

**INFLUENCE OF COGNITIVE BIASES ON  
INVESTMENT DECISION MAKING IN PROPERTY  
MARKET IN PLATEAU STATE, NIGERIA**

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AGRICULTURE AND TECHNOLOGY**

**2018**

**Influence of Cognitive Biases on Investment Decision Making in  
Property Market in Plateau State, Nigeria**

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**A Thesis Submitted in Partial Fulfillment of the Requirements for  
the Degree of Doctor of Philosophy in Finance in the Jomo Kenyatta  
University of Agriculture and Technology**

**2018**

**DECLARATION**

This thesis is my original work and has not been submitted for a degree in any other university

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## **DEDICATION**

This thesis is dedicated to God almighty for His enduring love which cannot be quantified, to my family who taught me to follow my dreams and actualize them, to my wife and to my children for encouraging me to complete this program.

## **ACKNOWLEDGEMENTS**

I thank the Almighty God for the gift of life and seeing me through this scholarly journey. I am very thankful to my supervisors: Prof. Willy M. Muturi and Dr. Florence Memba for their valuable contributions in the development and completion of this thesis. I am most grateful to my wife, Mrs Hannatu Ishaya Dashol, and my children for their moral support throughout the duration of the program. I am highly indebted to the Yakmap's for their unflinching support, advice and encouragement for reaching this feat. I am also thankful to Dr/Mrs Yakubu Dashe for their support, Engr Philip Dashibil and my brothers who stood by me at the most trying moments. I appreciate the kind support of the presiding pastor of Global Life Mission, Apst Joseph Danladi Dafohom, for standing by me in the gap. I thank the Lecturers who put me through the course work. I wish to thank my PhD Finance classmates for adding value to this thesis. I appreciate all persons, who in one way or the other, have helped in prayers, moral or financial support, etc. May the good Lord reward each and everyone accordingly. I am particularly grateful to all respondents of the questionnaires without which this research would not have been accomplished. I also thank Mr. Alumasi Mike for analyzing the data used in this research.

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## **LIST OF ABBREVIATIONS AND ACRONYMS**

<b>ANOVA</b>	Analysis of Variance
<b>FDI</b>	Foreign Direct Investment
<b>FHA</b>	Federal Housing Authority
<b>GPG:</b>	Global Property Guide
<b>IMF:</b>	International Monetary Fund
<b>IPAs:</b>	Investment Promotion Agencies
<b>LDCs</b>	Less Developed Countries
<b>MDGs:</b>	Millennium Development Goals
<b>NSE:</b>	Nairobi Stock Exchange
<b>OECD</b>	Organisation for Economic Cooperation and Development
<b>SPSS:</b>	Statistical Package for Social Sciences
<b>UAE:</b>	United Arab Emirates
<b>UK:</b>	United Kingdom
<b>UNIDO</b>	United Nations Industrial Development Organization
<b>USA:</b>	United States of America

## DEFINITIONS OF KEY TERMS

**Anchoring:** is a psychological heuristic which can be said to occur when investors give unnecessary importance to statistically random and psychologically determined ‘anchors’ which leads them to investment decisions (Kahneman & Tversky, 1979).

**Behavioural finance:** is a relatively new paradigm of finance, which seeks to supplement the standard theories of finance by introducing behavioural aspects to the investment decision making process (Warne, 2012).

**Bias:** is tendency to overestimate the likelihood of favourable events, and to underestimate the likelihood of unfavourable events (Virine & Trumper, 2008).

**Cognitive bias:** A cognitive bias is a systematic discrepancy between the “correct” answer in a judgmental task, given by a formal normative rule, and the decision makers or experts actual answer to such a task (Von Winterfeldt & Edwards, 1986).

**Overconfidence:** can be summarized as unwarranted faith in one’s intuitive reasoning, judgments, and cognitive abilities (Pompian, 2006).

**Property market:** The buying, selling and renting of land or buildings Odosute (2015).

**Representativeness** refers to the degree of similarity that an event has with its parent population or the degree to which an event resembles its population (Kahneman & Tversky, 1979).

**Investor Decision Making** is an allocation of resources for medium or long term and the expected effect is to recover the investment costs and have a high profit (Avram *et al.*, 2009).

## ABSTRACT

A big number of investors are investing in property market without sound decision making leading to stagnation of investment. Thus, this study was aimed at establishing the cognitive biases influencing investment decision-making in property market in Plateau State, Nigeria. Five objectives guided the study; the influences of anchoring bias, overconfidence bias, narrow framing, representativeness bias and disposition effect on investors' decision making. Descriptive research design was used in the study. The study population comprised of 1650 registered property investors who were investment traders at the property market in Plateau State and licensed to operate in the property market in the state. Property investors were targeted. Multi-stage sampling procedure was used in the selection of representative sample comprising of purposive sampling and the normal approximation to the hyper-geometric distribution to select the sample size. The final sample size was thus comprised of 312 respondents. Primary data was collected using standard questionnaires with both closed and open ended questions. Cronbach's Alpha Test was used to test the internal consistency reliability of measurements. The study employed both descriptive and inferential statistics to allow presentation of data in a more meaningful way and thus simpler interpretation of data. The study performed tests on statistical assumptions such as test of regression assumptions and statistics used. This included tests of reliability, normality, linearity, independence, heteroscedasticity and multicollinearity. The linear regression analysis results further confirmed that there was a significant positive linear relationship between anchoring bias, overconfidence, narrow framing and representativeness bias in investors' decision making in property market in Plateau State, Nigeria. The study concluded that anchoring bias, overconfidence, narrow framing, and representativeness and disposition effect in making investment decisions is solely determined by years of experience as an investor. The positive coefficient on these variables was consistent with expectations that more experienced investors used more personal judgment in making decisions. The study further concluded that investors need to invest for the long-term, identify their level of risk tolerance, determine an appropriate asset allocation strategy, and rebalance portfolios at least yearly. The main recommendation for investors is to make constant attempts to increase their awareness on behavioral finance by educating themselves on the field. Studying about the biases and reflecting on their decisions are likely to help achieve better self-understanding of the extent and manner to which they gets influenced by emotions while making financial decisions under uncertainty. Even after satisfactory awareness is achieved, it is highly recommended that they maintain a chart of the behavioral biases they are likely to be vulnerable to.

## CHAPTER ONE

### INTRODUCTION

#### 1.1 Background of the Study

There are several investment decisions related to property trading, such as: buying, selling, choice of property, length of time to hold property, and size of property to trade. However, in this part, two important property trading decisions: selling and buying are focused because they have connection to the other decisions, and high impact on the investment decisions (Tversky, 1979). Behavioural economists attribute the imperfections in property markets globally to certain biases. These biases include cognitive biases such as overconfidence, overreaction, representative bias, information bias, and various other predictable human errors in reasoning and information processing. These have been researched by psychologists such as Kahneman (1979), Tversky (1979), Thaler (1994), and Slovic (2000).

A cognitive bias is a systematic discrepancy between the “correct” answer in a judgmental task, given by a formal normative rule, and the decision makers and experts' actual answer to such a task (Kahneman, Slovic, Tversky, 1982; and Gilovich, Griffin, Kahneman, 2002). Thus, cognitive biases can further be viewed as a negative consequence of adopting heuristics. They are a discrepancy between someone’s judgment and reality and can be cognitive (Virine & Trumper, 2008).

Previous studies report that investors decrease the selling decisions of assets that get a loss in comparison to the initial purchasing price, a trend called the “disposition effect” by Shefrin and Statman (2005). Odean (2005) confirms the same conclusion that individual investors tend to sell properties which their values, in comparison to their original buying price, increase rather than sell the decreasing ones. However, it is difficult to demonstrate this phenomenon in the rational ground. It is not really reasonable to conclude that property investors rationally sell winning properties because they can foresee their poor performance. Besides, Odean also recognizes that the average return of sold properties is greater than that of the average return of properties that investors hold on.

Investment in property is viewed as an engine of sustainable growth (Ahn & Hemmings, 2000). However, in less developed countries (LDCs) the national level of savings is very low (Javorcik & Smarznska, 2004). Thus, there is a wide gap between the required rate of investment in property market and the existing rate of such investments (Asiedu, 2006). The Brussels Declaration enclosed 30 worldwide development goals for LDCs, together with the realization of an investment to GDP ratio of 25 per cent and an annual GDP growth rate of at least 7 per cent in order to attain sustainable progress and poor quality reduction in LDCs (United Nations, 2010).

Property investment is largely regarded as a potential basis of supporting growth and development of the developing and developed nations (Blomstrom & Kokko, 2003). According to the Global Property Guide (GPG) and the Global Housing Watch (IMF, 2015), strategies of attracting investment in the property market turned out to be a greatly used technique of many governments all over the world to advance their economies. As a result of this, several studies were dedicated to the techniques of how best to do it. One such studies is the United Nations (2000) millennium development goals (MDGs), a survey of property development in a number of countries with strategies to attract investments for the development of affordable housing for all citizens.

Further, the United Nations Industrial Development Organization (UNIDO) reported that the stream of foreign direct investment (FDI) internationally reached a towering level of USD 1.3 trillion in the year 2000. Investment promotion agencies (IPAs) in several parts of the globe, particularly in the well advanced economies of Europe and North America, and also the flourishing Asian economies of China, recorded great volumes of property market business and celebrated great triumph in attracting fresh investment to their countries. Generally this investment flow, however, was concentrated in the well-developed parts of the European Union, the United States and Japan which jointly accounted for 71% of global inflows from the Foreign Direct Investors (UNIDO, 2008).

Jensen and Malesky (2010) affirmed that irrespective of broad uncertainty about the gains of globalisation, the majority of U.S. states had offered rewarding opportunities to draw investments in property. Accordingly, the African share of world investment fell from its initial one percent to a further low of a meagre 0.67%. As a result, African countries were encouraged and supported to establish Investment Promotion Agencies (IPAs) so as to “promote” their attractions and fashion a one-stop-shop and to facilitate the passageway for external investors in the property market. In contrast, in the year 2006, Nigeria with an estimated population of 160 million attracted FDI of over USD 22 billion, while Malaysia with much less population and far-off less natural endowments attracted investments that almost tripled the Nigeria’s figure of USD 22 billion and not much has altered since then (UNIDO, 2008). Nigeria formed an Investment Promotion Agency, (Nigerian Investment Promotion Commission (NIPC) to provide a “one-stop-shop” to facilitate the course and eradicate impediments in front of inward investments in other sectors including investment in the property market (UNIDO, 2008).

According to (Somil, 2007), behavioural finance is the study of how human psychology, thoughts, feelings and attitudes (such as confidence) influence financial decisions and behaviours. Behavioural finance is based on psychological factors and contends with market efficiency and investors’ rationality. According to (Shiller, 2007) behavioural finance is the study of the influence of psychology on the behaviour of financial practitioners and the subsequent effect on market.

There are two sets of psychological factors-Cognitive (the way of thinking) and Emotional (the way people feel). Behavioural finance is based on the cognitive psychology (how people think) and the limit to arbitrage (when market will be inefficient). Rather than using all the available information, people select some important information (Shiller, 2007). Psychological factors influence investment decision so that investors have been found to make irrational decision (Graham, Harvey & Huang, 2009).

