friends, family, relatives, newspaper, school/colleges, TV and other sources of information. The transparency in capital market is measured as one of the very important reforms that magnetically fascinated the investors and increased their number in retail investment through algorithmic trading.

5.2 Tabular representation of Objectives and Results

<table>
<thead>
<tr>
<th>S.no</th>
<th>Objective</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>To examine the factors involved in the creation of quantitative /algorithmic trading model.</td>
<td>Found important factors: P/E ratio, sharpe ratio, net present value, ROI, simulation, CAPM model, sensitivity analysis, Historical data, artificial neural network, GUI, Support vector machines, data mining, sentimental analysis and behavioral analysis.</td>
</tr>
<tr>
<td>2.</td>
<td>To analyze the awareness level, acceptance and influence of Quant techniques of investment among the retail investors in Mumbai.</td>
<td>The basic awareness about the algorithmic trading is high but in advanced knowledge about the algorithmic trading is quite low. Investors adopted machine based trading on manual trading due to more friendly to technology and technology automation. The biggest barrier to choose algo trading is low awareness. The main reason to choose algo is ease, speed and price improvement.</td>
</tr>
<tr>
<td>3.</td>
<td>To investigate the impact of correct quantitative model on investor’s</td>
<td>The correct quantitative model provides the liquidity and can improve the volatility.</td>
</tr>
</tbody>
</table>
perception against the stock market. Found negative perception also for unfair trading pattern related to algorithm trading. Sentiments of investors play a vital role in transaction. Found regulatory body intervention is strong factor to choose algorithm. It is found that investor’s perception for choosing algo trading has significant relationship with gender. Technology automation is important factor in algorithm trading.

4. To study the comparison between traditional approach and the modern approach (Quantitative model) of investment techniques. Traditional approach of trading is still followed by people only having age more than 60 years. Modern approach is based on technology and time factor with speed of transaction to get profit in short period of time.

5.3 Key conclusions

From the primary data analysis through questionnaire, it is found that algorithmic trading dominated by men over women. The age group of 25-40 years is more active investors group and more than 60 years age group shows least inclination in algorithmic trading. Private occupation groups are the leading group in algorithm trading. The socio-economic group having more than Rs.5, 00,000 incomes annually shows more inclination. Those having more than 2 years of experience in algo trading them usually prefer it for the trading purpose.

From the personal interview it is clearly found that investors are more or less treating algo as a mathematics and statistics for the trading in security market. Some of them treated as complex structure of information to get the positive result. Technology automation is the main source for acceleration of algo trading in the current scenario. Investors having more age hesitate to use technology for security reason and also due to resistant to change. Investors who is less than 40 years are more inclined towards the technology usage for trading purpose because of ease, speed and convenient. Almost all investors focus on price improvement and safety of the trade. According to them, choosing algo is itself a technique to handle the sentiments for the trading. Some of them face software issue while rest of them faces problem related to the internet and network issue. Most of them depend upon dealers for the trading tips and rest of them on friends, relatives, colleagues and family members. According to them, dealers are more profit oriented not customer oriented. They drive them into illegal practice of trade and earn profit. According to the respondent, dealer should be loyal and responsible for the fair trade practices to protect the customers not their profit. All investors suggest regulatory body to govern it very strictly to protect the interest of investors. They want good infrastructure and facility for smoothening of system from government. They suggest retail investor that before entering into algorithm, must not only aware about it
but also go through the advanced knowledge about the trading through algo is recommended. They should attend seminars, conferences for the same to get the more idea about it.

This study also interviewed (through questionnaire) top ten stock broking firms in mumbai for algo trading. It is found that most of the investors shows their interest in machine based trading. 80% of the dealer target all types of customers while 20% are focused on retail and big HNIs. 70% of the dealers don’t have the trading journal while 30% has. 80% of dealers have the research facility and they provide to investors according to the need. Only 10% provides free of cost research. They used algo trading from 2-5 years. They all believe that software training, SEBI guideline, government policy, user friendly technology, individual perception and income level affect the algo trading in mumbai. 40% dealers update their software in 3 months and 40% in 6 months while rest 20% 2-3 months. 80% dealers informed their customer regarding software update through sms, email, and software alert. 70% dealer said that there is no grievance for algo trading while 30% said that 0-5 grievance on daily basis. 70% investors have the problem with internet connection, 20% with system related and only 10% having the problem with software. Software related complaint received on monthly basis only 0-5 complaints. There is 0-5 enquiry in a month for algo trading is 40% and again 40% for 10-20 enquiries. There is only 10% each for 5-10 and 20-50 enquiry. 80% of the dealer never changed their software. 70% of the dealer changed or update their software within 6 months. According to the dealer, investors are more rational for information and behave accordingly. Investors require more knowledge to get into the algo trading for proper utilization of the technology.

