Behavioral Biases and their Importance in Shaping Overall Investment Behavior of Indian Engineers

Priya Kansal*
Seema Singh**

Abstract

The study investigates the three broad dimensionsviz. overconfidence, optimism and loss aversion of investment behaviorof engineers and their impact on the investment behavior in context of Indian Stock Market. We have studied the importance of each Behavioral dimension/bias in shaping the overall investment behavior. Also, the sub-factors of each dimension are studied in terms of their relative importance in shaping the broad dimension.A structured questionnaire were developed and distributed among 423Engineers who are engineering graduate. Multi-criteria technique of AHP is used to define the relative contribution of each of the behavioral bias in shaping the investment behavior. The three biases have been studied viz. overconfidence, loss aversion and overreaction. The results revealed that overconfidence is the most important bias and plays most important role in shaping investment behavior followed by loss aversion and optimism. The most important factor in deriving overconfidence is self-attribution. Results also reveal that most of the engineers are loss averse because they do not like to realize their losses.However, they are not so optimistic for the stock market that they don't expect the price rise even after a long fall.

Keywords: *Investmentbehavior, Overconfidence, Optimism, Loss Aversion, AHP.*

Introduction

The Efficient Market Hypotheses, proposed by Eugene Fama suggest that in an efficient market, all the market information are immediately incorporated in security prices and that security prices are the best estimated and accurate prices all the time. But Behavioral Finance denies this assumption and suggest that there are number of evidence such as January Effect, Weekend effect, Seasonality etc. through which it has proved that markets are not efficient all the time and investors often travel from rationality to irrationality in perhaps a predictable manner. To some extent, our emotions, feelings and perceptions influence the investment decisions and these are known as mental biases.Behavior finance makes an

*Research Scholar, Department of Humanities, Delhi Technological University, Delhi, India
priyagoel0211@gmail.com

**Head & Associate Professor, Ph.D., Department of Humanities, Delhi Technological University, Delhi, India
seemasinghdtu@gmail.com

attempt to study the irrational behavior of investors in the market based on the said mental bias. This field also explains the factors responsible for such behavior. The nature of Indian stock market is considered to be highly volatile, sensitive and reactive to unpredicted shocks and news and it takes no time to impact the market activities.Hence, it is very important to understand the role and importance of Engineers, their tradingbehavior. Unlike institutional investors, Engineers are considered tobe less informed, have psychological biases. It is believed that investmentbehavior of Engineers influences the stock prices. With this perception about the Engineers, majority ofinvestment strategies and stock market policies are designed and focused to their institutionalcounterparts, thereby ignoring the engineers' interests tosome extent.The purpose of this paper is to analyse the determinants of individual investor behaviorin Indian stock market.

Objective of the Study

The objective of the study is to identify the determinants of investment behavior and their relative importance in shaping the investment behavior of Indian engineers.

Theoretical Background

Behavioral finance is an emerging science, and a relatively new and developing field of academic study that tries to study the irrational behavior of investors. Most of investment decisions to some extent are biased and are influenced by our perceptions that do not meet the criteria of rationality. The main focus of Behavioral finance is on this irrationality of individual investor that can affect their investment decisions and the market prices. It attempts to better understand and explain how investor's emotions and cognitive errors influence investors and their decision-making process while doing investments. The contribution of behavioral finance is not to diminish the fundamental work that has been done by proponents of efficient market hypothesis. Rather, it is to examine the importance of unrealistic behavioral assumptions and make it more realistic. It does this by adding more individual aspects of the decision-making process in financial markets. Without these contributions of behavioural finance, certain aspects of financial markets cannot be understood. Despite the importance of individual's investment decisions, we know little about the factors that influence them. Finance research has often ignored the engineers' decision making process while taking financial investment decisions .There is aneed to develop a behavioural paradigm to probe the determinants of investor behavior and their impact on engineers' financial decision making process. Behavioural finance models ranges from individual investor conduct to market-level outcomes. For thepurposes of this research,we adopted an approach favored by traditional Economist.The current study examinesbehaviors or biases of Engineers that distinguish them from the rational investors envisioned in classical economic theory,Behavioural Finance Micro (BFMI)

Literature Review

The proposition that has dominated in the field of standard finance isEfficient Market Hypothesis (EMH). This hypothesis is based on three basic assumptions that form the basis of the EMH. The first and most significant assumption is that investors are rational. Secondly it is based on the notion that everyinformation is reflected in the market before making investments. It is related to internal consistency. The third principle is that the decision maker always tries to maximize their utility.