People invest in the property market for different reasons. Some of the investors invest in the property market for commercial purpose, some for resale, and some for investment purpose and many other reasons. But when they invest in the property market, they do not know that certain factors affect their investment decision (Statman, Fisher & Anginer, 2008). Many people make investment emotionally, feeling fantasy; mood and sentiments have been observed to affect investment decision. There are some psychological factors that affect the investors in investment decision (Shanmugsundaram & Balakrishnan, 2011). Investors are affected by how investment problems are presented to them. They often make different choices pertaining similar scenarios depending on how the problem has been framed (Jordan & Miller, 2008).

Most of the research that has been conducted on investment decision making have focused on influences of behavioural factors on investors while investing and have been done in Europe, Asia, and the Middle East while inconclusive studies have been undertaken in the emerging markets like Nigeria (Wang, 2005; Khim, 2008; Luong & Ha, 2011; Coval & Shumway, 2005; Dunusinghe & Ranasinghe, 2015). However, this study intends to streamline the research to cognitive biases on investment decision making, among other biases such as emotional bias and so on, in order to consider its influence on investors' decision making.

### **1.1.1 Cognitive Biases on Investment**

Decision makers also tend to make judgments based on an initial assessment as anchor, but fail to make sufficient adjustments later on. It is the tendency to rely on

one trait or piece of information when making decisions. Virine and Trumper (2008) categorized several cognitive biases into four types: (i) behavioural biases and biases related to perception; (ii) biases in estimation of probability and belief; (iii) social and group biases; and (iv) memory biases and effects. Studies have also been conducted all over the world on the relationship between behavioural patterns of investors and investment decisions. Hussein and Al-Tamimi (2006) investigated the factors influencing the United Arab Emirates (UAE) investor behaviour where it was found that six factors were the most influencing factors; expected corporate earnings, get rich quick, stock marketability, past performance of the firm's stock, government holdings, the creation of the organized financial market.

Gattimore (2007) studied the interaction between demographic and financial behavioural factors in investment decisions. The study was conducted to find the impact of demographic factors influencing individual investors' behaviour. It showed that gender interacts with five financial behavioural factors i.e. overreaction, herding, cognitive bias, irrational thinking, and overconfidence and the level of individual savings interacts with only four of the financial behavioural factors; overreaction, herding, cognitive bias, and irrational thinking. Yosra and Boujelbene (2013) study revealed that Tunisian investors do not always act rationally while making investment decisions. The study concluded that herding attitude, representativeness, anchoring, loss aversion, and mental accounting all influence the Tunisian investors' perception of their decision making process.

### **1.1.2 Property Market Investment in Nigeria**

The Nigerian property market has evolved extensively with great opportunities for investors, particularly in states like Rivers, Kano, Enugu, Kaduna, Oyo, Lagos and the capital city Abuja. These regions have witnessed great upturn of investors, plunging millions of dollars in the real estate sector, especially in the commercial sectors. The growing interest in the Nigerian Market is due to high demand raised by the increase in urban population and change in shopping culture among the increasing population. These factors have resulted in the upspring of numerous shopping malls. The Nigerian property market remains attractive with numerous

opportunities in the following sectors of the market; Retail Real Estate, Office blocks and Serviced Apartments (Federal Housing Authority, 2015).

Nigeria has several major cities across the states and the federal capital; Lagos, Abuja, Enugu, Ibadan, Jos Plateau, Kano, Kaduna and Port-Harcourt and which are the nation's first tier cities. Each of them has its own distinct economic drivers and they all function on a somewhat national scale. They all have potentials for investors in the property market due to the upsurge in urbanization (Sonibare & Akeredolu, 2006).

For instance, according to the National Population Census (2006), the city of Lagos is a metropolis of about 14 million people and for all practical purposes encompasses the entire state of Lagos. It is the financial capital of the country and arguably of West Africa as a whole: Home to the headquarters of the major financial institutions in the country as well as country headquarters for multinational companies such as ExxonMobil and Chevron (Falola & Heaton, 2008). Thus, it is a hub of property investment. The city of Abuja is located in the country's Federal Capital Territory (FCT) and is home to the Federal Government Executive, Legislative and Judiciary. As such all the other operations, both public and private, that are related to Federal Government activities are also present in the region (Falola & Heaton, 2008).

Even though the population, at about 1.5million inhabitants is much less than 14 million of Lagos, it provides a very elite population with a significant number of foreign nationals and expatriates due to the presence of embassies, consulates and international organizations (Odosute, 2008). Port-Harcourt is the capital city of Rivers state, and as the state name implies is located in the riverine areas of the Niger delta, home to the bulk of the country's famous oil deposits. Port Harcourt has become the center of the activities for this region, and is driven primarily by the oil extracting and exploration industries (Odosute, 2008).

Based on what little real estate information available, and the macro-economic potentials of the country, the real estate sector is beginning to see dedicated capital

being raised towards investment. International Private Equity firms and fund managers - most of them with an emerging market focus, having invested in other such markets as India and China - are slowly beginning to seek real estate investments in Nigeria (Federal Housing Authority, 2015).

Nigeria's real estate industry is still grossly underdeveloped, with very limited and in some cases non-existent institutional quality product (Odusote, 2008). However the continued interest of investors in the region, spurred by current real estate fundamentals and a positive macro-economic outlook, point to growth in the market; if not all over the country, in the short to medium term, at least in its major markets of Lagos, Abuja and Port-Harcourt (Odusote, 2008). The evolution of Nigerian real estate has been greatly influenced by the laws and institutions in which it is nested, as well as the policy environment through time. From the legal right to own land, to the limits on leasing, to the mortgage interest rate charged; all have had a bearing on the profitability of the form of real estate developed (Federal Housing Authority, 2015).

Nigeria is in the midst of a housing boom, primarily due to the great demand created by a rising population. Nigeria's housing deficit is estimated to be 17 million as of August 2015. Yet demand is characterized by high inequality, creating a dichotomy between the demand for luxury secure accommodation for high-income earners, and low-cost, affordable housing for the masses (Odusote, 2008). In Nigeria's urban centres, particularly Lagos, Abuja and Port Harcourt, recent years have seen a hike in housing prices on a scale that is rarely seen in developing cities. Globally, the highest real estate price rises over the last decade have been recorded in nations such as India, which saw prices rise 284% between 2001 and 2011, and Russia, which saw an increase of 209% in the same period. However, in cities such as Lagos, it is estimated that house prices rose by 400-500% between 1998 and 2013 (Federal Housing Authority, 2015).

According to the Federal Housing Authority (2015), approximately 7,343 establishments make up the real estate sector in Nigeria. Lagos State and the Federal

Capital Territory (FCT), Abuja dominate, with 2,342 and 1,677 establishments respectively, making a combined total of over 50% (31.89% and 22.84% respectively) of all real estate establishments in Nigeria. Proportionally, Abuja has a far greater number of establishments per capita, and a higher real estate value than Lagos. The third greatest number is Rivers State, with 422 establishments, at a much lesser 5.75% of the total. Both Borno and Jigawa states have the fewest Real Estate Establishments, with 7 each, representing less than 0.10% of the total, yet these are two of the states where property registration is easiest.

Odosute (2015) opined that Real Estate establishments can be classified as engaging in one of two activities; those that deal in own or leased property, and those that provide real estate services on a fee or contract basis. At the state level, Lagos has a majority of establishments dealing in own or leased properties of 59.31%, and thus 40.69% offering services on a fee or contract basis. Federal Capital Territory (FCT) Abuja had a more equal split of 50.33% of Real Estate activities using own or leased property and 49.67% on a fee or contract basis. Five states had real estate establishments with only own or leased property, namely Borno, Jigawa, Sokoto, Yobe and Zamfara. Only Nasarawa State recorded establishments that offered services on a fee or contract basis. The total income received across all Nigerian real estate establishments was recorded at N743,745.54 million in 2010. It increased by 32.73% in 2011 to N987,191.97 million. With a slower increase by 16.59% or N163,754.79 million, 2012 saw total income come to N1,150,946.76 million.

Although the value of properties in Nigeria, especially Lagos, Port Harcourt and Abuja, has moved in tangent with the global market price following the 2007/08 global crises, recent research indicated that property values have rebounded in other state cities like Plateau, Oyo, Sokoto, Katsina and Kaduna. In Jos, Plateau state, a number of residential properties are slowly being converted to commercial facilities, as landlords get more value for commercial properties (Lands & Survey, 2015).

### **1.1.3 Property Market Investment in Plateau State, Nigeria**

Nigeria is made up of thirty-six states with Abuja as the capital city. Plateau State is situated in the North-Central and the middle belt zone of Nigeria. Jos is the capital city of Plateau State, linked by road, rail and air to other parts of the country. Plateau state is known among the thirty-six states in Nigeria to be endowed with cool and temperate climate as against other states in the country with hot weather conditions. This has attracted both serving and retired top government officials and businessmen from all parts of the country to invest in the property market in the state as most of them prefer to reside in the state after their retirement. The state has often been classified as a miniature Nigeria with virtually all the tribes in the country residing there.

Apart from its favourable climate and tourist attractions, the state is also known to be blessed with natural resources such as tin, columbite, and lead among others. These resources have attracted investors from within and beyond which has resulted in the increase in property development by investors (Nwude, 2012). However, most of the investors tend to exhibit certain biases as overconfidence, representativeness bias and herding in making their investment decisions in the property sector in Nigeria (Obamuyi, 2013).

Although ethnic differentiation has been a factor of most Nigerian states, including Plateau State, the situation on the ground reveals that property rates have maintained an upward movement from 2001 to 2009 (Dung-Gwom & Rikko, 2009). With a population of above three million people, Plateau State remains one of the cherished states for investors in Nigeria. It was adjudged the "home of peace" or as the safest state to live in Nigeria (Dung-Gwom, 2008). Likewise the sales value of tenement, flat, duplex, semi-detached house and four bedroom bungalows have increased gradually from 2001 until 2009 when a sharp rise was observed, which continued till 2012 (Aliyu, 2012).

Looking at what is being witnessed in the state presently, the scenario is entirely different because the sales and rental values of landed properties is increasing and is

maintaining a steady upward movements as at 2012, and this contrasts the reality on other major states where there is a decline in the property market due to global decline of the oil sector (Aliyu, 2012). Housing and land price in the state has been on an upward increase (Aliyu, 2012). The basic questions arising from this scenario are: What are the cognitive biases that have influenced the investors to invest in the Plateau State property market in Nigeria?

#### **1.1.4 Global Perspective of Investor Decision Making**

A research done by Foster, Reidy, Misra and Goff (2011) showed that advice from husband/relatives, advice from friends and colleagues, advice of experts, advertisement regarding investment and own perceptions, in that order, were the most important factor that influenced the employed women to make their investment decisions. A study by Luong' and Ha (2011) found five behavioural factors affecting the investment decisions of investors in a stock exchange in China. These were: herding, market prospect, overconfidence and anchoring bias. Skousen (2007) added to this list, other factors such as wars and terrorist threats, speeches by political leaders, natural disasters, national elections, economic rises, nationalization of corporate assets, and the death of a senior politician such as a prime minister, among others.

Brahmana *et al.* (2012) conceptually built a framework that linked the psychological biases such as attention bias, heuristic bias, regret bias and cognitive bias to individual investor decisions. Chandra and Sharma (2010) undertook a study within the geographical area of Delhi and National Capital Region to identify the major psychological biases that influence the individual investors' behaviour and that, in return, may drive a momentum effect in stock returns.