5.3.1. To examine the factors involved in the creation of quantitative /algorithmic trading model.

Every next model used mathematical aspects and statistical calculation and combination of different factors like, P/E ratio, sharpe ratio, net present value, ROI to create the best model to predict the price movement of the security in stock market.

There was also simulation, black box, CAPM, sensitivity analysis to get the best model for daily prediction too. Historical data was also used for efficient prediction and movement of market.

The model required lots of data related to security and its movement. Therefore, there was use of artificial neutral network, GUI, Support vector machines, data mining.

For investor’s perception, a sentimental analysis and behavioral aspect was taken. They play a vital role in price movement.

5.3.2. To analyze the awareness level, acceptance and influence of Quant techniques of investment among the retail investors in Mumbai.
From the analysis of the data, it is found that most of the investors (55.8%) are aware and 34% having the little idea about the algorithmic trading in the market and out of that more than 82% investors used machine based trading, which shows a good response for the future prospects. More than 90% respondent believed that algorithmic trading is more efficient that manual trading. The main source of information about the algorithmic trading was broker then school/college where friends, teachers and researcher play a vital role. Therefore, broker plays a crucial role in spreading the concept of algorithmic trading. As per the respondent, algorithmic trading is popular due to investors are friendlier to technology and then it is checked decision tool for investment. Most of the respondents are active in algorithmic trading more than 2 years. According to the respondent, the biggest barrier to choose algo trading is low awareness and then resistance to change. The study shows the main reason to choose algorithmic trading is easy to use, speed and price improvement.

From this study, it is also found that there is significant relationship between age and income level of the investor with their preferred types of trading (machine based and manual trading). There is significant relationship between age and income of the investor with awareness of algorithmic trading. There is significant relationship between age investors respondents having perception for efficient trading through algorithm in Indian stock market

Though cross tabulation analysis, it is found that there is significant relationship between gender of the respondent’s and barrier for choosing algorithmic trading in Indian stock market. There is significant relationship between gender of the respondent’s and reason and perception for choosing algorithmic trading in Indian stock market. There is significant relationship between age and gender of the respondent’s with reason and source of information for algorithmic trading in Indian stock market. There is significant relationship between age and gender of the respondent’s with the popularity for algorithmic trading in Indian stock market. There is significant relationship between gender and age of the respondent’s with year of experience in algo trading in india.

From t-test, it is found that there is significant relationship between factors of modern trading like real time price movement, safety and more profit with gender distribution. There is significant relationship between only one factors of effectiveness of algo trading i.e, maximum risk with gender distribution while no significant relationship with rest of the factors like minimum loss, stability in return, high short term return, volatility, liquidity, speculations, future contingencies, consumption need, expected future performance with gender distribution.

From ANOVA test, it is found that that maximum risk, minimum loss, expected future performance, Future contingencies, consumptions need, speculations and other parameters vary significantly with respect to age group of the respondent. It is also found that maximum risk, minimum loss, Stability in return, high short term return, expected future performance, opportunity for superior gain, first safety then gain, future contingencies, consumption need
and speculations have affected the income level of the investors. Investor’s year of experience in algo trading has significant relationship with process of algo trading or advanced knowledge for algorithmic trading (how to place an order, how to cancel an order and regulation for the trade).

Through factor analysis, it is found that factors like time to open an account with brokerage house, brokerage charges and software has significant relationship for the algorithmic trading. It is also found that maximum risk, minimum loss, stability in return, volatility, high short term return, consumption need and future contingencies are the significant factors for the effectiveness of algorithmic trading in India. This study shows prospects for algo trading is more return on fraud trading, reduced chances of fraud and Indian capital market is more efficient. This result shows strong contradiction of perception of investors for unfair trade practice through algorithmic trading. It is also found that advanced knowledge about the process of transaction in algo trading like how to place an order, how to cancel an order, regulation for trade, what to do if investors have a complaint has significant factors for processing the transaction.

5.3.3. To investigate the impact of correct quantitative model on investor’s perception against the stock market.

To get the idea about this objective, researcher used secondary data and personal interview technique to get the result.

The result shows by the secondary data showed that correct quantitative model provides the liquidity and can improve the volatility. Some of the institutional investors have the negative perception that unfair trading pattern related to algorithm trading. Some of the investors are driven by sentiments and affect his/her trading behavior in the market. Market supervision is also found one of the important reasons for choosing the quant model.

According to the primary data, found that investors are little confused about the advanced concept of algorithmic trading.