Behavioral finance denies the traditional assumptions of expected utility maximization with rational investors in efficient market. There are two building blocks of behavioral finance viz. *cognitive psychology* and the *limits to arbitrage* (Ritter, 2003). Cognitive psychology refers to how people think and the limit to arbitrage is the condition when market is inefficient.

Herbert Simon (1947, 1983) proposed much of the basic theories of behavioural finance under the general heading of '*bounded rationality*'. It specifies that decision making is based on some cognitive limitations. As a result, human behavior is made on the basis some *heuristics* (Tversky and Kahneman, 1974). The same is also proposed by Slovic (1972) in investment risk-taking behavior where he found that, investor process the information into small pieces and show some judgmental biases which lead people to overreaction on new information (DeBondt and Thaler, 1985, 1987).

Investors tend to become more optimistic when the market goes up and more pessimistic when the market goes down. Hence, prices fall too much on bad environment.

According to Kent, et al. (2001), most of the investors behave, while investing, is like they often do not participate in all asset and security categories, they exhibit loss-averse behavior, they use past performance as an indicator of future performance, they trade too aggressively, they behave on status quo, they do not always form efficient portfolios, they behave parallel to each other, and they are influenced by historical high or low trading stocks.

All the aforesaid studies studied the existence of behavioral biases in developed country. Moreover, which bias is more prominent has not been studied yet. Hence this paper tries to fill this gap by studying the existence of behavioral biases in a developing country like India. Also, it studies the priority of each bias in shaping the overall investment behavior.

Research Methodology

Data for the study is primarily collected through survey in the form of questionnairesfromstock market investors who have graduate degree in engineering inDelhi NCR. Questions related to investors profile and determinants of investor behavior were included using a Five point Likert scale. Data collected were analyzed through SPSS and Spread Sheet. *Analytic Hierarchy Process (AHP)* is used to find the relative importance of different behavioural traits of the investors in contributing overall investment behavior. AHP is one of Multi Criteria decision making method that was originally developed by Prof. Thomas L. Saaty. In short, it is a method to derive ratio scales from paired comparisons.

The study identified four broad dimensions of investor behaviour that could have an impact on their investment decisions*(Overconfidence, Optimism Herding and Loss Aversion)* that were further divided into different factors and respondents were asked to rate each factor on Likert scale. On the basis of the overall responses of the investors and the ratings that they assign to the factors of the each dimension AHP determine the relative weights for each dimension of the investment behavior and priorities them in terms of their level of contribution in the formation of behavior of the investor.

Data Analysis and Interpretation:

Profiling of Respondents

Figure 1 shows the demographic profile of investors. Out of 423 investors, there are 78.5% males and 21.5 % females respondents. Majority of investors falls into the age category of 31-40 years. The reason may be that this is the age group which has the comparatively higher income than the investors of 30 years and less. Moreover, they have lesser financial responsibility than the higher age group investors. Most of the investors are married. Only 23.6% investors are single. 23.6% investors are involve in job, 21.5% investors are administration, 20.8% are entrepreneur, 19.4% investors are teachers and 14.7% are scientist. Approximately 50% investors falls in the income group of 5 Lacs to 10 Lacs.