Their study found that the individual investors' behaviour is driven by some psychological factors such as conservatism, under-confidence, opportunism, representativeness and informational inferiority complex. However, Alghalith *et al.* (2012) empirically tested dominant theories and assumptions in behavioural finance,

using data from the Standard & Poor's 500 index. Their findings suggested that differences in psychological biases did not determine their investment preferences.

### **1.1.5 Regional Perspective of Investor Decision Making**

Olweny and Kimani (2011) studied the influence of the stock market on the Kenyan economic growth established that rise in the NSE 20 share index signaled a better market, expecting of better dividends, better profits and in turn a rise in economic growth. Although such a scenario would mean more investments in the stock market, it does not always happen; meaning that there are other factors at play (cognitive biases) in making such investment decisions at the Nairobi Securities Exchange.

A study by Johnson, Lindbon and Platan (2002) on factors that influenced the speculative bubble during the 1998-2000 involved a survey of 160 private investors drawn from Aktiesprarna Association in South Africa in December 2001 and 47 institutional investors comprising of banks, mutual funds and investments banks was conducted by use of a questionnaire. The study findings were that herd instincts, cognitive dissonance, anchoring and loss aversion contributed significantly to the speculative bubbles as well as overconfidence. Kahuthu (2011) examined another heuristic bias known as herding was at play at pricing of stock at the NSE. The study established that herd instinct exists and that some investors were influenced by others while others relied on technical analysis made by financial experts.

## **1.2 Statement of the Problem**

Property investment has huge potential from its sales and rental value which has attracted a lot of asset investors to venture into property development. However, many investors in Plateau State property market in Nigeria are losing their investment in an attempt to exploit the massive opportunity in this sector (Alleyene & Broome, 2010). This has resulted into making many property investors to develop more properties and also modify and beautify the already existing ones (Agarwal & Panwar, 2014). In making the fundamental decision to invest in property, investors'

decision making is often driven by personal judgements, emotional and cognitive biases as well as other behavioural factors (Alleyene & Broome, 2010).

The property market in Plateau State is dominated by a few institutional players. A big number of investors are investing in property market without sound decision making leading to stagnation of investment (Aliyu, 2012). The lack of knowledge and information on fundamental decision making strategies among investors in the property market has led to massive loss and frustrations after investing in unprofitable ventures (Nwude, 2012).

Aregbeyen and Mbadiugha (2011) found that the most influencing factors on investors' decisions are: future financial security, recommendations by reputable and trusted stock brokers, management team of the company, awareness of the prospects of investing in shares, composition of the board of directors of companies and recent financial performance of the company. Tomola (2013) found that investment decisions of investors in Nigeria are influenced by past performance of the company stock, expected stock split/capital increases/bonus, dividend policy, expected corporate earnings and get-rich-quick.

Fares and Khamis (2011) investigated investors' stock trading behaviour at the Amman Stock Exchange, Jordan. They identified four behavioural factors (age, education, accessibility to the internet and interaction between the investor and his/her broker) that influenced investors' trading decisions. Waruingi (2011) established that there are five behavioural factors affecting the investment decisions of individual investors at the Nairobi Securities Exchange: Herding, Market, Prospect, Overconfidence-gamblers fallacy, and Anchoring-availability bias. Luong and Ha (2011) shows that there are five behavioural factors affecting the investment decisions of investors at the Ho Chi Minh Stock Exchange, Vietnam: Herding, Market, Prospect, Overconfidence-gamblers fallacy, and Anchoring-ability bias.

Not many studies have been pursued in the developing world especially in Nigeria on cognitive biases influencing investors' decision making. Mostly, the majority of the

researchers in behavioural finance in Nigeria tend to give more importance to investors' behaviour in the stock exchange rather than investor behaviour in the property market. Various scholars have attempted to establish the determinants of investors' decision making in Nigeria. However, there exist theoretical, conceptual and methodological gaps that the current study sought to address. All the studies analysed in this section generalized on the behavioural factors in forming investors' decision making and were not specific on the key cognitive biases determining the investors' decision making.

### **1.3 General Objective**

The main objective of this study was to establish the influence of cognitive biases on investment decision-making in property market in Plateau State, Nigeria.

#### **1.3.1 Specific Objectives**

The specific objectives were:

- i. To determine the influence of anchoring bias on investment decision making in property market in Plateau State, Nigeria.
- ii. To identify the influence of overconfidence bias on investment decision making in property market in Plateau State, Nigeria.
- iii. To explain the influence of narrow framing on investment decision making in property market in Plateau State, Nigeria.
- iv. To establish the influence of representativeness bias on investment decision making in property market in Plateau State, Nigeria.
- v. To determine the influence of disposition effect bias on investment decision making in property market in Plateau State, Nigeria.

## **1.4 Research Hypotheses**

The study was guided by the following hypotheses:

**H0<sub>1</sub>:** Anchoring bias does not significantly influence investment decision making in property market in Plateau State, Nigeria.

**H0<sub>2</sub>:** Overconfidence bias does not significantly influence investment decision making in property market in Plateau State, Nigeria.

**H0<sub>3</sub>:** Narrow framing bias does not significantly influence investment decision making in property market in Plateau State, Nigeria.

**H0<sub>4</sub>:** Representativeness bias does not significantly influence investment decision making in property market in Plateau State, Nigeria.

**H0<sub>5</sub>:** Disposition effect bias does not significantly influence investment decision making in property market in Plateau State, Nigeria.

**H0<sub>6</sub>:** Cognitive biases do not significantly influence investment decision making in property market in Plateau State, Nigeria.

## **1.5 Justification of the Study**

The research may be a good reference of property-investment behaviour for the investors to consider and analyse the property market trend before making suitable decisions on investment. The concepts of behavioural finance are relatively new in comparison to other financial theories. In developed security markets, behavioural finance is applied widely to explore the behaviours that impact the investment decisions; however, as mentioned above, behavioural finance has the limited number of application for less developed property markets. This study was guided by the following theories; heuristic theory, prospect theory, Theory of planned behaviour, herding theory and Fuzzy Trace Theory (FTT). These theories was selected since they provide a clear understanding on the relationship that exist between cognitive

biases and investors decision making and also enables easy formulation of the research hypotheses.

This study may be done with hope to confirm the suitability of using behavioural finance for all kinds of property markets. The research provided a good chance for the future scholars to understand more theoretically and practically about the property market as well as the theories of behavioural finance.

Decision and risk analysis were designed to improve judgments and decisions and to overcome many of these biases. However, when eliciting model components and parameters from decision makers or experts, analysts often face the very biases they are trying to help overcome. When these inputs are biased they can seriously reduce the quality of the model and resulting analysis. Some of these biases are due to faulty cognitive processes; some are due to motivations for preferred analysis outcomes. This study identifies the cognitive and motivational biases that are relevant for decision and risk analysis because they can distort analysis inputs and are difficult to correct

## **1.6 Scope of the Study**

The study was carried out in Plateau State Nigeria. The motivating factor behind opting for the population in Plateau State Nigeria is that it has an updated record of the registered investors in office/shops and rental residential properties. It was limited to the influence of cognitive biases on investment decision making in property market.

This study was guided by the following theories; heuristic theory, prospect theory, Theory of planned behaviour, herding theory and Fuzzy Trace Theory (FTT). These theories were selected since they provide a clear understanding on the relationship that exist between cognitive biases and investors' decision making and also enables easy formulation of the research hypotheses.

The study focused on the property market, that is, shops, residential and rental houses since they are the most common types of commercial properties in the study area and more information can be obtained about them. The study further focused on the period 1995-2015.

### **1.7 Limitations of the Study**

Although there were a few limitations, care was taken to make sure they never impacted on the final results and conclusion. The limitation of this study includes lack of adequate theories relating to the relationship between individuals cognitive biases and investors decision making. The study mitigated this limitation by adopting general theories that related to cognitive biases and investor decision making.

The study further over-relied on the use of primary data collected using questionnaires hence failing to use secondary data provided limitation for the study. The study made sure that information provided through questionnaires was insightful to make conclusion on the influence of cognitive biases on investor decision making. The study further faced limitations in accessing empirical studies from scholars in developing countries since most accessible empirical literature was conducted in developed countries. The study however conducted thorough empirical literature analysis to capture what other authors have established in this field.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This chapter reviews related literature materials conceptualizing the research study. It comprised of theoretical review, conceptual framework, and empirical review, critique of existing literature, research gap and summary of the chapter.

#### **2.2 Theoretical Reviews**

This study was guided by the following theories; heuristic theory, prospect theory, Theory of planned behaviour, herding theory and Fuzzy Trace Theory (FTT).

##### **2.2.1 Heuristic Theory**

The proponents of heuristic theory were Kahneman and Tversky (1984) who revolutionized the academic research on human judgment/decision making. The central idea of the “heuristics and biases” was that judgment under uncertainty often rests on a limited number of simplifying heuristics rather than extensive algorithmic processing. The popularity of this central idea soon spread beyond academic psychology, affecting theory and research across a range of disciplines including economics, law, medicine, business and political science. The message was revolutionary in that it simultaneously questioned the descriptive adequacy of ideal models of judgment and offered a cognitive alternative that explained human error without invoking motivated irrationality (Gilovich & Griffin, 2002).

Kahneman and Tversky (1979) described three general-purpose heuristics; availability, representativeness, anchoring and adjustment that underlie many intuitive judgments under uncertainty. These heuristics, it was suggested, were simple and efficient because they piggybacked on basic computations that the mind had evolved to make. Heuristics were defined as the rules of thumb, which makes decision making easier, especially in complex and uncertain environments by

reducing the complexity of assessing probabilities and predicting values to simpler judgments (Kahneman & Tversky, 1979).

Representativeness refers to the degree of similarity that an event has with its parent population or the degree to which an event resembles its population (Kahneman & Tversky, 1979). In property market, when investors seek to buy “hot” property instead of poorly performing ones, this means that representativeness is applied. Anchoring is a phenomena used in the situation when people use some initial values to make estimation, which are biased toward the initial ones as different starting points yield different estimates (Kahneman & Tversky, 1979).

Anchoring arises when a value scale is fixed by recent observations. Investors always refer to the initial purchase price when selling or analyzing in the property market. Availability bias happens when people make use of easily available information excessively. In property market, this bias manifest itself through the preference of investing in local property companies which investors are familiar with or easily obtain information, despite the fundamental principles so-called diversification of portfolio management for optimization (Waweru et al., 2008).

Later, scholars like Waweru *et al.*, (2008) also listed two more factors named Gambler’s fallacy and Overconfidence into heuristic theory. Investors and analysts are often overconfident in areas that they have knowledge (Evans, 2006). It is also noted that overconfidence can enhance other’s perception of one’s abilities, which may help to achieve faster promotion and greater investment duration (Oberlechner & Osler, 2004). When people overestimate the reliability of their knowledge and skills, it is the manifestation of overconfidence (Hvide, 2002).

The belief that a small sample can resemble the parent population from which it is drawn is known as the “law of small numbers” which may lead to a Gamblers’ fallacy (Barberis & Thaler, 2003). This behaviour is an explanation for investor overreaction (DeBondt & Thaler, 1995). More specifically, in property market, Gamblers’ fallacy arises when people predict inaccurately the reverse points which

are considered as the end of good (or poor) market returns (Waweru et al., 2008). In the property market in Plateau State, this theory will lay the foundation of three variables; Anchoring, overconfidence and representativeness biases.