From the questionnaire also found that investor’s perception for choosing algo trading has significant relationship with gender. Men and women are more inclined to choose algo trading due to technology automation. They tried to exploit the technology to get the maximum return from the security market.
5.3.4 To study the comparison between traditional approach and the modern approach (Quantitative model) of investment techniques.

From the questionnaire, it was found that that time saving, more convenient and no dependency on others are the biggest factors for choosing algorithmic trading on conventional/ traditional approach of trading in security market.

From personal interview, it was found that in traditional trading, investors focus on more profit over convenience while in modern approach convenience is the second utmost priority of the investors for trading. People have less time to put into stock market but want to get more profit with ease and speed too with the help of technology automation. In traditional approach, investors are more influenced by friends, relatives and mostly from broker to trade in the security market. In modern approach of algorithmic trading, investors need not to worry about the influence as everything take care by mathematical model to drive the profitable trading according to the requirement of the investors. Conventional trading always depends upon the third party to execute the trade and because of this most of the time communication gap, delay in trade comes into the picture while modern approach erased it.

5.4 Learning for the researcher

Trading through quantitative analysis has become very trendy over the past decades. Technology automation is one of the very important factors to execute algorithmic trading. The role of investment decision dominated by men with the age of 25-40 years and more than Rs.5,00,000 income level. The market has become computerized, translucent and self-driven. The main barrier to choose algorithms is low awareness and resistant to change which could be overcome by awareness programs, seminars, conference, workshops for algorithms. Investors are very much friendly to technology and want to use it for the ease, speed and price improvement in trading. It is found that investors are ready to take maximum risk for maximization of profit. Investors has all the basic knowledge about algorithmic trading but it require more on advanced knowledge and regulation part of it.

5.4.1 Recommendations for Investors

This study recommended investors to start showing interest in financial education for algorithmic trading system, model and process for transaction. Investors should start getting knowledge and implication of technology automation in financial market. Females should start enchanting more initiative in investment strategy planning and adapting the latest trend in financial market.

Females should make them realize the significance of their contribution in stock market. Schools, colleges, universities should introduce the curriculum of algorithm in financial
market to improve the financial literacy of the students as prospect investors. Investor should attend different conference, workshop and development program for getting more or advanced knowledge for algorithmic trading. Investors should get in touch with different financial market module for trading to invest efficiently in security market.

Investors should minimize their hesitation and resistant to change for the new transaction pattern for algo trading efficiently. Investors can get the idea of algorithmic trading from brokers, friends, relatives who is working with good algorithms and making money from the same. Investor learning is very important reason for investment. Research and awareness programs should be attended for rational decision. Seminars, conferences and training programs should be attended for this purpose also.

5.4.2 Recommendations for Regulators

The transparency for algorithmic trading should be taken care by regulators on priority basis. Regulator (SEBI) should build the confidence among investors regarding algorithmic trading against unfair trade practices.

SEBI should conduct awareness program for algorithm trading. It should be engaged to encourage not only women investors while also senior citizens. Regulator should have to ensure investors by providing security, liquidity and return for their investments. As per literature review, only little research carried out for algorithmic trading in Indian stock market. So, SEBI and other regulatory bodies and financial institutions should provide support to accomplish advance research in this area.

SEBI should also start their trading module for algorithms. SEBI should release guideline regarding algo trading through their website, newspaper, etc for creating the awareness among investors. Adequate publicity through T.V., newspapers, radio, magazines, pamphlets, and leaflets should be done.

5.4.3 Recommendations for Brokers

Brokers play a vital role in decision making among the investors. Brokers should provide information to investors at huge with detailed data including the role of SEBI for algorithmic trading to make them confident to trade in algorithms. Brokers should be fair on the part of information to trade in security market offered to investors.

Brokers should keep his interest below on investor benefits. With respect to the investors having the age of 60 years and above, this group should be targeted with an objective to learn them the importance of algorithms and its positive implication on investment. Brokers should involve or educate women to participate in algorithmic trading in India.
Brokers should also conduct some awareness camp in the branch to create awareness and invite existing investors and prospective investors too. Brokers should be very informative related to software, products, process and compliance for the algorithmic trading.

Brokers should protect the investor’s interest on his own interest. Regarding algorithmic trading broker should go with more journals, newspapers and TV media to accomplish the investors. Brokers can have a pleasant approach with investors to promote investor’s decision making for algorithms.

5.5 Scope for Further Research

No investigation in any subject matter can be complete in itself. In this study, an effort was made to explore the awareness, acceptance, influence and perception of algorithmic trading in stock market in Mumbai region. Therefore, more location either national, state and district level can be explored for further research taking the current study as a reference. Awareness for gender, preference could be attempted separated to know more about the women participation. Role of technology and software could also be an interesting factor for study. There could be a comparative study on perception of institutional investors (HNI) and retail investors in Indian stock market.