The incorporation of behavioral approach on portfolio selection presents a new realm for analyzing the ways in which investor makes decisions. The majority objectives of the study has focused on psychological aspects of the investor. It was explained by evaluating the behavioral approach of investors in portfolio selection and strategies for optimization. The various investment behavior, investment strategy, investment preference and the risk tolerance level are analyzed to derive a pattern of investment behavior. Snow ball sampling method is used to extract the sample for the population. The collected data is then analyzed using appropriate statistical tools and summary of findings are explained below:

8.1 Investment Scenario of Investors

The place of residence has an important influence on the investment behavior of the investors. Using snow ball sampling technique the sample was extracted across Kerala, which was then grouped into three zones such as North Kerala, South Kerala and Central Kerala.
8.1.1 Demographic Profile of Investors

The demographic profile of the investors was analyzed using variables such as gender, age group, marital status and educational qualification.

Of the total sample of 916, 72.3% of investors were male investors. 39.4% of sample of investors belongs to the age group of 35-44 and 74.6% of investors have their marital status as married. The educational qualification of investors of was found to be high. Majority of the samples has their educational qualification either post graduation or professional qualification.

8.1.2 Economic Profile of the Investors

Economic profile of the investor was taken in order to evaluate the financial background of the investor. The variables such as income from all sources of the investor, investment surplus and sources of income were taken for the study.

Based on their income, the investors are categorized into four such as low income group – income less than ₹ 200,000; middle income group – income between ₹ 200,000 – ₹ 500,000; middle income group – income between ₹ 500,000 – ₹ 15,00,000 and upper income group with income above ₹ 15,00,000. It was found that 37.4% of investors were in group of middle income group and 36.6% average income group. Therefore it was summarized that the majority of investors were in group of middle income group and 45.9% of investors have their investment surplus less than ₹ 200,000. Savings is found to be a major source of investment of the investor.
8.1.3 Trading Behavior of the Investors

The three variables analyzed under the trading behavior were investment experience, trading pattern and the self monitoring pattern of investment. The investors of the sample were found to be experienced investors and possess more knowledge about the investment avenues. 42.8% of investors have their investment experience more than 5 years while 53.4% of investors have experience between 2-4 years. 37.8% of investors trade frequently in the stock market. Of which 38.8% of investors have a nature of frequently self monitoring the existing portfolio.

8.1.4 Current Investment Pattern

The investors were asked to mention the percentage of their current investment pattern. From the given pattern, it was observed that fixed deposit found to be more preferred investment avenue of the investors. Along with investment in financial asset, the investors prefer to invest in physical assets also. The investment found 12.42% of investment in the form of real estate and 9.76% in the form of gold. Female investors prefer to have their investment in fixed deposit while male investors have their first preference in equity investment.

8.1.5 Investment Preference

Every investment made by investors is based on specific objectives. The investment objectives were termed as investment preference in the study. Family need and infrastructure need found to have more preference as compared to other objectives. The collective objectives such as family need, and infrastructure need has more preference than individual needs such as tax benefit, retirement savings and emergency fund. The investors
found to prefer moderate return from their investment and their majority of investment is made for duration of less than 5 years.

8.1.6 Factors Affecting Investment Decision

While analyzing the various factors affecting the investment decision, “heuristics” play a vital role in decision making. Heuristics were the short cuts used by the investors to save time and money in the world of investment. Trust heuristics has more impact on the decision making process. Under trust heuristics, the investors locate proxies as trust worthiness for detailed, complex and reliable information. These proxies are fundamental information about the company (Rank 1), past performance of the company (Rank 2) and recommendation from expert (Rank 5) plays a vital role on investment decision.

8.2 Behavioral Factors Affecting the Investment Decisions

Exploratory factor analysis was carried out to identify the behavioral factors affecting the investment decision of investors. Five factors were extracted with a variance of 64.12% of their total variance. Varimax rotation was used to extract the five factors. The five factors were representative bias, overconfidence, regret aversion, mental accounting and herd behavior.

Representative bias and overconfidence bias found highly among the investors. Representative biases explain how investors judge the probability of events through the assumption made by their brain. The factor was extracted with an Eigen value of 3.851 and a data variance of 24.070. The investors’ tendency to rely on their own ability and skills explains the
behavior of overconfidence. Overconfidence factors are extracted from the factor analysis with an Eigen value of 2.241 and data variance of 14.007.

The study found that there exist two levels of topology among the investors in their decision making process: (1) internal and (2) societal. The major traits of the investors extracted from the factor analysis (variables with loading more than 0.80) are listed below. The details are extracted from Table 5.4.