### **2.2.2 Prospect Theory**

Prospect theory was created in 1979 and developed by Daniel Kahneman and Tversky (1992) as a psychologically more accurate description of decision making. The theory states that people make decisions based on the potential value of losses and gains rather than the final outcome. In addition people evaluate these losses and gains rather than the final outcome and that people evaluate these losses and gains using certain heuristics (Tversky & Kahneman, 1979).

Prospect theory is a theory of decision making under conditions of risk. Decisions are based on risks. Judgements are assessments about the external state of the world. They are made especially challenging under conditions of uncertainty, where it is difficult to oversee the consequences or outcome of events with clarity. Decisions involve internal conflict over value-trade-offs. They are made difficult when choices promote contradictory values and goals. The theory directly addresses how these choices are framed and evaluated in the decision making process, (Tversky & Kahneman 1979).

Prospect theory reveals the difference between the two phases of choice making for an investor: First phase of framing and the other phase of evaluation. By developing the prospect theory, Tversky and Kahneman (1979) explained how people take care of risk and uncertainty. The theory explains the apparent irregularity in human behaviour when assessing risk under uncertainty. It advocates the fact that human beings are not consistently risk-averse; rather they are risk-takers in losses and risk-averse in gains.

Kishore (2004) called this, certainty effect that human beings are not consistently risk-averse; rather they are risk averse in gains but risk-takers in losses and traders are most apt to take subsequent risks if they have already experienced losses.

Investors in the property market in Plateau State may tend to under weigh probable outcomes compared with certain ones and might also respond differently to the similar situations depending on the context of losses or gains in the property market.

Prospect theory focuses on subjective decision-making influenced by the investors' value system (Filbeck, Hatfield & Horvath, 2005). Prospect theory describes some states of mind affecting an individual's decision-making processes including disposition effect (Waweru et al., 2008). Regret is an emotion that occurs after people make mistakes. Investors avoid regret by refusing to sell decreasing property and willing to sell increasing ones. Moreover, investors tend to be more regretful about holding losing property too long than selling winning ones too soon (Forgel & Berry, 2006).

In addition, Lehenkari and Perttunen (2004) find that both positive and negative returns in the past can boost the negative relationship between the selling trend and capital losses of investors, suggesting that investors are loss averse. Risk aversion can be understood as a common behaviour of investors, nevertheless it may result in bad decision affecting investors' wealth (Odean, 2005). Rockenbach (2004) suggests that connection between different investment possibilities is often not made as it is useful for arbitrage free pricing. In this research, prospect theory will form the theoretical foundation of disposition effect and its influencing level on the investment decision making of investors at the property market in Plateau State, Nigeria.

### **2.2.3 Theory of Planned Behaviour**

The theory of planned behaviour (TPB) was introduced by Ajzen (2002) as a link between beliefs and behaviour. It was intended by Ajzen (2002) as an improvement on the earlier predictive power of the theory of reasoned action in 1980. The theory of reasoned action considers behavioural intention as the immediate motivator for individuals to perform the behaviour. Behavioural intention, in turn, is a function of two determining factors, namely attitude toward the behaviour (AT) and subjective norm (SN) that relate to conducting the behaviour (Ajzen & Fishbein, 1980).

Attitude toward the behaviour is defined as one's general feelings indicating their favourableness or unfavourableness to the behaviour. Subjective norm is defined as one's perception regarding whether significantly others think the behaviour should be performed or not (Ajzen & Fishbein, 1980). Despite the fact that TRA is widely accepted in literature, this theory still contains limitations. It does not anticipate accurately behaviours constrained by a lack of opportunities or resources such as skills, time or capital to make investment decision. This is even when individuals would otherwise be favourable of and socially urged to perform the behaviour (Ajzen, 1991).

To overcome this limitation, Ajzen (2002) added another variable into the original TRA model, namely perceived behavioural control (PBC), introducing the theory of planned behaviour. Perceived behavioural control is defined as one's perception of the ease or the difficulty/anomaly in conducting the concerned behaviour, relating to the existence or absence of necessary resources and opportunities (Ajzen, 2002). The theory of planned behaviour also claims that perceived behavioural control could influence behaviours in two ways: (1) PBC could affect the intention to perform behaviour; (2) PBC could directly affect the behaviour, in a way dependent from the concerned intention. Both of these two control influences could involve in the investors' process of decision-making and in their behaviours. Such control influences could include internal factors such as individual knowledge, experience, skills or emotions, etc., and external factors, namely financial resources, time or partners' cooperation, etc. that are vital in decision making (Ajzen, 2005).

The significance in explaining behaviour of the three basic elements of TPB, including attitude toward the behaviour, subjective norm, and perceived behavioural control have been claimed in multiple studies (Sommer, 2011). The theory of planned behaviour has been widely used to predict business behaviours (Krueger & Carsrud, 1993). According to Ajzen (2005), in the short term, TPB shows that "people intend to perform behaviour when they evaluate it positively, when they experience social pressure to perform it, and when they believe that they have the means and opportunities to do so". This view of motivation indicates a possibility to

explain the principal factors influencing investors' decision making in property market in Plateau State. The theory of planned behaviour laid the foundation of explaining the dependent variable decision making, explaining the indecision of either to buy or sell in investors' investment decision making.

#### **2.2.4 Herding Theory**

Raafat, Chater and Frith, (2009) proposed the herd behaviour theory to describe how individuals in a group can act collectively without centralized direction. They proposed an integrated approach to herding, describing two key issues; the mechanisms of transmission of thoughts and or behaviour between individuals and the patterns of connection between them. They suggested that bringing together diverse theoretical approaches of herding behaviour illuminates the applicability of the theory to many domains, ranging from cognitive neuroscience to economics and business fields (Raafat, Chater & Frith, 2009).

Herding effect in financial market is identified as tendency of investors' behaviours to follow the others' actions. Practitioners usually consider carefully the existence of herding, due to the fact that investors rely on collective information more than private information which can result into the price deviation of the securities from fundamental value; therefore, many good chances for investment at the present can be impacted. Academic researchers also pay their attention to herding; because its impacts on property price changes that influence the attributes of risk and return models and this has impacts on the viewpoints of asset pricing theories (Tan, Chiang, Mason & Nelling, 2008).

In the perspective of behaviour, herding can cause some cognitive biases, including conformity, congruity and cognitive conflict, the home bias and gossip. Investors may prefer herding if they believe that herding can help them to extract useful and reliable information (Kallinterakis, Munir & Markovic, 2010). In the property market, herding investors base their investment decisions on the masses' decisions of buying or selling stocks. In contrast, informed and rational investors usually ignore following the flow of masses, and this makes the market efficient. Herding in the

opposite causes a state of inefficient market, which is usually recognized by speculative bubbles. In general, herding investors act the same ways as prehistoric men who had a little knowledge and information of the surrounding environment and gathered in groups to support each other and get safety (Caparrelli *et al.*, 2004).

There are several elements that impact the herding behaviour of an investor, for example: overconfidence, volume of investment, and so on. The more confident the investors are, the more they rely on their private information for the investment decisions. In this case, investors seem to be less interested in herding behaviours. When the investors put a large amount of capital into their investment, they tend to follow the others' actions to reduce the risks, at least in the way they feel (Kallinterakis *et al.*, 2010).

Besides, the preference of herding also depends on types of investors, for example, individual investors have tendency to follow the crowds in making investment decision more than institutional investors (Goodfellow, Bohl & Gebka, 2009). Waweru *et al.* (2008) propose that herding can drive stock trading and create the momentum for stock trading. However, the impact of herding can break down when it reaches a certain level because the cost to follow the herd may increase to get the increasing abnormal returns.

Genesove and Mayer (2001) state that investors who sell their assets at the price less than original purchase price usually expect the selling price is more than other sellers' asking price. It is not only the expectation of the sellers, but also the correction of the market that decides the selling price: investors encountering a loss often due to the transaction at the relatively higher price than others. Coval and Shumway (2000) find that investors, having gains (losses) in the first half of trading day tends to take less (more) risk in the second half of trading day.

When making a decision of property to purchase, investors may not find a good property to buy after considering systematically the thousands of listed ones. They normally buy a property having caught their interest and maybe the greatest source

for attention is from the tremendous past performance, even good or bad. According to Barberis and Thaler (2003), individual investors seem to be less impacted by attention-grasping property for their selling decisions because the selling decision and the buying decision are differently run. Because of short-sale restraints, when deciding to choose a property for selling, they can only focus on the ones that currently belong to them. Whereas, with a buying decision, individuals have a lot of chances to choose the wanted property from the wide range of selective sources, this explains why factors of attention impact more on the property buying decisions than the selling decisions. Therefore, behavioural factors impact the investment decisions of investors in the financial markets, especially in the real estate markets. This theory laid the foundation of the herding bias of investors and the overconfidence bias in the study.

### **2.2.5 The Fuzzy-Trace Theory**

Fuzzy Trace Theory (FTT) as fielded by Kuhberger and Tanner proposes that people simultaneously encode mental representations (traces) of information that vary in precision. Essential elements of a decision consist of knowledge, gist of information, retrieval (how knowledge and values are accessed when needed), and processing (how what is perceived is put together with what is retrieved to make a decision) (Kuhberger & Tanner, 2010). In processing, values and principles are retrieved that are then applied to mental representations of gist.

The fuzzy-trace theory proposes that the framing effect is the result of superficial and simplified processing of information (Reyna & Brainerd, 1991). To evaluate this theory, researchers suggested and tested mechanisms by which decision makers might simplify framing problems by reasoning in qualitative patterns rather than in probabilistic and numerical patterns. The findings suggest that participants follow the path of greatest simplicity by using simplification mechanisms to reduce cognitive demands (Kuhberger & Tanner, 2010). This theory holds that individuals initially peruse the available alternatives to determine if they can make a good decision and expend minimal cognitive effort. They only commit to a more complicated cognitive effort if they cannot fulfil their desire to arrive at a good decision by embracing a

simpler alternative. Although this is an appealing explanation of the framing effect, this model ignores effective processes that should play an important role in determining what constitutes a good decision (Kuhberger & Tanner, 2010).

