

# THE INTERNATIONAL JOURNAL OF BUSINESS & MANAGEMENT

## Influence of Behavioural Biases on Investment Decisions of Individual Investors in Nairobi Securities Exchange

**Annetty V.W. Angote**

Phd. Student, Jomo Kenyatta University of Agriculture and Technology, Kenya

**Dr. Tobias Olweny**

Lecturer, School of Business & Entrepreneurship (JKUAT), Kenya

**Dr. Julius Miroga**

Lecturer, Kakamega, CBD (JKUAT), Kenya

### **Abstract:**

Individual investment financial decision making was influenced by either modern or traditional finance. In traditional finance the individual investor was to determine the intrinsic value of a security to establish whether it's overvalued, correctly valued or undervalued. The tradition of traditional finance demanded use of mathematical formulae which some individual investors had limited knowledge. In the modern finance theory commonly denoted as behavioral bias applied psychological knowledge to evaluate the investment decision at investors' disposal. This study therefore sought to establish the effect of behavioral biases on investment decisions of individual investors in Nairobi Securities Exchange. The specific objectives of the study was: to determine the effect of fear of regrets bias on investment decisions of individual investors' decisions in NSE; to establish the effect of human availability heuristic bias on investment decisions of individual investors in NSE; to examine the effect of mental accounting bias on investment decisions of individual investors in NSE; to explain the effect of anchoring bias on investment decisions of individual investors in NSE; to determine the influence of herd mentality bias on investment decisions of individual investors in NSE and individual investment decisions in NSE. The research was guided by Modern Portfolio Theory, Efficient Market Hypothesis, Prospect Theory, Heuristic Theory and empirical literature on behavioral biases. The research population was individual investors who had invested in both equity and bonds in Nairobi Securities Exchange between 2013-2017 period under study which were 831,000 as individuals and investment banks through which they bought stock which were 22 firms. The study adopted multiple regression models. Purposive sampling was used to select 16 investment banks from which the quota sampling design was adopted to randomly selecting a sample 384 individual investors in the NSE. Primary data was collected through the use of closed ended questionnaires, pick and drop procedure was used to collect data through the use of registered offices of stock brokers. Descriptive statistics such as mean and standard deviation was used in data analysis where p-value ( $p < 0.05$ ) was used to determine the significant on behavioral biases and investment decisions of individual investors. Tests such as reliability tests using Cronbach's Alpha, normality tests among others were used. Inferential statistics which included correlation analysis and regression analysis was also applied in interpreting the results of the study and tables and graphs which was used to present the data collected for easy understanding. The findings from this research were therefore provided an understanding of how behavioral biases affected investment decisions of individual investors based on the prevailing biases and the eventual outcomes for each investment decisions hence identified the most influencing behavioral finance factors on the company's individual investors decisions, how their future policies and strategies was to be applied and effected.

**Keywords:** Anchoring Bias, behavioral bias, behavioral finance, herd mentality bias, human availability heuristics bias, mental accounting bias, Nairobi Securities Exchange (NSE), fear of regrets bias

## 1. Introduction

### 1.1. Background of the Study

In an economy across the world investment decisions are major determinants since they contribute to the development of that economy, this is according to Khawaja, Bhutto, and Naz (2013). Investment decisions were determined by some fundamental behavioral biases such as fear of regrets, human availability heuristics, mental accounting, anchoring and herding biases other than the macroeconomic variables. Changes in investment decisions were linked with behavioral biases in advanced countries (Muradoglu et. 2000). The biases always are interfered with the rationality of an investor at the time of investment. According to Chen et. (2007) indicated that some behavioral biases of individual investors in China found that investment decisions were more regular than in USA investors thus underperforming.

Modern Portfolio Theory and Capital Asset Pricing Model, (Sharpe, 1964) assumed that investors were not puzzled regarding the size of information presented to them and that they were not controlled by their behavioral biases,

(Lewllen,2001). But several studies in the developed capital markets found that many phenomena regarding stock investment decisions cannot be explained. Investors in capital asset exchanges, typically take many different and important decisions, the most common are taking investment decisions in order to maximize their wealth; while others deal with considerations seeking market timing techniques to maximize their wealth.

In determining influence of behavioral biases on investment decisions of individual investors in NSE also several independent variables were taken into account. These are fear of regrets bias, human availability heuristics bias, mental accounting bias, and anchoring and herd mentality bias. These independent variables were expected to have either a positive or negative effect on the investment decisions of individual investors in NSE. This study therefore sought to answer the following research question; - was there any relationship between behavioral biases and investment decisions of individual investors in the NSE. In answering the above question, both qualitative and quantitative approach was used to develop the concept of the research (Creswell, 2003). A study of related relevant literature formed the major parts of this research and the result was presented using statistical tables.

The main objective of this study was to establish whether the behavioral biases and investment decisions had an influence on individual investors in Nairobi Security Exchange (NSE); hence, several studies had different results in identifying any of those factors as the most influential on stock investment decisions in the other markets. This study examined the effect of the following behavioral biases on individual investment decisions. These biases were; fear of regrets bias (Shiller, 1995), human availability heuristics bias (Hirshleifer,2001), mental accounting bias (Thaler, 2006), anchoring bias (Kahnman & Riepe, 1998) and herd mentality (Shiller et al., 2004).

### 1.1.1. Behavioral Biases

Behavioral bias was defined by Shefrin, (2000) as “a rapidly growing area that deals with the influence of psychology on the behavior of financial practitioners”. Individual stock investments behavior was concerned with choices about purchases of small amounts of securities for his or her own account (Nofsinger and Richard, 2002). No matter how much an investor was well informed, had done research, studied deeply about the stock before investing, he also behaves irrationally with the fear of loss in the future. This different behavior in the individual investors is caused by various factors which compromise the investor rationality.

Several studies in the context of the stock markets on behavioral biases show that investors are greatly influenced by their behavioral characteristics. Ariely, Loewenstein, Prelec (2006), for instance, argue that the judgement of the fundamental values of assets is a tough task, so investors are likely to value their assets in relative terms, and mostly become anchored to the previous buying prices. Similarly, Barber, Odean, and Zhu (2009) found out that the investors are likely to buy “attention grabbing” or “in new stock” because these stocks are easily to recall. Moreover, the investors tended to buy previously owned stocks because they could easily recall them and had some information about them (Mutswenje, 2017).

Fear of Regret Bias, according to Shiller, (1995), human beings had the tendency to feel the pain or the fear of regret at having made errors. As such, to avoid the pain of regret, people tended to alter their behavior which ended up being irrational at times. Linked with fear of regret was a cognitive dissonance, which was the mental suffering that people experience when they were presented with the evidence that their beliefs were wrong, (Odean,1998). People could be subjected to behavioral biases during decision making which prevented them from making rational decisions (Shefrin, 2000).

Disposition bias was the tendency of individual investors to sell investments that were performing well too soon and hold on losing stock too long. In disposition bias people avoided action that created fear of regrets and sought actions that caused pride. Nofsinger, (2005) found that selling an increasing stock qualifies a good choice to buy that stock in the initial instance and brought pride. Doing away with an underperforming stock led to the realization that the initial choice to buy it was not good, and thus brought about fear of regrets found in the USA.

Human Availability Heuristics Bias could be viewed as mental short cuts used to ease the cognitive load of making a decision or finding a satisfactory solution for a problem. Examples of this method included use a rule of thumb, or common sense. These rules worked well under most circumstances, but in certain cases led to systematic errors or cognitive biases - (Kahneman & Tversky,1974). Cognitive biases were a pattern of deviation from rational behavior in conclusion that occurred in specific situations. In a context where those specific situations occurred, such was the case of behavioral bias, human beings were considered as predictably irrational decision makers. Therefore, behavioral bias suggested that a new framework was to think about investors' behavior on investment decisions.

Self- deception was a process which involved convincing oneself of a truth (or lack of truth) so that one does not reveal any self-knowledge of the deception. One deceived oneself to trust something that was not true as to better convince others of the truth. The biologist Trivers, (1991) suggested that deception plays a significant part in human behavior and communication (as in animal behavior in general). According to Trivers, (1991) self-deception has evolved so that one has an advantage over another: - the ability to read subtle cues such as facial expression, eye contact, posture, tone of voice, and speech tempo to infer the mental states of the other individuals. In Trivers self-deception theory, individuals are designed to think they are better (smarter, stronger, better friends) than they were because this helps individual fool others about these qualities.

According to Hirshleifer (2001), most known judgments and decision biases had three common roots; -availability heuristic simplification. Availability Heuristic simplification happened when cognitive resource constraints (like read limitation attention, processing power and memory) force the use of human availability heuristics bias were used to make decisions. Another source of bias was that we were subject to emotions that could overpower reason. An evolutionary rationale for a lack of self- control was that emotions such as love and rage could act as mechanism that allowed credible

commitment or threat toward potential allies and enemies (Hirshleifer, Nesse 2001). Much of the work of discovering availability heuristics in human decision-makers was done by the Israeli psychologists Amos Tversky and Daniel Kahneman (2002 Nobel priced), but the knowledge had been developed dramatically in the last one decade.

Mental Accounting Bias is when Investors who are prone to psychological bias will always take risks that they do not acknowledge, experience outcomes that they do not anticipate, was prone to unjustified trading and ended up blaming themselves or others when outcomes were bad;-(Kahneman & Riepe, 1998). Individuals were found to be more spend thrift on money received as bonus or dividends that money meant to cater for tasks such as health or education. If investors have a tendency of recognizing immediately in their mental accounting but postponing acknowledging their bad decisions, they, sold stocks that had performed well and hold on poorly performing stocks, namely the "disposition effect" (Odean, 1998). Mental Accounting is the set of cognitive operations used by individuals and households to organize, evaluate and keep track of financial activities, (Thaler, 1999). In other words, it involved people's tendency to generate, depending on their special traits, different mental accounts, and register events as they had experienced.

According to Shleifer (2000), behavioral finance related to the usual assumptions, of traditional finance by incorporating observable, systematic and very human departures from rationality into models of financial markets and behavior. By combining psychology and finance, researchers hoped to better explain certain features of securities markets and investors behavior that appear irrational. Shefrin (2000) noted that investors are prone to committing specific errors of which some are minor and others fatal. By allowing psychological bias and emotion to affect their investment decision, investors could do serious harm to their wealth. According to Richard Thaler (2006), every financial decision was based on rational calculation of its effects on overall wealth position. He further stated that individuals separated their money into various mental accounting where they treated money differently depending on its source.

Anchoring Bias in the early studies of behavioral biases had mostly focused on a single anchoring and adjustment heuristic and considered it to be operating independently. Yet developments in the behavioral decision's theory specify that different anchoring heuristic often operate collectively and influence decisions and predictions, (Tversky and Kahneman, 1974). Anchoring bias is a cognitive heuristic that arises out of people's tendency estimated by starting from initial guess and then making adjustments to the initial guess in order to arrive at the final estimate, Pompian (2006). The initial guess "anchor" comes from a variety of sources, such as the computation, a given value, the current value or the historical averages. Regardless of the source of the anchor, the adjustments of up or down to reach the final estimates were always insufficient.

Anchoring bias could lead the investors to the following consequences. Firstly, they have made investors "anchor" to the current market values and stayed too close to them. Secondly, "anchor" has not allowed the investors or the security analysts to adjust to the new information hence continue adhering closely to the original estimates. Thirdly, the current levels of the returns had been used as "anchors" to forecast the rise or fall in the percentage values of an asset class. Fourthly, last but not least, the current economic state of certain countries or companies had served as the "anchor" for the future prospects (English, Mussweiler & Strack 2006).

Stock markets and investors are likely to differ between the developing and developed countries. Investors' attitudes and behavior were shaped by environmental factors and it is likely that such behaviors were reflected in their decision making for instance, Pompian (2006) suggests that the education is an important tool to overcome anchoring and adjustment and biases. Thus, the behavioral biases worked differently due to differences in education levels between developed and developing countries. Anchoring can be captured by the fact that the investors rely on past experience, prices (fair prices), ignore new information, fixing prices before buying or selling stock and being on the lookout for the best time to buy or sell stock, guided by moods and the level of openness to new experiences, (Mc Elroy and Dowd, 2007). Herd Mentality bias is when individuals were influenced by their peers to adopt certain behavior, follow trend, and or purchase items. Herd mentality implied a fear base reaction to peer pressure which makes individuals act in order to avoid feeling "left behind" from the group. Related to bandwagon effect that led to numerous banks runs in the 80's. Herd mentality pertains to the behavior of animals in herds, flocks, and schools and to human conduct during activities such as stock bubbles and crashes. Large stock market trends often begin with and end with periods of frenzied buying (bubbles) or selling (crashes) (Robert Shiller, Ivo Welch, et al., 2004).

In "herding" models, it is assumed that investors were fully rational, but only have partial information about the economy. In these models, when a few investors buy some type of asset, this revealed that they had some positive information about that asset, which increased the rational incentives of others to buy the asset too. Even though this is a fully rational decision, it may sometimes lead to mistakenly high asset values (implying, eventually, a crash) since the first investors by chance, had been mistaken (Shiller et al., 2004).

### 1.1.2. Individual Investors' Decisions

Investment Decisions; -Investment decisions were made by investors and financial investment managers. Investors commonly performed financial investment analysis by making use of fundamental analysis, technical analysis and judgmental analysis, (Baker, 1977). Investment decisions were often supported by financial decision tools. It was assumed that information structure and the factors in the market systematically influenced individuals' investment decisions as well as market outcomes. Investor market behavioral derived from psychological principles of decision making to explain why people buy or sell stock the way they always do. These factors focused upon how investors interpreted and acted on information to make their own investment decisions.

### 1.1.3. Nairobi Security Exchange

Nairobi Securities Exchange; -The NSE started operations in the early 1920s before Kenya got independence. This market was informal for trading local stocks. By 1954, the NSE was formalized and recognized by the London Stock Exchange trading overseas stocks. After Kenya attained independence, the stock exchange continued to grow and became a major financial institution. A Memorandum between the Nairobi Securities Exchange and Uganda Securities Exchange was signed in November 2006 for purpose of cross border listing. The Memorandum permitted listed companies in both exchanges to trade across each other; this made to foster economic growth and development among regional securities markets. In July 2007, the NSE reviewed the Index and declared the companies that would form the NSE Share Index. The review of the NSE 20-share index was for the aim of ensuring it is a true reflector of the market. It constituted 20 blue chip companies who qualified to trade their stocks on the NSE.

In 2008, the NSE All Share Index (NASI) was introduced. This index became a complementary index to NSE which measures the overall market performance by utilizing all the shares traded during the day. In April 2008, NSE launched the NSE Smart Youth Investment Challenge to promote stock market investments among Kenyan youth. In July 2011, the Nairobi Stock Exchange Limited, transformed to the Nairobi Securities Exchange Limited. The change of name brought about the strategic plan of the Nairobi Securities Exchange to evolve into a full securities exchange which help in trading, clearing and settlement of financial instruments. The NSE adapted a digital system, to compete with other securities exchange across the world (NSE, 2015).

There are more than 55 businesses and companies trading at the Nairobi Securities Exchange and more than 20 licensed investment banks at the exchange. Currently the NSE trades over 1.2 billion shares annually, and plays a significant function in the development of Kenyan economy. The volume of shares traded at the Nairobi Securities Exchange in 2012 was 5.50 billion compared with 7.53 billion in 2010 and 5.71 billion in 2011 (CMA, 2015). Most privatized firms which have managed to trade on NSE have been successful in their quest for high profits and capitalization, as at 2013 over 50 firms have listed their shares on the NSE.

### 1.2. Statement of the Problem

The Modern Portfolio Theory (MPT) by Markowitz (1952) explains the key idea of individual investors is to maximize individual investment decisions since the investor was rational due to adoption of fundamental principle of risk return trade-off. Contrary the investor rationally had been challenged to be determined by fundamental principle (Fama, 1998) which realized abnormal returns (Aduda *et al.*, 2012) found that Equity Bank Ltd and Mumias Sugar Ltd individual investors posted returns ranging from 8% to 32.33% and -9.21% to 17.55% in financial year 2011-2012 respectively which indicated the investors acted irrationally. Therefore, the issue relating to irrationality of investors leading to abnormal returns is important to unlocking the potential of investor individual decision making.

Much of the empirical evidence on behavioral biases and investment decisions were carried out in developed countries which were largely information efficient unlike developing economies like Kenya (Wang *et al.*, 2005); Barber & Odean, 2011); Lee *et al.*, 2013). These studies had provided mixed results which presented several research gaps hence could not be generalized to the situation in Kenya. For instance, where Khawaja *et al.*, (2013) studies investors' behavioral biases and the stock market development and found that most biases are significant but they had positive relationship with the growth of the market, meaning, even though investor encounter biases, market still perform well and keep on developing.

Despite the fact that different researchers did several similar studies, Kimani Waruingi, (2011); Kimeu *et al.*, (2016) using availability bias as one of independent variable, mixed results were experienced, for instance the former study showed insignificant influence on decision making and the latter showed significant influence on investment decisions. In addition, several studies made on behavioral biases on individual investors were herding in nature but not singly as suggested Shiller (2000), human tendency to making investment decisions being collectively or individual.

In view of the gaps documented in the preceding paragraphs, there remain unresolved issues on the relationships between the study variables. It was on this basis of this background that this study sought to fill the gap in literature by determining the situation in Kenya so as to provide empirical evidence on the effect of behavioral biases, determinants of individual investors' performance and individual investment decisions in the Nairobi Securities Exchange.

### 1.3. Research Objectives

The general and specific objectives of the study were as follows:

#### 1.3.1. General Objectives

The main objective of this study was to establish the influence of behavioral biases on investment decisions of individual investor in NSE.

#### 1.3.2. Specific Objectives

- To determine the influence of fear of regrets bias on investment decisions of individual investor in NSE.
- To establish the influence of human availability heuristic bias on investment decisions of individual investor in NSE.
- To examine the influence of mental accounting bias on investment decisions of individual investor in NSE.
- To explain the influence of anchoring bias on investment decisions of individual investor in NSE.
- To determine the influence of herd mentality bias on investment decisions of individual investor in NSE.

#### 1.4. Research Hypotheses

- $H_{o_1}$ : Fear of regrets bias has no significant influence on investment decisions of individual investor in NSE.
- $H_{o_2}$ : Human availability heuristic bias has no significant influence on investment decisions of individual investor in NSE.
- $H_{o_3}$ : Mental accounting bias has no significant influence on investment decisions of individual investor in NSE.
- $H_{o_4}$ : Anchoring bias has no significant influence on investment decisions of individual investor in NSE.
- $H_{o_5}$ : Herd mentality bias has no significant influence on investment decisions of individual investor in NSE.

#### 1.5. Justification of the Study

Since this study was based on investment decisions and its influence on behavioral biases of individual investors in NSE, the research project was aimed at justifying if behavioral biases could improve investment of individual investors in NSE or not. In this sense investment decisions needed to undergo a thorough analysis of the situations prevailing based on a number of behavioral biases, however regardless of the varied information available that justifies rationality and irrationality, investors were keen to avoid uncertainties associated with the ultimate investment decisions they engaged in. By doing this financial stockholder investment decisions emerged in local market, NSE designed strategies on efficient operation of risk profiles and management. Investors' behaviors biases were also contributing towards economic growth of the country because of their behavioral finance factors which affected their decisions when they invested in securities.

#### 1.6. Scope of the Study

The research proposal was aimed at finding out how behavioral bias influence investment decisions of investors in the NSE. The scope was focused on fear of regrets bias and behavioral biases on investment decision making of individual investors that was how evidence of beliefs, alterations of behavior and cognitive dissonance. It was focus on human availability heuristics bias and behavioral biases on investment decision making of individual investors that was how frequency of likelihoods and instant/events as they emerge in mind. It was also focusing on mental accounting bias on behavioral biases on investment decision making of individual investors that is keeping track of financial activities, different mental accounts and registration of events experienced. The scope was focused on anchoring bias on behavioral biases on investment decision making of individual investors; that was own level of productivity. Last but not least it focused on herd mentality bias on behavioral biases on investment decision making of individual investors; that was influence by peers to adopt certain behavior, influenced by peers to follow trend and influenced by peers to purchase items. The target population of the study was be individual investors in NSE. Data was be collected using questionnaires, interview and information gathered from documentary sourced in form of reports and records which covered a time scope from 2013 to 2017.

## 2. Literature Review

### 2.1. Introduction

This chapter presented the review of both the empirical and theoretical literature of behavioral biases on investment decisions of individual investors in the NSE in terms of development in stock index, past performance of the stock and expected corporate earnings. It also presented several research gaps from empirical evidence and a briefed of how the current study intended to fill such gaps. Finally, a conceptual framework was presented indicating the link between study variables.

### 2.2. Theoretical Framework

The theoretical framework showed the understanding of theories and models by the researcher for concepts relevant to research topic and the whole area of which the research relates (Kiaritha, 2014). The theories provided a generalized explanation to occurrence of issues affecting research as a whole hence the researcher was conversant with those theories applicable to his/her area of study (Kombo & Tromp, 2009). This section highlighted the theories that anchor the study. In particular the theories captured include, Modern Portfolio Theory (MPT), Efficient Market Hypothesis (EMH), Prospect Theory (PT) and Heuristic Theory (HT).

#### 2.2.1. Modern Portfolio Theory

Modern Portfolio Theory (MPT), a hypothesis put forth by Harry Markowitz (1952) in his paper "Portfolio Selection," was an investment theory based on the idea that risk-averse investors can construct portfolios to optimize or maximize expected return based on a given level of market risk, emphasizing that risk is an inherent part of higher reward. It was one of the most important and influential economic theories dealing with finance and investment decisions. It also called "portfolio theory" or "portfolio management theory," MPT suggested that possible to construct an "efficient frontier" of optimal portfolios, offering the maximum possible expected return for a given level of risk. It suggested that was not enough to look at the expected risk and return of one particular stock (independent variable;- length of time to hold stock, buying and selling decisions and choice of stock). By investing in more than one stock, an investor could reap the benefits of diversification, particularly a reduction in the riskiness of the portfolio. MPT quantifies the benefits of diversification, also known as not putting all your eggs in one basket. The risk in a portfolio of diverse individual stocks

was less than the risk inherent in holding any one of the individual stocks (provided the risks of the various stocks are not directly related). Consider a portfolio that holds two risky stocks: one that paid off when it rains and another that pays off when it does not rain (fear of regrets bias;- likelihoods of events). A portfolio that contains both assets would always pay off, regardless of whether it rains or shines. Adding one risky asset to another could reduce the overall risk of an all-weather portfolio. In other words, Markowitz showed that investment was not just picking stocks, but about choosing the right combination of stocks among which to distribute one's nest egg.

The study also agreed with Haugen & Robert (2001) findings that investing in many stocks, an investor can maximize on the advantages of diversification, specifically a decline in the riskiness of the portfolio decision. Therefore this study confirmed the pioneer founder of this theory Markowitz (1952) that the key tenet of investor was to optimize performance in an overall investment portfolio since the researcher was rational due to adoption of fundamental principle of risk-return trade-off, this was because the study found that, even though biases had an effect on investment decisions of individual investors, the effect was positive and therefore individual investment decisions would keep on improving (mental accounting;- keeping track of financial activities). This was because investors used investment banks that were professionals who had strong research departments that studied and analyzed the market and business models and advised the investors who ended up making sound investment decisions.

According to Huberman (2001), provided a compelling evidence that people had a propensity to invest while often ignoring the principles of portfolio theory. Hence this theory concluded that even though investors are faced with emotions and psychology when making investment decisions (mental accounting bias;- different mental accounting) which caused them to behave irrational, their individual investment decisions was ever improving. Markowitz (1952) indicates that despite the fact that investment was all about picking the right combination of stocks, the stock market earned an average of 8% per year, it was hard pressed to get anyone who owned the much-touted "average" portfolio generating an 8% return every year like clockwork (Matuszak, 2008). This indicated that emotion and psychology play a responsibility when investors made decisions, sometimes making them to behave in unpredictable or irrational ways hence stock performance imperfection.

### 2.2.2. Efficient Market Hypothesis

Efficient Markets hypothesis was developed by Eugene Fama in the 1960s. Efficient markets theory dwells on asymmetric information problems in financial markets. The theory posits that efficient financial markets would instantaneously (human availability heuristic bias) incorporate any new information (Fama, 1969). An efficient market is defined as a market where there are large numbers of rational, profit-maximizers actively competing, with each other trying to predict future market (anchoring bias; - individual tendency to make general market forecasts) values of individual securities, and where important current information was almost freely available to all participants. In an efficient market, competition among the many intelligent participants led to a situation where, at any point in time, actual prices of individual securities already reflect the effects of information based both on events that have already occurred and on events which, as of now, the market expects to take place in the future. In other words, in an efficient market at any point in time the actual price of a security was a good estimate of its intrinsic value (Fama, 1969).