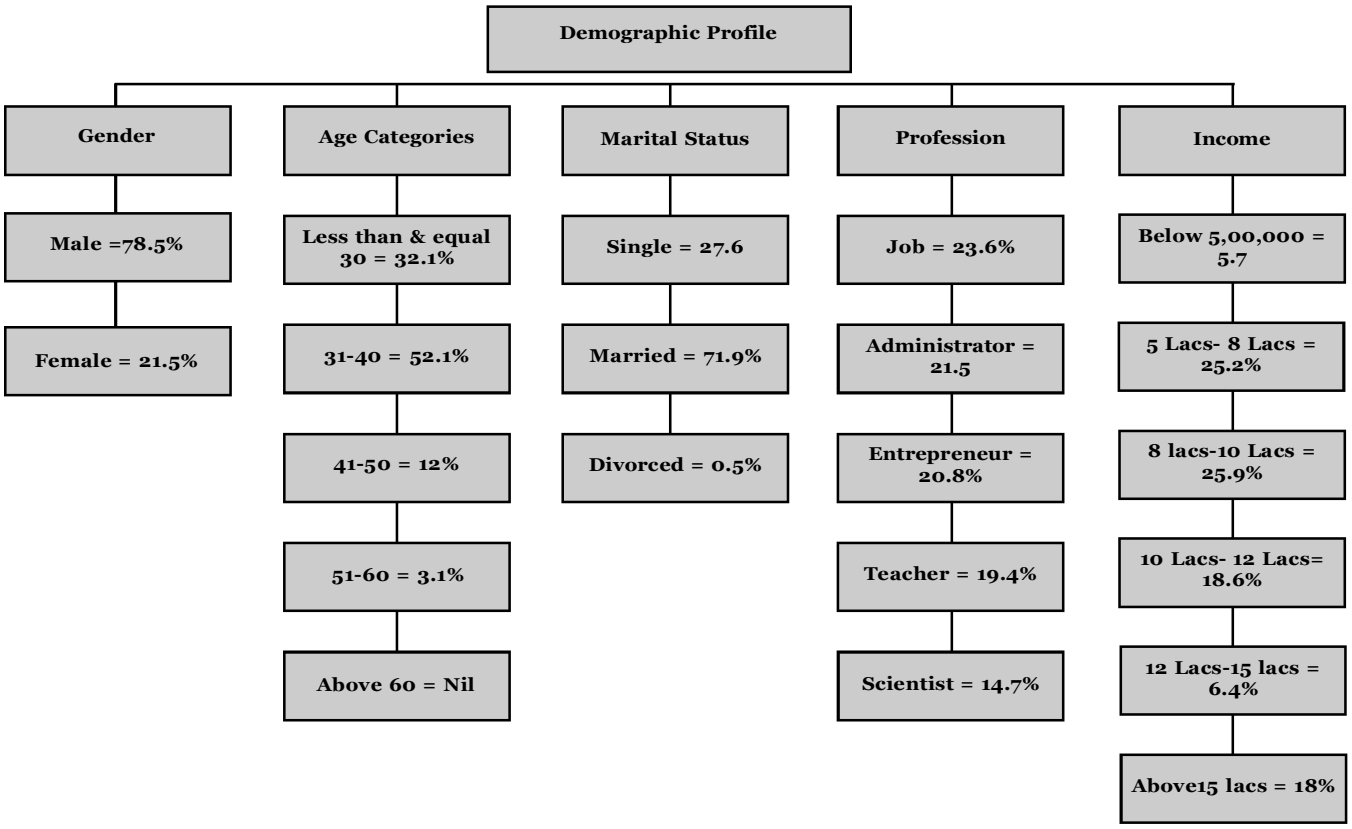

Figure 1: Demographic Profile of Respondents

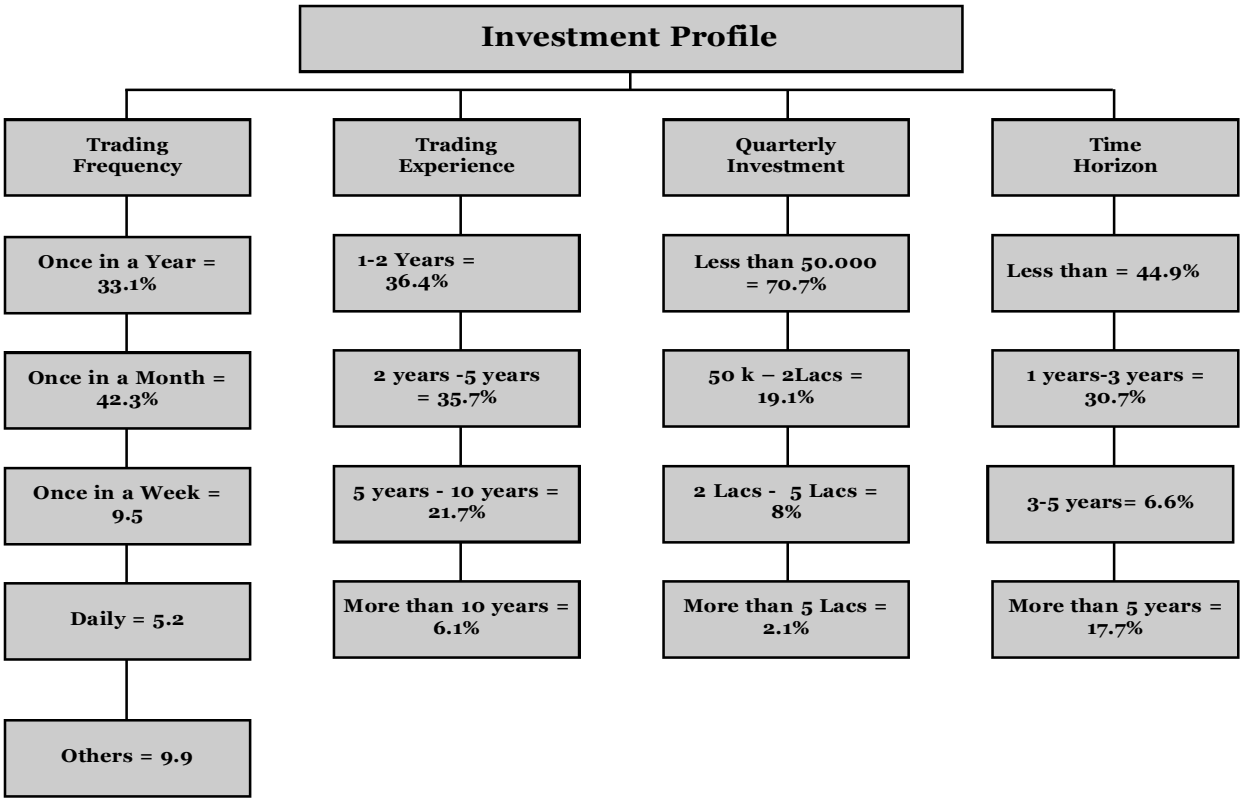

Figure 2: Investment Profile of Investor

Figure 2 Shows the investment profile and sophistication of the respondents. It shows that most of the investors (42.3%) invest on monthly basis where as 33.1% people have very low frequency i.e. once in a year. However, approximately 10% investors invest twice or thrice in the stock market. Very few investors (5.2%) believe in intraday trading. Respondents having experience of 1-2 years are 36.4%, experience of 2-5 years are 35.7%, 5-10 years are 21.7% where as investors having experience of more than 10 years are 6.1%. This shows that the respondents have good trading experience in stock market which enhances the validity of the study. The figure also shows that the time horizon for most of the investor is very low, maximum to 3 years. Only approximately 23% investors invest for more than 3 years.

Analysis of Determinants of Investor Behavior

With the help of previous literature, we have identified three broad dimensions of investment behavior: Overconfidence, Optimism and Loss Aversion that are divided into different sub factors. Table 1,2,3,4 shows the frequency of responses for the different