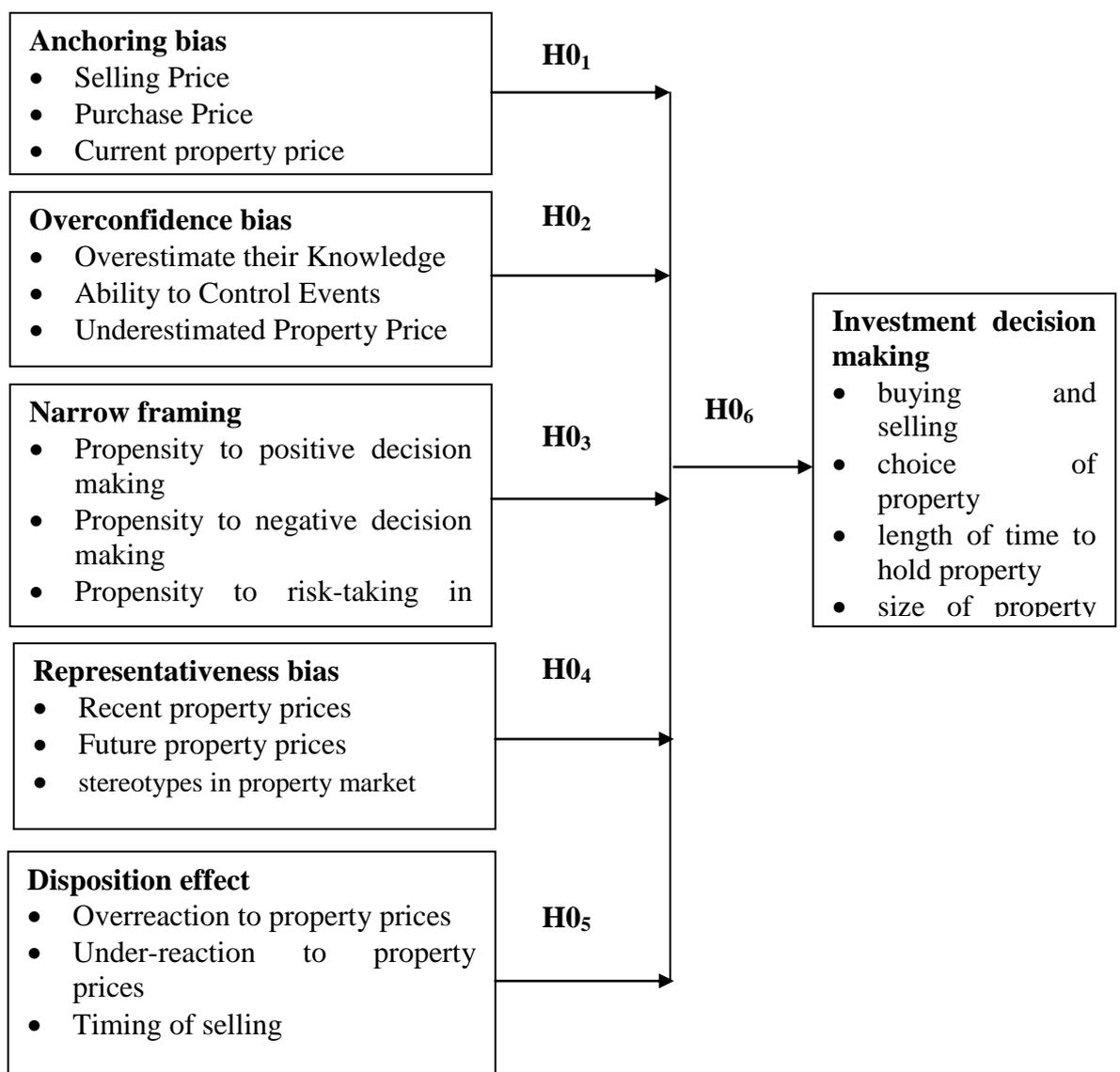
In summary, the heuristic theory, prospect theory, theory of planned behaviour, herding theory and fuzzy trace theory (FTT), will form the foundation of this study. They anchored and network in explaining the relationship between anchoring, overconfidence, narrow framing, representativeness and disposition effect with respect to their effects on investment decision making.

### **2.3 Conceptual Framework**

The conceptual framework outlined the relationship between the independent (anchoring bias, overconfidence bias, narrow framing bias, and representativeness bias and disposition effect) and the dependent variable, investment decision making in the property market, Plateau State, Nigeria. It showed that investment decision making is directly and indirectly influenced by cognitive biases since the decision to invest is both a logical and illogical in nature as dictated by the mind-set of the investor. Each of the variables may influence investment decision making either individually or in tandem with each other. The indicator of each variable clearly illustrates the measurement of the influence towards investment decision making.

**Independent variable**

**Dependent variable**



## **Figure 2.1 Conceptual Framework**

### **2.3.1 Anchoring Bias**

Tversky and Kahneman (1974) define anchoring to be when people make estimates by starting from an initial value that is adjusted to yield the final answer and since adjustments are typically insufficient, different starting points yield different estimates, which are biased towards the initial values. They further stretched out that anchoring as the use of irrelevant information as a reference for evaluating or estimating some unknown value or information. When anchoring, people base decisions or estimates on events or values known to them, even though these facts may have no bearing on the actual event or value.

Anchoring can be captured by the fact that the investors rely on past experience, past prices (fair prices), ignore new information, fixing prices before buying or selling stock and being on the lookout for the best time to buy/sell stock, guided by moods and the level of openness to new experiences. Various factors are seen as influencers of anchoring. A wide range of research has linked sad or depressed moods with more extensive and accurate evaluation of problems, (Bodenhausen, Gabriel & Lineberger, 2000). As a result of this, earlier studies hypothesized that people with more depressed moods would tend to use anchoring less than those with happier moods.

According to Wilson *et al* (1996) the research found that experts (those with high knowledge, experience, or expertise in some field) were more resistant to the anchoring effect. Since then, however, numerous studies have demonstrated that while experience can sometimes reduce the effect, even experts are susceptible to anchoring. In a study concerning the effects of anchoring on judicial decisions, researchers found that even experienced legal professionals were affected by anchoring. This remained true even when the anchors provided were arbitrary and unrelated to the case in question, (Englich, Mussweiler & Strack, 2006).

### **2.3.2 Overconfidence Bias**

Overconfident investors are known to trade more frequently and have negative abnormal returns amongst stock market traders, especially when they are less experienced yet successful (Odean, 1998, Barber & Odean 2001). These studies provide valuable insights that help investigate the relation between overconfidence and investment performance. The current study extends this analysis to participants in virtual communities.

The concept of overconfidence derives from a large body of cognitive psychological experiments and surveys in which subjects overestimate both their own predictive abilities and the precision of the information they have been given. People are poorly calibrated in estimating probabilities; events they think are certain to happen are often far less than 100 percent certain to occur. In short, people think they are smarter and have better information than they actually do (Pompian, 2006).

### **2.3.3 Narrow Framing**

The framing effect is observed when a decision maker's risk tolerance (as implied by their choices) is dependent upon how a set of options is described. Specifically, investors' choices when faced with consequentially identical decision problems framed positively (in terms of gains) versus negatively (in terms of losses) are often contradictory (Magi, 2008). Narrow framing according to Bailey, Nicholas, Andrei, Shleifer & Robert (2009) is the propensity of an investor to select investments individually, instead of considering the broad impact on the portfolio. It is typical for the economic agent to combine the new option they confronts with one already confronted, then checks if the new option enhance or not the future distribution of wealth and/or consumptions.

### **2.3.4 Representativeness Bias**

Representativeness is judgment based on overreliance stereotypes where the investors' recent successes tend to continue into the future also. The tendency of decisions of the investors to make based on experiences is known as stereotype

(Shefrin, 2000). Representativeness can manifest itself when investors seek to buy 'hot' properties and to avoid those, which have performed poorly in the recent past. Investors may form judgements based on patterns that are simply random in a data and not representative of the facts.

This behaviour could provide an explanation for investor overreaction (Allen & Evans, 2005). People tend to categorise events as typical or representative of a well-known class, and to overstress the importance of such a categorisation. For example, property prices often rise when a company reports increased earnings several quarters in a row, because investors tend to infer a high long-term earnings growth rate (Evans, 2006).

### **2.3.5 Disposition Effect**

The disposition effect is the tendency of investors to sell stocks early when the price increases and hold stocks longer when this price decreases. As a consequence, investors may lose opportunities to gain greater profits from a stock winner whose price continues to rise; in contrast, they can suffer greater loss when the stocks continue to decline. The disposition effect is a phenomenon widely studied in behavioral finance. There are two main competing theories attempting to explain this phenomenon: the prospect theory and the regret theory. Although both theories give a fairly comprehensive explanation, they fail to take into account the motivation of investors in making investment decisions.

The disposition effect is the tendency of investors to sell stocks early when the price increases and hold stocks longer when the price decreases (Shefrin & Statman, 1985). As a consequence, investors may lose opportunities to gain greater profits from a stock winner whose price continues to rise; in contrast, they can suffer from greater loss when the stocks continue to decline. The disposition effect is a phenomenon that has been extensively studied in behavioral finance since it was revealed by Shefrin and Statman in 1985. In addition, it has been studied and found to occur within individual investor trading patterns (Dhar & Zhu 2006) as well as aggregate market-trading patterns.

### **2.3.6 Investors' Decision Making**

There are several investment decisions related to property trading, such as: buying, selling, choice of property, length of time to hold property, and size of property to trade. However, in this part, two important property trading decisions: selling and buying are focused because they have connection to the other decisions, and high impact on the investment decisions.

Previous studies report that investors decrease the selling decision of assets that get a loss in comparison to the initial purchasing price, a trend called the “disposition effect” by Shefrin and Statman (2005). Odean (2005) confirms the same conclusion that individual investors tend to sell properties which their values, in comparison to their original buying price, increase rather than sell the decreasing ones. However, it is difficult to demonstrate this phenomenon in the rational ground. It is not really reasonable to conclude that property investors rationally sell winning properties because they can foresee their poor performance. Besides, Odean (2005) also recognizes that the average return of sold properties is greater than that of the average return of properties that investors hold on.

Genesove and Mayer (2007) state that investors who sell their assets at the price less than original purchase price usually expect the selling price is more than other sellers' asking price. It is not only the expectation of the sellers, but also the correction of the market that decides the selling price: investors encountering a loss often do the transaction at the relatively higher price than others. Coval and Shumway (2005) found that investors, according to prospect theory, having gains (losses) in the first half of trading tends to take less (more) risk in the second half of trading.

## **2.4 Empirical Literature**

According to Pompian (2006), there are numerous cognitive biases that influence the investors' behaviour in property market. Some biases influence majorly while others have slight role in influencing the behaviour of an investor. Pompian (2006) further argues that some authors refer to biases as heuristics (rules of thumb), while others call them beliefs, judgments, or preferences; still other scholars classify biases along cognitive or emotional lines. This study entirely focused on five cognitive biases (anchoring, overconfidence, narrow framing, representativeness and disposition) which as stipulated by Tversky and Kahneman (1974) as playing a significant role in explaining investors' decision making in the property market.

### **2.4.1 Anchoring Bias and Investors' Decision Making**

Anchoring bias is the tendency to rely too heavily, or anchor on a past reference or one piece of information when making a decision. Anchoring refers to individual's tendency to base their estimates and decisions on familiar positions, known as 'anchors', with an adjustment relative to the starting point, known as reference points. This fixation is called anchoring (Mangot, 2008). A reference point is the property price that investors compare to the current property price. The brain's choice of a reference point is important because it determines whether the investor feels the pleasure of obtaining a profit or the pain when experiencing loss (Benartzi & Thaler, 1995).

Pompian (2006) in a study on Behavioural Finance and Wealth Management in USA found that investors exhibiting anchoring bias are likely to be influenced by these anchors while answering key questions like 'Is this a good time to buy or sell the stock?' or 'is the stock fairly priced?' The concept of Anchoring can thus be explained by the tendency of investors to "anchor" their thoughts to a logically irrelevant reference point while making an investment decision.

Andersen (2010) shows the involvement of Anchoring in decision making of market participants by using an existing trading algorithm. The algorithm was applied to real

market data of the Dow Jones Industrial average and CAC40 stock index to look for arbitrage possibilities. The model returned out-of-sample profit even while considering transaction costs on the CAC40 and thus provide evidence that Anchoring had a role to play in the weekly price fixing of the Dow and CAC40.

Ngoc (2013) conducted a study to examine the behavioural factors influencing the decisions of individual investors at the Securities Companies in Ho Chi Minh City, Vietnam. Data for this research was collated from 188 responses. The findings were that, in terms of anchoring, its moderate impact shows that there are two schools of forecasting the future stock prices for the investment decision making. One of them depends on recent price to forecast future prices while the other is not affected by the recent price. This reflects the status quo of Vietnam market that many investors use anchoring bias to analyze and predict the changes of stock prices in the future based on the previous prices while others prefer other information rather than the price, which can be available information as stated previously. This finding could be explained that the high and unexpected fluctuations of stock price trend at the HOSE make the investors to think of the anchor that is a more reliable way to predict the changes of stock prices than the prices that they experienced in the past.