- Evaluating the past price movement to predict the future price (0.851)
- New about the company (0.841)
- Opinion from friends and colleagues (0.840)
- Hold stocks with an expectation of trend reversal (0.836)
- Recommendations given by famous analysts (0.828)
- Investing during the time of bearish market (0.827)
- Investment based on time horizon (0.821)

8.2.1 Descriptive Analysis of Dominant Behavioral Factors

It was found that investors of Kerala were highly influenced by the representative bias, with mean of 12.50 and standard deviation of 2.18. This shows the tendency how the investors become stereotyped in their investment decisions.

The overconfidence bias was found to be high influence among the investors of Kerala. In a scale of 4-20, the mean value found to be 14.72 with a standard deviation of 2.90. The investors’ overconfidence was generated because of the high influence of representative bias where previous experience and knowledge has an important role. The two factors
such as illusion of knowledge and illusion of control contributes the overconfidence bias of the investor.

Regret aversion found to have tolerable influence on the decision making of investors of Kerala. The score was found with a mean of value of 11.47 with a standard deviation of 2.25 obtained on a 3-15 scale. The main reason for the influence of regret aversion was because of their negative investment outcomes which intrinsically drive the investor to be conservative in their investment pattern. The volatility of the Indian Stock Market is one of the major reasons for the regret aversion.

Mental accounting which represents the categorization and evaluation of financial decisions has moderate influence on their investment decision making of the investors of Kerala. The score was found with a mean value of 11.30 with a standard deviation of 2.20 on a 3-15 scale in the descriptive analysis. This shows that investors were conscious about their current income, current assets and the future income. It exhibits the preference of the investor to have diversified portfolio and invest for their future (retirement savings).

Herd behavior shows the influence of social groups in the decision making of investors. However it has only a moderate effect on the investment decision. The score was found to be a mean value of 10.38 with a standard deviation of 2.25 measured on a 3-15 scale. Even though it has only a moderate effect, the investors prefer to have a consensus in available information and recommendations given by the experts and the social groups.

Therefore the implication of five factors in the decision making process of portfolio selection was as follows:
Findings and suggestions

- The investors gave priority to only those portfolios which provide better profitability. In order to gain short term profit they evaluate the price movements of portfolio (representative bias).

- Overconfidence bias was generated from the investment experience of investor; therefore investors’ prefer to have a systematic plan on portfolio selection. Their investment preferences were fixed with fixed time schedule.

- Majority of investors’ preferred to have a conservative portfolio. Investors’ evaluate the actual return with their expected return because of regret aversion. Therefore, the portfolio of an investor should be a combination of moderate and conservative investment avenue. This will help in increasing the return (optimization of return) and decrease regret.

- Investors found to be conscious about their future returns. Due to the effect of mental accounting investor behavior disclose the characteristics of having diversified portfolio. The investment made by investor is based on time horizon and retirement savings found to be indispensible factor of the investment (mental accounting).

- The investors’ investment decisions were influenced by the society. Therefore during the time of portfolio selection, along with the maturity schedule, adequate technical information should be given to the investors. It is advisable to provide recent updates about the company and the industry along with the expert opinion (herd behavior).
8.2.2 Behavioral factors variation among demographic variables

The variation in the behavioral factors was due to the heterogeneity among the investors. Socio demographic factors like age group, gender, marital status, education, income and surplus were analyzed to find the heterogeneity among the investors.

The behavioral biases were found more on female investors than male investors. However the present study reveals the fact that the element of gender variation is negligibly less. The variation of mean is found to be statistically significant for overconfidence bias and herd behavior. Even though there exhibits a mean variation among the behavioral factors such as representative bias, regret aversion and mental accounting, it is statistically insignificant as p value is greater than 0.05. However the following consideration should be taken while designing an optimum portfolio when comparing male investors with female investors:

a) There exist no lack of familiarity between the male investors and female investors (representative bias). They were aware about the movements in the financial markets.

b) Women investors should be given more priority while designing an optimum portfolio as they were overconfident about their knowledge, skills and ability.

c) Both the investors prefer to have conservative approach on their investment portfolio selection. Because the regret aversion found to be same among the male and female investors.

d) The investment decision making process of female investors found to be highly influenced by the external factors (herd
behavior). But both the investors were having same level of mental accounts about their current and future income.