The Efficient Market Hypothesis (EMH) has been a central finance paradigm for over 40 years, probably the most criticized too. Fama (1970) defined an efficient market as one in which security prices fully reflect all available information, and hypothesis stated that real world financial markets were efficient. Fama went on to say that it would be impossible for a trading system based on currently available information to have excess returns consistently. The theoretical foundation of MH was based on three key arguments: Firstly, investors were rational and value securities rationally, secondly that in case some investors are irrational, their trades were random and cancelled each other out without affecting prices and thirdly was that rational arbitrageurs eliminate the influence of irrational investors on market. The fact that EMH was not purely based on rationality alone but also predicted efficient markets in cases where rationality did not exist, gave the theory a lot of credibility. The empirical evidence from 1970s, which only strengthened the cause, fell into two main categories; any fresh news about a security should be reflected in its price promptly and completely and prices should not move as long as there was no new information about the company, since was exactly equal to the value of the security, (Shleifer,2000). According to Malkiel (2003), an efficient market was market in which securities prices fully reflect all known information. Hence, one cannot make above average profits consistently considering that financial market prices follow a 'random walk'. Therefore, financial market prices were fair and information arrived into the market in a random fashion giving none of the market participants any undue advantage.

The efficient market theory had attracted some controversies and criticisms considering the empirical contradictions that emerged in the 1970s and 1980s leading to stock market anomalies. Such anomalies had casted doubts on the prescriptions of the theory that financial markets were indeed efficient. Banz (1981) documents such anomalies to include: small-firm effect/size effect, January effect, Holiday effect and Weekend effect. In the context of this study investors intending to buy or sell stocks were not able to access all relevant market information from stocks sellers and agents, auditors, entities, market intermediaries and government agencies. In particular, the entity would not voluntarily disclose negative information about it on stocks that was available for sale since it could suffer competitive disadvantage; investment banks may not disclose to investors all the hidden transaction costs since the investors avoided them for fear of paying more.

Consequently, asymmetric information was inevitable problem on the part of investors and therefore the theory helped to gauge the impact of information on the portfolio performance as a result of investors having processed the available information and made investment decisions. According to (Mutswenje, 2017), Kenyan capital markets was still an emerging market and there was asymmetric flow of information on the market, this flow caused undue advantage

among investors to cause competitive disadvantage. The level of asymmetric flow of information was significant because majority of the investors tend to anchor on given information when investing, thus this theory contradicted his findings.

### 2.2.3. Prospect Theory

This theory was developed by Kahneman and Tversky (1979). The theory focused on subjective decision-making of individual investors' value system Kahneman and Tversky (1979) in the process of coming up with the Prospect Theory indicated how people take care of risk under uncertainty. In reality the theory explained the apparent regularity in human behaviors when evaluating risk under uncertainty. That was, human beings do not consistently fear risk; rather they fear risk when there were gains but take up risk when there were in losses. According to Tversky and Kahneman, people were more concerned with more weight on the outcomes that were seen to be more certain than those seen to be mere probable.

This theory had become particularly important in behavioral finance due to its application of expected utility theory. The proponents of prospect theory were of the idea that individuals treat gains and losses differently (mental accounting; - different mental accounting), they argued that individuals got motivated not to maximize expected financial returns but rather expected utility of their actions (Kahneman & Tversky, 1986). The application of utility theory to prospect theory was based on expectation of expected utility of its outcomes (Paul, Mark, Nigel & Emma, 2001). Thus, different behaviors could be understood as responses to different market circumstances leading to different implications (Paul et al., 2001) Investors assumed probable outcomes as opposed to outcomes (human availability heuristics bias;- frequency of likelihoods) that were certain and investors react differently to the same circumstances depending on the outcomes of gains or losses (Kahneman & Perttunen, 2004).

Therefore, it was the main theory that underpinned the independent variables (investor biases) of this study). Regret was an emotion which occurred after investors make mistakes. Investors run away from regret by not selling losing stocks instead they sell increasing ones. Moreover, investors became more regretful about keeping under performing stocks too long than selling performing ones too soon (Forgel & Berry, 2006). Prospect theory explains some scenarios in the mind affecting an individual's process of making decision like fear of regrets and mental accounting biases (Waweru et al., 2008). In asset integration a prospect is acceptable if its utility exceeds the utility of other assets in terms of monetary outcomes (Nicholas, 2012). The prevalence of risk aversion was best known for generalizing risky choices (individual investment decisions;- choice of stock). The theory posits that the disutility arising from a falling wealth was greater than the utility arising from an increase in wealth of the same size. Thus, individuals require risk premium to engage in trade with an element of risk in return, reference points for dividing gains and losses vary, depending on performance targets and past history. Individual behavior in financial markets is affected by social influence which maximized the empirical pattern of transaction on the market. According to Muswenje (2017), in his study, concluded that human behavior was affected by this theory when making their investments and that investors are faced with emotions when assessing risk under uncertainty. In his study he also agreed with the statement that investors try to run away from regret by not selling underperforming shares and willing to sell performing ones though they had challenges.

Prospect theory recognizes that the utility curve was not a straight line. It advanced the notion of utility in useful and accurate direction. It added insight that utility curve differs in domains of gains from losses (Plott, Charles, Kathryn, 2007). The shape of the prospect theory value curves was similar across individuals. The curve was S-shaped thus its convex below reference point. The slope of the curve measures sensitivity to change. The curve was more sensitive to origin and become less progressively less sensitive. The S curve means people tend to be risk averse in domain of gains and risk seeking in the domain of losses.

### 2.2.4. Heuristic Theory

Heuristics are defined as the rule thumbs, which makes decision making easier for individuals, especially in complex and uncertain environment (Ritter, 2003). Waweru et al., (2008) suggested that although current theories of heuristics processing do suggest that people simplified how they made judgments and decisions, these theories rarely explained how these processes reduce the amount of effort required. "Heuristics are simple, efficient rules of thumb which have been proposed to explain how people make decisions, come to judgment and solve problems, typically when facing complex problems or incomplete information. These rules worked well under most circumstances, but in certain cases can lead to systematic cognitive biases" (Parikh, 2011, p.16).

Existing models were successful in pointing out what people do when they are faced with difficult tasks and limited resources. And, to some degree, the models addressed issues when people reduce the effort associated with decision processes. Because the field had largely ignored effort-reduction, it had become susceptible to several confusions and redundancies. The theory was appropriated for the study so as to explain the influence of heuristic factors such as overconfidence bias, anchoring bias and availability bias on investment decision in NSE (Jagongo and Mutswenje, 2014). Although, the theory was appropriated for the study its applicability was inhibited when the investment decision was influenced by other factors other than the heuristics.

A Conceptual Framework was a structure of concepts and theories which were pulled together as a map for the study. When researchers use conceptual frameworks to guide their studies, you can expect to find a system of ideas, synthesized for purpose of organizing, thinking and providing study directions (Chinn & Kramer, 1999). The aim of this study was behavioral biases on investment decisions of individual investors in NSE in terms of past performance of companies' stock, expected corporate earnings and development in stock market index. The independent variables of the study include: Fear of regrets bias that was when one feared to make a financial decision that with hindsight appear to be dumb hence had impacted on buy and selling of stock at NSE. Human availability heuristics bias that was rules of thumb

which people used to make financial decisions in complex and uncertain environments hence decision-maker was irrational and took shortcuts depending on frequency of likelihoods and events as they emerged in someone's mind that was how individual investor measured psychologically in terms of financial stock investment at NSE. Mental accounting bias that was how individual investors kept track of financial activities, different mental accounts, and registration of events experienced that was past performance of companies' stock. Anchoring bias that was how financial investor's tendency makes general market forecast that was close to current levels, to anchor to forecasts on historical minimum or maximum prices, percentages of a particular asset class that might rise or fall based on the current level returns etc. Herd mentality bias that was individuals were influenced by peers to adopt certain behaviors and the way they followed the trend in purchasing items. These independent variables were expected to regress against the dependent variable which was investment decisions in NSE that is measurement of buying and selling decisions and length of time to hold stock.

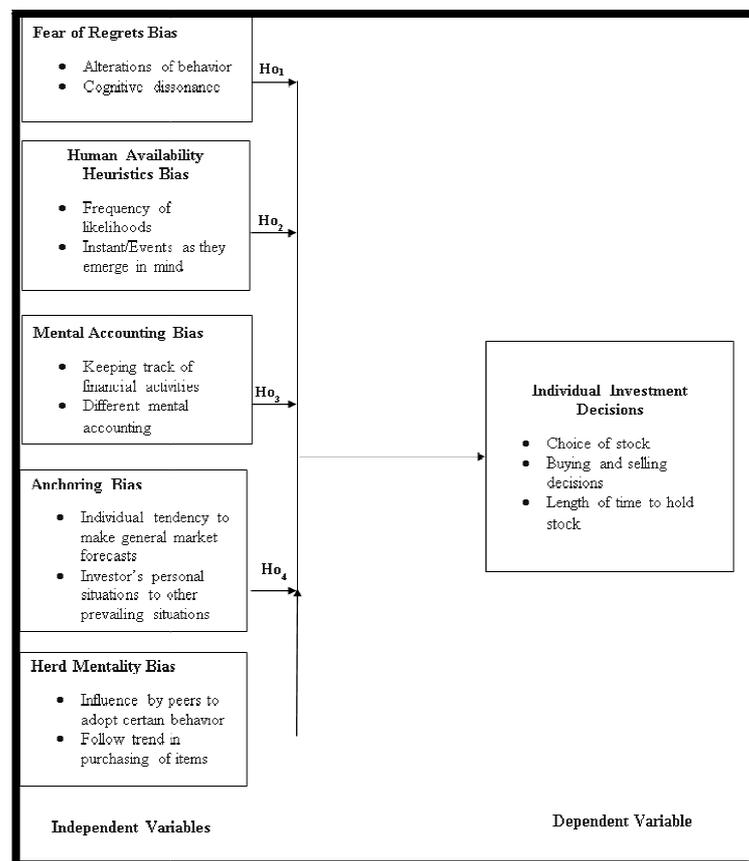


Figure 1: Conceptual Framework

### 2.2.5. Behavioral Biases on Investment Decisions

Behavioral finance theories were based on cognitive psychology, which suggests that human decision processes were subject to several cognitive illusion. These cognitive illusions could be grouped into two classifications: illusions due to heuristic availability decision processes and illusions caused by the adoption of mental frames, which were conveniently grouped in the prospect theory. These two categories were what formed the bias of the behavioral theories: (Waweru, 2008).

Waweru *et al.*, (2008) indicated that price changes of stocks had effect on their investment behavior at some level. Tripathi (2008) in his study found that investors used both fundamental as well as chartist analysis when trading in Indian stock market. Majority of the investors strongly agreed with the fact that many company fundamentals such as size, book to market equity, price earnings ratio and leverage to a large extent affect share prices and hence the application of these variables in the asset pricing model could very well describe cross sectional variations in the share returns in India.

Korniotis and Kumar (2009) predict cognitive ability (fear of regrets bias) using a host of demographic variables (age, education, and social networks). They found that prudent investors performed well over others by about 3.6 % annually both before and after accounting for transaction costs. Other investors underperformed appropriate benchmarks by a bit more than 3.6 % annually after costs with about half of the shortfall being traced to trading costs and half to bad stock selection. Korniotis and Kumar (2009) used the LDB dataset to analyse the association between age and performance. Interested with the observation that cognitive abilities decreased with age, they found evidence (evidence of beliefs) to support the opinion that investment performance declined with age. Kramer and Lensink (2009) studied on the effect of Financial Advisors on the Portfolio of Individual Investors. They found that financial advisers benefited individual investors, because advice improves risk-adjusted equity returns and reduces risk. Abreu and Mendes (2009) study on Financial Literacy and Portfolio Diversification suggested that level of investors' education, their financial knowledge and

the information sources used by individual investors to collect information on markets have a significant effect on the number of different stocks that form a portfolio.

Barber and Odean (2011) studied on the behavior of individual investors at the France Stock Exchange and found that investors' performances were affected by their behaviors which deleteriously affect their financial well-being effect on the number of different stocks that formed a portfolio (moderating variable;- past performance of the company/ies stock). Aduda *et al.*, (2012) study established the behavior and financial performance of individual investors in the trading shares of companies listed at the NSE, Kenya. The study found that individual investors demonstrated different behaviors (fear of regrets bias;- alterations of behaviors) that affected their financial performance in trading shares of companies listed at the NSE, Kenya. Babajide *et al.*, (2012) studied Investors' Behavioral Biases and the Security Market: A case study of the Nigerian Security Market. They made use of the primary data to determine the effects of behavioral biases on securities market performance in Nigeria. The study found enough evidence that behavioral biases do exist though not so common in the Nigeria Security Market.

Khawaja *et al.*, (2013) studied Investor's Behavioral Biases and the Stock Market Development (moderating variable;- development in stock index): An Empirical Study of the Pakistani Stock Market. The study found that most of the biases were significant and they had positive relationship with the market growth. It suggested that even though investors' encountered biases, the market still performed well and keep improving (mental accounting bias;- keeping track of financial activities), which is contrary to behavioral finance theories. It was loss aversion that had negative relationship with the market but that relationship was insignificant and therefore we could not conclude that biases had impacted on market development. Kramer and Lensink (2013) studied the effect of financial advisors on portfolio returns, risk, trading and diversification. The study found that financial advises benefit individual investors, because advice improved risk-adjusted equity returns and reduced risk.

Alalade *et al.*, (2014) used primary data approach based on survey research design to determine the effects of behavioral biases on Nigeria Stock Market and employed questionnaires as instrument and the technique of correlation with Pearson Product Moment Coefficient to analyse a survey of 110 randomly selected investors in Nigeria Stock Market. The study found that there were enough evidence of behavioral biases existing though not much common in the Nigeria Stock Market. Mutswenje and Jagongo (2014) studied factors influencing individual investment decisions at the NSE, Kenya;- the study found that expected corporate earnings, price per share, and development in stock index, friend recommendations and get rich quickly where the main factors investors consider when making investment decisions.

Nyamute *et al.*, (2015) studied the relationship between investor behavior and portfolio performance at the NSE, Kenya and found that the overall model was statistically significant that investor behavior influenced portfolio performance. C. N. Kimeu *et al.*, (2016) did a study on influence of behavioral factors on investment decisions and performance at the NSE, hence found out that some of the behavioral factors had significant influence on the performance of stocks. Mutswenje & Jagongo (2017) did a study on behavioral biases and individual portfolio performance in the NSE to determine the effect of behavioral biases and performance of equity and bonds on NSE. His findings were based on forecasts (anchoring bias;- making general market forecasts and personal situational to other prevailing situations) in change in stock prices, preferences to buy local stocks, reliance on past stock returns among others. He found out that investors rely on previous experience in the market for the next investment

#### 2.2.6. Influence of Behavioral Biases on Investment Decisions

Several studies document that investors are systematically reluctant to sell stocks for a loss (Shefrin and Statman, 1985; Odean, 1998; Grinblatt and Kelohaiju, 2001). Less was known about how they make purchases. There were three indications of how likely stocks caught investors' attention: daily abnormal trading volume, daily returns, and daily news (Odean, 1998). Institutional investors were more likely to be net buyers on days with low abnormal trading volume than on those with high abnormal trading volume (Odean, 1998). Their reaction to extreme price moves depended on their investment style. Rational investors were more likely to sell their past losers, thereby postponing taxes: behaviorally motivated investors were more likely to sell past winners, thereby postponing the regret (fear of regrets; - evidence of beliefs) associated with realizing a loss (Shefrin and Statman, 1985).

The tendency of individual investors to be net buyers of attention-grabbing stocks is greatest on days of negative returns (Odean, 1998). Informed investors would observe the same signal whether they are deciding to buy or to sell a stock. Odean (1999) proposed that investors manage the problem of choosing among thousands of possible stock purchases by limiting their search to stocks that have recently caught their attention. Contrarian investors, for example, will tend to buy out-of-favor stocks, while momentum investors will chase recent performers.

According to Shefrin (2000), she contended that heuristic-driven bias and framing effects caused market prices to deviate from fundamental values suggested that behavioral finance may explain empirical evidence, which casts doubt on existing financial models based on rationality. She also argued that because investors relied on the representativeness heuristics, they could become overly optimistic about past winners and overly pessimistic about past losers and that this bias could cause prices to deviate from their fundamental level.

However, heuristic processes and prospect theory were found evident with heuristics strongly dominating prospect theory in explaining the behavior of institutional investors operating at the Nairobi Securities Exchange. Market information and the fundamentals of the underlying stock were found to have the highest impact on the investment decision making by Institutional Investors.

Krishnan and Booker, (2002) analyzed the determinants affecting the decisions of investors who use professional recommendations to make a short-term decision to hold or sell a share. The findings indicated that a strong form of the professional summary recommendation report reduced the disposition error for gains as well as disposition error for

losses. Hodge (2003) analyze investors' thinking of earnings quality, auditor independence, and the importance of audited financial information. He concludes that lower thinking of earnings quality was associated with greater reliance on firm's audited financial statements and fundamental analysis of those statements when making investment decisions.

Swarup (2003) studied decisions taken by the investors when investing in the primary markets. The study found that investors gave more attention to their own analysis as compared to their professional advisors. Hussein (2007) in their study, found that company's earnings, getting wealth quickly, past performance and the development of the structured financial markets were what investors consider. Dimitrios (2007) studied Investors Behaviour at the Athens Securities Exchange and found that investors relied heavily on media and noise in the market when making investment decisions, while professional investors relied heavily on fundamental and chartist analysis and less on portfolio analysis.

Mutswenje and Jagongo (2014) studied factors influencing individual investment decisions at the NSE, Kenya;- the study found that expected corporate earnings (moderating variable;- determinants of investment decisions), price per share, and development in stock index, friend recommendations and get rich quickly where the main factors investors consider when making investment decisions.

Mutswenje & Jagongo (2017) did a study on behavioral biases and individual portfolio performance in the NSE to determine the effect of behavioral biases and performance of equity and bonds on NSE. His findings were based on forecasts in change in stock prices, preferences to buy local stocks, reliance on past stock returns among others. He found out that investors relied on previous experience in the market for the next investment

### 2.3. Empirical Literature

This section reviewed various studies on the study variables in view of documenting research gaps.

#### 2.3.1. Fear of Regrets Bias on Investment Decisions

According to Odean (1999), while studying the US market, obtained data by a brokerage house for 10,000 accounts and tested the disposition effect. He found that there is an investor's preference to sell winners and to hold the losers, except in December, but this, he said could be explained by tax reasons. He showed that this investor behavior could not be motivated by rebalancing portfolio reasons or reluctance to increase the trades to minimize transactions costs.

Fear of regrets bias also resulted in what was known as herding behavior. Shiller (2000) outlined psychological experiment by Deutsch and Gerrard where the human tendency to concur with the majority view was shown. In the experiment, people questioned their own opinions if they found everybody disagreed with it. These human tendencies were individually sensible, but collectively led to irrational and herding behavior. Any investor felt more comfortable investing in a popular stock if everybody else believed that it was a good one. Responsibility of it falling was shared with the other investors who originally expected it to do well.

A Gallup-SET research study was designed to better understand and explain the behavior of the Thai retail investor. The program, which began in late 2004, included a series of investigations into the capital market using a range of methodologies: qualitative diagnosis, quantitative assessment, and secondary data analysis. Gallup used the results, along with its experience in measuring investor behavior, to develop a conceptual framework for evaluating the attitudes and behaviors (evidence of beliefs) of active, potential, and inactive investors. The model assumed that a potential investor's attitude towards investing in the stock exchange was influenced by many factors, including political, environmental, social, and technological ones. The model also included important psychonomic, or attitudinal and psychographic, variables that shape investors' reactions to external factors, such as risk tolerance and perceptions or beliefs (evidence of beliefs) about shares as an investment tool.

The research identified five key segments among potential investors, three segments among active investors, and two among inactive investors. The segments were unique both in their behavioral profiles as well as their psychographics. The first segment was the potential investors whose analysis revealed five key segments: young risk takers, optimistic and confident, shaky but willing, cautious and risk-averse, and unaware but interested. Two segments - young risk takers and optimistic and confident - showed the most potential. The second category included active Investors which among the three key segments - adventurers, cautious optimists, and risk averse - the first two segments had greater potential; the risk averse were more fearful and tended to have small portfolios.

The last segment of inactive investors revealed two key segments: long-term investors, who were holding their stocks and waiting for the right time to maximize returns on their investments, and quitters, who were likely to exit the market soon due to investment losses. The study further concluded that rather than making investment decisions using a strictly rational thought process, investors were significantly influenced by personal beliefs and attitudes that were more emotional than they were rational.

In another study, Wang (2005). aimed at investigating the behavior and performance of individual investors in the emerging China's market using the market level data uniquely available from the Shanghai Stock Exchange (SHSE). China's stock market has been dominated by over sixty million of individual investors and the fastest growing stock market in the world over the past decade. In this study, Wang analysed both the levels and changes of individual ownership to detect the behavior (alterations of behaviors) and performance of individual investors. He established that Chinese individual investors had a tendency to hold stocks with high risk (as measured by firm size, beta, and volatility), high book-to- market ratios, high turnover, and high float ratios. Moreover, individual investors as an aggregate tended to sell stocks that outperformed the market over the previous 6 months, and hold on to the underperforming stocks. However, stocks that were associated with high individual ownership or a large increase in ownership significantly underperformed those with low individual ownership or a large decrease in ownership over the subsequent 6 months. His findings were consistent

with the behavioral finance theories that investors were overconfident and displayed the disposition effect. Wang further established that investors were predisposed to sell past winners and hold on to past losers in both the bull and bear markets, however, they appeared to be more overconfident in making investment decision in the bull market than in the bear market, that was, investors tended to own (purchase) stocks with relatively higher risk, higher turnover, and lower float ratios in the bull market than in the bear market (Wang, 2005).

### 2.3.2. Human Availability Heuristics Bias on Investment Decisions

Kimani Waruingi (2011) examined the behavioral factors on investors' choices of securities at Nairobi Securities Exchange. In his study he hypothesized heuristic factors which includes; representativeness, anchoring and overconfidence. He adopted descriptive survey design whereby primary data was collected using self-administered drop and pick questionnaires. The data was analyzed using factor and descriptive methods. In his findings he found that overconfidence had higher on the decision making of individual investors in terms of price changes, market information and past trends (frequency of likelihoods) of stocks.

Kengatharan and Kengatharan (2014) examined the influence of behavioral factors on investment decision and performance in Colombo Securities Exchange. The study hypothesized that heuristic factors, prospect factors, market factors and herding factors have significant influence on investment decisions in Colombo. Cross sectional data was collected through the use of questionnaires. The study adopted descriptive survey and correlation design. Data was analyzed through use of descriptive statistics, exploratory factor analysis and regression analysis. Results of the study showed that heuristic factors such as an individual believe in their skills and knowledge (instant/ events as they emerge in minds) of stock can help in outperforming market, dependence on previous experience and forecast on the stock price changes in future all had high impact on investment decision. Regression analysis showed an inverse significant relationship between overconfidence and investment decision while anchoring had a positive significant relationship with investment.

C.N. Kimeu et al (2016) examined the influence of behavioral factors on investment decisions and performance at the NSE. The study hypothesized that heuristic factors, prospect factors, herding factors and rationality factors had significant influence on investment decisions of equity and bonds at the NSE. The research population was individual investors who had invested in equity and bonds at the NSE as at the end of third quarter of 2015. The target population of 80 respondents with the same sample size was used. Simple random sampling technique was used and primary data was collected using closed ended questionnaires, pick and drop procedure was used to collect data through the use of registered offices of stock brokers. Descriptive statistics such as mean and standard deviation was used to analyze the data. Inferential statistics which included correlation analysis and regression analysis was also used in interpreting the results of the study. Tables and graphs were used to present the data which the findings showed that investment decisions at the NSE were positively influenced by behavioral factors including heuristic, prospect, herding and rationality.

The objectives of the above study were to determine the influence of heuristic factors on investment decision making. To achieve this, the respondents were required to rate how often their investment decision was influenced by heuristic factors on a five-point Likert scale. Majority (56.9%) of the investor's often scrutinized investment past performance as an indicator of future performance so as to make investment decision, (43.1%) of the investors always used trend analysis to make investment decision and (37.5%) often carried out trend analysis. Majority (40.3%) reported that they often use predictive skills to time and outperform the market. 63.9% of the respondents always securities return expectation which is beyond the market returns, 65.3% argued that they always set the securities prices based on the selling or buying prices while 66.7% use the securities purchase price as its benchmark. On overall majority of the respondent's investment decision is mostly influenced by heuristic factors hence the return study agrees with a Pakistan study which showed that heuristic factors had significant influence on equity investors (Farooq & Sajid, 2015).

### 2.3.3. Mental Accounting Bias on Investment Decisions

According to Waruingi (2011) whereby he conducted a survey study on behavioral factors influencing investors' choices on securities at Nairobi Securities Exchange, in his study hypothesizing prospect factors, that was loss aversion, regret aversion and mental accounting using primary data and self-administered drop and pick questionnaires. He found out that mental accounting had high impact on the investment decisions of individual investors in the NSE.