In a study on Anchor points, reference points, and counteroffers in negotiations, Kristensen and Gaerling (1997) used 377 responses to test the hypothesis that “in negotiations counter-offers are generated through an Anchoring-and-adjustment process leading to an effect of the anchor point. Those counteroffers are influenced by changes in reference point which in turn determine whether the anchor point is perceived as a gain or a loss.” The negotiation process was simulated with the help of business administration undergraduate students. The results showed that the participants treated the proposed selling price as an anchor.

Parikh (2011) studied on anchoring in behavioural science in India using a sample size of 390. The findings were that, anchoring causes valuations to be biased towards an initial starting estimate. It was first shown in a real estate context by who describe that listing prices anchored pricing decisions of students as well as real estate agents.

After more than a decade of research, demonstrations of anchoring by appraisers cover a broad spectrum of experimental settings. Further finding was that, even negotiators who are trained as deal makers and provided with rich and accessible information are anchored in the negotiation process.

Diaz and Hansz (2001) in a study on anchoring bias, risk aversion and personality type using a response of 221 showed that the anchoring bias is even stronger for commercial expert appraisers working in unfamiliar markets. The findings also stated that the anchors used by investors, in order of importance, are: the uncompleted contract price of a comparable property; the uncompleted contract price of the subject property; and the value opinions of other experts. This order of importance could be seen as counterintuitive, but is consistent with normative training and general availability of information in real world settings.

Kim and Nofsinger (2008) studied commercial appraisers who work with familiar property in an unfamiliar market using 233 responses. The findings suggested that agents are heavily influenced by anchoring and adjusting. Participants formed a preliminary view, which operated as a strong anchor. This anchor was only customized with the appearance of strong signals from the market place to challenge the anchor. The fact that appraisers expect weak market information makes it very likely that their initial anchor will not be rejected.

Monti and Legrenzi (2009) studied on investment decision-making and anchoring Bias. The findings were that property prices of today are often determined merely by those of the past. Anchoring can lead investors to expect a property to continue to trade in a defined range or to expect a company's earnings to be in line with historical trends, leading to possible under-reaction to trend changes. Investors usually form an opinion about an item and they become unwilling to change their mind-set despite that there is new information that has huge significance and may be contrary to what they presently believe. Investors also tend to become more optimistic when the market rises and more pessimistic when the market falls.

## **2.4.2 Overconfidence Bias and Investors' Decision Making**

In its most basic form, overconfidence can be summarized as unwarranted faith in one's intuitive reasoning, judgments, and cognitive abilities (Pompian, 2006). Psychologists have determined that overconfidence causes people to overestimate their knowledge, underestimate risks, and exaggerate their ability to control events. The concept of overconfidence derives from a large body of cognitive psychological experiments and surveys in which subjects overestimate both their own predictive abilities and the precision of the information they have been given. People are poorly calibrated in estimating probabilities; events they think are certain to happen are often far less than 100 percent certain to occur. In short, people think they are smarter and have better information than they actually do (Pompian, 2006).

According to Shefrin (2000), overconfidence pertains to how well investors understand their own abilities and the limits of their knowledge on property market. Individual investors who are overconfident about their abilities tend to think they are better than they actually are. The same applies to knowledge. Individual investors who are overconfident about their level of knowledge tend to think they know more than they actually do. Overconfidence does not necessarily mean that individuals are ignorant or incompetent. Rather, it means that their view of themselves is better than is actually the case.

Kafayaat (2014) using a sample size of 220 investors from Islamabad stock exchange examined if investors of Islamabad Stock Exchange are indicating tendencies of irrational behaviour when exposed to certain psychological and cognitive dilemmas related to the financial world and what are the interrelationships among these dilemmas. The study found that overconfidence led to over-optimism, as previously proved by (Weinstein, 1980). Investors, who were overconfident about their success, showed inclination towards over-optimism. The findings on overconfidence bias showed that it negatively affects the rational decision making of investors.

Fagerström (2008) using a sample size of 670, conducted a study to investigate overconfidence and over optimism in the market and factors that affect human beings

in decision making when it comes to investing and analyzing. The scientific method of the research was a quantitative back-testing exercise method based on historic data taken from IBES, Institutional Brokers' Estimate System. The data taken was a summary of consensus expected growth of profits for the companies at S&P500 for the upcoming 12 months, compared with the realized outcome for the period February 1986 to April 2008. The results showed that analysts of the S&P 500 were exaggerated by the problems of over confidence and the over optimistic biases. It also confirms theory of Anchoring and Herding.

Ngoc (2013) conducted a study to examine the behavioural factors influencing the decisions of individual investors at the Securities Companies in Ho Chi Minh City, Vietnam. Data for this research was collated from 188 responses. The findings were that investors are overconfident in their own abilities, and investors and analysts are particularly overconfident in areas where they have some knowledge. Further, investors sold past losers and bought past winners as if past market performance could be extrapolated into the future.

Chaudhary (2013) studied on the subject perceptions of overconfidence and predictive validity in financial cues. The findings were that investors are generally overconfident regarding their ability and knowledge. They also found that investors tend to underestimate the imprecision of their beliefs or forecasts, and they tend to overestimate their ability. Finally, overconfident investors generally conduct more trade as they believe they are better than others at choosing the best properties and best times to enter or exit a position. Thus, overconfidence can cause investors to under-react to new information and that leads to earn significantly lower yields than the market.

Barber and Odean (2001) partitioned investors based on gender and, based on the previous psychological research and concluded that men are more overconfident than women in investment decisions. They documented that men trade 45% more than women, and find that men's net returns were cut by 2.5% a year while it was 1.72% for women, in data gathered from 1991 through 1997.

Chira, Adams and Thornton (2008) aimed at studying the cognitive biases and heuristics, which, the business students are subjected to. The main purpose of the study was to look at how influenced the students are by overconfidence biases, heuristics, and framing effects. The behavioural survey was administered to a sample of sixty-eight students at Jacksonville University in USA during November 2007 by administering a questionnaire and collecting empirical evidence about both undergraduate and graduate business students' own perceptions of bias. The findings concluded that students are less disposed to make the mistake of being overly confident and optimistic when there is more objectivity involved in making the assessment. Students did not display illusion of control tendencies and a tendency to be subject to the familiarity heuristic.

### **2.4.3 Narrow Framing and Investors' Decision Making**

Kahneman (2003) studied on prospect theory: an analysis of decision-making under risk. The findings were that narrow framing occurs when decisions are made intuitively rather than through systematic reasoning. He distinguished two modes of thinking and making decisions. The first relies on effortful reasoning and systematic processing of information. By its very nature, this mode of thinking is analytic, controlled by the decision maker, relatively slow and less affected by the context. People that use this mode of thinking are less likely to frame decisions narrowly. The framing effect occurs due to a trade-off between the cognitive effort required to calculate expected values of an alternative (if processing is costly, people are less likely to choose the stimulus) and the affective value of the alternative (if the outcome produces a feeling of displeasure, people are less likely to choose the stimulus).

In the second, Kahneman (2003) found that in a positive frame, the compromise between arriving at a good decision and minimizing cognitive effort is easy to achieve; for example, selecting the option in which "200 people will be saved" feels "correct" in an emotional sense and is effortless (i.e., no calculations are necessary). If the decision maker expends the cognitive effort required to analyze the more risky option, this alternative also will feel emotionally correct and thus appear viable. In

contrast, such compromises are more difficult to attain in the negative frame. Thus when selecting among options presented in a negative frame, individuals are more willing to undertake the cognitive effort demanded to assess the more risky option because they are more focused on improving the outcome.

Laing (2010) used a sample size of 265 to test the existence of the framing effect and sunk cost effect whilst examining the influence of cognitive factors. The findings confirmed the existence of the framing effect and a sunk cost effect. In particular the lowering of the amount of sunk cost produced a higher mean funding outcome than that attained in the positive frame. With regards to cognitive factors a significant correlation between perception of responsibility and the amount of funding granted was identified. This is consistent with the existence of escalation commitment behaviour, which is considered to be a manifestation of feelings of responsibility. The perception of the problem space produced an unexpected set of results. In particular both low image compatibility and high image compatibility were significant predictors of the level of funding granted.

Rabin and Weizsacker (2008) studied the tendency to choose dominated lotteries when offered a set of concurrent risky prospects with a response of 56 small lottery firms. The results showed both in an experimental setting and using a large representative survey, that a majority of people choose dominated strategies when prospects were presented in isolation. But this disappeared when the joint distribution of these prospects was shown, consistent with narrow framing driving their decisions. Importantly, they also proved theoretically that even small degrees of narrow framing can result in people making dominated choices, provided preferences departed.

Barberis and Huang (2007) studied on Prospect Theory and Asset Prices in a small lottery firm using a sample size of 603 respondents. The findings were that, since regret comes from comparing the consequences of a specific action with those of a verifiable alternative, it leads people to focus on the outcomes of the action itself and ignore their contribution to overall wealth. Hence, regret-prone individuals should be

more likely to frame the small lottery narrowly and turn it down. For those who rely on reasoning, access to their income risk lowers the probability of turning the lottery down by as much as 12 percentage points, about 20% of the sample rejection rate. By contrast, making their human capital risk more accessible to individuals who rely on intuition has no perceptible effect on the decision. This evidence is consistent with narrow framing being triggered by the decision mode and amplified by regret.

Wang (2005) in a study on the adaptive decision maker and using a sample size of 400 stock brokers found that individual investors take longer to make decisions when the options are framed as losses rather than gains. The costs and benefits involved in this kind of choices are of two types; cognitive and affective, and that both play a role in the framing effect. They also found that, the cognitive effort involved in calculating an expected value is larger in risky than in certain choices and on the other hand, the affective cost is higher for losses than gains.

#### **2.4.4 Representativeness Bias and Investors' Decision Making**

Rahul (2012) define representativeness as an assessment of the degree of correspondence between a sample and a population, an instance and a category, an act and an actor or, more generally, between an outcome and a model. Representativeness is concerned with determining conditional probabilities. Representativeness is said to be usually employed, by property investors while making judgments under uncertainty (O'Hagan *et al*, 2006).

Yosra and Boujelbene (2013) assessed the determinants of institutional investors' behaviours using a sample size of 300 Tunisian investors. They used a survey approach and developed a questionnaire that included sixty three items dealing with six biases. The findings showed the extent to which there is a group of investors who are subject to the bias of representativeness. The results further showed that the sample of investors extrapolates future performance of the Stock Market in the recent past events. Rather than tending to consider recent events, investors are led to overestimate the probability of the occurrence of a future event. So, the Tunisian investors' behaviour seems to be largely influenced by the representativeness bias.

Wen and Jianfeng (2011) noted another interesting consequence of judgment by representativeness bias in a study on long run underperformance of IPOs to the investors' short term orientation. He used a sample size of internet based questionnaires. The findings were that, while making investments, individual investors tend to attribute good characteristics of a company directly to good characteristics of its property. These companies turn out to be poor investments more often than not. Further, the representativeness heuristics involves individuals assessing situations based on superficial characteristics rather than underlying probabilities. One possible manifestation of this inclination is the assumption that the properties of a "good company" will be a good investment. The representativeness bias is seen as a mental shortcut that involves overreliance on stereotypes. Investors may consider recent past returns to be representative of what they can expect in the future. Because of this extrapolation bias, investors might buy properties that have recently increased in value.