The age group found to be very significant factor and have significant role in the investment behavior. Using One Way ANOVA test, it was found that there exists a significant variation among the across the age group and found statistically significant as the p value <0.05. The following aspects should be considered while designing an optimum portfolio:

- The age groups 18 - 24 were exhibiting high biases while comparing other age groups. As they represent the fresh investors and should be given an aggressive approach while designing a portfolio. They strictly monitor their returns and regret aversion also found to be high among this age group. The positive and negative impact on their portfolio will affect their long term investment strategy. At this level of age, the investors try to test the financial market.

- The age group 25-34 requires only a conservative approach in their portfolio selection. Social groups have more impact on their decision. This group spend less time on their individual decision making process rather they go for collaborate decision making process. That is why the herd behavior found high for this particular group. Therefore portfolio selection is based on opinions and advices.

- The age groups 35-44, were the group of investor whose prime consideration will be on infrastructure needs and the family
needs. The stage where the investors will be more serious about their future planning. The mental accounting was found high among investors belonging to this age group. These groups of investors prefer to have diversified portfolio during the time of portfolio selection.

- Representative bias, overconfidence bias and regret aversion were found high to the investors belonging to the age group 45-55. This particular age group will be given prime importance for their retirement savings. They strictly monitor their existing portfolio and regret aversion is found to be high as compared to other age group. This particular age group will have an influential role on other investors also. Therefore well designed optimization strategy is required for this investors belonging to the age group.

- Herd behavior found to be most influencing factors for the investors belonging to the age group above 55.

Marital status of investors doesn’t have much impact on the behavioral factors of the investors. Only the herd behavior was found to be statistically significant. However the following behavioral aspects have to be considered during the time of portfolio selection

- An equal consideration is required for both investors. Investors’ doesn’t show a distinct difference between the married investors and unmarried investors.

- Recommendations and opinions have a significant role during the time of decision making.
The influence of herd behavior shows the investors' attitude to evaluate their return based on the recommendations. However, herd behavior found to be high for the investors who were not married as compared to the investors who were married.

Educational qualifications found to be a significant factor while determining the portfolio of investors. The following parameters were found from the analysis:

- As educational qualification increases, the investors tend to evaluate more technical information rather than the fundamental information.
- Irrespective of education, all the investors prefer to evaluate more business news compared to others (herd behavior).
- Educational qualification has no effect on the overconfidence bias such as skill, knowledge, and the stock picking ability of the investors.
- The risk-taking ability increases with the educational qualification of the investors. This is because of the influence of herd behavior among the investors. However, the majority of investors prefer to have a conservative approach in their portfolio.
- The number of Investment Avenue in the portfolio should be based on the educational qualification of the investors and found high among the investors with postgraduate qualification.

Income of the investor found to be a significant factor and significantly vary with the behavioral factors. The following facts were found with respect to the income of the investor:
Investors follow a standardized mode on their portfolio selection process. They evaluate the fundamental and technical aspects of the investment avenues. As income increase the risk taking capacity will be increased. The investors show a tendency to follow the contrarian strategy by investing into the bearish market.

Income level of an investor found to have no effect on the knowledge and the ability of the investors in stock picking.

Regret aversion found to be high average income group. Regret aversion exhibit the behavioral pattern of investor in monitoring their existing portfolio and their concern about the return.

Investors with more income prefer to have more diversified portfolio. Therefore as income increase, the more investment avenues can be added to the existing portfolio. The mental accounting found to have significant variation across the income group.

Recommendations and opinions have more influence on the decision making process of the investors among the average income group.

8.3 Investment Strategy and the Variation among the Trading Behavior of the Investor

How investors differ from others in respect of investment strategies was analyzed using multivariate analysis. It was found that 40.9% of investors prefer to have fundamental analysis as their investment strategy in general. A detailed analysis was carry forwarded to identify the specific investment strategies.
Exploratory factor analysis was carried out to identify the investment tools applied by investors. Four factors were extracted with a variance of 65.680% of their total variance. The variables have Kaiser Meyer score of 0.805 shows a high level of data adequacy. The factors extracted are Financial Statement Analysis, Corporate Social Regulations, Technical Chart Analysis and Opinion Analyst. Financial statements and financial ratios extracted from balance sheets were found to be most preferred tools among the investors. The financial statements have been given importance as investors were more conscious about their future (expected) return from their investments. They preferred for a stabilized return rather than abnormal return. Instead to opinions and recommendation, the investors carry forwarded both quantitative and qualitative analysis

The major investment tools extracted from the factor analysis (variables with loading more than 0.80) were listed below.