subfactors of overconfidence dimensions, Pairwise comparison matrix, normalized matrix and rank matrix respectively. Similarly, Table 5,6,7,8 shows the frequency of responses for the different sub factors of optimism dimensions, Pairwise comparison matrix, normalized matrix and rank matrix. Table 9,10,11,12 shows the frequency of responses for the different sub factors of loss aversion dimensions, Pairwise comparison matrix, normalized matrix and rank matrix

Frequency Analysis of Overconfidence

Table 1: Frequency Results for Overconfidence

Question	S.A(1)	A(2)	U(3)	D(4)	S.D(5)	Total
Your Current Portfolio will outperform the SENSEX (*predictive Overconfidence*)	41(9.7%	133(31.4%)	191(45.2%)	46(10.9%)	12(2.8%)	423(100%)
More than 80% of time your investment decision proved to be right *(Certainty Overconfidence)*	41(9.7%)	132(31.2%)	166(39.2%)	72(17%)	12(2.8%)	423(100%)
You are responsible for all your past successes. *(Self Attribution)*	8419.9	171(40.4%)	137(32.4%)	25(25.9%)	6(1.4%)	423(100%)

The frequency results of these three statements tell reveals that investors have high level of Overconfidence as there is greater level of self-attribution, high level of certainty and predictive confidence as majority of investors gave rating of 2and 1 in case of each parameter.