Antony (2009) examined the effect of investor psychology on real estate market prices in Nairobi, Kenya. The study found that investors' psychology plays a great role in determining investment decision and market prices. He took a sample of 40 institutional real estate investors located in Nairobi. In his study he ranked the psychological factors in order to their importance from the most important to least important. Representativeness bias was the first followed by mental accounting, followed by herding effect.

Gitau (2011) examined the effect and extent of behavioural factors and their influence on property decisions in Kenya using a sample size of 155. The major finding was that heuristic factors such as representativeness and availability biases had more influence on property decision making. Ji and Zhang (2006) did an investigation using the factor model for determining the individual investment behaviour in China and Canada, in a quasi-experimental study. They examined the representativeness heuristic by contrasting the buy and sell behaviour of Canadian and Chinese investors in three experiments. The study found that Chinese investors were less prone to exhibit the representativeness bias than Canadian investors.

Dhar and Kumar (2001), examining the representativeness bias, investigated the price trends of properties bought by more than 62,000 households at a discount brokerage during a 5-year period. They found that investors tend to buy properties that have recently enjoyed some positive abnormal returns. This finding is consistent with the thinking that the past price trend is representative of the future price trend.

#### **2.4.5 Disposition Effect and Investors' Decision Making**

Shefrin and Statman (1985) devise this shorthand term, disposition effect, to conceptualize the idea that investors tend to sell winners too early and to hold losers too long. According to Henderson (2012) disposition effect is the tendency of an investor to sell winners too early and hold losers too long. Shefrin and Statman (1985) in their model provide that the disposition effect should be weaker at the end of the year because investors can control themselves then. Rationally, the investor recognizes that realizing losses can be advantageous for tax purposes. Irrationally, he disposes the tax considerations because he is driven by the positive thoughts associated with realizing gains. Investors find discarding loss-making properties easier when the deadline for the end of the tax year approaches.

Crane and Hartzell (2007) using a sample size of 266 respondents, examined the disposition effect in corporate investment decisions: evidence from Real Estate Investment Trusts in Texas, USA. The findings were that there was strong statistical evidence consistent with the existence of the disposition effect among REIT management – REITs tend to sell winners and hold losers. In addition, there was evidence that this effect was stronger for smaller properties and that firms showing the strongest evidence of the disposition effect tend to be smaller firms with lower insider ownership.

They also examined the implications of this behaviour for shareholders and they found no evidence of mean reversion in property returns that would make the disposition effect optimal; if anything, the returns went in the opposite direction implying that property performance suffers by retaining losers. Finally, it was found that companies that show greater tendencies toward the disposition effect may sell

winner properties at lower prices relative to other winner properties of a similar type and size. Overall, the evidence suggested that some REIT managers' behaviour is consistent with the disposition effect and that this behaviour can have negative implications for investors.

Kyle, Ou-Yang and Xiong (2006) using a sample size of 1670 respondents, assessed if, Prospect theory and liquidation decisions predict disposition effect. They considered an investor who is endowed with a project, or indivisible asset, and who is trying to decide when to liquidate the project. On liquidation, the investor receives prospect theory utility defined over the difference between the project's liquidation value and the amount invested in the project. The findings were that the analysis did not take the investors' initial buying decision into account. As soon as this was done, it was recognized that the expected risky asset return must exceed a certain level. This, in turn, affects the likelihood that prospect theory will predict a disposition effect.

In a study on behavioural finance and its implications for stock price volatility, Genesove and Mayer (2001) using a sample size of 950 respondents, utilized real estate assets in their study of individuals' behaviour. The findings were that there was evidence in support of the disposition effect (on the loss aversion side of the function). Sellers with nominal losses tend to have higher asking prices for their condominiums, have a lower hazard rate of selling, but conditional upon selling, they receive higher prices. Frazzini (2006) and Coval and Shumway (2005) present evidence that the disposition effect can help explain the decisions of mutual fund managers and proprietary traders, respectively, and that such decisions manifest themselves in asset prices and returns.

In a study on the disposition effect and under-reaction to news using 1230 responses and collecting data through questionnaires, Frazzini (2006) tested whether the disposition effect caused 'under- reaction' to new information leading to return to predictability and price drifts. With data of mutual fund holdings he builds a new measure of reference purchasing prices for individual properties. The conclusive

finding was that the disposition effect could induce ‘under-reaction’ to new information. And this would indeed lead to return to predictability and price drifts. The information content of the news and the investors’ preference price relative to the current price determine the price pattern. Another finding was that the average fund was about 20 percent more likely to realize gains than losses. He distinguished the funds based on their past returns, based on this he concluded that about a third of the funds (those with lower return) are 50 percent more likely to realize gains and losses.

Barberis and Xiong (2009) in a study on drivers of the disposition effect, using a sample size of 400 responses, investigated whether prospect theory preferences can predict a disposition effect. The findings were that, one of the most robust facts about the trading of individual investors is the disposition effect: when an individual investor sells a stock in his portfolio, he has a greater propensity to sell a stock that has gone up in value in purchase than one that has gone down. They consider two implementations of prospect theory. In one case, preferences are defined over annual gains and losses, in the other they are defined over realized gains and losses. They also found that the annual gain/loss model often fails to predict a disposition effect. In contrast, the realized gain/loss model predicts a disposition effect more reliably.

Professors Shefrin and Statman studied on the disposition to sell winners too early and ride losers too long using theory and evidence and a sample size of 545 responses. The study developed the idea of loss aversion into a theory called the ‘disposition effect’, which indicates that individuals tend to sell winners and hold losers. In later research, Professors Barber and Odean tested this idea using data from 120 US retail brokers. They found that investors were roughly 50% more likely to sell a winning position than a losing position, despite the fact that US tax regulations make it beneficial to defer locking in gains for as long as possible, while crystalizing tax losses as early as possible. They also found that the tendency to sell winners and hold losers harmed investment returns (Shefrin & Statman, 2005).

#### **2.4.6 Investors' Decisions Making**

There are several investment decisions related to property trading, such as: buying, selling, choice of property, length of time to hold property, and size of property to trade. However, in this part, two important property trading decisions: selling and buying are focused because they have connection to the other decisions, and high impact on the investment decisions.

Previous studies report that investors decrease the selling decisions of assets that get a loss in comparison to the initial purchasing price, a trend called the “disposition effect” by Shefrin and Statman (2005). Odean (2005) confirms the same conclusion that individual investors tend to sell properties which their values, in comparison to their original buying price, increase rather than sell the decreasing ones. However, it is difficult to demonstrate this phenomenon in the rational ground. It is not really reasonable to conclude that property investors rationally sell winning properties because they can foresee their poor performance. Besides, Odean (2005) also recognizes that the average return of sold properties is greater than that of the average return of properties that investors hold on.

Genesove and Mayer (2007) state that investors who sell their assets at the price less than original purchase price usually expect the selling price is more than other sellers' asking price. It is not only the expectation of the sellers, but also the correction of the market that decides the selling price: investors encountering a loss often do the transaction at the relatively higher price than others. Coval and Shumway (2005) found that investors, according to prospect theory, having gains (losses) in the first half of trading tends to take less (more) risk in the second half of trading.

Grinblatt and Han (2006) claim that the behaviour of investors which is described as the disposition effect can be considered as a puzzling characteristic of the cross-section of average returns, called momentum in property returns in which, investors prefer selling a property that has helped them to gain capital. The selling pressure can firstly slow down the property price, and then create higher returns. In contrast, if the

asset holders are experiencing capital losses, they may merely make decision of selling when an expected price is given. In this case, the price may be initially increased, leading to lower returns later.

Odean (2005) provides several understandings about the preferable properties that investors would like to buy. As mentioned above, selling decisions mainly prioritize winning assets; whereas, buying decisions are related to both prior winning and losing assets. Odean (2005) states that the buying decisions may be a result of an attention effect. When making a decision of property purchase, investors may not find a good asset to buy after considering systematically the thousands of listed properties. They normally buy a property having caught their interest and maybe the greatest source for attention is from the tremendous past performance, even good or bad.

According to Barberis and Thaler (2003), investors seem to be less impacted by attention-grasping properties for their selling decisions because the selling decision and the buying decision are differently run. Because of short-sale restraints, when deciding to choose a property for selling, they can only focus on the ones that currently belong to them. Whereas, with a buying decision, individuals have a lot of chances to choose the wanted properties from the wide range of selective sources, this explains why factors of attention impact more on the property buying decisions than the selling decisions.

Barber and Odean (2005) already prove that the selling decisions are less determined by attention than buying decisions in case of individual investors. To give this conclusion, they create the menu of attention-grasping properties with several criteria: unusually high trading properties, abnormally high or low return properties. Eventually, the authors explore that the individual investors in their sample are more interested in purchasing these high-attention properties than selling them. As such, from the viewpoints of behavioural finance, the investor behaviours impact both selling and buying decisions at different levels, and then they also impact the general returns of the market.

Chandra (2008) explored the impact of behavioural factors and investors' psychology on their decision-making, and to examine the relationship between investors' attitude towards risk and behavioural decision-making. The research was based on the secondary data. Through this research, the author finds that unlike the classical finance theory suggests, investors do not always make rational investment decisions. The investment decision-making is influenced, largely, by behavioural and cognitive factors like greed and fear, Cognitive Dissonance, heuristics, Mental Accounting, and Anchoring. These behavioural and cognitive factors must be taken into account as risk factors while making investment decisions.

Waweru, Munyoki and Uliana (2008) surveyed the institutional investors at the Nairobi Stock Exchange. The work investigated the role of behavioural finance and investor psychology in investment decision making. The study established that cognitive behavioural factors such as Representativeness, Overconfidence, Anchoring, and Gamblers' Fallacy, Availability, Loss Aversion, Mental Accounting and Regret Aversion affected the decisions of institutional investors operating at the Nairobi Stock Exchange.

Maheran, Muhammed and Ismail (2008) intended to investigate the relationship between investment decision making of an investor and their rationality in investing in the Malaysian capital market. The findings of the study indicate that the economic condition and frame of references influence investor decision-making behaviour. The study concluded that Malaysian investors are partially rational in their decision-making.

Cianci (2008) in her study conducted an experiment with 78 graduates as substitutes for real investors and results suggested that investors made higher relevance ratings and lower investment attractiveness ratings while provided with simultaneous negative information in comparison with sequential negative information (consistent with phenomena of multiple loss aversion and loss buffering). Investors' relevance and attractiveness ratings were higher when positive information was provided sequentially (consistent with gain savouring). The study categorized investors as

current and prospective. It was examined how they evaluate positive and negative information presented sequentially or simultaneously aimed to determine whether these results can be generalized to apply to investment related information and whether investor status affects this evaluation in decision making.

Sairafi, Selleby and Stahl (2008) in their study 'behavioural finance; a student perspective' examined the characteristics of investment interested business students and their decision-making process and choices from the perspective of behavioural finance. The research holds an abductive approach and is based on qualitative data. Data collection was done through an Internet-based questionnaire. In the study, herd behaviour was found to be the most evident behavioural factor. This paper found that the behaviour of respondents in the chosen population was best described as "student behaviour"; a somehow irrational behaviour explained by the learning process in which business students exist.