Breuer, Rieger and Soypak (2012) conducted in a study whose main objective was to highlight the relevance behavioral (keeping track of financial activities) preference patterns for corporate dividend policy. An empirical study which was carried out in 32 countries with a sample of 5750 firms used. The study incorporated a model which determined the relationship between dividend payout policies based on the ideas of mental accounting. The model predicted a positive influence of the investor's loss aversion and investors (different mental accounting) amount of time discounting on the dividend payout ratio. The study established that loss aversion was the main determinant for corporate dividend policy from sample used for the study. H2: Prospect factors have no significant influence on investment decision among investors at the NSE.

Kansal and Singh (2015) conducted a study on behavioral biases amongst investors in the Indian Stock Exchange. A structured questionnaire was administered among 196 investors who were engineering graduates through convenience sampling technique. Multi criteria technique of analytic hierarchy process was used to define the relative contribution of each behavioral bias in shaping the investors behavior. It was established that most investors over rated their loss aversion tendency and they generally had a fear of loss.

Kimeu, Anyango and Rotich (2016) examined the influence of behavioral factors on investment decisions and performance at the NSE. The study hypothesized that heuristic factors, prospect factors, herding factors and rationality

factors had significant influence on investment decisions of equity and bonds at the NSE. The research population was individual investors who had invested in equity and bonds at the NSE as at the end of third quarter of 2015. The target population of 80 respondents with the same sample size was used. Simple random sampling technique was used and primary data was collected using closed ended questionnaires, pick and drop procedure was used to collect data through the use of registered offices of stock brokers. Descriptive statistics such as mean and standard deviation was used to analyze the data. Inferential statistics which included correlation analysis and regression analysis was also used in interpreting the results of the study. Tables and graphs were used to present the data which the findings showed that investment decisions at the NSE are positively influenced by behavioral factors including heuristic, prospect, herding and rationality.

The study sought to establish the influence of prospect factors on investment decision. A five Likert scale was used to rate the influence of prospect factors on investment decision. Descriptive statistics was used to summarize the data. On average most of the investors always invested when they had a sure gain. Most investors (mean=3.5) often invest when they were with a sure loss, they were followed by 27.8% who are sometimes risk averse. 37.5% reported that they were often willing to dispose their securities when there are signs of losses, they were followed by 31.9% who are sometimes willing to dispose the security. On average (mean 3.3) of the investors were sometimes willing to dispose securities which have decreased in value. 59.7% of the respondents were often willing to sell securities which have increased in values faster on the other hand 37.5% were often willing to dispose their loss-making securities. On average (mean=4.0) of the investors often tend to treat and account for every individual investment rather than a portfolio of securities. On average investors decision was sometimes influenced by prospect factors (mean=3.7).

#### 2.3.4. Anchoring Bias on Investment Decisions

Kimani W. (2011) in his study on behavioral biases and investors' choices at the NSE, whereby he used a format of continuous variables 6-point Likert measurements, primary data collected using drop and pick questionnaires consisting of both semi-structured and open-ended questions, based on 100 individual investors from twenty registered stock brokerage and investment banks. In his findings he concluded that anchoring as one of the prospect factors (individual tendency to make general market forecasts) had high impact on the investment decisions of individual investors at the NSE.

Mutswenje & Jagongo (2017) did a study on behavioral biases and individual investor portfolio performance at the NSE to determine the effect of anchoring bias among other behavioral bias portfolio performance at NSE. The researcher used a descriptive research design, using a target population of all individual investors who formed stock portfolio between 2011-2015 (831,000) and investment banks which these investors had bought these securities (22 firms). He used multiple regression and hierarchical multiple regression.

Purposive sampling technique was used to select 16 investment banks from which quota sampling design was adapted to randomly select a sample of 384 individual investors at the NSE. Reliability test using Cronbach's Alpha Test (0.848), normality test using Q-Q Plots (Verification of normality). Multicollinearity using Tolerance and VIF (VIF<3) homogeneity of variance using Levene's Test ( $p>0.05$ )

The findings were as follows:-

Statements under Anchoring Bias Mean S.D

Forecasting the change in stock prices based on recent stock prices 4.5 0.8

Preference to buy local stocks than international stocks because the 4.1 0.9

Information of local stocks is more available

Reliance on previous experiences in the market for next investment 4.0 1.1

Reliance on past stock returns when buying them 3.8 1.3

Table above reflects how investors behave on the stock market under various aspects of anchoring bias. In view of whether investors forecast the change in stock prices based on recent prices, nearly all the investors strongly agreed with the statement and this could be because recent stock prices would give the investors a certain trend on how the stocks were doing for easy forecasting in where to invest. On the aspect of whether the investors preferred to buy local stocks than foreign stocks because the in format the statement. This was because the information on local stocks was easily available from the market at no cost as opposed to international stocks. On the aspect of whether investors relied on previous experiences in the market for next investment, majority of them were in agreement with the statement because the level of experience that investors had because of trading on the stock market gave them a certain level of confidence that acted as their anchor before investing.

This confirmed the findings of Tacer (2007) who found that investors try to avoid uncertainty when they had insufficient data by paying attention to that when they were faced with the first data to reduce uncertainty, because this reduced uncertainty and relieve the mind of individual. And finally with the aspect of whether investors relied on past stock returns when buying them (investors' personal situations to other prevailing situations), majority of them agreed with the statement because past stock returns act as a guide to investors among different stocks before buying them. This finding concurred with those of Törngren and Montgomery (2004) who established the association between returns and the confidence of people with profession and people without profession in the stock market. They found that people without profession were normally affected by past stock return movements, as an indicator of past movements acting as anchors for their expectations.

### 2.3.5. Herd Mentality Bias on Investment Decisions

In rational asset pricing context, herd mentality bias reflects more on the irrational response of investor than the outcome of rational decision making because it implied that prices may be driven away from their equilibrium value. Literature showed the dispersion from the rational asset pricing was caused by cognition of investor in self-satisfaction. In psychology, this behavior was more known as cognitive dissonance and regret aversion.

To reduce the pain psychologically, investor usually adjusts their feeling about the success of historical investment choice by remembering their stock past performance as better than in the reality. Akerlof and Dickens (1982), who examined the relationship between cognitive dissonance and economic consequences, found the changes in belief and cognitive dissonance towards economic consequences due to modernization. Goetzmann and Peles (1996) conducted a research regarding the cognitive dissonance of investor by survey. They found that most of the people tend to do the cognitive dissonance to please them. In finance, this cognitive dissonance can be caught in herd mentality bias (Devenow & Welch, 1996).

Herd mentality bias means an event that under certain conditions most of the investors focus only on a subset of securities by flocking, while neglects other securities with identical exogenous characteristics (Hirshleifer, Subrahmanyam, & Titman, 1994). In a simple relationship, the herd mentality bias was related to the social psychology which called regret aversion and cognitive dissonance. The experimental and empirical evidence showed individual in groups abides the group decision, even when they perceive the group to be wrong. Individual suppresses their own beliefs and relied on their investment decision solely on the collective action, even though they disagree with the prediction. The reason is that individual avoids being regret if the group is found to be true. Another reason is to satisfy their judgment if the judgment was found to be wrong in the future. It was better to have mistaken in a group rather in person. This was what they called as regret aversion and cognitive dissonance; or in finance was called as herding mentality bias.

Academic literature included many models of herding mentality bias in the financial market. Shiller and Pound (1989) documented survey evidenced on herd mentality bias among the institutional investors. They found that institutional investor place significant weight on the advice of other professionals on their buy and sell decisions in volatile stocks. Scharfstein and Stein (1990) proposed the herding model of manager ignorance on their own information because of their regret aversion. Froot, Scharfstein and Stein (1992) confirmed that speculators with short horizons might herd on the same information. Lakonishok, Shleifer, and Vishny (1994) found only weak evidence of herding decision by institutional investors among small stocks and no evidence of herding among large stocks. Trueman (1994) showed that individual investor might herd toward the report issued by other analysts. Nofsinger and Sias (1999) found institutional investors positive feedback trade more than individual investors and institutional herding impacts prices more than herding by individual investors. Welch (2000) explained how sequential issues of IPOs could lead investors to ignore their private information and herd on the decision of earlier investors

More topical herding mentality bias model was the model of Christie and Huang (1995). It was based on the dispersion of firm returns from the market normal distribution return. Christie and Huang (1995) model were popular for their explanation of herding in anomalous condition of market such as market stress. Other seminal papers such as Chang, Chen and Khorana (2000), and Gleason, Lee and Mathur (2000) also followed the Christie and Huang (1995) model. This research also replicated the Christie and Huang (1995) model.

Much empirical studies had documented the evidence of herding behavior. Chen, Rui and Xu (2003) found the herd mentality bias in Chinese Stock Market. It was aligned with Chang et al. (2000) and Hwang and Salmon (2004). Chang et al. (2000) found the relationship between herding and high return dispersion in U.S., Hong Kong, Japan, Korea and Taiwan. Meanwhile, Hwang and Salmon (2004) found that developed market such as U.S. and U.K. exhibit less herd mentality bias than emerging market such as Korea. They addressed the information asymmetry as the case of this condition.

In the Malaysia context, this herding mentality was also found. For instance, Kaminsky and Schmukler (1999) addressed herd mentality bias as the reason chaotic financial environment in Malaysia during 1997 crisis because of the herding of the bad news from neighboring countries. In line with Kaminsky and Schmukler (1999), Glick (2007) also found the herd mentality bias during the financial reforms in Malaysia. For the stock market case, Wong and Kok (2009) found the herding in bursa Malaysia. This paper also employed Christie and Huang (1995) model. Toh and Hooy (2010) also employed the same model and fell in the same conclusion. They found investor followed other investor, cross sectionally, in herd mentality bias and Monday Irrationality in their trading decision. More topical, Chiang and Zheng (2010) documented also the herd mentality bias in bursa Malaysia.

Kimani (2011) in his study on behavioral biases which included herd behavior as one of the independent variables, and investors' choices at the NSE, whereby he used a format of continuous variables 6-point Likert measurements, primary data collected using drop and pick questionnaires consisting of both semi-structured and open-ended questions, based on 100 individual investors from twenty registered stock brokerage and investment banks. In his findings he concluded that herd behavior is related to the duration of participation at Nairobi Securities Market that was between 1 and 3 years the proportion of investment was 25%, between 3 and 5, 21% and more than 10 years, 9%. This shows that individual investors paid more of their attention to stock market in the recent years.

#### 2.4. Critique of the Existing Literature

Malmendier and Tate (2004), USA did a test on the overconfidence CEO hypothesis. In their findings most CEOs suffer from overconfidence, and this strongly affects the decision of corporate investment. The study did not investigate the effect of other biases on investment decision. The study investigated anchoring, disposition and confirmation biases in addition to overconfidence bias on investment decision.

According to the study of Wang (2005) which aimed at investigating the behavior and performance of individual investors in the emerging China's market at Shanghai Stock Exchange (SHSE), the study showed that stocks were associated with high individual ownership that is large increase in ownership significantly underperformed those with low to individual ownership hence investors were predisposed to sell past winners and hold on to past losers in both bull and bear markets. The above assumptions can be critiqued by doing a research on the behavioral biases on investment decisions of individual investors in NSE; fear of regrets as one of the independent variables giving consideration of evidence of beliefs, alterations of behavior and cognitive dissonance as measurable items.

A Gallup-SET research study which was designed for better understanding and explanation of the behaviors of the Thai retail investor, a program which began in late 2004 including series of investigations into capital market assumed that a potential investor's attitude towards investing in the stock exchange was influenced by many factors, including political, environmental, social and psychographic variables that shape investors reactions to external factors such as risk tolerance and perceptions or beliefs about shares as an investment tool. The study concluded that investors were significantly influenced by personal beliefs and attitudes that were more emotional than they are rational (Gallup 2006). Chen *et al.*, (2007), did a research done in China to analyse overconfidence in Chinese investors. They found out that Investors in China trade more regularly than USA Investors, hence in their study they restricted to overconfidence bias in China and USA. These studies did not investigate the influence of investors' investment decisions. It investigated anchoring, disposition and confirmation biases in addition to overconfidence bias. The study also addressed the effect of investors' investment decisions.

Kimani Waruingi (2011) examined the behavioral factors on investors' choices of securities at Nairobi Securities Exchange. In his study he hypothesized heuristic factors which includes; representativeness, anchoring, overconfidence and herding behavior. He adopted descriptive survey design whereby primary data was collected using self-administered drop and pick questionnaires. The data was analysed using factor and descriptive methods. In his findings he found that herding behavior had higher on the decision making of individual investors in terms of price changes, market information and past trends (influence by peers to adopt certain behavior and following trend to purchase items) of stocks.

Aduda *et al.*, (2012), Kenya did a research study to establish the behavior and financial performance of individual investors in the trading shares of companies. The study found that there were different behaviors and financial performance of individual investors in trading shares. The study did not capture other individual biases other than overconfidence. It did not have a moderating variable. The study incorporated other biases and moderating variables on portfolio performance.

Khawaja *et al.*, (2013), Pakistani did a research on Investors' Behavioral Biases and the Stock Market Development. The showed positive relationship between Investors' Behavioral Biases and the Stock Market Development. It used Pearson correlation coefficient techniques to analyse Investors' Behavioral Biases and the Stock. The study incorporated the moderating variable of determinants of investment decisions. The study also incorporated other tools of analyses.

Lee *et al.*, (2013), USA did a study on how to investigate bias and gender on portfolio performance and risk. They found out that there was a relationship between investor biases and portfolio performance. However, the study did not incorporate moderating variable of determinants of investment decisions, but the essence of the study focused on incorporation of the moderating variable of determinants of investment decisions.

Alalade *et al.*, (2014), Nigeria did research on Testing Investors' Behavioral Biases and the Nigerian Stock Market Returns. The study done by Kengatharan & Kengatharan (2014) on influence of behavioral factors on investment decision and performance in Colombo Securities Exchange (CSE) showed that heuristic factors have significant influence on investment decisions in Colombo that is the heuristic factors such as an individual believe in their skills and knowledge of stock outperformed market, dependence on previous experience and forecasts on stock price charges on investment decision.

In the study carried out by Kimeu *et al* (2016) on influence of behavioral factors on investment decisions and performance at the NSE, the heuristic factors had significant influence on investment decisions of equity and bonds in NSE. The assumption can be critiqued by doing a research on the behavioral biases and investment decisions of individual investors in NSE using human availability heuristics bias as one of the independent variables giving consideration of frequency of likelihoods and events as they emerge in mind as measurable items.

Kimeu, Anyango and Rotich (2016) did a study on influence of behavioral factors on investment decisions and performance in NSE which the findings showed that prospect factors had positively influence on individual investment in NSE. The empirical findings can be critiqued by doing a research on the behavioral biases on investment decisions of individual investors in NSE using mental accounting bias as one of the prospect factors as an independent variable giving consideration of keeping track of financial activities and different mental accounting as measurable items.

Mutswenje & Jagongo (2017) did a study on behavioral biases and individual portfolio performance in the NSE to determine the effect of anchoring bias among other behavioral biases. His findings were based forecasts in change stock prices, preference to buy local stocks, reliance on past stock returns. His findings showed that investors rely on previous experience in the market for next investment. The assumption could be critiqued by doing a research study on the behavioral biases on investment decisions of individual investors in NSE using anchoring and adjustment as one of the

behavioral bias as an independent variable giving into account individual tendency to make general market forecasts, and investors personal situation to other prevailing situations as measurable items.

### 2.5. Research Gaps

The studies that had so far been done had focused on the impact of behavioral factors on individual investors on different investment portfolios at various international firms and in the NSE. They included psychological factors such as representatives, overconfidence, herding, loss aversion among others in relation to general individual investment performance. This paper proposed that future studies should dwell on the general objective of how to establish whether the behavioral biases had influence on investment decisions of individual investors in NSE.

The following specific objectives were factored; - to show fear of regrets bias as a behavioral bias on investment decisions of individual investors in NSE. Evidence of beliefs, alterations of behavior and cognitive dissonance was looked into to show how individual investors made their decisions while investing in NSE. To determine human availability heuristics bias as a behavioral bias on investment decisions of individual investors in NSE. Frequency of likelihoods and instants/events as they emerged in mind in individual investors while making investment decisions in NSE. To examine mental accounting bias as a behavioral bias on investment decisions of individual investors in NSE. Many people may have kept in mind different financial activities and different mental accounting which could end up in making wrong or right decisions on when, where, how and what to sell or buy in NSE. To explain anchoring bias as a behavioral bias on investment decisions of individual investors in NSE. Individual tendency was made in general market forecasts and investor's personal situations to other prevailing situations needed to be explained to understand where to anchor and adjust when one wants to invest in NSE. To determine the influence of herd mentality bias on investment decisions of individual investors in NSE. Many people were influenced by peers to adopt certain behaviors and followed trend in purchasing stock, this needed to be looked into and see why they tended to do so. When researchers combined the general and behavioral finance factors on investment decisions of individual investors in NSE based on various psychological factors it enhanced performance of companies' stock, expected corporate earnings and develop stock market index.

## 3. Research Methodology

### 3.1. Introduction

This chapter highlighted the methodology that informed the study. This included: researched philosophy, researched design, and targeted population, sampling designed and validity and reliability tests as well as diagnostic tests. The chapter further presented an overview of the data collected, analyzed procedure and presentation of the studied results. The chapter concluded by providing an operationalization of the research variables.

### 3.2. Research Philosophy

Research philosophy was defined as the development of the researched background, researched knowledge and its nature (Saunders & Thornhill, 2007). This research involved drawing conclusion, and considering researched issues using a quantitative research approach. Furthermore, the study adopted a positivist paradigm which involved a statistical analyzed approach. This closely was associated with scientific approach and implied that investigations should be capable of replication (Kothari, 2009).

Positivism was based upon values of reason, truth and validity and it was focused purely on facts, gathered through direct observation and experience and measured empirically using quantitative methods (Erickson & Kovalainen, 2008). Hatch and Cunliffe (2006) indicated that positivists assumed that what truly happened in organizations should only be discovered through categorization and scientific measurement of the behavior of people and systems and that language was truly representative of the reality. To achieve this, a sufficient large number of participants was required to complete the questionnaire.

### 3.3. Research Design

This was a configuration of the research which comprised of how the research was organized; it was the sequential thread that hold together all the important aspects of the research so that they made a meaning (Laurel, 2011; Kothari, 2010). In recognizing that no single designed existed in isolation, Saunders, Lewis and Thornhill, (2007) postulated that combined different designs in one study enabled triangulation and this increased validity of the findings. This study adopted a descriptive design. Descriptive design was cross-sectional;- this was appropriate for studies where data was collected from a large sample with several variables being studied at the same point in time as opposed to longitudinal designs where variables are studied over a period of time, that is performance.

Descriptive designed was appropriate when the purpose was describing characteristics of certain groups and the study of variables occurred at a single point of time; the designed facilitates description of trends, attitudes or opinions of a large group in terms of asking questions of who, what, where and how of the topic (Burns & Bush, 2010; Churchill Jr. & Iacobucci, 2005). It was on this basis that the design was adopted. Descriptive survey research design assumed world view and several world views (2006). Saunders *et al.*, (2009) indicates that survey was a popular and common strategy in business and management research. According to Zikmund, Babin, Carr and Griffin (2010) descriptive survey research described characteristics of objects, people, group organizations or environments. Kothari (2004) on the other hand noted that it was the arrangement of conditions for collection and analysis of data with the aim of combining relevance to research purposed. Sekaran and Bougie, (2011) argued that descriptive survey design helps one to understand the characteristics of a group in a given situation and assists in systematic thinking about aspects of a given situation.

Descriptive survey research designed employed applications of scientific methods critically analyzed and examined the source materials, interpreting data, and arriving at generalization and prediction (Neeru, 2012).

### 3.4. Target Population

Mugenda and Mugenda (2003) described the targeted population as the complete set of individual cases or objects with some characteristics to which the researcher wants to generalize the results of the study. Individual investors do their share investment at the NSE through investment banks. Therefore, the targeted population of this study comprised of 831,000 individual investors at the NSE who had consistently invested in shares from the year 2011-2015 (the active investors) and who had formed a stock portfolio over the five years period and had invested through investment banks.

According to CDSC (2015), active individual investors for the five-year period were 831,000 and the investment banks through which these individual investors invested were 22 (CMA, 2017) as shown in Appendix II. The unit of analyzed of the study was the investment banks and unit of observation as the active individual portfolio investors who had traded on the stock market through these firms throughout the five-year period under study. This period was long enough to provide a trend of investment decisions for generalization.

### 3.5. Sampling Frame

According to Kombo and Tromp (2009) a sample was a finite part of a statistical population whose properties were studied in order to gain generalized information representing the whole universe. It enabled one to draw conclusion generalized to the population of interest (Sekaran & Bougie, 2011). Kombo and Tromp (2009) described a sample as a collection of representative units chosen from the universe. These are the various methods used in sampling but vary in cost, effort, and skills required. The quality of the sample depended on whether it represented the population with respect to the variables in the study (Zikmund *et al.*, 2010).

### 3.6. Sample Size & Sampling Techniques

A sampling design was a definitive plan for obtaining a sample from a given population (Kothari, 2005). It referred to the technique or the procedure the researcher would adopt in selecting some sampling units from which inferences about the population was drawn. The study adopted quota sampling. The sample of investment banks was utilized as the premise that these were the banks that existed for the entire period under study of 2013-2017. Purposive sampling was used when the studied had given a list of which reflected the range of situations concluded (Palys, 2008). The study adopted quota sampling designed which classified the population elements into quotas and samples separately from each quota as per Bryman and Bell (2007).

Quota sampling represented the major characteristics of the population by sampling a proportional amount of each quota, in this case, the type of investment bank. The target population was classified into quotas which represented the investment banks. Allocation of the sub-sample across the quotas was proportionate to the population per quota. From each quota, study units were selected randomly using CDSC accounts of respondents to get the 384 respondents. The study adopted a formula used by Jones (2015) to determine the sample size of the study. The formula was usually applicable where the population of interest was more than 10,000 units and where it was not clear on the variability of the proportion. The formula was used to compute the sample size in similar study by Lee *et al.*, (2013).

$$n = \frac{Z^2 pq}{d^2}$$

Where: n was the desired sample size when the target population is 10,000

z was the confidence level (95%); that is, z=1.96

p was-expected preference (as fraction of 1).

d was-The level of statistical significance set. (0.05 level).

q was 1-p (expected non-prevalence)

$$384 = \frac{1.96^2(0.5)(0.5)}{0.05^2}$$

The desired sample size (n) was thus 384

Since n = 384

On the aspect of investment banks, purposive sampling was determined by the sample that conformed to the study and the existence of the banks that existed for the entire period under study of 2013-2017.

### 3.7. Data Processing & Analysis

Since the study combined behavioral biases and individual investment decisions, then multiple regression model was used by equating performance measures for each investor to a composite index of each behavioral biases and individual investment decision. This was in view of Patton (1999); Denzin (1978) and Bryman (2006). Triangulation was of importance since a single method could not adequately shed light on a phenomenon but using multiple methods helped facilitate deeper understanding.

The general equation for multiple regression analysis (standard) model was expressed as follows:

$$Y = B_0 + B_1 X_1 + B_2 X_2 + B_3 X_3 + B_4 X_4 + B_5 X_5 + \epsilon \dots \dots \dots \text{Eg.} \dots \dots 3.1$$

Where:-

Y was Investment decisions of individual investors

$X_1, X_2, X_3, X_4$  and  $X_5$  are independent variable (behavioral variables)

$X_1$  was fear of regrets bias

$X_2$  was human availability heuristics bias

$X_3$  was mental accounting bias

$X_4$  was anchoring bias

$X_5$  was herd mentality bias

$\varepsilon$  was the error term (random component) and source of randomness in  $Y$ .

$B_0$  was the intercept of the systematic component of the regression relationship.

$B_1 + B_2 + B_3 + B_4$  &  $B_5$  were the coefficients of the regression models.

Kothari (2009) defined data analysis as the application of logic to understand and interpret data collected. Each independent and dependent variable had several indicators which were grouped and analyzed together to give one parameter for each variable using a composite indexed as follows:

$Index = \frac{\text{summation of } iw}{\text{summation of } w} \dots \dots \dots 3.1.7$

Where:  $i$  = Value index

$w$  = weightage that represents the relative importance of different items.

The composite index number measures the relative change of a variable of several indicators. Data was analyzed using Simple Linear Regression analysis, Step Multiple Regression analysis,

Hierarchical Multiple Regression Analysis, Correlation Analysis and Descriptive Analysis. Regression analyses and hypotheses tests were both conducted at a significance level of 0.05. The Coefficient of determination and p-values were also used to facilitate the interpretation of the regression output from SPSS. The open-ended questions will be analyzed by putting common themes together and making inferences from the outcomes (Glesne, 1999). Coopers and Sehinder (2003) noted that grouping common themes together helped in bringing issues into the limelight which had not been identified by the use of structured questions in the questionnaire.