AHP Analysis of Overconfidence

Table 2: Pairwise Comparison Matrix for Overconfidence

Feature	Predictive Confidence	Certainty Confidence	Self-Attribution
Predictive Confidence	1.00	2.00	0.25
Certainty Confidence	0.5	1.00	0.33
Self Attribution	4.00	3.00	1.00

Table 3: Normalized Matrix for Overconfidence

Feature	Predictive Confidence	Certainty Confidence	Self-Attribution	Average
Predictive Confidence	0.182	0.333	0.158	0.224
Certainty Confidence	0.091	0.167	0.209	0.155
Self-Attribution	0.727	0.500	0.633	0.620
Total	1.000	1.000	1.000	1.000

Table 4: Rank Matrix for Overconfidence

Feature	%	Rank
Self - Attribution	62%	1
Predictive Overconfidence	22.4%	2
Certainty Overconfidence	15.5%	3

The Analytical Hierarchical Process determined the relative weights of each factor of the dimension of *Overconfidence*. In the overall dimension of Overconfidence the most prominent factor was the *Self-Attribution* that result in successful investment, (approx. 62%) followed by*Predictive Overconfidence* with approximate weights of 22% and *Certainty Overconfidence* with 16%.

Frequency Analysis of Investor Optimism

Table 5: Frequency Results for Optimism

Question	S.A(1)	A(2)	U(3)	D(4)	S.D(5)	Total
You, generally buy the securities whose prices are currently rising *(contrary to Market)*	42(9.9%)	192(45.3%)	118(27.9%)	59(13.9%)	12(2.8%)	423(100%)
You think off long term investment profits even if the price of the stock, you bought, falls immediately *(Price Increase Expectation)*	41(9.7%)	133(31.4%)	191(45.2%)	46(10.9%)	12(2.8%)	423(100%)

By analyzing the responses the high Optimism among the investors is low since only 10 % investors are optimistic about the price rise. However if we see the composite scores of positive optimism, 42% of investors do believe that even if the market falls, it will recover within a few days and 55% investors this that there is a further scope in the current marketfor price rise.

AHP Analysis of Optimism

Table 6: Pairwise Comparison Matrix for Optimism

Feature	Contrary to Market	Price Increase Expectation
Contrary to Market	1.00	0.50
Price Increase Expectation	2.00	1.00

Table 7: Normalized Matrix for Optimism

Feature	Contrary to Market	Price Increase Expectation	Average
Contrary to Market	0.333	0.333	0.333
Price Increase Expectation	0.667	0.667	0.667
Total	1.000	1.000	1.000

Table 8: Rank Matrix for Optimism

Feature	%	Rank
Price Increase Expectation	66.7%	1
Contrary to Market	33.5%	2

Interpretation: The second determinant *Investor Optimism*was measured in terms of investor's outlook of the stock market. AHP analysis assigned the highest rank to the factor*Price Increase Expectation* (66.7%). Only 33.5% of respondents are believed that market will rise more than now. On the whole the optimism among the investors is very low.

Frequency Analysis of Loss Aversion

Table 9: Frequency Results for Loss Aversion

Question	S.A(1)	A(2)	U(3)	D(4)	S.D(5)	Total
Today's looser will be winner one day, so it better to hold them rather to sell *(Loss holding)*	120 (28.4%)	119 (28.1%)	103 (24.3%)	53 (12.5%)	28 (6.6%)	423 (100%)
Loosing Rs.1000 caused you more mental pain than the pleasure of getting Rs.1000 *(Risk Penalty)*	114 (27.0%)	127 (30.0%)	88 (20.8%)	63 (14.9%)	31 (7.3%)	423 (100%)
You often actively dispose gains from your portfolio *(Early Profit Booking)*	42 (9.9%)	137 (32.4%)	140 (33.1%)	87 (20.6%)	17 (4.0%)	423 (100%)
You are often reluctant to realize the losses *(Risk Aversion)*	61 (14.4%)	143 (33.8%)	128 (30.3%)	72 (17.0%)	19 (4.5%)	78 (100%)

Interpretation: By considering the various factors collectively it could beinferred that majority of investors are Loss averse and they do not prefer realizing losses. Rather they prefer selling their winning stocks at earliest.