- Using company information, statements and financials (0.814)
- Government regulation (0.816)
- Recent updates in newspaper and magazines (0.824)

8.3.1 Descriptive analysis of investment strategy

The summaries of descriptive analysis are listed below:

The Factor 1 –Financial Statement Analysis was measured on a scale of 4-20 and obtained a mean value of 16.66. This score indicates that the financial statement of the firm found to have highly important among the investors during the time of portfolio selection. As a part of their optimization strategy, the investors were highly conscious about their future (expected) return as per the investment objectives generated from
their personal and social needs. So before selecting their investment avenue they evaluate the rate of return from the fund reinvested.

The Factor 2- Corporate Social Regulations shows the attitude of investors in evaluating the intrinsic value of the firm before investing. The factor was measured on a scale of 4-20 and obtained a mean value of 16.16. This indicates that the investors give high importance towards the ethical investments, the management hierarchy of the firm, government regulations and Corporate Social Regulations were evaluated during the time of portfolio selection. Through the ethical investment investors preferred to have consistent return.

The Factor 3- Technical Chart Analysis shows investors preference on trading pattern to predict the future value of the shares. The factor obtained a mean value of 10.74 from a scale of 3-15. The score indicates that investors are moderately influenced by the technical analysis. Because the investors were well accustomed to the developments in the stock market and they know that share prices are very sensitive towards all the market information. And they have given less importance to abnormal profits which can be earned using chart analysis.

The Factor 4- Opinion Analyst shows the “trust heuristics”, a non conventional tool. In the descriptive analysis, the factor obtained a mean value of 10.49 on a scale of 3-15. This indicates the moderate attitude of investors towards the trust heuristics. So rather than the recommendations investors are given more importance to quantitative and qualitative aspects.
8.3.2 Variation of investment strategy across trading behavior

Investment experience, trading pattern and expected return from investment are chosen to study the trading behavior of the investors.

The three categories of investors with investment experience were analyzed in the study. The variation of mean value within the group of investors with various investment experiences is tested using One Way ANOVA. It was found that new investors (investment experience less than 1 year) prefer to use financials of the company, fundamental aspects of the company and chart patterns. They have least preference on opinions and recommendations. The investors with investment experience of 2- 4 years prefer to have opinions and recommendations as their tool for investment analysis. Financials from Balance sheet, fundamental factor and opinion factor were found to be statistically significant where as technical factor is found to be statically insignificant as the p value is greater than 0.05. Since the variables found to be significant in the test, the researcher has conducted LSD Post Hoc test in order to find out the multiple comparison among the group

From the analysis the following implications was derived by comparing investment strategy with respect to investors’ investment experience:

- Investment strategy on portfolio selection employed by the investor varies according to their investment experience. The new investors prefer to evaluate the fundamental aspects of the portfolio while experienced investors prefer to have recommendation and opinions. Thereafter the experience of an investor became “heuristic” for the investment decision.
The investment strategy used by the investors during the time of portfolio selection found to be the cognitive aspects that the investors organize their information and code events.

Technical expert opinions and recommendations found to be important criteria for the investors with an investment experience of 2 – 4 years. Since the herd behavior is high, more consensus information should be provided to these investors. Because they have a tendency to evaluate their return frequently.

Investors return on investment was analyzed with the investment strategy of the investors. Investors who prefer to have investment return above 15 percent, preferred on financial of the company and fundamental of the company. This investor seems to invest only on those companies who are fundamentally strong. Technical analysis is preferred more to investors who prefer to have returns less than 10 %. Opinion and recommendations have less impact on investors who prefer to have return less than 10 %. But statistical significance was found only in the financial statement analysis (F value 7.557 and p value <0.05) and opinion (F value 6.736 and p value <0.05).

From the analysis, the following investor traits were explored when analyzing the investment strategy and investment return:

- Investors segmentation based on return expectation is found not an important element during the time of portfolio selection.
- Investor framing effect was found to be developed using the financial statements of the firm and the proxies like opinion has important effect on the return expectation of the investors.
Findings and suggestions

Investors, who frequently trade in stock market, prefer to have financial statement analysis (mean value 16.79 standard deviation 2.59) and technical analysis (mean value 11.01 standard deviation 2.86) as their preferred tool for investment. The value for the occasional traders were financial statement analysis (mean value 16.43 standard deviation 2.46), corporate social regulations (mean value 15.87 standard deviation 2.76), technical analysis (mean value 10.37 standard deviation 2.79) and opinion (mean value 10.02 standard deviation 2.40). In the LSD Post Hoc test, the mean variation was found among the investors who occasionally invest/trade in stock market. The investment strategy namely opinion analyst varies across the trading/investing pattern of the investor and found the statistically significant.