### 3.8. Data Collection Instruments

The study adopted primary and secondary data. Questionnaire was used to collect primary data on behavioral biases and individual investment decisions. Respondents were asked about their behavioral aspects and their determinants of investment decisions on a Likert five-point scale, closed-end and open-end questions. Kothari (2004) indicated that qualitative variables were best measured using an itemized rating scale particularly a Likert five-point scale. This Likert five-point scale was used in similar studies by Lee *et al.*, (2013) and Nyamute *et al.*, (2015) to measure qualitative variables. For example, fear of regrets bias was measured based on the number of transactions in an average period of three months where more than four times means high fear of regrets bias and less than four times means fear of regrets bias. Questionnaires were important for collecting information that could not be seen directly in the process of finding about feelings, motivations, attitudes and experiences of respondents (Mellenbergh, 2008). The study because they helped in

Franker (2006) indicated that a questionnaire was important in getting objective data since participants were not compromised in any way by -the researcher. The study further found that questionnaires had the added advantage of being cheap and use less time as instruments of data collection. Inclusive in the questionnaire was a small part of question which could cut across between primary and secondary data which required the respondents to give their details (collected from the NSE for individual company's prices of the investor stock plus any dividend given during the period and their 364- day Treasury bill rate which was used as a proxy of risk-free rate: this was obtained from the central bank of Kenya).

#### 3.8.1. Validity Test

Validity was the extent to which a test measured what was supposed to measure (Haynes *et al.*, 1995). Content validity was the extent to which the elements within a measurement procedure were relevant and representative of the construct that they were used to measure (Haynes *et al.*, 1995). To assess the scales' content validity, the study carried out instrument pre-test which was done by administering randomly their search instrument to 16 individual investors from the 16 quotas with 1 individual investor being randomly drawn from each of the 16 quotas. These respondents were not allowed to participate in the main study because they could bring biasness in the outcome.

The pre-test aimed at determining whether; the questions had clear phrasing and words being understood by the respondents, the questionnaire was arranged in a sequence that was logical and easily followed, there was need to clarify some items, or the relevance of the questions. Pre-testing was considered necessary since it was a means of determining to what extent a questionnaire communicated. It was important to pre-test the research instrument so as to actually determine the strengths and weaknesses of the questionnaire in terms of the format, wording, and order of the questions and clarity of questions (Chandran, 2004; Cooper & Shindler, 2003).

#### 3.8.2. Reliability Test

Reliability was concerned with the consistency, stability or repeatability of a variable being measured and therefore mirrored on the estimates of the degree to which the measurement was free of being random or unstable (Cooper & Schindler, 2011). Cronbach Alpha test was performed to examine the reliability of the scale for the indices for behavioral biases, determinants of individual investors' performance and individual investment decisions. Reliability was improved by increasing the test length and improving item quality through item discrimination (Wells & Wollack, 2003);

Kothari, 2010). As a general rule, a Coefficient greater than or equal to 0.7 is considered acceptable and a good indication of construct reliability (Zaiontaz, 2013).

### 3.9. Data Collection Procedure

Primary data was collected through administration of questionnaires by the researcher drop and pick method was used with the help of each investment bank. This method of using questionnaire was appropriated because it encouraged quick responses from the respondents. Where the respondent could not be reached physically, the researcher with the help of the investment bank used other methods like emailing or scanning and further virtual interview of the questionnaire. This approach was adopted from a similar study made by Lee *et al.*, (2013).

The data collection process was carried out in a systematic way. The researcher identified the individual investors by physically visiting them. The researcher introduced himself to the security guards and/or receptionists at the entrance and made her intention known. The security guards/receptionists interrogated her and eventually allowed her into the office. The researcher approached the investor and introduced herself as so and so. She was interacted briefly with the investor and then gave him/her the questionnaire which was then filled and returned the same time to the researcher or later on as agreed. For the late responses, the researcher took note of the investor details and came back after a number of days as agreed upon. The researcher then reverted after that period and again introduced herself to the security guards in order to collect the questionnaires from the respective individual investors. For those individual investors who could not be reached physically, the researcher left the information with the receptionist for further consultations.

### 3.10. Diagnostic Tests

The study used multiple regression models that was utilized, the principal data analysis method of which basic assumptions of regression were tested before the actual analysis. These diagnostic tests included normality test, linearity test, multicollinearity checks and homoscedasticity test and was carried out as captured hereunder.

#### 3.10.1. Normality Test

The normality test was supplementary to the graphical assessment of normality (Elliott & Woodward, 2007). The assumption of normality in the distribution of data presumed to apply in this study considering that multiple regression analysis was used as the principal data analysis method. Normality tests were carried out using Kolmogorov-Smirnov tests, Shapiro-Wilk test, Kurtosis and Skewness, Quantile-Quantile plots (Q-Q plots) and histograms (Saunders *et al.*, 2009; Field, 2005). Shapiro-Wilk test was used to test for normality in this study: the test became applicable when the sample size was between 3 and 2,000 (384).

The Shapiro-Wilk test compared the scores in the sample to a normally distributed set of scores with the same mean and standard deviation. If the test was non-significant ( $p > 0.05$ ), it meant that the distribution of the sample was not significantly different from a normal distribution hence it was probably normal. Conversely, if the test was significant ( $p < 0.05$ ), then the distribution in question was considered non-normal (Field, 2009). In this case dummy variables or some other method was supposed to be used to effectively remove those observations (outliers). The Q-Q plot (quantile-quantile plot) further be used in this study for checking normality visually.

#### 3.10.2. Linearity Test

Linearity was the behavior of a circuit in which the output signal strength varied in direct proportion to the input signal strength (Rouse, 2010). Linearity of variables was tested using correlation coefficients as suggested by Cohen, West and Aiken (2003) and further linearity analysis performed for specific regression equations using Ramsey specification test. The Ramsey specification test null hypothesis, stated that the p value should be greater than 0.05 for the model to be linear otherwise it was nonlinear hence miss specified. In this case consideration of application of a nonlinear log transformation to the dependent and/or independent variables, used dummy variables or considered adding another regression that was a nonlinear function of one of the other variables.

#### 3.10.3. Multicollinearity Checks

Multicollinearity was the study of the relationship between independent variables in a study. It is also viewed as the absence of a strong correlation between two or more independent variables. Multicollinearity permeates virtually every aspect of multiple regression analysis and has an adverse effect on such analysis especially if the correlation among independent variables was high (Aczel, 2009). In testing for multicollinearity, Variance Inflation Factor (VIF) was adopted. The magnitude of multicollinearity was then analyzed by determining the size of VIF. According to Sosa-Eacudero (2009), if  $VIF = 1$ , there was no correlation, if VIF was more than 5 but less than 10, there was moderate correlation and if VIF was greater than 10, there was high correlation. The common rule of thumb was that VIF should be less than 3 (Kutner, Nachtsheim & Neter, 2004). In the event of very high correlations, the researcher would have considered dropping one of the variables (Saunders, *et al.*, 2009; Kothari, 2010). The researcher could also have ignored it, transform the highly correlated variables into a ratio and include only the ratio and not the individual variables in the regression (Brooks, 2008).

#### 3.10.4. Homoscedasticity

Homoscedasticity was the assumption of equal standard deviations of Y values about the population regression line, regardless of the value of X. Homoscedasticity was the extent to which the data values for the dependent and independent variables had equal variances (Weirs, 2008). However, if the variances happened to be unequal, then

heteroscedasticity existed. However, even if heteroscedasticity existed, one can still carry out regression analysis since this does not bias the ordinary least square regression coefficients (Saunders *et al*, 2009). Hence, regression analysis using heteroscedasticity data will still provide unbiased results for the relationship between the predictor and independent variables. Heteroscedasticity could as well be dealt with by using the generalized least squares method, transforming the variables into logs or reducing by some other measure of size, and also using heteroscedasticity error estimates. For this study the researcher used Levene's test which is meant to test the null hypothesis that the population variances were equal. If the P-value of Levene's test is less than the significance level, then the null hypotheses of equal variance was not supported meaning that there was a difference between the variances in the population (Levene's 1960).

#### 4. Research Findings and Discussions

##### 4.1. Introduction

This study sought to establish the significant Influence of Behavioral Biases on Investment Decisions of Individual Investors in NSE. The chapter present results on descriptive and regression analysis, interpretation of the results, a discussion compared and contrasted with the findings of the literature and other empirical studies. The descriptive analysis of the research data is presented using measures of central tendency (means and standard deviations) and cross tabulation (to appreciate the nature of the relationship between selected study variables). This chapter further presents results for several preliminary tests on research data (as a precursor for multiple regression analysis) and these include: tests for validity, reliability, normality, linearity, multicollinearity and homogeneity of variance. The chapter presents results on simple linear, multiple and hierarchical regressions analysis on the study relationships. Lastly, the chapter discusses the study findings (by comparing and contrasting the same with other studies) and a summary of key findings.

##### 4.2. Respondent Rate

The sample size of the study was 384 individual investors at NSE. Out of the 384 questionnaires issued to individual investors, a total of 304 questionnaires were fully filled and received back constituting a respondent rate of 79%. Table 1 below displays a summary of the respondent rate.

	Figures in Numbers	% Rate
Questionnaires Issued to Respondents and Received Back	304	79%
Questionnaires Issued but not Received Back	80	21%
Questionnaires Issued in Total	384	100%

Table 1: Summary of Respondents  
Source: Survey Data, 2019

The study respondent rate of 79% was considered adequate for purposes of data analysis based on support from similar empirical evidence from other studies. Lee *et al*, (2013) adopted the same rate in their study on investor's bias and gender on portfolio performance and risk in USA.

##### 4.3. Cross Tabulation of Selected Variables

This section presents relationships between selected study variables. Cross tabulation is often applicable when the data in question is nominally scaled. Table 2 below captures the respondent rate of the relationship between the gender of the respondents and their age profiles.

Gender		Rate (%)	Age Bracket			
			18-30	31-40	41-50	Above 50
Male	121	40%	53	26	15	27
Female	183	60%	34	68	37	44
Total	304	100%	87	94	52	71

Table 2: Gender versus Age Bracket  
Source: Survey Data, 2019

From the results in Table 2 above, the study finds that 40% of the respondents were male hence it is evidenced that majority of the individual investors (in shares) are female. This is in line with the case study done by Bashir *et al*, (2013) whereby the results showed that the majority of individual investors in shares were females with a percentage rate of 55% compared to male which was 45%. From above we can see that age bracket of 31-40 constitutes to majority (94) which is equivalent to 31% of the total respondents followed by age bracket 18-30 (87) which is equivalent to 29% of the total respondents. The age bracket of above 50 (71) constitutes of 23% of the total respondents and followed by the least of the age bracket 41-50 (52) with a percentage rate of 17%. However, this percentages vary when it comes to comparing gender and age brackets (singly). From the above findings you find that the majority of male investors are in the age bracket of 18-30 (53) (44%) followed by age bracket of above 50 (27) (22%), then age bracket of 31-40 (26) (21%) and lastly age bracket of 41-50 (15) (13%). This is contrary of female respondents whereby the majority are found in the age

bracket of 31-40 (68) (37%) followed by age bracket of above 50 (44) (24%). The age bracket of 41-50 becomes third (37) (20%) and fourth and last is age bracket of 18-30 (34) (19%). This controversy may be due to various factors deduced which included the following; - a). male at the age bracket of 18-30 are mostly single and even if married they are not so much committed hence would find a lot of the savings floating since some are still depending on parents/guardians. b). male responsibilities for their own nuclear family start at age bracket of 31-40 and increases to the age bracket of 41-50 but it slows down at the age bracket of above 50 when the children are becoming independent and the family is becoming stable. c). female at the age bracket of 18-30, they not mature in mind even if they are single or married. They tend to be so much dependent either to the family or friends and hence very few are focused on the future. d). at the age bracket of 31-40, most of them are mature and working hence knowledgeable. At the age bracket of 41-50, the responsibilities are becoming many but towards the age of 50 and above the responsibilities gradually slows down.

Marital Status		Rate (%)	Age Bracket			
			18-30	31-40	41-50	Above 50
Single	92	30%	40	29	20	3
Married	200	66%	63	40	53	44
Divorced/ Separated	12	4%	2	4	1	5
Total	304	100%	105	73	74	52

Table 3: Marital Status versus Age  
Source: Survey Data, 2019

From the results in Table 3 above, the study finds that 66% (200) of the respondents were married and this could mean that most of the shares were actually bought by married investors. Of the married investors, 32% fell in the bracket of 18-30 years meaning majority of investors transacting in financial markets are young and are within the working age brackets. This is within the expectation since at this age bracket; men are in employment and virtually with less responsibility. These findings are similar to Kübilay and Bayrakdaroğlu (2016) who found that investors between 21-30 age range are in majority by 40,5%. This was closely followed by married investors of between age bracket of 41-50 (53) having a percentage rate of 26%, then age bracket above 50 (44) (22%) and lastly followed by age bracket of 31-40 (40) (20%) meaning that responsibilities are emerging hence there is need to look for alternative ways to get extra shilling since most of them now enlightened and understand the market. From the above table, majority of the single individual investors (92) (30%) are in the age bracket of 18-30 (40) (44%). This is due to the fact that they are not occupied heavily hence they are able to transact without any fear of regret. They are followed by age bracket of 31-40 (29) (32%). Then age bracket of 41-50 (20) (21%) and lastly age bracket of above 50 (3) (3%) in that order of maturity. This shows that when single investors age their desire and urge to diversify in other fields emerge and that is why the trends of investing starts changing gradually. Divorced and or separated investors comprise of 4% percent of total respondents (304) (12). Their trend is more or less fluctuating up and down (not static). This may be due to the experiences they are incurring in life such that when they become stable, they invest more and vice versa happens when they become unstable. However, from the above the table it can be deduced that the most stable age bracket is above 50 (5) (42%) followed by age bracket of 31-40 (4) (33%), then followed by age bracket of 18-30 (2) (17%) and lastly age bracket of 41-50 (1) (8%). Table 4 below presents the link between the respondents' gender and their marital status.

Gender		Rate (%)	Marital Status		
			Single	Married	Divorced/Separated
Male	121	40%	59	59	3
Female	183	60%	63	110	10
Total	304	100%	122	169	13

Table 4: Gender versus Marital status  
Source: Survey Data, 2019

From the results in Table 4 above, the study finds that 60% (183) of the respondents were female and this could mean that most of the shares were actually traded by female investors in marriage (110) (60%), then followed by single (63) (35%) and lastly divorced/separated (10) (5%). These findings are similar to Eagly and Carli (1981) where females are more likely to follow the herd behavior as compare to males. Of the female investors, 40% were married which is expected because majority of the women in marriage do not invest in many capital-intensive investments that require huge capital, thus they are left with enough income to invest in stock. This was followed up by female singles and male singles who tied up (23, 9%) suggesting a strong dominance of females to the extent of this investigation. From the above findings we can deduce that the male investors both as single and married their trend of trading in shares was stable (59) (59) respectively with a percentage of 49%. This shows that male investors, irrespective of marital status they do invest. Lastly male investors who are divorced or separated (3) (2%) do not see the need of investing. Most of their income is wasted through lavish spending.

Table 5 below captures results on the relationship between respondents' education level and monthly income.

Level of Education		Rate (%)	Monthly Income			
			Less than 20,000	20,001-100,000	100,001-200,000	Above 200,000
Secondary	30	10%	17	13	NIL	NIL
Tertiary	248	81%	50	129	66	3
Others	26	9%	8	3	5	10
Total	304	100%	75	145	71	13

Table 5: Level of Education versus Monthly Income

Source: Survey Data, 2019

Results in Table 5 above indicate that, 52% tertiary level (129) had an income of sh.20,001- sh.100,000 followed by graduates in the income range of sh.100,001- sh. 200,000 (27%). Somewhat similar patterns were also evident amongst tertiary level of education which had the same patterns. Hence, it is confirmed that people earn a salary based on what they have trained for and the salary increase as they gain experience. Kübilay and Bayrakdaroğlu (2016) study also concurs with these findings that 64% of investors have bachelor's degree and 25.4% of whom have master's degree indicating that the educational level is high. From the same table the findings revealed that among the three categorized level of education, tertiary level (248) leads with huge percentage of 81% followed by secondary level (30) at rate of 10% and lastly others (26) with a rate of 9%. At secondary level is it deduced that monthly income level is low as compared to tertiary and others which means income is determined by experience and educational level. In general, educational level (304) compared to monthly income between 20,001-100,000 (145) has the highest rate of 48% of individual investors in stock. This is followed by monthly income less than 20,000 (75) (25%) and then 100,001-200,000 (71) (23%) and lastly above 200,000 (13) (4%). Most of these trends due to the reasons explained above.

Table 6 below presents results on the relationship between the duration of investment and age.

Duration (Years)		Rate (%)	Age Bracket			
			18-30	31-40	41-50	Above 50
1-5	111	36%	12	44	38	17
6-7	73	24%	24	15	27	7
8-10	114	38%	6	84	18	6
Over 10	6	2%	1	1	2	2
Total	304	100%	43	144	85	32

Table 6: Duration of Investment versus Age Bracket

Source: Survey Data, 2019

Table 6 above indicates that 38% of the investors had invested on the stock market between 8-10 years followed by 36%, those who had invested for 8-10 years. This is an indication that majority of the investors (74%) fell in the period under study. Table 6 above further indicates that 24% of the investors had invested for 6-7 years followed by lastly 2% of the investors in for over 10 years. Investors in the age bracket of 31-40 had the majority investors (144) (47%) followed by age bracket of 41-50 (85) (28%) and then age bracket of 18-30 (43) (14%) and lastly age bracket of above 50 (32) (11%). This indicates that duration of 8-10 with investors of age bracket 31-40 (84) (74%) had the majority investors as also indicated above.

Table 7 below indicates the link between occupation and monthly income

Occupation		Rate (%)	Monthly Income			
			Less than 20,000	20,001-100,000	100,001-200,000	Above 200,000
Accountant	50	16%	9	13	18	10
Engineer	60	20%	5	43	10	2
Medic Arch	28	9%	3	20	4	1
N.P.A	7	2%	NIL	NIL	1	6
B. Owned	154	51%	10	126	18	NIL
Others	5	2%	1	3	1	NIL
Total	304	100%	28	205	52	19

Table 7: Occupation and Monthly Income

Source: Survey data, 2019

Table 7 above indicates that 51% of the investors are business people (B. Owned) followed by engineers at 20%. Hence, it can be concluded that these are the occupations that people tend to have some free time which can be used to

study the stock market for investment. Table 7 above further indicates that most of the respondents at 41% were business owned people earning an income of 20,001-100,000 which is realistic since majority of business owned earn within the above range. This was followed by engineers at 14% who were generating an income level of ksh.20,000-ksh.100,000 which is also realistic since majority of the individual businesses in earn between the said range. Also, this leaves the above investors to be in forefront trading in the stock market. Further to the above indications, the findings deduced that 67% of the respondents generally earned an income of between 20,001-100,000 which is very realistic with the current prevailing economic situation of our country. From the above results the accountants despite having the knowledge and experience on how stock is traded at NSE., then any other occupation they lagged behind compared to business owned and engineers hence this is a prove that they are risk averse when it comes to trading in shares with different companies quoted at NSE.

#### 4.4. Descriptive Analysis

This section presents an overview of descriptive analysis relating to the study variables. The respondents who were asked to provide information concerning the five variables (fear of regrets bias, human availability heuristic bias, mental accounting bias, anchoring bias and herd mentality bias on individual investment decisions). The study used measures of central tendency (means and standard deviations) to summarize the measurable indices of the variables under the research study. Each variable will be discussed separately and the responses presented in table forms followed by discussions under beneath.

##### 4.4.1. Fear of Regrets Bias

This was the first independent variable of the study. The respondents were asked to rate the extent to which they agreed with statements regarding application of fear of regrets bias in order to boost decision investment of individual investors on a scale of 1 to 5, where 1 strongly disagree and 5 strongly agree. Table 8 below presents the means and standard deviations of measurable indices with regards to the bias.

Measurable Indices	Mean	S.D
I'm not sure of the trend of the investment.	3.46	1.64
I'm not sure of the constant increase in the investment.	3.48	1.42
I consider my own investment to increase yearly by a certain constant percentage.	3.42	1.62
I fear the stock investment to decrease twice in future than increase.	3.42	1.44
I believe that my own investment can either increase or decrease in the same proportion.	3.50	1.60
I'm sure the stock investment to increase twice in future than it will decrease.	3.54	1.40
I am in doubt if my stock investment will increase constantly in the next five years.	3.60	1.42
I am in doubt if my stock investment will result in gains or losses.	4.1	0.99

Table 8: Fear of Regrets Bias  
Source: Survey Data, 2019

and 51% (business owned). From the above Table 8 the measurable indices have produced almost similar central tendency which could be as a result of well explained measures or could have just been due to coincidence from one area to the other. But in most cases, it may be due to the 100% filled questionnaires which was closely followed and monitored. When it comes to surety of the trend of investment it seemed like most individual investors' decisions were quiet not sure if they are going to make losses or profits. Most of them argued that trend depends on several unpredictable factors which cuts across the economy debts (both internal and external), demand and supply forces (uncontrolled factors) etc. due to fear of regrets the individual investors would opt to use other sources (brokers) of who are still not very reliable. A Gallup-SET research study was designed to better understand and explain the behavior of the Thai retail investor. The program, which began in late 2004, included a series of investigations into the capital market using a range of methodologies: qualitative diagnosis, quantitative assessment, and secondary data analysis. Gallup used the results, along with its experience in measuring investor behavior, to develop a conceptual framework for evaluating the attitudes and behaviors (evidence of beliefs) of active, potential, and inactive investors. The model assumed that a potential investor's attitude towards investing in stock exchange was influenced by many factors, including political, environmental, social, and technological ones. For fear of regrets most individual investors could opt to trade with companies and firms they are knowledgeable with and also invest minimal first to check on how the trend will be pursued in future. When it comes to consistent increase in the investment of individual investors, it becomes hard to predict because first and foremost the trend depends on the above-described factors which cuts across various issues which include the interest rates, dividends paid etc. the consistence can only be applicable if the interest rates are minimized and kept constant and also dividends paid when profits are earned etc. New products or securities can also encourage increase in the investment of individual

investors because everyone fancies in new things. When earnings per share is more there have been constant increase in investment.

In general, from previous investigations what determines decision investments of the individual investors is level of income (20,001-100,000) based both on education and profession whereby the largest percentage of income based on education 81% (tertiary level) and 51% (business owned). From the above Table 8 the measurable indices have produced almost similar central tendency which could be as a result of well explained measures or could have just been due to coincidence from one area to the other. But in most cases, it may be due to the 100% filled questionnaires which was closely followed and monitored. When it comes to surety of the trend of investment it seemed like most individual investors' decisions were quiet not sure if they are going to make losses or profits. Most of them argued that trend depends on several unpredictable factors which cuts across the economy debts (both internal and external), demand and supply forces (uncontrolled factors) etc. due to fear of regrets the individual investors would opt to use other sources (brokers) of who are still not very reliable. A Gallup-SET research study was designed to better understand and explain the behavior of the Thai retail investor. The program, which began in late 2004, included a series of investigations into the capital market using a range of methodologies: qualitative diagnosis, quantitative assessment, and secondary data analysis. Gallup used the results, along with its experience in measuring investor behavior, to develop a conceptual framework for evaluating the attitudes and behaviors (evidence of beliefs) of active, potential, and inactive investors. The model assumed that a potential investor's attitude towards investing in stock exchange was influenced by many factors, including political, environmental, social, and technological ones. For fear of regrets most individual investors could opt to trade with companies and firms they are knowledgeable with and also invest minimal first to check on how the trend will be pursued in future. When it comes to consistent increase in the investment of individual investors, it becomes hard to predict because first and foremost the trend depends on the above-described factors which cuts across various issues which include the interest rates, dividends paid etc. the consistence can only be applicable if the interest rates are minimized and kept constant and also dividends paid when profits are earned etc. New products or securities can also encourage increase in the investment of individual investors because everyone fancies in new things. When earnings per share is more there have been constant increase in investment.

When it comes to the constant increase in percentage of own investment on yearly basis, the factors to be considered were similar to the above discussed. When individual earnings per share increased constantly that was a good indication and hence the percentage increase seemed to be constant from one year to the other and vice versa was felt when percentage increase became inconsistency. Pertaining own investment, the individual's investment was determined by constant increase whereby referring to duration verses age bracket we found out that between 1-5 years there was constant increase in percentage of 36% and it actually encouraged individual investors to increase in their own investment. Most of the own investments was barred with mixed reactions whereby the individual investors lived in fear of number of transactions to be carried out within a year. Some opted not transact frequently in fear of incurring losses at the end of the year. Although the law admits them to transact on quarterly basis they still lived in fear of unknown. Most of the individual investors who experienced a lot of biasness were seen to withdraw within a shorter period of time although number was minimal. Some individual investors were confident that their own investment would increase or decrease in the same percentage either way which was true to some extent when kept monitoring the trend at NSE. This was also due to the constant number of individual investors who opted to purchase or sell the quoted stock which determined the equality of the equation in either way.