AHP Analysis of Loss Aversion

Table 10: Pairwise Comparison Matrix for Loss Aversion

Feature	Loss Holding	Loss Penalty	Profit Booking	Loss Aversion
Loss Holding	1.00	1.00	0.25	0.50
Risk Penalty	1.00	1.00	0.20	0.33
Early Profit Booking	4.00	5.00	1.00	0.50
Risk Aversion	2.00	3.00	2.00	1.00

Table 11: Normalized Matrix for Loss Aversion

Feature	Loss Holding	Loss Penalty	Profit Booking	Loss Aversion	Average
Loss Holding	0.125	0.1	0.072	0.215	0.128
Risk Penalty	0.125	0.1	0.058	0.142	0.106
Early Profit Booking	0.5	0.5	0.290	0.215	0.376
Risk Aversion	0.25	0.3	0.580	0.429	0.389
Total	1.00	1.00	1.00	1.00	1.000

Table 12: Rank Matrix for Risk Preferences/Attitudes

Feature	%	Rank
Risk Aversion	38.9%	1
Early Profit Booking	37.6%	2
Loss holding	12.8%	3
RiskPenalty	10.6%	4

AHP analysis revels that investors are generally reluctant to realize the losses because of the higher risk aversion. The factor of *risk aversion* gets the highest rank among all four factors with weights of 39% approx. Also, the tendency of selling their winnersweights about 38%. While the other two factors *Loss Holding* and *Risk Penalty*weighs about 13% and 11%.

AHP Analysis of Determinants of Investor Behavior

After analyzing the importance of sub factors of all the broad dimensions, we analyze the importance of all the three broad dimensions in overall investment behavior. Table 13, 14 and 15 shows the Pairwise comparison matrix, normalized matrix and rank matrix of all the three dimensions of investment behavior.

Table 13: Pairwise Comparison Matrix ofBehavioral Determinants

Feature	Overconfidence	Optimism	Loss Aversion
Overconfidence	1.00	5.00	2.00
Optimism	0.20	1.00	0.20
Loss Aversion	0.50	5.00	1.00

Table 14: Normalized Matrix of Behavioral Determinants

Feature	Overconfidence	Optimism	Risk Aversion	Average
Overconfidence	0.588	0.455	0.625	0.556
Optimism	0.118	0.091	0.063	0.090
Loss Aversion	0.294	0.455	0.313	0.354
Total	1.00	1.00	1.00	1.00

Table 15: Rank Matrix of Behavioural Determinants

Feature	%	Rank
Overconfidence	55.6%	1
LossAversion	35.4%	2
Optimism	9%	3

AHP determined that *Overconfidence* carries more than 55% weight, so it is the most prominent behavioural dimension that has greater impact in the formation of overall behavior followed by*Loss Aversion* with aweight of 35% and *Optimism* with weights 9%.

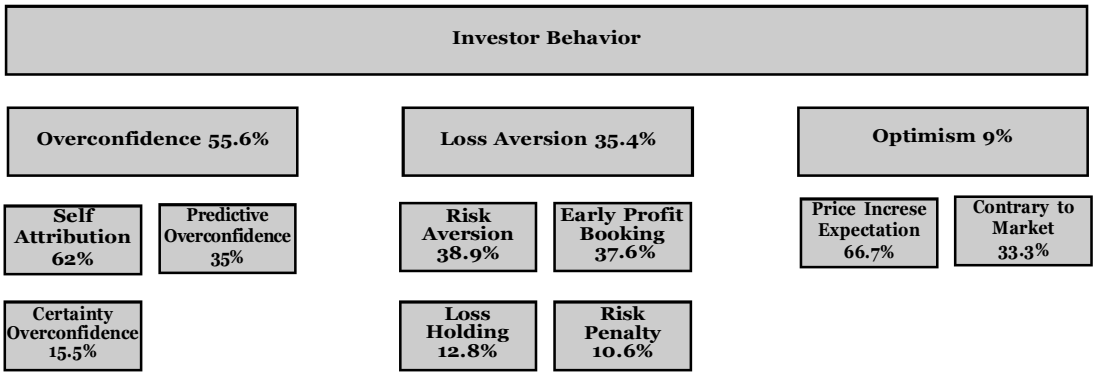

Figure 5: AHP Results of Investor Behavior

Findings

This paper analysesinvestment behavior of individual investor in terms of four broad behavioral dimensions viz;Overconfidence, Optimism and Loss Aversion that are measured in terms of different factors. The findings suggest that the dimension of *overconfidence* plays an important role in the determination of overall behavior, followed by the role of *Loss Aversion and Optimism*.