The following were summarized from the analysis:

- During the time of portfolio selection, the evaluation of investment strategy helps to analyze the various proxies or heuristics employed by the investors.
- The trading/investing patterns of investors were not affected by the financial statement analysis and it was found statistically insignificant.
- Investors who trade frequently evaluate the price and volume movements using technical chart analysis.
- Investors who invest in fixed intervals were those investors who prefer to have long term investment with long term return. They invest with specific objective and in fixed time horizon. These investors have to be given more consideration as they were
conscious about their investment. Along with technical opinions and recommendations they tend to evaluate the ethical considerations of their investment.

8.4 Investors Risk Tolerance

The investors risk tolerance represents the maximum amount of psychological risk an investor can afford. The investors were segregated into three distinct groups according to their risk taking behavior. 31% of investors are grouped into the category of investors who were ready to take risk and classified as aggressive investors. 25.4% of investors were categorized as those investors who take above average financial risk and named as moderate investors. 43.6% were those investors who are ready to take only average risk and grouped as conservative investors. Further risk attitude was analyzed. It was found that majority of investors considered themselves as risk takers.

The various demographic factors were analyzed to evaluate the relationship between the risk tolerance levels of the investors. Chi square analysis was applied for testing the hypothesis. The demographic variables age group, marital status, educational qualification and sources of investment were found statistically significant while evaluating the risk tolerance level of investors. Determination of financial risk tolerance level of an investor is an important element during the time of portfolio selection. It explains what kind of return the investor expects from their investment. The following facts should be considered while determining the financial risk tolerance level of investors:
Findings and suggestions

Gender: The male investors found to be more aggressive investors where as the female investors are moderate investors. But this grouping is found to be statistically insignificant as the p value is greater than 0.05, indicating that both of them having risk tolerance level. There is no need for segmenting the investors into male and female as done in the previous studies.

Age group: the study revealed the fact the risk tolerance level of the investor increases with the age group of the investor. The investors in an age group of above 55 were found to be conservative investors where as age group of 18-24 found to be moderate investors. But the majority of the investors were found to be conservative investors. However the statistical significance shows that the investors should be segmented based on their age group during the time risk assessment.

Marital status: investors who were not married were found to be aggressive investors, whereas the married investors were found to be conservative investors. The investors who were not married have less financial responsibilities and they are independent in their decisions as compared to married investors. However the financial responsibilities of married investors found to be an important factor while determining the risk tolerance level. The statistical significance of the hypothesis testing shows that the investors should be segmented according to their marital status.

Educational qualification: Risk tolerance level significantly varies according to the educational qualification. Investors with lower education (higher secondary education) were found to be moderate investors. But post graduates and professionals were found to be conservative investors.
The variation across the educational qualification is found to be statistically significant as the p value is <0.05. Therefore during the time risk assessment, the educational qualification of an investors found to be an important element.

Income group: income group of investors was found to have no significance with the risk tolerance level of the investor. The cross tabulated result exhibits the result that the average income group found to be aggressive investors, whereas the low income group were classified as conservative investors. However the income of the investors found to have less effect while evaluating risk tolerance level.

Source of investment: Source of investment shows a strong association with the risk tolerance level of the investors. Aggressive investors were those investors who possess inherited amount, where by bank finance and money extracted from business is found to be source for moderate investors. The major source of investment for conservative investors is found to be personal borrowing. However variable found to be highly significant during the time of assessing the financial risk tolerance level of the investor.

8.4.1 Investment Behavior and Risk Tolerance

The investors’ psychology on risk tolerance was analyzed using One Way ANOVA test. The test reveals that representative bias, regret aversion and herd behavior does significantly vary across the investor segment.

Representative bias was found high among aggressive investors and low for conservative investors. Regret aversion found too high for
Findings and suggestions

Moderate investors and low for conservative investors. Herd behavior was found to be high for aggressive investors and low for conservative investors. These three biases/investment behavior were found to be statistically significant as the probability value is less than 0.05. The LSD Post Hoc Test was done in order to find out the multiple comparisons among the significant biases.

Overconfidence bias is found high among the aggressive investors, and low for conservative investors. Mental accounting was found to be high among aggressive investors but low for conservative investors. However, these two biases found to be statistically insignificant among the investors as the associated p value is greater than 0.05.