The probability in increase of stock investment according to number of transactions now and compared in future actually was based on how the existing investors were performing in that when the returns were doing good through choice of investment during a certain period is actually attracts new entrants in the market and vice versa could also take place when investors never made a wise choice of the stock to be traded in. When asked a matter of surety in their investments, most investors declined due to good reasons they gave which included unpredictable conditions such as factors affecting economy micro and macro. As explained earlier referring to duration and investment of individual investors, the duration between 1-5 years carried the day with an average percentage of 36. This was due to the fact that individual investors understand the essential part of investing at NSE. During this period is when they learn the trend of stock investment, when and how to buy/sell. Who to introduce as a broker etc. During this period, one can know which stock does better and which company to invest in. it is also a stage gauging fear on investment. Last but not when investors were asked to give opinion on the results of gains and losses, they had mixed reactions. Some thought that once invested in stock and the prices happen to change whichever way that's completely a gain or a loss which is not in reality. Once an investor invests in stock market he or she needs to dwell on the trend of the stock. Hence exploit the opportunity when it's due. The most essential thing with trading at stock market exchange is to earn dividends. The capital will be good if an investor only optimizes his or her return.

#### 4.4.2. Human Availability Heuristics Bias

This was the second independent variable of the study. The respondents were asked to rate the extent to which they agreed with statements regarding application of human availability heuristics bias in order to boost decision investment of individual investors on a scale of 1 to 5, where 1 strongly disagree and 5 strongly agree. Table 9 below presents the means and standard deviations of measurable indices with regards to the bias.

	Mean	S.D
I prefer to buy because it was recommended by a friend who is usually right about such things.	3.43	0.72
I'm likely to take information as confirmation for sell of stock hence a good area for investment.	3.45	0.92
In my own opinion one stock have more percentage in people decision making than other stock.	3.62	0.78
In my own opinion USA provides the best investment opportunities.	3.96	0.74
I rely on the past successful experience to determine the current outcome.	4.18	0.87
I rely on a company's past stock returns when predicting for the best industry.	3.73	0.75
I rely on a greater positive outcome than smaller negative outcomes to make future decisions.	3.98	0.87

*Table 9: Human Availability Heuristics Bias  
Source: Survey Data, 2019*

From the above Table 9 which had several measurable items cutting across various factors including preference of buying using a friend who is more knowledgeable in stock investment was discussed and the findings were that at least 12% of the respondents were convinced by well-known friends who were also investors at the NSE. This may have been due to good personal relationship whereby one would opt to introduce the idea to a friend and then he or she embarks on it and gets interested in the same. This also included brokers who have been trading with different companies at various stock markets. Being introduced by a friend has one big advantage because they engage one to one and gives more clarity on issues which would have taken a different dimension. The percentage may have seemed low. This is due to engagement with such kind of friends who are mobile and scarce. The second measurable item that was discussed was information being confirmation of sell of stock and therefore being a good area for investment. Sometimes information given can actually be confirmation on the stock one needs to buy or sell. This is when it is more and well explained. According to the above Table the percentage of respondents was 18% which constituted the highest response. This was because the information provided was adequate and reliable and every age bracket had enough to rely upon to make decisions as to whether to invest or not. It is true one stock had more percentage than two or more. This was because of various factors which included funds, fear of unknown or uncertainty. Despite the fact that one stock was preferred, also there was need to check on the one that had constant earnings per share to be sure of predictions of the future. This measurable item had a percentage of 13% which meant that people would prefer trading in one stock until they well establish themselves with knowledge and funds.

The fourth measurable item (12% of the respondents) constituted of preference between USA stock market compared to others including NSE which actually had mixed reactions in its findings and discussions. Some respondents argued that investing in USA stock market was expensive due to fluctuations of currencies between two or more countries trading at the stock securities markets. They also feared uncertainty in earnings per share. According to Muswenje (2017), in his study, concluded that human behavior is affected by prospect theory when making their investments and that investors are faced with emotions when assessing risk under uncertainty. In his study he also agreed with the statement that investors try to run away from regret by not selling underperforming shares and willing to sell performing ones though they have challenges. Others thought it was the best place to invest because such activities pioneered there and hence experience is the best teacher. Having done this for a long period in itself satisfies one ambitions. When an individual investor can provide a benchmarking ground with one of the 7Gs countries it is a great honor to the nation and the entire world. When it came to reliance it was deduced that most individual investors relied on the past trends in trading of stock to predict the current and somehow the future. This constituted the fifth measurable item and the percentage of the respondents was 16%. Its mean was the highest because the investors felt that if they invest according to the past then they stand better chance of making right decisions (loss averse). Despite the fact that it may look like herding behavior in itself but reality remains with the surety in sustainability performance. The past formed the basis the Price Index (PI) for the current and future decisions. The sixth measurable item which is not far from the fifth comprised of reliance of the past stock in prediction of the future best industry to trade with. The percentage of the respondents was 16%. The respondents' agreed with the statement and even gave examples of such companies which Safaricom with its mushrooming and diversified products that have seen it excel for quiet sometime. Some argued that when the buying or selling price have a bigger margin it gives or places the company in a better position in future although others said that when the prices are low then they give a better position because the individual investors may end up purchasing them out of sheer knowledge. The last but not least measurable item (seventh with a percentage of 16%) which talked about greater positive reliance than less negative reliance in prediction of the future. this was direct explanation because if positive is more than negative it called for its future proposal other than that of negative despite the fact that its trend maybe shorter. Most of the investors may rely on stocks that may give better earnings (profits) for a long trend despite the fact that at one given time they experience losses.

#### 4.4.3. Mental Accounting Bias

This was the third independent variable of the study. The respondents were asked to rate the extent to which they agreed with statements regarding application of mental accounting bias in order to boost decision investment of individual investors on a scale of 1 to 5, where 1 strongly disagree and 5 strongly agree. Table 10 below presents the means and standard deviations of measurable indices with regards to the bias.

	MEAN	S.D
I prefer Asset A for kshs50 to Asset B for kshs40 despite increase of 8% and 10% respectively.	3.84	0.80
I prefer Asset A for kshs50 to Asset B for kshs40 despite the decrease of 8% and 10% respectively.	4.00	0.79
I prefer stock price kshs50 when it decreases by 8% at the end of the year than when it increases by 8% by half of the year.	3.76	0.73
I prefer price of Asset A for kshs50 to price of Asset B for kshs40 despite the increase by 8% and decrease by 10% in 2018 and vice versa in 2019 respectively.	3.54	0.86
I tend to rely on price of Asset A for kshs50 than Asset B for kshs40 when there is an increase of kshs6 and kshs4 respectively.	3.97	0.94
I tend to rely on price of Asset B for kshs40 than Asset A for kshs50 when there is an increase of kshs4 on each by the end of the year.	3.66	0.70
I prefer price of Asset A for kshs50 to price of Asset B for kshs40 when there is an increase of kshs4 on each by the end of the year.	3.81	0.74

Table 10: Mental Accounting Bias

Source: Survey Data, 2019

From the above Table 10 the respondents were expected to give their views on how their thinking or conceptualizing in their minds towards decision making while investing in the stock at NSE to what they would have preferred to trade in in comparison of two portfolios in terms of amounts and percentage rates. Despite generally the end result of each in comparison still gave the same answer there were mixed reactions which may have been due to lack of understanding or sheer ignorance or even curiosity as to why they are asked to joke their minds with simple calculations which seemed to be complicated. Breuer, Rieger and Soypak (2012) conducted in a study whose main objective was to highlight the relevance behavioral (keeping track of financial activities) preference patterns for corporate dividend policy. An empirical study which was carried out in 32 countries with a sample of 5750 firms used. The study incorporated a model which determined the relationship between dividend payout policies based on the ideas of mental accounting. The model predicted a positive influence of the investor's loss aversion and investors (different mental accounting) amount of time discounting on the dividend payout ratio. The study established that loss aversion was the main determinant for corporate dividend policy from sample used for the study. H2: Prospect factors have no significant influence on investment decision among investors at the NSE

Although in comparison between the highest and lowest percentage, (10.9%-18.4%) the difference was minimal. From the first and second measurable items of preferences between Asset A of kshs50 with an increase of 8% and in comparison with Asset B of kshs40 with an increase of 10% (first) and (second) preference between Asset A of kshs50 and Asset B of kshs40 with a decrease of 8% and 10% respectively meant one thing at the same time (attracted an increase of kshs4 and decrease of kshs.4 respectively) although the respondents had different opinions towards the same which showed some light variations between the first and second measurable items of mean (0.16) and standard deviation (0.01).The third measurable item that so comparison between transactions at the beginning of the year and the end of the year that is end of the previous year, a decrease of 8% and an increase of 8% in the mid of the year. This simply meant that during a particular whole year there was nothing in change form that took place since comparing the two transactions in monetary terms the increase of kshs4 and a decrease of kshs4 were experienced in mid and end of the year hence no effect in stock value.

According to the fourth measurable item which had preference of Asset A of kshs50 and an increase of 8% and Asset B of kshs40 and decrease of 10% in 2018 and vice versa in 2019. This deduced that when Asset A increased by 8% in 2018 and reduced by 8% in 2019 it lost its value although minimally by kshs0.32 (from kshs50 down to kshs49.68) in 2019. For Asset B the trend remained the same as Asset A since it was deduced that a decrease of kshs0.4 (from kshs40 down to kshs39.4) will be experienced in 2019. According to fifth and sixth measurable items which preferred Asset B to Asset A when there is an increase of kshs4 on each and vice versa also received mixed reactions whereby some of the respondents saw an equal return for both, but others agreed with them by considering the percentages increase of each which was 10% and 8% for Asset B and Asset A respectively. The argument on this also depended on value for money at present and in future which was possibly to go whichever way depending on the inflation, forces of demand and supply etc.

#### 4.4.4. Anchoring Bias

This was the fourth independent variable of the study. The respondents were asked to rate the extent to which they agreed with statements regarding application of anchoring bias in order to boost decision investment of individual

investors on a scale of 1 to 5, where 1 strongly disagree and 5 strongly agree. Table 11 below presents the means and standard deviations of measurable indices with regards to the bias.

	MEAN	S.D
My forecast is the change in stock prices based on recent stock prices.	3.22	0.66
I'm likely to sell the security at the end of the year because in my opinion it has achieved the maximum price level.	3.81	0.85
I rely on my previous experiences in the market for my next investment.	3.64	0.86
I rely on the past economic growth to determine the current.	3.98	0.76
I prefer to buy local stocks than international stocks because the information of local stocks is more available.	3.66	0.94
I rely on economic stability to predict the current	4.19	0.82
I am likely to predict future stock prices basing on the past and current stock prices.	3.86	0.77

*Table 11: Anchoring Bias  
Source: Survey Data, 2019*

From the above Table 4:12 the respondents had some knowledge on anchoring behavior hence the measurable statements to them were satisfying. For the first measurable item which the respondents were expected to agree with the statement of change in the stock prices as was to be determined by current of recent stock prices (the basic indicator) of what the future stock prices will be. This statement was true because most of the individual investors rely on the current stock prices to determine the future stock prices. Unless there arises anomaly then the trend of investment for future always has an upper hand of the current or even sometimes of the past depending on what one to anchor on as the starting point (PI) of determinacies. So basically, it was deduced that any change in the stock was aligned with the past and present prices of the stock. The second measurable item was selling of the security which has attained optimum level at the end of the year. In a statement form this information was okay since the trading of stock at the market depends on an individual and if he or she has attained optimum price for the same one can opt to sell. Others looked at it as not statement either they saw it as a question whereby they could feel that the optimum or maximum price could be revised due to several factors some which are uncontrollable like force of demand and supply hence make them go whichever way to the benefit or loss to the investor. That's why some could hold even at the end of the year after attaining optimum or maximum price. The third measurable item which was almost as the first one only the difference is stock prices (first) and experience (third). When one talks about experience it means wholly, it cuts across variety of issues inclusive of changes in stock prices. As for this aspect change in stock prices was excluded because it was dealt with as explained above. The respondents' agreed that reliance on the present experience determines the future investment which includes the procedures of trading at stock exchange. The stability of the security they are trading in. The potentiality of the firm either in paying dividends including amount paid and applicable rates applied.

The fourth measurable item was reliance on growing of the economy in determination of current trade is the stock at the NSE. Although economic growth received mixed reactions because when one talks of economic growth without emphasizing the particular area based for the research it becomes enormous to explain what kind of answers are expected. For this study it was a mere trend in investment as to how it's affected by improvement in economy due to exchange rates, low inflation, and demand and supply forces. It was seen true since these factors directly affect the economy and lures investors it invests more. The fifth measurable item which emphasized on provision of information required for an individual investor to invest sufficiently that is both in comparison of local and international information. The reactions went both ways although the majority rested on local information because it was easily accessed. Some said that local information can also be one to one which was more clarified and well understood. They said it minimized losses and also created confidence in the individual investors. This finding concurs with those of Törngren and Montgomery (2004) who established the association between returns and the confidence of people with profession and people without profession in the stock market. They found that people without profession are normally affected by past stock return movements, as an indicator of past movements acting as anchors for their expectations. The sixth measurable item was an emphasis of the fourth measurable item that is economic growth (fourth) and economic stability (sixth). Economic stability as a determinant of trading in stock at NSE was seen to be very important because it removed doubts such as fear of regrets since the economy was stable. Low fluctuations were experienced too in such an environment hence assurance of stability of currencies. The seventh and last but not least measurable item encumbers all the above measurable items which talks about prediction of future stock prices comparing the past and present. All these relied on the stock prices, economic growth and economic stability as all explained much earlier. It was deduced that the past and current prices can be used to predict the future prices.

#### 4.4.5. Herd Mentality Bias

This was the fifth independent variable of the study. The respondents were asked to rate the extent to which they agreed with statements regarding application of herd mentality bias in order to boost decision investment of individual investors on a scale of 1 to 5, where 1 strongly disagree and 5 strongly agree. Table 12 below presents the means and standard deviations of measurable indices with regards to the bias.

	Mean	S.D
I think other investors' decisions of choosing stock types have impact on my investment decisions.	3.87	0.80
I think other investors' decisions of the stock volume have impact on my investment decisions.	3.91	0.75
I think other investors' decisions of buying and selling stocks have impact on my investment decisions.	3.63	0.94
I react quickly to the changes of other investors' decisions and follow their reactions to the stock market.	4.06	0.78
I prefer to be influenced by peers to adopt other investors' decisions than mine.	3.75	0.92
I make decisions because others are making the same.	3.94	0.74
I believe decisions made by majority is always the right ones.	3.83	0.91

Table 12: Herd Mentality Bias

Source: Survey Data, 2019

From the above Table 12 which had several measurable items on herd mentality bias of how individual investors behaved while investing in stock. There were seven measurable items where by respondent's were to give their views. Generally, there was no much disparity between the respondents' views from one measurable item to the other. This was deduced from the calculated central measure of tendency as shown above. The first measurable item was comparison on others views to individual and how it impacted on investment in the stock market. The percentage of 14.1 of the total respondents concurred with this statement and they argued that by individual investment must have been influenced in one way or the other by decisions and patterns of others. Such that if there are some individuals have been investing in for example shares in Safaricom company whereby they have been experiencing increase in stock value for some time and for example in another company that has not been experiencing increase in stock value, a respondent preferred to trade in the former than latter. The second measurable item was comparison of others stock value volume in making decision to invest. The percentage for this statement was 12.5. Most respondents agreed that the volume of stock was actually a determinant to how individual investment could be carried out. They gave example of shares of Kenya Commercial Bank in comparison with Cooperative Bank of Kenya. Most shares were bought with individuals at the former than the later because the supply was adequate. Third measurable item with a percentage of 18.4 of the total respondents was on the behaviors of buying and selling which influenced the patterns of individual investment at the stock market. Most individual investors bought shares that others were buying and also sold the shares when others were selling. This is a common scenario whereby people tend to think that decisions made by others are good and safe especially there is loss because it is shared equally (collective responsibility). Herd mentality bias means an event that under certain conditions most of the investors focus only on a subset of securities by flocking, while neglects other securities with identical exogenous characteristics (Hirshleifer, Subrahmanyam, & Titman, 1994). In a simple relationship, the herd mentality bias is related to the social psychology which called regret aversion and cognitive dissonance. The experimental and empirical evidence show individual in groups abides the group decision, even when they perceive the group to be wrong. Individual suppresses their own beliefs and relies on their investment decision solely on the collective action, even though they disagree with the prediction. The reason is that individual avoids being regret if the group is found to be true. Another reason is to satisfy their judgment if the judgment is found to be wrong in the future. It is better to have mistaken in a group rather in personal. This is what they called as regret aversion and cognitive dissonance; or in finance it called as herding mentality bias.

The fourth measurable item with 13.5% was, which discussed on the rate of change of decision making at the stock market. This also as previous had an upper hand of the majority decisions whereby the individual investors wholly relied on the changes of other people decisions. An example was given as when to buy or sell when there was unpredictable situation such as a disaster. The fifth measurable item with 17.8% was being influenced by others through self-peers to adopt. This almost carried the day because most investors group themselves in anything that has similarities, for example age brackets, education level marital status, professionalism etc. it goes along with English Saying "birds of the same feathers flock together". Then the sixth measurable item (12.2% of total respondents) was making decisions others are making (following others blindly). There were some who opted to adopt this statement since to them they relied wholly on others to make decisions for them. Most of this category of respondents comprised age brackets 18-30 and above 60 because they were less knowledgeable but eager to know much at same time in whichever way. The seventh and last but not least was (11.5% of the total respondents) going by the majority decision because it was thought to be best. "Sometimes beauty remains in the beholders eye." "Not everything that glitters are gold." Once in an awhile it makes sense but sometimes things can change for bad. From the discussion it was found out that "good" decisions are made collectively since many ideas add value to substance. But in conclusion it was deduced that "better" decisions need individual approach.

#### 4.4.6. Individual Investment Decisions

This was the dependent variable of the study. The respondents were asked to rate the extent to which they agreed with statements regarding application of individual investment decisions in order to boost decision investment of

individual investors on a scale of 1 to 5, where 1 strongly disagree and 5 strongly agree. Table 13 below presents the means and standard deviations of measurable indices with regards to the dependent variable.

	Mean	S.D
I prefer to invest in the stock of my choice.	3.94	0.86
I tend to think my choice of stock is the best stock to invest.	3.98	0.82
I prefer to invest in a stock that will earn me more profit in a short period.	3.65	0.77
I tend to rely on stock that sell in shorter time than the one that takes longer time to be sold.	4.12	0.84
I prefer to invest in the stock that can be easily procured.	3.85	0.78
I prefer to invest in the stock that you can benchmark with others.	3.99	0.91
I prefer to invest in the stock which is stable and sustainable.	4.18	0.68

Table 13: Individual Investment Decisions

Source: Survey Data, 2019

From the above Table 13 it was deduced that 15.8% of the total respondents who were interviewed agreed that in preference of investing in stock of owns choice. This was due to the fact that when his or her decisions, he or she feels that the decision is ok. They argued that when in investing in stock at stock market, individual decision the weight because it affects one directly. The second measurable item which consisted of 14.5% of the total respondents had similar findings it was a continuation of the first whereby instead of having assurance in individual choice in decision making it also gave an opinion of doubt that is the individual choice maybe the best. The findings were that some respondents concurred with this statement because they knew at one given time mistakes have been made and still it happens now and even in future. The third statement was had a percentage of 13.1. The respondents were to gauge in the most appropriate period for investment. It was found out that short period decision was preferred than long period whereby it was deduced most of the respondents wanted to monitor how their stock was performing hence be able to trade in more or withdraw in case of experiencing stagnation or no growth. The fourth statement with 15.1% of the total respondents was similar to the third only that it had a significance of comparison between the short and long periods which they tend to think either of the two could be advantage or disadvantage depending on various factors which included the upper and lower limits of the value of stock that is being traded in. The demand and supply factor and other external factors that could cause the changes in individual investment decisions.

The fifth statement with a percentage of 13.5% of the total respondents was basing on the decision of how easily the stock can be available that is supply. The respondents were with idea that a stock which its supply was adequate traded in more than the one which was scarce. This also went well with the prices of the stock. It was found out that sufficient prices increased the number of shares and decreased the price of the stock simultaneously. The sixth statement had a percentage of 17.4% of the total respondents. It was found out that a stock that sold much had decision making of benchmarking with others in the same market whereby it was found out that bench marking decision making increased the value of stock because of perfection. The seventh statement the last but not least had a percentage of 10.5% of the total respondents. This statement preference in the stock decisions which were stable and sustainable. Most respondents agreed with this and most of them who embarked on it were found excelling.

In summary of the above preference was made by reviewing what previous researchers did which include Nyamute *et al.*, (2015) studied the relationship between investor behavior and portfolio performance at the NSE, Kenya and found that the overall model is statistically significant that investor behavior influences portfolio performance. C. N. Kimeu *et al.*, (2016) did a study on influence of behavioral factors on investment decisions and performance at the NSE, hence found out that some of the behavioral factors had significant influence on the performance of stocks. Mutswenje & Jagongo (2017) did a study on behavioral biases and individual portfolio performance in the NSE to determine the effect of behavioral biases and performance of equity and bonds on NSE. His findings were based on forecasts (anchoring and adjustment bias;- making general market forecasts and personal situational to other prevailing situations) in change in stock prices, preferences to buy local stocks, reliance on past stock returns among others. He found out that investors rely on previous experience in the market for the next investment.

#### 4.5. Validity and Reliability Tests

The study conducted of validity and reliability tests to check for content validity and internal consistency of questionnaires.

##### 4.5.1. Validity Test

Validity was the extent to which a test measure was supposed to measure (Haynes *et al.*, 1995). Content of validity was the extent to which the elements within a measurement procedure were relevant and representative of the construct that was to be used to measure (Haynes *et al.*, 1995). Pre-testing was considered necessary since it was a means of determining to what extent a questionnaire communicated. It was important to pre-test the research instrument so as to actually determine the strengths and weaknesses of the questionnaire in terms of the format, wording, and order of the questions and clarity of questions (Chandran, 2004; Cooper & Shindler, 2003). The questionnaires were pre-tested

amongst 16 individual investors from the 16 quotas where 1 individual investor was randomly drawn from each of the 16 quotas. Those who participated in the pretest were excluded from the study to avoid biasness. 4.5.2 Reliability Test

Reliability test was concerned with the consistency, stability or repeatability of a variable being measured and therefore mirrored on the estimates of the degree to which the measurement was free of being random or unstable (Cooper & Schindler, 2011). Cronbach Alpha test was performed to examine the reliability of the scale for the indices for behavioral biases, and individual decisions of individual investments. Cronbach's Alpha was considered a good measure of item homogeneity. Internal consistency is a necessary but not sufficient condition for measuring homogeneity in a sample of test items. And if the items in a test are correlated to each other, then the value of Alpha is increased. It has been suggested by Zaiontaz (2013) that reliability of 0.7 is enough to predict tests or hypothesize measures of a construct. In this study Zaiontaz (2013) measure of reliability was adopted. Cronbach Alpha test was performed to examine the reliability of the scale for the indices for behavioral biases, determinants of investment decision and portfolio performance. Reliability can be improved by increasing the test length (the percentage of measurement error decreases as test length increases) and improving item quality through item discrimination (Wells & Wollack, 2003; Kothari, 2010). The general output of the reliability test informing the study was presented in Table 14 below.

Cronbach's Alpha	No. of Items
0.890	5

Table 14: Reliability Statistics

Source: Survey Data, 2019

Table 13 above indicated an alpha coefficient ( $\alpha$ ) of 0.890 for the composite index of five study variable items which was good and having met the decision criteria of more than 0.70 set by Zaiontaz (2013). The specific output for each study variable was as follows: fear of regrets bias (0.964), human availability heuristics bias (0.807), mental accounting bias (0.926), anchoring bias (0.809) and herding mentality bias (0.834) which all were good and having met the 0.7 decision threshold.

#### 4.6. Diagnostic Tests

The study conducted various diagnostic tests before utilizing the multiple regression model that uses the principal data analysis method of which basic assumptions of regression must be tested before the actual analysis. These tests included normality, linearity, multicollinearity and homoscedastic tests.

The Table 14 below indicates the relationship between six variables all-inclusive of both independent and dependent variables using mean averages of each measurable items as X indices against average SD of each measurable items as Y indices.

Variable	Mean Average As Per Measurable Indices (X)	Average SD As Per Measurable Indices
Fear of Regrets Bias	3.565	1.441
Human Availability Heuristics Bias	3.764	0.807
Mental Accounting Bias	3.797	0.794
Anchoring Bias	3.766	0.809
Herd Mentality Bias	3.856	0.829
Individual Investment Decisions	3.959	0.809

Table 15

Source: Survey Data, 2019

From the above table a comprehensive single linear regression was computed to determine estimated intercept (a) and estimated slope (b).

$$Y=A+BX$$

$$Y=7.0616+-1.624X.$$

The study sought to test research hypothesis using this composite simple linear regression analysis, whereby Coefficient of Correlation (R) was computed as 0.8196 and (R<sup>2</sup>) as 0.6717. R<sup>2</sup> indicates how much variation in the individual investment decision is explained by the behavioral biases. A low R<sup>2</sup> values inherently is not bad. Minitab (2016) indicates that in the fields of predicting human behavior, it is entirely expected that R<sup>2</sup> values will be low because human beings are harder to predict than physical processes.