In this study *overconfidence* bias is measured

in terms of four factors: Self Attribution, predictive overconfidence and certainty overconfidence. It is clearly found that majority of investors attribute all their successes in stock market to themselves only. They also believe that their portfolio will always outperform the SENSEX. They are found to be confident about their investment decisions.

When studied the level of *optimism* among investors in terms of their perception of future position of the stock market, we found that investors are not much optimistic about the future of market. It's found that some investors want to keep their investments in the stock markets only because the stock prices have declined and they do not want to sell their stocks at a loss. Very few investors are interested to buy the securities whose prices are currently rising in the stock market as they think that price will go down and their investment will incurlosses.

When measured *loss aversion* of Engineers we found that investors are risk averse and they are reluctant to realize their losses and hold the same. They also prefer to realize their gains at earliest to book the profit. However, they hold the securities in the expectation that market will recover and they will earn from the securities. Moreover, the risk penalty is more for the investors.

Conclusion

For a very long time, the researchers and market participants relied on the assumption that all investors are rational while making their investment decision. The assumption of rationality suggests that investors always try to maximize their utility and demonstrate full controls on their emotions and feelings. But this study reveals that investors are not rational while taking their investment decisions. We found that investors are overconfident, loss averse and optimistic and all these dimensions play a very crucial role in investment behavior. Also there are number of sub dimensions in this area.

References

De Bondt.W&Thaler, R. (1985). Does the stock market overreact? Journal of Finance, 40, 793-808.

De Bondth Werner F.M., (1991). What do economists know about the stock market? *Journal of Portfolio Management,*18, 84-91

De Bondth Werner F.M., (1991). Behavioural Economics; APortrait of individual investors. *European Economic Review,*42, 831-844.

Kenney, Derrick, (2003). Investor psychology plays key role in market plays, fort worth, *Business Press,* December, 5-11.

Kent D., Hirshleifer., and Siew Hong Teoh. (2001). Investor psychology in capital markets: evidence and policy implications, *Journal of Monetary Economics*, 49(1), 139-209.

Kent, D., Hirshleifer, D. and Subrahmanyam, A., (2001). Overconfidence, Arbitrage, and Equilibrium asset pricing. *Journal of Finance,*56, 921-965

Kansal P. and Singh S. (2016), A study of the Implications of Profession on Investment Behavior of Women Engineers, *Asia Pacific journal of Research,* 1, 49-61.

Kansal P. and Singh S. (2016), Stock market Anomalies: A study of Combined Effect of Seasonality and Size Effect in Indian Stock Market, *International Journal in Management and Social Sciences,* 4(6).

Kansal, P., & Singh, S. (2015). Anchoring Effect in Investment Decision Making-A Systematic Literature Review. *Asia Pacific Journal of Research*, 1(32), pp.17-27

Kansal, P., & Singh, S. (2015). Investment Behavior of Engineers: An Empirical Study. *Researchers World Journal of Art Science and Commerce*, *6*(4), 20-27.

Naughton, Tony, (2002). The winner is….behavioural finance*?, Journal of financial Services Marketing*, 7(2), 110-112.

Peterson M. J., (1999), Buying on the Rumor and sell on the news" (BRSN). *Journal of Finance*, 50, 131-155.

Prechter R. Jr. (2001). Unconscious Herding behaviour as the Psychological Basis of financial Market trends and patterns. *Journal of Psychology and Financial Market,* 2(3), 120-125.

Ritter Jay, (2003), Behavioural finance, *Pacific-Basin Finance Journal,*11, 429-437.

Tversky a. and Kahneman D., (1974). Judgment under uncertainty; Heuristics and biases. *Journal of Science* 185, 1124-1131.

Siller, R. J., (1999). Human behaviour and the efficiency of the financial system. In Taylor,, J. and Woodford, M., (Eds.). Handbook of Macroeconomics. Amsterdam: Elsevier.

Tversky, A., and Kahneman, D (1986) Rational Choice and the Framing of Decisions. *Journal of Business, 59, 251-294*

Thaler, R. (1985) Using Mental Accounting in a Theory of Purchasing Behaviour; *Marketing Science, 4, 12-13*.