The result of the test summarized as follows:

- As investors found to be conscious about their return, they have to categorize according to their risk tolerance level. Different approach is required for each category of investors. Both technical and fundamental information about the investment avenue should be given to the investors.

- Overconfidence bias was found to have no association with the risk tolerance level of the investors.

- Regret aversion have strong association with the risk tolerance level of the investors. Risk–return trade-off should be established while determining the optimum portfolio for segment of investors.

- Investors prefer to have diversified portfolio. But the number avenues in the portfolio were not a criterion for an investor and will not affect their risk tolerance level.
Opinion, recommendations and technical information shapes the risk tolerance level of investor. Each group requires different portfolio pattern with varying level of associated risk.

8.4.2 Investors Psychology on Risk Tolerance

Discriminant function was applied to evaluate the investors’ psychology on risk tolerance. The five behavioral factors such as representative bias, overconfident bias, regret aversion, mental accounting and herd behavior were taken to find the discriminating ability between the groups of risk takers and non risk takers. From the Equality of Group Means it is found that overconfidence bias and mental accounting have no difference among the two groups. The model has an Eigen value of 0.514 and canonical correlation of 0.583. The standardized Canonical correlation function coefficients disclose that herd behavior, regret aversion and overconfidence bias have high discriminating ability between the risk takers and non risk takers. It means that publicly available information such as financial news in newspapers and magazines and the recommendations by the expert have more impact on the investor’s investment decision making process. Therefore while designing an optimum portfolio it should be noted that investors prefer to have technical information about their portfolio. They require up to date information about their portfolio. Even though they found to be confident in their investment experience (overconfidence bias 0.233) but they exhibit a nature to wait for the future for a better tomorrow. That is regret aversion have impact when they analyses their returns from their investment. Representative bias have discriminant function coefficient of 0.184 which shows that the investment decision of an investor was based on fundamental and technical information about their
portfolio. Instead of long term profits investors prefer to have short term, in which they invest for short period. Instead of family requirements, investors preferred for capital appreciation.

Investors’ psychology on risk tolerance was explained using multivariate discriminant function. One discriminant function was identified within an eigen value of 0.514 and canonical correlation of 0.583. Risk tolerance equation was derived from Canonical Discriminant Function Coefficient. The equations helps to classify the investors based on the midpoint of the centroid. The classification result of 89.7% indicates a very good predictive capacity of the discriminant function

8.5 Investment Decision – A Behavioral Portfolio Model

The study is an attempt to identify the deviation from the established trend of efficient market hypothesis. The study reveals the fact that the investment decision is affected by investment behavior of the investor. Investment behavior is found to be a function of psychological factors and strategies applied in selecting optimum portfolio.

The decision making was analyzed based on psychographic factors within the dimensions of sociological and economic factors. In case of sociological factors age group, marital status, educational qualification and investment experience were found to be significant in the Chi square analysis as the p value <0.05. However the notable factor from the analysis is insignificance of gender differences. Female investors found to be equally competent with male investors. This proves that women have an important role in financial decision making. The following findings were extracted from the study:
Increase or decrease in the existing investment cannot be distinguished among the male and female. Both of them found to be equally competent in the decision making process. Female have not be considered different in the process of decision making.

Financial responsibilities of married investor differ from unmarried investor. The investors who were not married were ready to increase their investment as compared to single investors. Therefore different portfolio should be designed according to the marital status of the investor.

Optimum portfolio should be developed based on the investment experience of investors.

Economic factors such as income, investment surplus and expected return from investment are found to be statistically significant as the p value 0.05. The following findings were found significant while analyzing economic factors of investors affecting investment decisions:

- Economic background of an investor found to be an important factor has to consider during the time of portfolio selection.
- Optimum portfolio for investors can be designed by determining the income level of the investors.

8.5.1 Investment Diversification Strategies

The diversification strategies of the investors were analyzed using their investment preference, investment strategy and investment behavior. The investors’ future plan on investment was analyzed by giving two options to the investors either to buy or hold/sell strategy. That is by comparing the last year’s performance of stock market, whether they will
Findings and suggestions

Investors evaluated the 'buy' option or 'hold/sell' option. The investors found to be confident as 88.6% of investors are ready to go for “buy” option, which shows the intention of investors to increase their investment.

8.5.2 Investment Plan and Investment Strategy

Investment strategy applied on ‘buy’ option and ‘hold/sell’ option were analyzed by testing the hypothesis using Independent sample t test. It was found that all the four factors of investment strategy such as financial statement analysis, corporate social regulations, technical chart analysis and opinion were found to be statistically significant as p < 0.05.