Variable	T- Values for Testing Hypothesis Test	VIF for Testing Multicollinearity Test	Levene's Test for Testing Homo/Heteroscedastic (SY)
Fear of Regrets Bias	-0.374	1.1092	0.4483
Human Availability Heuristics Bias	-0.064	-	-
Mental Accounting Bias	0.037	1.3055	0.4575
Anchoring Bias	0.058	1.1181	0.4469
Herd Mentality Bias	0.210	1.2917	0.4327
Individual Investment Decisions	0.527	1.6356	0.4469

Table 16: Fear of Regrets Bias against Other Variables

Source: Survey Data, 2019

The essential of testing hypothesis is to evaluate two mutual exclusive statements about a population to determine which statement is best supported by the sample data. When we say that a finding is statistically significant, it's a praise to hypothesis test. Comparison; - if p-values are more than significance level (.05) reject the null hypothesis (your alternative hypothesis is correct hence the data is significant) and vice versa fail to reject null hypothesis.

From the above Table 15 when calculating T-Values for testing hypothesis along with other tests using fear of regrets bias as comparison of the other variables the results showed that fear of regrets, human availability heuristics and mental accounting biases had T-Values of -0.374, -0.064 and 0.037 respectively which showed that the p-values were less than significance level (0.05) hence accept null hypothesis. While testing T-Values for hypotheses tests for anchoring and herd mentality biases, the values were 0.058 and 0.210 which were more than significance level (0.05) hence we reject the null hypothesis and said that alternative hypotheses is correct and hence the data was significant. According to evaluation of dependent variable, T-Values for hypothesis testing showed greater p-value (0.527) than significance level (0.05) which evaluated the significance of the data.

Multicollinearity test is the study of the relationship between independent variables in a study. It is also reviewed as the absence of a strong correlation between two or more independent variables. It permeates virtually every aspect of multiple regression analysis and has an adverse effect on such analysis especially if the correlation among independent variables is high (Aczel, 2009). In testing for multicollinearity, Variance Inflation Factor (VIF) was adopted. The magnitude of multicollinearity was analyzed by determining the size of VIF. According to Sosa- Eacudero (2009) if VIF=1, then there is no correlation but if VIF is more than 5 and not more than 10, there is high correlation. However, the common thumb rule is that VIF should be less than 3 (Kutner, Nachtshein & Neter, 2004).

From the above Table 15, the VIF between fear of regrets bias and human availability, mental accounting, anchoring and herd mentality biases were; - 1.1092, 1.3055, 1.1181 and 1.2917 respectively. Since all the VIF were all less than common thumb rule (3) I presume all the variables were within the threshold for multiple regression analysis and that there appeared to be no excessive multicollinearity amongst the biases.

Homoscedasticity is the assumption of equal standard deviations of Y values about the population regression line, regardless of the value of X. homoscedasticity is the extent to which the data values for the dependent and independent variables have equal variances (Weirs, 2008). However, if the variances happen to be unequal, then heteroscedasticity exists. Levene's test was used to determine the equality of Standard Deviations of Y between fear of regrets bias and human availability, mental accounting, anchoring, herd mentality biases and dependable variable (individual investment decisions) and the results were;- 0.4483, 0.4575, 0.4469, 0.4327 and 0.4469 respectively which showed approximately equal distribution of SY and therefore revealed a state of homoscedasticity.

Variable	T- Values for Testing Hypothesis Test	VIF for Testing Multicollinearity Test	Levene's Test for Testing Homo/Heteroscedastic (SY)
Human Availability Heuristics Bias	-0.178	1.1558	0.0632
Mental Accounting Bias	-0.087	-	-
Anchoring Bias	-0.171	1.2857	0.0053
Herd Mentality	0.076	0.0374	0.0123
Individual Investment Decisions	0.362	0.0015	0.0053

Table 17: Human Availability Bias against Other Variables

Source: Survey Data, 2019

The essence of testing hypothesis is to evaluate two mutual exclusive statements about a population to determine which statement is best supported by the sample data. When the finding is statistically significant, it's a praise to hypothesis test. The comparison;- if p-values are more than significance level (.05) reject the null hypothesis (your alternative hypothesis is correct hence the data is significant) and vice versa fail to reject null hypothesis if the p-values are less than significant level (0.05).

From the above Table 16 when calculating T-Values for testing hypothesis along with other tests using human availability heuristics bias as comparison of the other variables the results showed that human availability heuristics, mental accounting biases anchoring biases had T-Values of -0.178, -0.087 and -0.171 respectively which showed that the p-values were less than significance level (0.05) hence accept null hypothesis that is the data had no significance. While testing T-Values for hypotheses tests for herd mentality bias, the value was 0.076 which was more than significance level (0.05) hence we reject the null hypothesis and said that alternative hypotheses is correct and hence the data was significant. According to evaluation of dependent variable, T-Values for hypothesis testing showed greater p-value (0.362) than significance level (0.05) which evaluated the significance of the data.

Multicollinearity test is the study of the relationship between independent variables in a study. It is also reviewed as the absence of a strong correlation between two or more independent variables. It permeates virtually every aspect of multiple regression analysis and has an adverse effect on such analysis especially if the correlation among independent variables is high (Aczel, 2009). In testing for multicollinearity, Variance Inflation Factor (VIF) was adopted. The magnitude of multicollinearity was analyzed by determining the size of VIF. According to Sosa- Eacudero (2009) if VIF=1, then there is no correlation but if VIF is more than 5 and not more than 10 there is moderate correlation, and when it is more than 10 there is high correlation. However, the common thumb rule is that VIF should be less than 3 (Kutner, Nachtshein & Neter, 2004).

From the above Table 16, the VIF between human availability heuristics, mental accounting, anchoring and herd mentality biases were;- 1.1558, 1.2857, and 0.0374 respectively. Since all the VIF were all less than common thumb rule (3) I presume all the variables were within the threshold for multiple regression analysis and that there appeared to be no excessive multicollinearity amongst the biases.

Homoscedasticity is the assumption of equal standard deviations of Y values about the population regression line, regardless of the value of X. homoscedasticity is the extent to which the data values for the dependent and independent variables have equal variances (Weirs, 2008). However, if the variances happen to be unequal, then heteroscedasticity exists. Levene's test was used to determine the equality of Standard Deviations of Y between human availability heuristics, mental accounting, anchoring, herd mentality biases and dependable variable (individual investment decisions) and the results were; 0.0632, 0.0053, 0.0123, and 0.0053 respectively which showed approximately equal distribution of SY between human availability bias against anchoring, herd mentality biases and independent variable (individual investment decisions) and therefore revealed a state of homoscedasticity. However, the relationship human availability bias and mental accounting did show a big difference of more than 10% which revealed a state of heteroscedasticity.

Variable	T-Values for Testing Hypothesis Test	VIF for Testing Multicollinearity Test	Levene's Test for Testing Homo/Heteroscedastic (SY)
Mental Accounting Bias	-0.1209	0.2291	0.0098
Anchoring Bias	-0.1953	-	-
Herd Mentality Bias	0.0265	0.4585	0.0231
Individual Investment Decisions	0.2818	0.0074	0.0098

Table 18: Mental Accounting Bias against Other Variables

Source: Survey Data, 2019

The essence of testing hypothesis is to evaluate two mutual exclusive statements about a population to determine which statement is best supported by the sample data. When the finding is statistically significant, it's a praise to hypothesis test. The comparison;- if p- values are more than significance level (.05) reject the null hypothesis (your alternative hypothesis is correct hence the data is significant) and vice versa fail to reject null hypothesis if the p-values are less than significant level (0.05). This means that the data is not significant to give a difference in what you are analyzing.

From the above Table 17 when calculating T-Values for testing hypothesis along with other tests using mental accounting bias as comparison to the other variables the results showed that mental accounting bias, anchoring bias and herd mentality bias had T-Values of -0.1209, -0.1953 and 0.0265 respectively which showed that the p-values were less than significance level (0.05) hence accept null hypothesis that is the data had no significance to reject the null hypothesis. While testing T-Values for hypotheses tests for dependent variable, that is individual investment decisions, the value was 0.2818 which was more than significance level (0.05) hence we reject the null hypothesis and said that alternative hypotheses is correct and hence the data was significant in total to make an alternative decision.

Multicollinearity test is the study of the relationship between independent variables in a study. It is also reviewed as the absence of a strong correlation between two or more independent variables. It permeates virtually every aspect of multiple regression analysis and has an adverse effect on such analysis especially if the correlation among independent variables is high (Aczel, 2009). In testing for multicollinearity, Variance Inflation Factor (VIF) was adopted. The magnitude of multicollinearity was analyzed by determining the size of VIF. According to Sosa- Eacudero (2009) if VIF=1, then there is no correlation but if VIF is more than 5 and not more than 10 there is moderate correlation, and when it is more than 10 there is high correlation. However, the common thumb rule is that VIF should be less than 3 (Kutner, Nachtshein & Neter, 2004).

From the above Table 17, the VIF between anchoring and herd mentality biases were; - 0.2291, and 0.4585, respectively. Since all the VIF were all less than common thumb rule(3) I presume all the variables were within the threshold for multiple regression analysis and that there appeared to be no excessive multicollinearity amongst the biases. Homoscedasticity is the assumption of equal standard deviations of Y values about the population regression line, regardless of the value of X. homoscedasticity is the extent to which the data values for the dependent and independent variables have equal variances (Weirs, 2008). However, if the variances happen to be unequal, then heteroscedasticity exists. Levene's test was used to determine the equality of Standard Deviations of Y between mental accounting, anchoring, herd mentality biases and dependable variable (individual investment decisions) and the results were; 0.0098, 0.0231, and 0.0098 respectively which showed approximately equal distribution of SY between mental accounting bias against anchoring, herd mentality biases and independent variable (individual investment decisions) with a small percentage difference of 2.3% and therefore revealed a state of homoscedasticity.

Variable	T- Values for Testing Hypothesis Test	VIF for Multicollinearity Test	Levene's Test for Homo/Heteroscedastic (SY)
Anchoring Bias	-0.2012	0.0456	0.0133
Herd Mentality Bias	-0.0084	-	-
Individual Investment Decisions	0.2069	0.0021	0.0062

Table 19: Anchoring Bias against Other Variables

Source: Survey Data, 2019

The essence of testing hypothesis is to evaluate two mutual exclusive statements about a population to determine which statement is best supported by the sample data. When the finding is statistically significant, it's a praise to hypothesis test. The comparison; - if p-values are more than significance level (.05) reject the null hypothesis (your alternative hypothesis is correct hence the data is significant) and vice versa fail to reject null hypothesis if the p-values are less than significant level (0.05). This means that the data is not significant to give a difference in what you are analyzing.

From the above Table 18 when calculating T-Values for testing hypothesis along with other tests using anchoring bias as comparison to the other variables the results showed that anchoring bias, and herd mentality bias had T-Values of -0.2012 and -0.0084 respectively which showed that the p-values were less than significance level (0.05) hence accept null hypothesis that is the data had no significance to reject the null hypothesis. While testing T-Values for hypotheses tests for dependent variable, that is individual investment decisions, the value was 0.2069 which was more than significance level (0.05) hence we reject the null hypothesis and said that alternative hypotheses is correct and hence the data was significant in total to make an alternative decision.

Multicollinearity test is the study of the relationship between independent variables in a study. It is also reviewed as the absence of a strong correlation between two or more independent variables. It permeates virtually every aspect of multiple regression analysis and has an adverse effect on such analysis especially if the correlation among independent variables is high (Aczel, 2009). In testing for multicollinearity, Variance Inflation Factor (VIF) was adopted. The magnitude of multicollinearity was analyzed by determining the size of VIF. According to Sosa- Eacudero (2009) if VIF=1, then there is no correlation but if VIF is more than 5 and not more than 10 there is moderate correlation, and when it is more than 10 there is high correlation. However, the common thumb rule is that VIF should be less than 3 (Kutner, Nachtshein & Neter, 2004).

From the above Table 18, the VIF between anchoring and herd mentality biases was 0.0456. Since the VIF was less than common thumb rule (3) I presume both variables were within the threshold for multiple regression analysis and that there appeared to be no excessive multicollinearity amongst the biases.

Homoscedasticity is the assumption of equal standard deviations of Y values about the population regression line, regardless of the value of X. homoscedasticity is the extent to which the data values for the dependent and independent variables have equal variances (Weirs, 2008). However, if the variances happen to be unequal, then heteroscedasticity exists. Levene's test was used to determine the equality of Standard Deviations of Y between anchoring and herd mentality biases and dependable variable (individual investment decisions) and the results were; 0.0133 and 0.0062 respectively which showed approximately equal distribution of SY between anchoring, herd mentality biases and independent variable (individual investment decisions) with a small difference of approximate 2.1% and therefore revealed a state of homoscedasticity.

Variable	T-Values for Testing Hypothesis Test	VIF Multicollinearity Test	Levene's Test for Homo/Heteroscedastic (SY)
Herd Mentality Bias	-0.0444	1.0112	0.7230
Individual Investment Decisions	0.0446	-	-

Table 20: Herd Mentality Bias against Other Variables

Source: Survey Data, 2019

The essence of testing hypothesis is to evaluate two mutual exclusive statements about a population to determine which statement is best supported by the sample data. When the finding is statistically significant, it's a praise to hypothesis test. The comparison;- if p-values are more than significance level (.05) reject the null hypothesis (your alternative hypothesis is correct hence the data is significant) and vice versa fail to reject null hypothesis if the p-values are less than significance level (0.05). This means that the data is not significant to give a difference in what you are analyzing.

From the above Table 19 when calculating T-Values for testing hypothesis along with other tests using anchoring bias as comparison to the other variables the results showed that herd mentality bias had T- Value of -0.0444 which showed that the p-value was less than significance level (0.05) hence accepts null hypothesis that is the data had no significance to reject the null hypothesis. While testing T-Value for hypothesis test for dependent variable, that is individual investment decisions, the value was 0.4460 which was more than significance level (0.05) hence we rejected the null hypothesis and said that alternative hypotheses was correct and hence the data was significant in total to make an alternative decision.

Homoscedasticity is the assumption of equal standard deviations of Y values about the population regression line, regardless of the value of X. homoscedasticity is the extent to which the data values for the dependent and independent variables have equal variances (Weirs, 2008). However, if the variances happen to be unequal, then heteroscedasticity exists. Levene's test was used to determine the equality of Standard Deviations of Y between herd mentality biases and dependable variable (individual investment decisions) and the result was; 0.7230 which showed approximately unequal distribution of SY herd mentality biases and independent variable (individual investment decisions) with a difference of approximately 7.2% and therefore revealed a state of heteroscedasticity.

Variables	Simple Linear Regression Analysis
Fear of Regrets/Individual Investment Decisions	$Y=7.1596+-1.6041X1$

*Table 21: Fear of Regrets Bias (Independent Variable) Against Individual Investment Decisions (Dependent Variable)  
Source: Survey Data, 2019*

The essence of testing linearity of regression is to avoid assumption that occur between the predictor (independent variable) and the predicting value (dependent variable). In linear regression while comparing predictors (X) and predicting (Y) variables considering constant factor (a), the linear regression line is always insignificant. In case one wishes to make it significant, then you need to remove the constant (Y-intercept) value which is also referred to (a). However, when Y-intercept is removed and rendered zero it will force the linear line of regression to start from origin which it may not be the case rendering biasness in the outcomes of either one or two independent variables. From the Table 4.20, in comparison of independent variable (X1) with dependent variable (Y), the Y-intercept (a) was 7.1596 and slope (b) was -1.6041 hence the equation is fully explained as shown above. The slope of the regression line (-1.6041) was the estimated individual investment decisions per unit change of fear of regrets bias. The intercept (7.1596) was the individual investment decisions that does not depend on the changes of fear of regrets bias.

Variables	Simple Linear Regression Analysis
Human Availability Heuristics/Individual Investment Decisions	$Y=1.2363+0.0114X2$

*Table 22: Human Availability Bias (Independent Variable) against Individual Investment Decisions (Dependent Variable)  
Source: Survey Data, 2019*

The essence of testing linearity of regression is to avoid assumption that occur between the predictor (independent variable) and the predicting value (dependent variable). In linear regression while comparing predictors (X) and predicting (Y) variables considering constant factor (a), the linear regression line is always insignificant. In case one wishes to make it significant, then you need to remove the constant (Y-intercept) value which is also referred to (a). However, when Y-intercept is removed and rendered zero it will force the linear line of regression to start from origin which it may not be the case rendering biasness in the outcomes of either one or two independent variables. From the Table 21, in comparison of independent variable (X2) with dependent variable (Y), the Y-intercept (a) was 1.2363 and slope (b) was 0.0114 hence the equation is fully explained as shown above. The slope of the regression line (0.0114) was the estimated individual investment decisions per unit change of human availability heuristics bias. The intercept (1.2363) was the individual investment decisions that does not depend on the changes of human availability heuristics bias.

Variables	Simple Linear Regression Analysis
Mental Accounting/Individual Investment Decisions	$Y=-2.6422+0.8880X3$

*Table 23: Mental Accounting Bias (Independent Variable) against Individual Investment Decisions (Dependent Variable)  
Source: Survey Data, 2019*

The essence of testing linearity of regression is to avoid assumption that occur between the predictor (independent variable) and the predicting value (dependent variable). In linear regression while comparing predictors (X) and predicting (Y) variables considering constant factor (a), the linear regression line is always insignificant. In case one wishes to make it significant, then you need to remove the constant (Y-intercept) value which is also referred to (a). However, when Y-intercept is removed and rendered zero it will force the linear line of regression to start from origin which it may not be the case rendering biasness in the outcomes of either one or two independent variables. From the Table 22, in comparison of independent variable (X3) with dependent variable (Y), the Y-intercept (a) was 2.6422 and slope (b) was 0.8880 hence the equation is fully explained as shown above. The slope of the regression line (0.8880) was the estimated individual investment decisions per unit change of mental accounting bias. The intercept (2.6422) was the individual investment decisions that does not depend on the changes of mental accounting bias.

Variables	Simple Linear Regression Analysis
Anchoring/Individual Investment Decisions	$Y=0.8140+-0.0013X4$

Table 24: Anchoring Bias (Independent Variable) Against Individual Investment Decisions (Dependent Variable)

Source: Survey Data, 2019

The essence of testing linearity of regression is to avoid assumption that occur between the predictor (independent variable) and the predicting value (dependent variable). In linear regression while comparing predictors (X) and predicting (Y) variables considering constant factor (a), the linear regression line is always insignificant. In case one wishes to make it significant, then you need to remove the constant (Y-intercept) value which is also referred to (a). However, when Y-intercept is removed and rendered zero it will force the linear line of regression to start from origin which it may not be the case rendering biasness in the outcomes of either one or two independent variables. From the Table 23, in comparison of independent variable (X4) with dependent variable (Y), the Y-intercept (a) was 0.8140 and slope (b) was -0.0013 hence the equation is fully explained as shown above. The slope of the regression line (0.0013) was the estimated individual investment decisions per unit change of herd anchoring bias. The intercept (1.8140) was the individual investment decisions that does not depend on the changes of anchoring bias.

Variables	Simple Linear Regression Analysis
Herd Mentality Bias/Individual Investment Decisions	$Y=1.6208+-0.2052X5$

Table 25: Herd Mentality Bias (Independent Variable) Against Individual Investment Decisions (Dependent Variable)

Source: Survey Data, 2019

The essence of testing linearity of regression is to avoid assumption that occur between the predictor (independent variable) and the predicting value (dependent variable). In linear regression while comparing predictors (X) and predicting (Y) variables considering constant factor (a), the linear regression line is always insignificant. In case one wishes to make it significant, then you need to remove the constant (Y-intercept) value which is also referred to (a). However, when Y-intercept is removed and rendered zero it will force the linear line of regression to start from origin which it may not be the case rendering biasness in the outcomes of either one or two independent variables. From the Table 24, in comparison of independent variable (X5) with dependent variable (Y), the Y-intercept (a) was 1.6208 and slope (b) was -0.2052 hence the equation is fully explained as shown above. The slope of the regression line (0.2052) was the estimated individual investment decisions per unit change of herd mentality bias. The intercept (1.6208) was the individual investment decisions that does not depend on the changes of herd mentality bias.

The multiple linear regression analysis was as follows:-

$$Y= 13.4729+-1.6041X1+0.0114X2+0.8880X3+-0.0013X4+-0.2052X5.$$

Model	R	R Square	Adjusted R Square	Std. Error of the Estimates
Fear of Regrets Bias/Individual Investment Decisions	0.6234	0.3886	-0.00002756	0.2786

Table 26: Model Summary for Fear of Regrets Bias and Individual Investment Decisions

Source: Survey data, 2019

From the Table 26 above it indicated a positive correlation between fear of regrets bias and individual investment decisions (R=0.6234). The results further indicated that fear of regrets bias accounts for 38.86% of individual investment decisions (R Squared=0.3886). This showed that the sample could be able to explain 38.86% of the variation in fear of regrets bias and individual investment decisions and the remaining 61.14% could be explained from external factors.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimates
Herd Mentality/Individual Investment Decisions	0.1052	0.0111	+0.00003296	0.0761

Table 27: Model Summary for Herd Mentality Bias and Individual Investment Decisions

Source: Survey Data, 2019

From the Table 27 above it indicated a positive correlation between herd mentality bias and individual investment decisions ( $R=0.1052$ ). The results further indicated that herd mentality bias accounts for 1.11% of individual investment decisions ( $R\text{ Squared}=0.0111$ ). This showed that the sample could be able to explain 1.11% of the variation in herd mentality bias and individual investment decisions while the remaining 98.89% could be explained from external factors.

The other three models, relationship between each predictor (human availability bias, mental accounting bias and anchoring bias) and predicting (individual investment decisions) factor showed  $R\text{ Squared}$  as greater than one and standard deviation of predictors factors as;- human availability bias (0.1380), mental accounting bias (0.1146) and anchoring bias (0.1367). This meant that at least all variations (100%) could be explained using internal factors, external factors become additional advantage.

#### 4.8. Summary of Key Findings

The section presents a summary of the study findings in view of the five hypotheses of the study and the research objectives. All the five hypotheses were tested at a significance level of 0.05 using simple linear regression analysis, multiple regression analysis (standard) and hierarchical multiple regression analysis. To test whether Fear of Regrets Bias had a significant effect on Individual Investment Decisions (H01), the hypothesis was tested using simple linear regression analysis. The test found that Fear of Regrets bias overall had statistically significant effect on Individual Investment Decisions ( $p=0.527$ ) at 5 percent significant level. The relationship was positive and it formed a linear regression pattern.

To test whether Human Availability Heuristics Bias had a significant effect on Individual Investment Decisions (H02), the hypothesis was tested using simple linear regression analysis. The test found that Human Availability Heuristics bias overall had a statistically significant effect Individual Investment Decisions ( $p=-0.362$ ). The relationship was positive and it formed a linear regression pattern. To test whether Mental Accounting Bias had a significant effect on Individual Investment Decisions (H03), the hypothesis was tested using simple linear regression analysis. The test found that Mental Accounting bias overall had a statistically significant effect on Individual Investment Decisions ( $p=0.2818$ ). The relationship was positive and it formed a linear regression pattern. To test whether Anchoring Bias had a significant effect on Individual Investment Decision (H04), the hypothesis was tested using simple linear regression analysis. The test found that Anchoring bias overall had statistically significant effect on Individual Investment Decisions ( $p=0.2069$ ). The relationship was positive and it formed a linear regression pattern. To test whether Herd Mentality Bias had a significant effect on Individual Investment Decision (H05), the hypothesis was tested using simple linear regression analysis. The test found that Herd Mentality Bias overall had no statistically significant effect on Individual Investment Decisions ( $p=0.0446$ ). Although when testing hypothesis using Levene's test in determining if data was statistically significant to be used it was found to be true since  $p>0.05$  ( $p=0.723$ ). The relationship was positive and it formed a linear regression pattern.

#### 4.9. Discussion

This section presented an interaction between the study findings and academic and empirical literature. The study analyzed the influence of behavioral biases on portfolio individual investment decisions. The investigation of behavioral biases and individual investment decisions relationship found out that some of the behavioral biases were not statistically significant in explaining individual investment decisions. This finding had empirical support from Alalade *et al.*, (2014), Babajide *et al.*, (2012) and Aduda (2012). In particular, the finding that individual investors seek financial advice from professional investment advisors when buying and selling stock decisions had a statistically significant influence on the individual investment decisions which also was empirically supported by Kramer & Lensink (2013). The study agreed with Khawaja *et al.*, (2013 who studied investors' behavioral biases and stock market development and found that most of the biases were significant. Again Khawaja *et al.*, (2013) found a positive relationship of behavioral biases with the market development which in line with this study that found out mixed relationship. But studies both agreed that though biases of investors do exist, the market is still growing and keep on improving. The study findings also agreed with Lee *et al.*, (2013) who studied on the effect of investor bias and gender on portfolio performance and risk and found that males and females demonstrate different behavioral biases and these behavioral biases can eventually affect their decision making during their investments. The findings further agreed with the study by Korniotis and Kumar (2009) who analyzed the relation between age and performance and found investment performance declines with age. The study was in line with that of Nyamute *et al.*, (2015) who found that the overall model of investor behavior is statistically significant indicating that investor behavior influenced by their decision making.