The following findings were listed from the above analysis:

- Investors evaluate the investment avenues more rigorously. They were found to be more conscious about their investment.
- Before investment along with the technical opinion, they evaluate the financial aspects of the firm along with background of the economy and industry. Therefore more elaborate mode of portfolio selection should be applied among the investors to reduce regret aversion.
- Since there exist mental accounting among all the investors, it is preferred to explain the risk return trade off for all investment avenues in the economy.

8.5.3 Investment Preference and Time Horizon

The association of investor’s preference on investment was analyzed with the time duration of their investment. One Way ANOVA was used for hypothesis testing. It was found that investment preferences such as family
need, infrastructure need, emergency need, capital growth and tax benefits are statistically significant and have an association with holding period of investment. An investor with less than 5 years as their investment time horizon has family needs and retirement savings as their investment preference. Tax benefit is the main investment preference for the investors who is having investment horizon of 5-10 years; whereby emergency need for investor with 10-20 years of investment horizon.

The implications of the above analysis were discussed as follows:

- The investors tend to invest blindly for their future purpose especially in retirement savings. So irrespective of the time horizon, in the portfolio, this characteristic of the investor should be considered. There should have an investment avenue exclusive for retirement savings. The conservative investment avenues were better to incorporate in the portfolio for achieving this objective of the investor.

- Investors will invest for a fixed time horizon only to achieve their psychological need. Therefore number of children of the investor and their age should be considered while designing an optimum portfolio.

- Along with the family needs of the investor such as marriage of children and education, the infrastructure needs such as constructing new house or buying new car should also be taken into consideration while designing optimum portfolio.

- Since the investors frequently monitor their investment, differentiated portfolio with varying preference should be incorporated for achieving an optimization of return of the investor.
8.5.4 Investment Plan and Investment Behavior

Investment behavior such as representative bias, overconfidence, regret aversion, herd behavior and mental accounting were analyzed using Independent Sample t test. The analysis was done to evaluate the association between the investment behavior and the investment plan. All the five factors were found to be statistically significant and accept the alternative hypothesis stating the factors that vary across the investment plan. The statistical significance explains the following aspects of investor:

- Investor evaluates the price movements and the fundamental aspects of economy before their investment decision – buy strategy. The frame dependence was high among the investors as they consider “the current performance of stock as the indicator of future”. Therefore during the time of portfolio selection, avenues with better return and less risk should be allocated for the investors.

- Even though overconfidence was generated from the experience, investors’ prefer to have a systematic plan on portfolio selection. Because they have a fixed objectives in their investment with fixed time schedule.

- As the regret aversion also affects the decision of the investor, conservative avenues should be incorporated in the portfolio by considering the investment preference and expected return from investment

- Investors should provide diversified portfolio in order to reduce their risk.

- It is advisable to provide recent updates about the company and the industry along with the expert opinion.
8.5.5 Investor Model on Investment Decision Making

The investment decision on portfolio selection and optimization of return were analyzed using behavioral approach. Multi dimensional approach was used to develop a risk model based on investment behavior (behavioral biases), risk tolerance and investment tools (strategies).

The behavioral biases (psychological biases) were taken to analyze the behavioral factors affecting the investment decision making in a descriptive approach. The five behavioral factors and four investment tools were taken as independent variables to predict the dependent variable decision making.

The variables used for building the model were:

- Representative bias
- Overconfidence bias
- Regret aversion
- Mental accounting
- Herd behavior

Investment behavior

Or

Behavioral factors

- Financial Statement analysis
- Corporate Social Regulation
- Technical Chart analysis
- Opinion Analyst

Investment strategy

Or

Investment tool
By using Multiple Discriminant Analysis, the following predictions were formulated.

1) The representative bias, overconfidence bias, regret aversion, mental accounting and herd behavior were the behavioral bias taken for the study. The identification of these bias will also help in evaluating the psychology of risk tolerance level of the investors.

2) The test of equality of group means shows that there exist significant group difference among all the independent variables (p<0.05).

3) The linear combination on group centroid, shows the significant difference between investors with buy strategy and hold strategy.

4) The Standardized Canonical Discriminant Function coefficient exhibit the result that financial statement analysis, opinion, herd behavior and mental accounting have more influence among the investors who prefers buy strategy. This shows the general trend of the investors, that they prefer short term profit rather than long term. Time horizon of investment and investment preference exhibits a direct relationship with the decision making process.

5) The corporate social regulation is having a least effect, the investors attitude was to analysis the management of the firm and other basics information about the company. Therefore the fundamental analysis was constrained to the firm specific analysis rather than economic and industry analysis.
8.6 Suggestions

The following suggestions was found from the analysis which is discussed as the managerial implication of the study

To advisors

1) Investors found to be stereotyped in their decisions. The previous patterns in terms of profitability of firm’s return and price movements have an important role in the decision making of the investors. Therefore while designing an optimum portfolio, these factors should be considered during the portfolio selection process.

2) The two facets of overconfidence bias such as illusion of knowledge and illusion of control have a moderate effect on the investment decision of the investors. As the investors found to be overconfident in their own skills and experience, the advisors should identify the investors preferred investment avenues along with investment objectives (preferences). From the preferred investment avenues, a systematic analysis on investment return should be carry forwarded before the portfolio selection. A structured portfolio should be designed for the investors for optimizing the return from the investment.

3) Regret aversion is based on option of choices. It was found that investors prefer to have conservative investments rather than more aggressive investments. Majority of the investors were found to have an expected return of 10% - 15 % from their investment. Even though they are ready to take risk in their investment, but willing to
take only an average financial risk. Therefore will designing the portfolio for the investors, the advisors should devise a conservative approach on portfolio selection.

4) Investors are found to be very conscious about their investment pattern, especially about their future income. As they were having a separate mental account for retirement savings, the advisor design on portfolio should incorporate the constraints such time preference of investment and the investment objectives of the investor.

5) Since the herd behavior has moderate influence on the decision making, the advisors should focus on almost randomly chosen fragments of information prior to recommendation by making up consensus value.

11) As the investors are well accustomed to the developments in the stock market and to all the available information pertaining to their investment, the following factors have to be considered during the time of portfolio selection:

   a) An optimum portfolio should be formulated by evaluating the historical data. Investment preference of the investors should be given priority especially on personal and economical need.

   b) The ethical, social and environmental criteria should be used during the time of portfolio selection.

   c) Investors have given less importance to charts, patterns and trend. Instead of abnormal profit from the market, they prefer to have stabilized return.
12) During the time of portfolio selection, it is essential to identify the risk tolerance level of the investors. An optimum portfolio can be designed based on the risk taking capacity of the investors. The following two factors have to be given more consideration while assessing the risk tolerance level of the investors

a) The demographic factors such as investors age, marital status, educational qualification and sources of investments have to considered during the time of clustering the investors.

b) The behavioral factors such as representative bias, regret aversion and herd behavior have to be given more significance when segmenting the investor according to their risk tolerance during the time of portfolio selection.

13) During the time of decision making, especially with increase or decrease in the investment avenue, the following psychographic variables have to be consider:

a) The sociological variables such as age group, educational qualification, marital status and investment experience of the investors determine whether to increase or decrease the existing investment.

b) Investors’ economic background can be determined using their income, investment surplus and expected return from the investment. These economic background determine the investors decision on increase or decrease their existing investment.
14) Model Interpretation: Behavioral Portfolio Model for optimization of returns.

Behavioral approach on portfolio selection and optimization of returns claims that psychological forces prevent the investors from acting rational decision making process. Based on the two prescriptive models developed (Model 1: Investors psychology on risk tolerance and Model 2: Investor Model on Investment Decision), the researcher has designed a sample portfolio for the investor. It incorporates four stages in portfolio designing and structuring optimum portfolio. The first three stages were framed based on the current study. The fourth stage is the suggestive sample portfolio designed by the researcher. The “Behavioral Portfolio Designed Model” developed by the researcher were as follows:

![Figure 8.1: Behavioral Portfolio Designed Model](image-url)
Based on the model, a sample portfolio designed for the investors were as follows:

a) Aggressive investors
The aggressive investors are those investors who were expecting return of above 15 % from their investment. They were ready to take substantial risk also. Therefore the total amount they are willing to invest can be segregated as 45 % on Equity, 30 % on Mutual funds and 35 % on Debentures and other debt instrument.

b) Moderate investor
The moderate investors are those who were expecting return between 10 % - 15 %. These investors require an investment pattern of equal proportion. Therefore their sample portfolio can 25 % on equity; 25 % on debt; 25 % on mutual funds and 25 % on fixed deposit. For the current study, Kotak Mahindra Banks Fixed Deposit rates are taken for evaluating the FD rates of return.
c) Conservative investors
Conservative investors are those investors who are considered themselves as non-risk takers. Their return expectation is also 10%. For such investors the designed portfolio is 40% on debt; 30% on mutual funds and FD 30%