The findings concurred with those of Barber and Odean (2011) who studied on the behavior of individual investors at the FSE and found that investors' performances are affected by their behaviors which deleteriously affected their financial well-being. It also contradicted the findings of Grinblatt and Keloharju (2009) who found that Finnish investors with an inflated sense of their own abilities tend to trade more which was a proxy of overconfidence leading portfolio underperformance.

Graham et al., (2009) further found that wealthier investors with high level of education are likely to think that they are more competent, meaning overconfidence which result to underperformance which contradicts this finding. The study contradicts the findings of Chen et al., (2007) who indicates that overconfidence of individual investor in China and they found that investor in China trade more frequently than US investor thus underperforming. The study agrees with Kaustia et al., (2008) findings who investigated the effect of anchoring bias on stock return expectations. From their analysis, they found that, it does not matter whether investors are students or professionals, their predictions are affected by an anchor. The study is further in agreement with George and Hwang (2004) findings who analyzed the association between the 12-month high price and profitability of the momentum investing technique. Their findings indicate that the closer the present value is to the anchor, the more successfully one can explain changes in prices. Törnngren and Montgomery (2004) analyzed the differences between confidence of professionals and lay persons and their performance in the stock market. They found that lay persons are normally affected by movement of stock price in the past. Past movements act as a reference point for their expectations. The study found that female trade more than male at 40% against 60% respectively which is similar to the findings of Bashir et al., (2013) but it contradicted that of Barber and Odean (2001) and Biais et al., (2005) who found that men trade more than women. Waweru et al., (2008) indicated that price changes of stocks had effect on their investment behavior at some level. Tripathi (2008) in his study found that investors used both fundamental as well as chartist analysis when trading in Indian stock market. Majority of the investors strongly agreed with the fact that many company fundamentals such as size, book to market equity, price earnings ratio and leverage to a large extent affect share prices and hence the application of these variables in the asset pricing model could very well describe cross sectional variations in the share returns in India. This was actually the same scenario in the case study whereby changes in the stock prices had a big influence in the individual investment decisions. Korniotis and Kumar (2009) predict cognitive ability (fear of regrets bias) using a host of demographic variables (age, education, and social networks). They found that prudent investors performed well over others by about 3.6 % annually both before and after accounting for transaction costs. Other investors underperformed appropriate benchmarks by a bit more than 3.6 % annually after costs with about half of the shortfall being traced to trading costs and half to bad stock selection. Korniotis and Kumar (2009) used the LDB dataset to analyse the association between age and performance. Interested with the observation that cognitive abilities decreased with age, they found evidence (evidence of beliefs) to support the opinion that investment performance declined with age. Kramer and Lensink (2009) studied on the effect of Financial Advisors on the Portfolio of Individual Investors. They found that financial advises benefited individual investors, because advice improves risk-adjusted equity returns and reduces risk. Abreu and Mendes (2009) study on Financial Literacy and Portfolio Diversification suggested that level of investors' education, their financial knowledge and the information sources used by individual investors to collect information on markets have a significant effect on the number of different stocks that form a portfolio. Aduda et al., (2012) study established the behavior and financial performance of individual investors in the trading shares of companies listed at the NSE, Kenya. The study found that individual investors demonstrated different behaviors (fear of regrets bias;- alterations of behaviors) that affected their financial performance in trading shares of companies listed at the NSE, Kenya. Babajide et al., (2012) studied Investors' Behavioral Biases and the Security Market: A case study of the Nigerian Security Market. They made use of the primary data to determine the effects of behavioral biases on securities market performance in Nigeria. The study found enough evidence that behavioral biases do exist though not so common in the Nigeria Security Market. This was in line with the investors' decisions since most of them were not very sure with their individual decisions hence they lied mostly on consultations from other investors to come up with the best idea.

According to Shefrin (2000), she contended that heuristic-driven bias and framing effects caused market prices to deviate from fundamental values suggested that behavioral finance may explain empirical evidence, which casts doubt on existing financial models based on rationality. She also argued that because investors relied on the representativeness heuristics, they could become overly optimistic about past winners and overly pessimistic about past losers and that this bias could cause prices to deviate from their fundamental level. However, heuristic processes and prospect theory were found evident with heuristics strongly dominating prospect theory in explaining the behavior of institutional investors operating at the Nairobi Securities Exchange. Market information and the fundamentals of the underlying stock were found to have the highest impact on the investment decision making by Institutional Investors. Mutswenje & Jagongo (2017) did a study on behavioral biases and individual portfolio performance in the NSE to determine the effect of behavioral biases and performance of equity and bonds on NSE. His findings were based on forecasts in change in stock prices, preferences to buy local stocks, reliance on past stock returns among others. He found out that investors relied on previous experience in the market for the next investment. This was in line with the individual investor's decision making before investing whereby they relied more on the past events to determine the present.

Waruingi (2011) conducted a survey study on behavioral factors influencing investors' choices on securities at Nairobi Securities Exchange, in his study hypothesized prospect factors that was loss aversion regret aversion and mental accounting using primary data and self-administered drop and pick questionnaires. He found out that mental accounting had high impact on the investment decisions of individual investors in the NSE. Breuer, Rieger and Soypak (2012) conducted in a study whose main objective was to highlight the relevance behavioral (keeping track of financial activities) preference patterns for corporate dividend policy. An empirical study which was carried out in 32 countries with a sample of 5750 firms used. The study incorporated a model which determined the relationship between dividend payout policies based on the ideas of mental accounting. The model predicted a positive influence of the investor's loss aversion and investors (different mental accounting) amount of time discounting on the dividend payout ratio. The study established that loss aversion was the main determinant for corporate dividend policy from sample used for the study. H2: Prospect factors have no significant influence on investment decision among investors at the NSE. This was in line with the findings whereby T-values for testing hypothesis for fear of regrets (0.527) and mental accounting (0.2818) biases in relationship

with investment decisions of individual investors' in NSE showed that the factors had no significant influence on investment decisions.

Herd mentality bias means an event that under certain conditions most of the investors focus only on a subset of securities by flocking, while neglects other securities with identical exogenous characteristics (Hirshleifer, Subrahmanyam, & Titman, 1994). In a simple relationship, the herd mentality bias was related to the social psychology which called regret aversion and cognitive dissonance. The experimental and empirical evidence showed individual in groups abides the group decision, even when they perceive the group to be wrong. Individual suppresses their own beliefs and relied on their investment decision solely on the collective action, even though they disagree with the prediction. The reason is that individual avoids being regret if the group is found to be true. Another reason is to satisfy their judgment if the judgment was found to be wrong in the future. It was better to have mistaken in a group rather in person. This was what they called as regret aversion and cognitive dissonance; or in finance was called as herding mentality bias. Academic literature included many models of herding mentality bias in the financial market. Shiller and Pound (1989) documented survey evidenced on herd mentality bias among the institutional investors. They found that institutional investor place significant weight on the advice of other professionals on their buy and sell decisions in volatile stocks. Scharfstein and Stein (1990) proposed the herding model of manager ignorance on their own information because of their regret aversion. Froot, Scharfstein and Stein (1992) confirmed that speculators with short horizons might herd on the same information. Lakonishok, Shleifer, and Vishny (1994) found only weak evidence of herding decision by institutional investors among small stocks and no evidence of herding among large stocks. Trueman (1994) showed that individual investor might herd toward the report issued by other analysts. Nofsinger and Sias (1999) found institutional investors positive feedback trade more than individual investors and institutional herding impacts prices more than herding by individual investors. Welch (2000) explained how sequential issues of IPOs could lead investors to ignore their private information and herd on the decision of earlier investors. This information was well in line with the case study because while testing hypothesis using T-values testing the findings revealed that p-value was (0.0446) <0.05 hence reject  $H_0$  meaning that there was significant influence between the predictor and predicting factors hence the data was statistically significant too (0.723).

## 5. Summary, Conclusions and Recommendations

### 5.1. Introduction

This study sought to establish the significant influence of behavioral biases on investment decisions of individual investors in the NSE. Hence, this chapter five presented the study summary findings. The study also presented several conclusions in relation to the research objectives and hypotheses. It also presented policy implications and recommendations made to various stakeholders. The chapter further highlighted the limitations of the study and further suggested areas of further research considering the study unique findings.

### 5.2. Summary

Like any other capital markets in the world including those in both developed and undeveloped countries for example CMA in China, USA, London etc., the capital markets authorities have been providing good business condition for business, however most of them in one way or the other has been encountering mixed performance, the capital market in Kenya being one of them having some investors having good performance while others performing poorly due to different investment decisions made by individual investors. The individual investors have lacked guidance on investment decisions which results in the outcome that is reflected in the portfolio performance. This meant that individual investors lacked clear guidance on levels of behavioral biases;-that is how to interpret good factors in prediction of better decision making so as to improve on overall performance. The study sought to empirically determine influence of behavioral biases on investment decisions of individual investors in Nairobi securities exchange. The study presented the background to the study by including the conceptual, theoretical and contextual issues explained in the study. Hence, the research problem, which documented the knowledge of research gaps that the study sought to fill, culminated to the objectives of the study. The study highlighted the anticipated value addition from the research effort. The study also documented relevant literature on the study variables from the local as well as foreign markets and subsequently developed a conceptual model to show the study interrelationships. When collecting the relevant data, the study used descriptive design (cross-sectional and longitudinal designs). A sample size of 384 individual investors was taken from the 16 investment banks where investors bought and sold shares for the period of five years. This section gave a summary of the findings of this study. The first objective of the study was to determine the influence of fear of regrets bias on investment decisions of individual investor in Nairobi Securities Exchange, Kenya. The study established that the model was positively not statistically significant between fear of regrets and investment decisions of individual investors as measured by Sharpe performance measure. It was apparently purported that as an individual investor made decisions to invest in NSE, he used several alternative behaviors and different cognitive dissonance in fear of having regrets after making a silly decision and by doing this, he increased his ways of making wise decisions in his investments. This was also an encouragement of choice of stock to be made, buying and selling procedures and decisions and even considering the duration of holding stock, considering both performing and non-performing.

The second objective was to establish the influence of human availability heuristics bias on investment decisions of individual investor in Nairobi Securities Exchange, Kenya. The study established that the overall model was positively and not statistically significant between human availability heuristics bias and investment decisions of individual investors 'as measured by Sharpe performance measure. This finding indicated that individual investment decisions of individual

investors were to be established by human availability heuristics through trading in one stock until well established with adequate knowledge and funds to start making choices in stock.

The third objective was to examine the influence of mental accounting bias on investment decisions of individual investor in NSE, Kenya. The study established that the overall model was positively and not statistically significant between mental accounting bias and investment decisions of individual investors as measured by Sharpe's performance measure. This finding indicated that individual investment decisions are made by each investor as they are visualized and accounted mentally to come up with the best decisions to adopt at every stage of investing which end up improving the choice of stock to be invested in at a particular time.

The fourth objective was to explain the influence of anchoring bias on investment decisions of individual investors' in NSE. The study established that the overall model was positively not statistically significant between anchoring bias and investment decisions of individual investors as measured by Sharpe performance measure. This finding indicated that investment decisions of individual investors 'explained how individual investors' relied on the current stock prices to determine the future stock prices and also how other personal situations could linger to individual investment decisions in determining the buying and selling of stock.

The fifth objective was to determine the influence of herd mentality bias on investment decisions of individual investors in Nairobi securities exchange, Kenya. The study established overall model as positive and statistically significant between herd mentality bias and investment decisions of individual investors as measured by Sharpe's performance measure (t-value and Levene's test in testing hypotheses). The findings indicated that investment decisions of individual investors determined how individual investors followed the trend in purchasing items of individual investment decisions in buying and selling of stocks.

### 5.3. Conclusion

In view of the research findings documented in the preceding chapter, the study made several conclusions in relation to the research objectives and hypotheses. Firstly, from test of hypothesis one, the study concluded that fear of regrets bias overall did not have a statistically significant effect on investment decisions of individual investors 'in NSE. This finding was supported by several empirical studies though it also contradicted some other studies. With the model overall for fear of regrets bias not being statistically significant, the study concluded that there could be other indicators outside the scope of this study, that could be having a significant effect on investment decisions of individual investors since this bias does not seem to have a major effect on investment decisions of individual investors. The results of this study further implied that the Modern Portfolio Theory which postulates that investors who invest in more than one stock could reap the benefits of diversification particularly in reduction of riskiness of the portfolio in NSE.

Secondly, from test of hypothesis two, the study concluded that human availability heuristics bias overall did not have a statistically significant effect on investment decisions of individual investors. This finding was supported by several empirical studies though it also contradicted some other studies. With the model overall for human availability heuristics bias being statistically insignificant, the study concluded that there is a tendency of investors to sell stocks that are increasing in price too soon and holding stocks that are decreasing in price too long thus having a major effect on their portfolio performance. The results of this study further implied that the prospect theory which postulated that investors managed risk under uncertainty was applicable among investors at the NSE since investors tend not to regret more about keeping underperforming stocks for too long than selling performing ones too early. Again, the optimal returns as postulated in the modern portfolio theory was true since investors were patient when holding and selling their stocks thus end up making abnormal returns which was expectations based on modern portfolio theory.

Thirdly, from test of hypothesis three, the study concluded that mental accounting bias overall did not have a statistically significant effect on investment decisions of individual investors. This finding was supported by several empirical studies though it also contradicted some other studies. With the model overall for mental accounting bias being statistically insignificant, the study concluded that most of the individual investment often tend to treat and account for every individual investment rather than a portfolio of securities investors and hence on other circumstances their investment decisions were influenced by other prospect factors (Kimeu, Anyango & Rotich, 2016).

Fourthly, from test of hypothesis four, the study concluded that anchoring bias overall did not have a statistically significant effect on investment decisions of individual investors. This finding was supported by several empirical studies though it also contradicted some other studies. With the model overall for anchoring bias not being statistically significant, the study concluded that there could be other indicators outside the scope of this study, that could be having a significant effect on investment decisions of individual investors 'portfolio since anchoring bias did not seem to have a major effect on investment decisions of individual investors. While describing the common human tendency on its reliance heavily on the first piece of information offered when making investment decisions thus having a major effect on individual investors 'decisions. The findings of this study further implied that the efficient market hypothesis theory which postulated that efficient financial markets will instantaneously incorporate any new information is not applicable among investors at the NSE since investors at the NSE are relying on a predetermined reference point called anchor for future adjustment.

Fifthly, from test of hypothesis five, the study concluded that herd mentality bias overall did have a statistically significant effect on investment decisions of individual investors. This finding was supported by several empirical studies though it also contradicted some other studies. With the model overall for overall bias not being statistically significant, the study concluded that there could be no other indicators outside the scope of this study, that could be having a significant effect on investment decisions of individual investors since herd mentality bias did seem to have a major effect on investment decisions of individual investors. While describing the common human tendency on its reliance heavily on the first piece of information offered when making investment decisions thus having a major effect on individual investors

'decisions. The findings of this study further implied that there was relationship between cognitive dissonance and economic consequences which found the changes in belief and cognitive dissonance towards economic consequences due to modernization which was easily caught in herd mentality bias (Devenow & Welch, 1996).

#### 5.4. Recommendations

In light of the findings of this study and the conclusions drawn from them, the following would be recommended: Firstly, individual investors should make use of professionals to understand how to make wise investment decisions. These professionals should have strong research departments that study and analyses the market and business models and be able to advice the investors who should end up making sound investment decisions. Individuals should avoid herd behavior and embark on other behavioral biases that can bring a difference in their decision making. This recommendation was in-alignment with the findings of fear of regrets bias where individual investors should be advised on when to adopt a certain way of investing so that preference is made to sell winners and to hold the losers. This will reduce behavioral biases in making investment decisions of individual investors. Secondly, Professionals in investment management should understand the area of behavioral finance by having conferences and seminars so that when decisions are being made, behavioral finance issues are put into consideration. This is aligned with the idea that since technology keep on advancing same to behavior hence proper adoption of behavioral finance is required to suit the intended technology.

Thirdly, capital market analysts at the Nairobi Securities Exchange should ensure a proper channel of giving out the market information to the public because this could affect the decision arrived at by the investor about the market. Brochures and other internal information sources would play a major role in marketing products bought and sold in NSE. This recommendation was based on anchoring bias. Thus, investors are advised to assess the flow of information on the market instead of relying on a predetermined piece of information which will not by the end of the day have sufficient information in investment decisions of individual investors. Fourthly, when investors become aware of behavioral biases in the market, it becomes the initial step in ensuring that the process of making decisions is not highly affected by them. Investors should become more aware of the likely effects of behavioral biases could have in their process of making investment decision at all levels on the stock market. Market participants should reach the decision-making process by keeping in mind the use of information, education, and understanding at their capacity to formulate a solution being dispensed in decision making.

Fifthly, academicians can use the contribution of behavioral biases on investment decisions of individual investors to identify the knowledge gaps and pursue further researches in the area of behavioral finance. Seventhly, Companies that seek to be listed at the NSE could make use of the findings of this study to understand individual investment decisions while investing investor and how they affect the price of securities and hence setting realistic prices which does not distort the market. Lastly, the market players could make use these findings as a foundation to educate investors and help in minimization of noise trading in the stock markets as well as being a stepping stone in building other behavioral finance factors which have been in limelight for long or even not known to be part of the same. The influence of behavioral factors/biases on individual behaviors can also be looked into as topic now in human resource but not in finance to establish how human beings behave and how their characters can be compared from one individual to another in analyzing the significance in the behavioral factors on individual behaviors.

#### 5.5. Limitations of the Study

The study encountered some limitations that are noteworthy. Firstly, the study suffered from complications in data collections in some aspects as some investors were reluctant in giving some information as they considered it a bit personal and cite it as some form of investigation to ascertain their wealth. However, where there was bit of hiccups the study had to involve the stock brokers to assure them their safety and security. Secondly, the study encountered challenges in some investors deciding not to participate in the study citing their busy schedules, however they eventually responded when they were given a longer duration to fill the questionnaires. Despite the fact that most studies done on behavioral finance were done by Kenyans examples cited were from foreign stock markets which made us fill that capital markets are performed better off externally than internally, likewise to relevant behavioral finance empirical evidence in Kenya on individual investor decisions in investment. However, the study relied on similar studies from foreign stock markets to enhance the discussions

#### 5.6. Areas for Further Study

The research gaps documented out of the research effort provide some basis for further empirical investigations. Firstly, there was need to consider carrying out a similar study that adopted a descriptive longitudinal design alone so as to capture the time effect of changes in certain behavioral biases such as herd mentality bias whose dynamic nature was bound to significantly affect investment decisions of individual investors with time. Secondly, the study found need to conduct a study to test the capital market efficiency in Kenya to the extent of the scope of this study considering that there were mixed findings in statistical significance of behavioral biases on investment decisions of individual investors' and also given that in Kenyan, capital market is still at early growing stage whereby it's still on fluctuations of ups and downs although mostly having a positive index but sometimes statistically significant or statistically insignificant. The ones which were positive but not statistically significant needs a lot of attention to understand what other factors from external that could well be added or studied to increase their significance.

Thirdly, a study should be carried out to investigate the influence of other indicators like micro-economic variables, IPOs, rights issue, portfolio risk, trading of securities cost, on investment decisions of individual investors since

the study found that most of the stated biases in the research study were not statistically significant in explaining investment decisions of individual investors. Fourthly, the study found the need to carry out a similar research using other measures of individual investors' investment decisions.

## 6. References

- i. Abreu, M. & Mendes, V. (2009). Financial literacy and portfolio diversification. *Journal of Quantity Finance*. Volume 10 (5).
- ii. Aker, D. & Duck, N. G. (2008). Cross-cultural Overconfidence and Biased Self Attribution. *Journal of Socio Economics*, 37, 1815-1824.
- iii. Aczel, A. & Sounderpandian, J. (2009). *Complete Business Statistics*. (10th Ed.) Boston: McGraw Hill.
- iv. Aduda, J., Odera, E. O. & Mactosh, O. (2012). The Behaviour and Financial Performance of Individual Investors in the Trading Shares of Companies Listed At the Nairobi Stock Exchange, Kenya. *Journal of Finance and Investment Analysis*, 2012, 33-60.
- v. Alalade, S. Y., Okonkwo, I.E. Folarin.N.A. (2014). Investors' Behavioral Biases and the Nigerian Stock Market Returns. *European Journal of Business and Management*, 2014.
- vi. Asness, C., Markowitz, T. & Pedersen, L.H. (2013). Value and Momentum.
- vii. Babajide, A. A. & Adetiloye, K. A. (2012). Investors' Behavioral Biases and the Security Market: An Empirical Study of the Nigerian Security Market. *Accounting and Finance Research Journal* Vol. 1, No. 1.
- viii. Baker, H.K., Hargrove, M.B. & Haslem, J.A. (1977) "An Empirical Analysis of the Risk Return Preferences of Individual Investors," *Journal of Financial and Quantitative Analysis*, Vol. 12, No. 3, pp. 377-389.
- ix. Bashir, T., Rasheed, S. U., Raftar, S.S., Fatima. S. S., & Maqsood, S. M. (2013). Impact of Behavioral Biases on Investors Decision Making: Male Vs Female. *Journal of Business and Management*. Volume 10, Issue 3.
- x. Barber, B. M. & Odean, T. (2000). Trading is Hazardous to Your Wealth: The Common Stock Investment Performance of Individual Investors. *Journal of Finance*, 55, 773-806.
- xi. Barber, B. M. & Odean, T. (2001). Boys will be Boys: Gender, Overconfidence, and Common Stock Investment. *Quarterly Journal of Economics*, 116, 261-292.
- xii. Barber, B. M. & Odean, T. (2011). The Behaviour of Individual Investors. *Journal of Finance*, 77, 893-931.
- xiii. Barberis, N., Huang, M., and Santos, T. (2001). Prospect Theory and Asset Prices. *Quarterly Journal of Economics*, 116(1), 1-53.
- xiv. Barberis, N., Huang, M., and Santos, T. (2001). Prospect Theory and Asset Prices. *Quarterly Journal of Economics*, 116(1), 1-53.
- xv. Byrnes, J. P. (2008). *Cognitive Development and Learning in Instructional Contexts*. (3rd Edition). Needham Hts, MA: Allyn & Bacon.
- xvi. Chandran, E. (2004). *Research Methods: A Quantitative Approach*. Nairobi: Daystar University.
- xvii. Chandran, V., Bhella, S., Schentag, C. & Gladman, D. (2007). Functional Assessment Chronic Illness Therapy Fatigue Scale is Valid in Patients with Psoriatic Arthritis. *Annals of the Rheumatic Diseases*, 66 (7), 936-39.
- xviii. Chen, G., Kim, K. A., Nofsinger, J. R., & Rui, O. M. (2007). Trading Performance, Disposition Effect, Overconfidence, Representativeness Bias, and Experience Of Emerging Market Investors, *Journal of Behavioral Decision Making*, 20, 425-451.
- xix. Cooper, D. R. & Schinner, P. S. (2003). *Business Research Methods* (10th Ed.) New York: McGraw Hill.
- xx. Cooper, D. & Schindler, P. (2008). *Business Research Methods*. Boston: McGraw Hill.
- xxi. Cooper, D. & Schindler, P. (2011). *Business Research Methods*. New York of
- xxii. Chronic illness therapy-fatigue scale is valid in patients with psoriatic Arthritis. *Annals of the Rheumatic Diseases*, 66 (7), 936-39
- xxiii. Daniel, K., Hirshleifer, D. & Subrahmanyam, A. (1998). Investor Psychology and Security Market Under- and Overreactions. *The Journal of Finance*, 53(6), 1839-1885.
- xxiv. Dhar, R. & Zhu, N. (2002). Up Close and Personal: An Individual Level Analysis of the Disposition Effect. Yale School of Management, ICF Working Paper No. 02- 20.
- xxv. Fogel, O. & Berry, T. (2006). The Disposition Effect and Individual Investor Decisions: The Roles of Regret and Counterfactual Alternatives. *Journal of Behavioral Finance*, Vol. 7, No. 2, pp.107-116.
- xxvi. George, T. J. & Hwang, C. Y. (2004). The 52-Week High and Momentum Investing. *The Journal of finance* Vol. lix, no. 5. Graham, J. R., Harvey, C.R., and Huang, H. (2009). Investor Competence, Trading.
- xxvii. Grinblatt, M., and Keloharju, M. (2009). Sensation Seeking, Overconfidence and Trading Activity, *Journal of Finance*, 64(2), 549-578.
- xxviii. Grinblatt, M. & Han, B. (2005). Prospect Theory, Mental Accounting, and Momentum. *Journal of Financial Economics*, 78, 311-339.
- xxix. Hamilton, W.D. (1971). "Geometry for the Selfish Herd". *Journal of Theoretical Biology*. 31 (2).
- xxx. Hoffmann, A.O.I., Shefrin, H., and Pennings, J. M. E. (2010). Behavioral Portfolio Analysis of Individual Investors, SSRN Working Paper No: 1629786.
- xxxi. Hussein, A.H. (2007) Factors Influencing Individual Investor Behaviour in the UAE Financial Markets. *Journal of Business*, Vol.92
- xxxii. Kahneman, D. & Riepe, M. A. (1998) Aspects of Investor Psychology. *Journal of Portfolio Management*, Vol. 24 No. 4.

- xxxiii. Kahneman, D. & Tversky, A. (1979). Prospect Theory: An Analysis of Decision under Risk. *Econometrical*, 47(2), 263-292.
- xxxiv. Khawaja, A., Bhutto, N. A. & Naz, S. (2013). Investors' Behavioral Biases and the Stock Market Development: An Empirical Study of the Pakistani Stock Market. *Review of Economics and Statistics*.
- xxxv. Kiarithia, W. (2014). Determinants of the Financial Performance of Savings and Credit Cooperatives in the Bankings Sector in Kenya. Ph.D Thesis, Juja; Jomo Kenyatta University of Agriculture and Technology.
- xxxvi. Kombo, D., & Tromp, D. (2009). Proposal and Thesis Writing: An Introduction Pauline Publications Africa, Nairobi: Don Bosco Printing Press.
- xxxvii. Kothari, C. R. (2010). *Research Methodology – Methods and Techniques* New Delhi, India: New Age International Publishers.
- xxxviii. Korniotis, G.M. & Kumar, A. (2009). Do Older Investors Make Better Investment Decisions? *Review of Economics and Statistics*.
- xxxix. Kramer, M.M. (2009). Financial advice and individual investor portfolio performance, *Financial Management*.
- xl. Kramer, R & Lensink, L. (2013). The Impact of Financial Advisors on the Stock Portfolios of Retail Investors, *Financial Management*.
- xli. Kübilay, B. & Bayrakdaroğlu, A. (2016). An Empirical Research on Investor Biases in Financial Decision-Making, Financial Risk Tolerance and Financial Personality. *Journal of financial research*. Vol.2.
- xlii. Lakonishok, J., Shleifer, A. & Vishny, R.W. (1994). Contrarian Investment, Extrapolation, and Risk. *The Journal of Finance*, 49(5), 1541-1578.
- xliii. Lee, Miller, Velasquez & Wann (2013). Effect of investor biases and gender on Portfolio Performance and risk. *The International Journal of Business and Finance Research*, 2013.
- xliv. Lewellen W. G., (2001). A Pure Financial Rationale for the Conglomerate Merger. *The Journal of Finance*, 26(2): 521-537.
- xlv. Markowitz, H. (1952). Portfolio Selection. *The Journal of Finance*, Vol. 7, No. 1, pp. 77-91.
- xlvi. Meir Statman (2010). *Behavioral Finance and Investment Management: Handbook of Finance*, Hoboken California.
- xlvii. Mugenda, M.O. & Mugenda, A. G. (2003). *Research Methods, Quantitative and Qualitative Approaches*, ACTS, Nairobi.
- xlviii. Mugenda, O. (2008). *Research Methods*. Nairobi: Acts Press.
- xliv. Mussweiler, T. & Schneller, K. (2003). "What Goes Up Must Come Down"—How Charts Influence Decisions to Buy and Sell Stocks. *The Journal of Behavioral Finance*. Vol. 4, No. 3, 121-130
- l. Mutswenje, V. & Jagongo, A. (2014). A Survey of the Factors Influencing Investment Decisions: The Case of Individual Investors at the NSE. *International Journal of Humanities and Social Sciences*, VOL4 (4)
- li. Mutswenje, V. (2017). Behavioral Biases and Individual Investor Portfolio Performance at The Nairobi Securities Exchange (Kenya). *International journal of humanities and social sciences*.
- lii. Nagy & Obenberger, (1994) "Factors Influencing Investor Behaviour", *Financial Analysts Journal*, Vol.50.
- liii. Ngechu M. (2004). *Understanding the Research Process and Methods and Introductions to*
- liv. *Research Methods*.
- lv. Nofsinger, J. R. & Sias, R.W. (1999). Herding and Feedback Trading by Institutional and Individual Investors. *The Journal of Finance*, 54(6), 2263-2295.
- lvi. Nofsinger J. R. (2005) Social Mood and Financial Economics. *Journal of Behavioral Finance* 6: 144-160.
- lvii. Nyamute, Lishenga & Oloko, (2015). Investor Behavior and Portfolio Performance at the Nairobi Securities Exchange, Kenya. *International Journal of Multi-Disciplinary Research and Development*. 2015, 548-551
- lviii. Odean, T. (1998). Are Investors Reluctant to Realize Their Losses? *The Journal of Finance*, 53(5), 1775-1798.
- lix. Olsen, R. A. (1998). Behavioral Finance and its Implication for Stock-Price Volatility, *Financial Analyst Journal*, 54(2), 10-18.
- lx. Oso, W. Y and Onen, D. (2008). *General guide to writing research proposal report (2nd edition)* Makerere Printers.
- lxi. Piaget, J. (1983). Piaget's Theory. P. Mussen (Ed). *Handbook of Child Psychology*. (4th Edition.) Vol. 1. New York: Wiley.
- lxii. Reluga, Timothy C.; Viscido, Steven (2005). "Simulated Evolution of Selfish Herd Behavior". *Journal of Theoretical Biology*. 234 (2): 213-225.
- lxiii. Reilly, F. K. & Brown, K. C. (2009) *Investment Analysis and Portfolio Management*, 10th Edition. Business School Edition and Stock-Track Coupon.
- lxiv. Saunders, M., Lewis, P. & Thornhill, A. (2007). *Research Methods for Business Students* (3rd Ed.). Harlow: Prentice Hall.
- lxv. Saunders, M., Lewis, P. & Thornhill, A. (2009). *Research Methods for Business Studies* (5th Ed.). Harlow; Prentice Hall.
- lxvi. Shapira, Z. & Venezia, I. (2000). Patterns of Behavior of Professionally Managed and Independent Investors. *Journal of Banking & Finance* 25. 1 573-1 587
- lxvii. Sharpe, W. F. (1964). Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk. *The Journal of Finance*, 19 (3), 425-442.
- lxviii. Shefrin, H. (2007). *A behavioral Approach to Asset Pricing*. Burlington, MA: Elsevier Academic.

- lix. Shefrin, H. & Statman, M. (1985). The Disposition to Sell Winners Too Early and Ride Losers Too Long: Theory and Evidence. *Journal of Finance*, 40, 777-790.
- lxx. Smith, E., (2008), *Using Secondary Data in Education and Social Research*, Buk Kingdom, Open University Press.
- lxxi. Sosa-Escudero, W. (2009). *Econometrics Analysis*, Final remarks, spring 2009, Economics507. <http://www.econ.uiuc.edu>, downloaded on 1 June 2014.
- lxxii. Törnren, G., & Montgomery, H. (2004). Worse than chance? Performance and confidence among professionals and laypeople in the stock market. *Journal of Behavioral Finance*, 5, 148-153.
- lxxiii. Tversky, A. & Kahneman, D. (1974). Judgment under Uncertainty: Heuristics and Biases. *American Association for the Advancement of Science, New Series*, Vol. 185, No. 4157. (pp. 1124-1131).
- lxxiv. Tversky, A. & Kahneman, D. (1992). Advances in Prospect Theory: Cumulative Representation of Uncertainty. *Journal of Risk and Uncertainty*, 5(4), 297- 323.
- lxxv. Viscido, Steven V.; Miller, Matthew; Wethey, David S. (2001). "The Response of a Selfish Herd to an Attack from Outside the Group Perimeter". *Journal of Theoretical Biology*. 208(3): 315-328.
- lxxvi. Viscido, Steven V.; Miller, Matthew; Wethey, David S. (2002). "The Dilemma of the Selfish Herd: The Search for a Realistic Movement Rule". *Journal of Theoretical Biology*. 217 (2): 183-194
- lxxvii. Waweru, N., M., Munyoki, E., & Uliana, E. (2008). The Effects of Behavioral Factors in Investment Decision-Making: A Survey of Institutional Investors Operating at The Nairobi Stock Exchange. *International Journal of Business and Emerging Markets*, 1(1), 24-41.
- lxxviii. Wells, C. S. & Wollack, J. A. (2003) *An Instructor's Guide to Understanding Test Reliability*. Testing & Evaluation Services. University of Wisconsin
- lxxix. Winchester, D.D., Huston, S.J., & Finke, M.S. (2011). Investor Prudence and the Role of Financial Advice. *Journal of Financial Service Professionals*, July 2011.
- lxxx. Zaiontz, S. (2013). Real statistics using excel. Real Statistics Resources. [www.real-statistics.com](http://www.real-statistics.com)

## Appendix

### Questionnaire

#### Dear Respondent

This questionnaire is aimed at investigating the influence of behavioral biases on investment decisions of individual investors in NSE. The information obtained through this questionnaire will be kept confidential and used solely for education purposes within the scope of this study. Your cooperation will be highly appreciated. Please read the questions carefully and feel free to answer them by giving your responses by ticking whichever option best describes your opinion.

#### Section A. Individual Investor Demographics

- 1) Location .....
- 2) Gender
  - i) Male .....
  - ii) Female.....
- 3) My age bracket
  - (i) 18 - 30
  - (ii) 31 - 40
  - (iii) 41 - 50
  - (iv) 50 and above
- 4) What is my level of education?
  - (i) Ordinary level
  - (ii) Advanced level
  - (iii) Certificate level
  - (iv) Diploma level
  - (v) Bachelor's level
  - (vi) Post graduate level
- 5) How much do I earn per month in KSHS.?
  - (i) Less than 20000
  - (ii) 20001 to 100000
  - (iii) 100001 to 200000
  - (iv) 200001 and above
- 6) How long have I been an investor in the stock market? 1-5 years  6 years  7 years ( ), 8-10 years ( ), over 10 years ( ).
- 7) How did I start investing at the Nairobi Securities Exchange? I was introduced by friends ( )  
Personal Initiative ( ), Advertisements ( ), Others ( ). Please specify.....
- 8) What is My occupation/profession? Accountant ( ), Teacher ( ), Engineer ( ), Medic ( ), Architecture ( ), No professional affiliation ( ), Businessperson ( ), Other occupation not listed ( ). Please specify.....

9) Using the CDSC accounts reports, kindly state the number of shares I have invested in from each company for each of the following years.

Year	Co.	2013 Shares.	2014 Shares.	2015 Shares.	2016 Shares.	2017 Shares.
	1.					
	2.					
	3.					
	4.					
	5.					
	6.					

Table 28

List more if any.

10) Do I seek financial advice from professional investment advisors as I make your stock buying and selling decisions? Yes ( ), No ( ).

10B) Please explain.....

11) How often do I purchase investments and continuously monitor their activity in order to exploit profitable conditions. Quarterly ( ), Half Yearly ( ), Annually ( ).

11B) Please explain.....

Section B. Individual Investor Behavioral Biases

12) On average in a period of three months, how many times do I transact on the stock market? More than four times ( ), Four times ( ), Two times ( ), Once ( ).

12B) Please explain.....

13) How do I rate my ability of financial knowledge and skills?

Above average ( ), Average ( ), Below average ( ), Not sure ( ).

13b) Please explain.....

14) How do I rate my own investment decisions?

Above average ( ), Average ( ), Below average ( ), Not sure ( ).

14B) Please explain.....

15) On average in a period of three months, how many times do I predict the development of the stock market?

More than four times ( ), Four times ( ), Two times ( ), Once ( ).

15B) Please explain.....

16) As an investor, how do I perceive yourself?

Above average ( ), Average ( ), Below average ( ), Not sure ( ).

16B) Please explain.....

17) If I make an investment and I'm exclusively optimistic about my investment decision then what is the reason of my optimism?

Good advice ( ), Strong market ( ), Own skills and knowledge ( ), Luck ( ), Not sure ( ).

17B) Please explain.....

18) If I make an investment and I'm excessively confident about my investment decision, then what is the reason of my confidence?

Good advice ( ), Strong market ( ), Own skills and knowledge ( ), Luck ( ), Not sure ( ).

18B) Please explain.....

B1. Fear of Regrets Bias on Investment Decisions of Individual Investors

Kindly tick the extent to which you agree or disagree with these statements on a scale of 5 (Strongly Agree) to 1 (Strongly Disagree), whereby:-

KEY: (5) Strongly Agree, (4) Agree, (3) Neutral, (2) Disagree, (1) Strongly Disagree.

		5	4	3	2	1
19	I'm not sure of the trend of the investment.					
20	I'm not sure of the constant increase in the investment.					
21	I consider my own investment to increase yearly by a certain constant percentage.					
22	I fear the stock investment to decrease twice in future than increase.					
23	I believe that my own investment can either increase or decrease in the same proportion.					
24	I'm sure the stock investment to increase twice in future than it will decrease.					
25	I am in doubt if my stock investment will increase constantly in the next five years.					
26	I am in doubt if my stock investment will result in gains or losses.					

Table 29

*B2. Human Availability Heuristics Bias on Investment Decisions of Individual Investors*

		5	4	3	2	1
27	I prefer to buy because it was recommended by a friend who is usually right about such things.					
28	I'm likely to take information as confirmation for sell of stock hence a good area for investment.					
29	In my own opinion one stock have more percentage in people decision making than other stock.					
30	In my own opinion USA provides the best investment opportunities.					
31	I rely on the past successful experience to determine the current outcome.					
32	I rely on a company's past stock returns when predicting for the best industry.					
33	I rely on a greater positive outcomes than smaller negative outcomes to make future decisions.					

Table 30

*B3. Mental Accounting Bias on Investment Decisions of Individual Investors*

		5	4	3	2	1
34	I prefer Asset A for kshs50 to Asset B for kshs40 despite increase of 8% and 10% respectively.					
35	I prefer Asset A for kshs50 to Asset B for kshs40 despite the decrease of 8% and 10% respectively.					
36	I prefer stock price kshs50 when it decreases by 8% at the end of the year than when it increases by 8% by half of the year.					
37	I prefer price of Asset A for kshs50 to price of Asset B for kshs40 despite the increase by 8% and decrease by 10% in 2016 and vice versa in 2017 respectively.					
38	I tend to rely on price of Asset A for kshs50 than Asset B for kshs40 when there is an increase of kshs6 and kshs4 respectively.					
39	I tend to rely on price of Asset B for kshs40 than Asset A for kshs50 when there is an increase of kshs4 on each by the end of the year.					
40	I prefer price of Asset A for kshs50 to price of Asset B for kshs40 when there is an increase of kshs4 on each by the end of the year.					

Table 31

*B4. Anchoring Bias on Investment Decisions of Individual Investors*

		5	4	3	2	1
41	My forecast the change in stock prices based on recent stock prices.					
42	I'm likely to sell the security at the end of the year because in my opinion it has achieved the maximum price level.					
43	I rely on my previous experiences in the market for your next investment.					
44	I rely on the past economic growth to determine the current.					
45	I prefer to buy local stocks than international stocks because the information of local stocks is more available.					
46	I rely on economic stability to predict the current					
47	I am likely to predict future stock prices basing on the past and current stock prices.					

Table 32

B5. Herd Mentality Bias on Investment Decisions of Individual Investors

		5	4	3	2	1
48	I think other investors' decisions of choosing stock types have impact on my investment decisions.					
49	I think other investors' decisions of the stock volume have impact on my investment decisions.					
50	I think other investors' decisions of buying and selling stocks have impact on my investment decisions.					
51	I react quickly to the changes of other investors' decisions and follow their reactions to the stock market.					
52	I prefer to be influenced by peers to adopt other investors' decisions than mine.					
53	I make decisions because others are making the same.					
54	I believe decisions made by majority is always the right ones.					

Table 33

B6. Individual Investment Decisions

		5	4	3	2	1
55	I prefer to invest in the stock of my choice.					
56	I tend to think my choice of stock is the best stock to invest.					
57	I prefer to invest in a stock that will earn me more profit in a short period.					
58	I tend to rely on stock that sell in shorter time than the one that takes longer time to be sold.					
59	I prefer to invest in the stock that can be easily procured.					
60	I prefer to invest in the stock that you can benchmark with others.					
61	I prefer to invest in the stock which is stable and sustainable.					

Table 34

Section C. Individual Investment Decisions

62) When making investment decisions to what extent do I rely on expected corporate earnings?

Very Great Extent ( ), Great Extent ( ), Not Sure ( ), Small Extent ( ), Not at All ( ).

62B) Please explain.....

63) When buying a share of a company on the stock market to what extent do I consider past performance of the company's stock?

Very Great Extent ( ), Great Extent ( ), Not Sure ( ), Small Extent ( ), Not at All ( ).

63B) Please explain.....

64) When selling a share of a company on the stock market to what extent do I consider past performance of the company's stock?

Very Great Extent ( ), Great Extent ( ), Not Sure ( ), Small Extent ( ), Not at All ( ).

64B) Please explain.....

65) When making investment decisions to what extent do I consider the development of the NSE All Share Index?

Very Great Extent ( ), Great Extent ( ), Not Sure ( ), Small Extent ( ), Not at All ( ).

65B) Please explain.....

Thank You for Filling the Questionnaire.

Investment Banks	
1.	Dyer & Blair Investment Bank Ltd.
2.	Suntrap Investment Bank Ltd.
3.	Kingdom Securities Ltd.
4.	Francis Drummond & Company Ltd.
5.	Old Mutual Securities Ltd.
6.	Africa Investment Bank Ltd.
7.	Sterling Capital Ltd.
8.	Ngenye Kariuki & Co. Ltd.
9.	Apex- Africa Capital Ltd.
10.	Faida Investment Bank Ltd
11.	NIC Securities Ltd.
12.	African Alliance Kenya Investment Bank Ltd.
13.	Standard Investment Bank Ltd.
14.	Kestrel Capital (EA) Ltd.
15.	Genghis Capital Ltd.

Investment Banks	
16.	CFC Stanbic Financial Services.
17.	SBG Securities Ltd.
18.	ABC Capital Ltd.
19.	Renaissance Capital (Kenya) Ltd.
20.	CBA Capital Ltd.
21.	Equity Investment Bank Ltd.
22.	KCB Capital Ltd.

Table 35: List of Investment Banks

Source: CMA (2019)

	Investment Banks	Estimated Target Population	Proportion	Sample Size
1.	Dyer & Blair Investment Bank Ltd.	106,000	0.13	49
2.	Suntrap Investment Bank Ltd.	92,000	0.11	43
3.	Kingdom Securities Ltd.	68,000	0.08	31
4.	Old Mutual Securities Ltd.	68,000	0.08	31
5.	Francis Drummond & Co. Ltd.	62,000	0.07	28
6.	Faida Investment Ltd.	54,000	0.06	24
7.	Africa Investment Bank Ltd.	49,000	0.06	23
8.	Apex - Alliance Kenya Investment Bank Ltd.	44,000	0.05	20
9.	Ngenye Kariuki & Co. Ltd.	43,000	0.05	20
10.	African Alliance Kenya Investment Bank Ltd.	40,000	0.05	18
11.	CFC Stanbic Financial Services	38,000	0.05	18
12.	Sterling Capital Ltd.	36,000	0.05	17
13.	Kestrel Capital (EA) Ltd.	36,000	0.05	17
14.	Standard Investment Bank Ltd.	32,000	0.04	15
15.	NIC Securities Ltd.	32,000	0.04	15
16.	Genghis Capital Ltd.	31,000	0.04	15
	Total	831,000	1.00	384

Table 36: Distribution of Respondents among Investment Banks

Research Objectives	Research Hypotheses	Data Analysis Method	Decision Rule of 5% Significance level (if p-values >0.05, fail to reject Ho and vice versa).
To determine the effect of fear of regrets bias on investment decisions of individual investors' in NSE.	H01- Fear of regrets bias has no significant influence on investment decisions of individual investors' in NSE.	*Simple Linear Regression Analysis.	p-values >0.05 fail to reject Ho
To establish the effect of Human Availability Heuristics bias on investment decisions of individual investors' in NSE.	H02- Human availability heuristics bias has no influence on investment decisions of individual investors' in NSE.	*Simple Linear Regression Analysis.	p-values >0.05 fail to reject Ho
To examine the effect of Mental Accounting bias on investment decisions of individual investors' in NSE.	H03- Mental accounting bias has no influence on investment decisions of individual investors' in NSE.	*Simple Linear Regression Analysis.	p-values >0.05 fail to reject Ho
To explain the effect of Anchoring bias on investment decisions of individual investors' in NSE.	H04- Anchoring bias has no influence on investment decisions of individual investors' in NSE.	*Simple Linear Regression Analysis.	p-values >0.05 fail to reject Ho
To determine influence of herd mentality bias on investment decisions of individual investors' in NSE.	H05- Herd mentality bias no influence on investment decisions of individual investors' in NSE.	*Simple Linear Regression Analysis.	p-values <0.05 reject Ho

Table 37: Tests of Hypotheses

Portfolio Information	2013	2014	2015	2016	2017
MPS per Investor					
364 T-Bill					
NSE A11 Share Index					
DPS per Investor					

Table 38: Secondary Data Collection Tool

Source: Researcher (2019)

<b>Agricultural</b>	<b>Commercial &amp; Services</b>	<b>Insurance</b>
Eaagads Ltd.	Express Ltd.	Jubilee Holdings Ltd.
Kapchorua Tea Co. Ltd.	Kenya Airways Ltd.	Pan Africa Insurance Holdings Ltd.
Kakuzi Ltd.	Nation Media Group	Kenya Re- Insurance Corporation Ltd.
Limuru Tea Co. Ltd.	Standard Group Ltd.	Liberty Kenya Holdings Ltd.
Rea Vipingo Plantations Ltd.	TPS Eastern Africa (Serena) Ltd.	British- American Investments Co. (Kenya) Ltd.
Sasini Ltd.	Scangroup Ltd.	CIC Insurance Group Ltd.
Williamson Tea Kenya Ltd.	Uchumi Supermarket Ltd.	Energy And Petroleum
<b>Banking</b>	Hutchings Biemer Ltd.	Kenya Power & Lighting Co. Ltd.
Barclays Bank Ltd.	Longhorn Kenya Ltd.	Kenol/ Kobil Ltd.
CFC Stanbic Holdings Ltd.	Atlas Development and Support Services.	Total Kenya Ltd.
I & M Holdings Ltd.	Construction And Allied	Kengen Ltd.
Diamond Trust Bank Kenya Ltd.	Athi River Mining.	Umeme Ltd.
Housing Finance Co. Ltd.	Bamburi Cement Ltd.	Automobiles & Accessories
Kenya Commercial Bank Ltd.	Crown Berger Ltd.	Car & General (K) Ltd.
NIC Bank of Kenya Ltd.	E.A. Cables Ltd.	Sammeer Africa Ltd.
National Bank of Kenya Ltd.	E.A. Portland Cement Ltd.	Marshalls (E.A.) Ltd.
Standard Chartered Bank Ltd.	INVESTMENT	
Equity Bank Ltd.	Olympia Capital Holdings Ltd.	
The Co-operative Bank of Kenya Ltd.	Centum Investment Co. Ltd.	

Table 39: List of Companies at the NSE

<b>Independent Variable</b>	<b>No. of Items</b>	<b>Cronbach Alpha</b>	<b>Composite Index (0.890)</b>	<b>Test for fitness (&gt;0.7) implies good test for fitness</b>
Fear of Regrets Bias	5	0.964		Good test for fitness
Human Availability Heuristics Bias	5	0.807		Good test for fitness
Mental Accounting Bias	5	0.926		Good test for fitness
Anchoring Bias	5	0.809		Good test for fitness
Herd Mentality Bias	5	0.834		Good test for fitness

Table 40: Reliability Tests

## Research Authorization

	<b>Activities</b>	<b>July 2018</b>	<b>June 2019</b>	<b>Aug 2019</b>	<b>Oct 2019</b>	<b>Nov 2019</b>	<b>Dec 2019</b>
1.	Investigation Determination of Research topic (concept paper)						
2.	Meetings and Discussions						
3.	Allocation of Supervisor						
4.	Meeting with Supervisors						
5.	Building on introduction & background to the problem.						
6.	Building on Problem Statement, Justification & Scope						
7.	Building on Literature Review and Methodology						
8.	Defense of Proposal						
9.	Approval for Data Collection						
10.	Data Collection						
11.	Data Analysis						
12.	Evaluation & Validation of Data						
13.	Conclusion, Recommendation & Printing						
14.	Defense of Final Project						
15.	Correction & Final Submission						

Table 41: Work Plan

<b>Item</b>	<b>Activity</b>	<b>Unit Cost</b>	<b>Total Cost</b>
Stationery	1 ream of ruled papers	450.00	450.00
	4 reams of photocopying papers	500.00	2000.00
	5 folders	100.00	500.00
	1 dozen pens	240.00	240.00
	3 field note books	70.00	210.00
<b>Subtotal</b>			3400.00
Services	Typesetting and printing	5000.00	5000.00
	Photocopying	10,000.00	10,000.00
	Binding	3,000.00	3,000.00
	Internet Browsing	10,000.00	10,000.00
Subtotal			22,000.00
Transport	Researcher	30,000.00	30,000.00
Subtotal			30,000.00
Subsistence	Researcher	15,000.00	15,000.00
Subtotal			15,000.00
Grand total			70,400.00

*Table 42: Budget*