## **2.5 Critique of Existing Literature Relevant to the Study**

Although there are many factors and biases that influence investors' decision making like behavioural factors, cognitive biases, emotional biases, contextual factors, market factors and demographic factors, this study has concentrated on cognitive biases. The decision is based on the fact that most of the reviewed studies have mostly concentrated on behavioural factors in forming decision making and only very few have looked at cognitive biases (Sairafi, Selleby & Stahl, 2008; Chandra, 2008; Genesove & Mayer, 2001).

Most of the studies reviewed have faced the issue of decision making based on the perspective of developed countries especially in America and Asia. Few studies have looked at the African context in investors' decision making (Maheran, Muhammed & Ismail (2008) -in the Malaysian capital market; Ji & Zhang (2006) - in China and Canada; Fares and Khamis (2011) -in Amman Stock Exchange, Jordan). Most of the studies conducted in the African context have predominantly focused on institutional investors, overlooking the individual ones (Waweru *et al.*, 2008) - institutional

investors at the Nairobi Stock Exchange; (Yosra & Younes, 2013) - Institutional Investors' Behaviours: Evidence from Tunisian Stock Market).

## **2.6 Research Gaps**

Few scholars in Nigeria have studied on the influence of cognitive biases on investment decisions of Nigerian investors. The few Nigerian scholars who have focused in this area have studied the behavioural factors in the stock market and not real estate or property market (Aregbeyen & Mbadiugha 2011). In addition, these studies have not focused on cognitive biases like anchoring, overconfidence, narrow framing, representativeness and disposition effect on investment decision making. Tomola (2013) studied on the factors influencing investment decisions of investors in Nigeria in the stock market. The variables studied were wealth maximizing factors, investment climate, market environment and socio-economic characteristics.

Aliyu (2012) examined the impact of intangible location attributes on the values of residential properties in Jos metropolis, Nigeria. The variables studied were socio-economic characteristics, intangible location attributes and conditions of the existing neighbourhood facilities. Aregbeyen and Mbadiugha (2011) found that the ten most influencing factors on investors' decision in order of importance are: motivation by people who have attained financial security through share investment, future financial security, recommendations by reputable and trusted stock brokers, management team of the company, awareness of the prospects of investing in shares, composition of the board of directors of companies, recent financial performance of the company, ownership structure of the company, reputable predictions of future increment in share value and bonus payments.

Most of the research has been conducted in Europe, Asia, and the Middle East while very few studies have been undertaken in the emerging property market like Plateau State. In the few studies undertaken in Africa especially in Nigeria and Kenya, the focus have mostly been on behavioural factors and on the stock exchange with real estate or property market receiving minimal coverage. This is the gap this study will aim to fill.

## **2.7 Summary**

The chapter has presented the literature review on the influence of cognitive biases on investors' decision making. The role of prospect theory, heuristic theory, Theory of planned behaviour, herding theory and Fuzzy Trace Theory (FTT) in explaining investors' investment decision making has been explored. The theoretical review reviewed that cognitive biases are critical in investors decision making.

For instance, heuristic theory laid the foundation of three variables; Anchoring, overconfidence and representativeness biases. The prospect theory states that people make decisions based on the potential value of losses and gains rather than the final outcome. In addition people evaluate these losses and gains rather than the final outcome and that people evaluate these losses and gains using certain heuristics. The theory of reasoned action considers behavioural intention as the immediate motivator for individuals to perform the behaviour. Behavioural intention, in turn, is a function of two determining factors, namely attitude toward the behaviour (AT) and subjective norm (SN) that relate to conducting the behaviour.

The conceptual framework provided the hypothesized relationship between the independent variables and dependent variables. The conceptual further provided the discussion of how the variables under the study were operationalized and measured. Different literatures were reviewed based on the relationship between cognitive biases and investors' decision making.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter presents the methodology adopted for the study. It describes the research philosophy, research design, population size and sampling design, data collection methods, pilot-testing, reliability and validity of instruments, data collection and analysis procedures that was used in the study.

#### **3.2 Research Philosophy**

Positivist philosophical approach entails developing research hypotheses based on both empirical and theoretical review. The developed hypotheses are then tested using quantitative methods such as statistical analysis with the aim of answering the research questions to accomplish the research purpose. Remenyi, Williams and Swartz (2005) claimed that positivist philosophical approach is the best way of achieving final results in research. The positivist paradigm is scientific and systematic and may be applied to both qualitative and quantitative research.

The principles of positivism comprise an observable social reality therefore making it the preferred paradigm for this study. Only apparent phenomena produce reliable

data (Saunders, Lewis & Thornhill, 2009). According Bryman and Bell (2007) the role of theories is to aid in developing hypotheses to test while research tests the hypothesis and provide necessary information for formulation of law. The results produced in research are comparable to generalization produced by natural scientists. Positivism also emphasizes on quantifiable observations that are used for statistical analysis (Remenyi, Williams & Swartz, 2005).

### **3.3 Research Design**

The method used for data collection was based on the exploratory nature of the research using descriptive survey design. This is a type of non-experimental research design for collecting and analyzing data in order to describe the problem in its current status. Descriptive surveys design was used in preliminary and exploratory studies to allow researchers gather information, summarize, present and interpret for the purpose of clarification (Orodho, 2004). Research design is an overall framework or a plan for investigation and logical model of proof that guides the investigator in the various stages of research (Kothari, 2008). This method is appropriate due to its capacity to establish how cognitive biases influence the decision making framework and behaviour of investors in reality and how it is consistent with the existing theories of finance.

### **3.4 Target Population**

The study population comprised of property investors who are investment traders at the property market in Plateau State who were registered and licensed to operate. The focus was on registered office or shops and rental residential properties in a sample of the seventeen Local Government headquarters of Plateau state. The motivating factor behind opting for the population in the Local Government headquarters is that an updated record exists of the registered investors in office/shops and rental residential properties. In this study, the target population comprised of a list of 1650 registered property investors which is the total number of registered property investors in the property market in Plateau state who have been licensed to operate in

all the Local Government headquarters including the capital city of the state (Lands & Survey, 2015).

### 3.5 Sampling Frame

A sampling frame as defined by Welman, Kruger and Mitchell, (2008) is a list of the source material or device from which a sample is drawn. It is a list of all those within a population who can be sampled, and may include individuals, households or institutions. The sampling frame was comprised of a list of 1650 property investors extracted from the official records of Ministry of Lands and Survey (2015) in Plateau State, Nigeria.

### 3.6 Sampling Technique

Sampling is an element of data collection, and is defined by Bryman and Bell (2011) as the fragment or section of the population that is selected for the research process. Multi-stage sampling procedure was used in the selection of representative sample. Purposive sampling was used to select the capital city of the state and some selected towns among the seventeen Local Government headquarters.

To determine the sample size for small populations, the normal approximation to the hyper-geometric distribution was used due to its ability to estimate sample sizes from small populations accurately. The sample size formula for small (hyper-geometric) populations is shown as follows:

$$n = \frac{NZ^2pq}{\{E^2(N-1)+Z^2pq\}} \dots\dots\dots \text{Equation (1)}$$

Where;            n= is the required sample size

                      N= is the population size (1650 individual investors)

$Z=$  is the level of confidence of the sample size (set at 95%) thus  
 $Z=1.96$

$P$  and  $q$  are the population proportions (Each set to 0.5).

$E$  sets the accuracy of the sample proportions (set to 0.05).

Therefore;

$$\frac{1650 \times 1.96^2 \times 0.5 \times 0.5}{\{0.05^2(1650 - 1) + 1.96^2 \times 0.5 \times 0.5\}}$$

$$n = 1584.66 \div 5.0829$$

The final sample size thus comprised of 312 respondents. The study adopted random sampling to select the 312 respondents that were included in the study out of the population of 1650 registered property investors.

### **3.7 Pilot Testing**

The questionnaire was pilot-tested on a 10% sample of respondents who are investors in the property market and who were not enlisted to participate in the study. This was based on assertion by Mugenda and Mugenda that between 1 and 10% of the population can be used in the pilot study for pretesting of the research questionnaires. This enabled the researcher to fine-tune the questionnaires for objectivity and efficiency of the process.

#### **3.7.1 Reliability of the Study Instruments**

According to Liu, Wu and Zumbo (2010) "Reliability and validity are central issues in all measurements. Both concerns how concrete measures are connected to constructs. Bryman and Bell (2011) suggests that Cronbach's alpha should be at least 0.7 to make sure that the measurements are reliable. However, many statisticians believe that it can be acceptable if the Cronbach's alpha is over 0.6 (Shelby, 2011).

This research chose the acceptable Cronbach's alpha which is 0.7 or more, with the corrected item-total correlation index as 0.3 or more because the measurements of financial behaviour might be new to the property traders of the Plateau State property market.

### **3.7.2 Validity of the Study Instruments**

Measurement validity deals with the question of whether a measure can actually provide measurements of a concept (Bryman & Bell, 2011). As the questionnaire is designed based on the theoretical models from previous studies, indicators for measurements are well applied to reflect truly the concept of "behavioural factors influencing investors' decisions". Besides, the 5-point Likert measurements removed the neutral opinions, which increase the measurements' accuracy. In addition, collected data was processed and analysed by employing SPSS software to explore the factors affecting investors' decisions and their correlations with decision making.

### **3.8 Data Collection Procedures**

An introductory letter was sought from Jomo Kenyatta University of Agriculture and Technology. The respondents were informed on the free will to participate in the study as well as the confidentiality of the information provided. Primary data was collected and used in the study. The researcher administered the questionnaires with the help of a research assistant and collected the filled-in questionnaires before leaving each of the selected respondents.

Primary data was collected using a questionnaire where a standard questionnaire with both closed and open ended questions were administered to capture the important information about the population. The selected individuals were given the questionnaires to fill where those with any difficulties were guided by a research assistant who also assisted in disseminating and collecting the questionnaires.

The questionnaire incorporated two sections with the first section enquiring respondents' background information, while the second part consisted of the study

objectives. A 5-point Likert scale was utilized asking the individual investors to indicate their opinions on the aspects of cognitive biases on their investment decision making. The 5 points in the scale range from 1 to 5: 1: Never, 2: Rarely, 3: Sometimes, 4: Often, 5: Always.

### **3.9 Data Analysis and Presentation**

Data analysis involved reducing accumulated data to a manageable size, developing summaries, looking for patterns and applying statistical techniques while data preparation includes editing, coding, and data entry and its activity that ensures the accuracy of the data and their conversion from raw form to reduced and classified form that are more appropriate for analysis. Data coding involves assigning numbers or other symbols to answers so that the responses can be grouped into a limited number of categories (Cooper & Schindler, 2011). Data entry converts information gathered by secondary or primary methods to a medium of viewing and manipulation. Statistical Package for Social Science (SPSS) version 22 was used as a tool to analyze the data.

#### **3.9.1 Descriptive Statistics**

The study employed both descriptive statistical techniques to allow presentation of data in a more meaningful way and thus simpler interpretation of data. Responses from open ended questions were coded, interpreted and their frequencies determined through cross-tabulation on differences between respondents and the central tendencies of respondents to each factor. To determine if associations exist between various variables, cross-tabulation was used. The descriptive statistics that the study employed included mean, standard deviation, frequencies and percentages.

#### **3.9.2 Inferential Statistics**

A multiple linear regression model was used to test the significance of the influence of the independent variables on the dependent variable. Prior to conducting the multivariate analysis, the study conducted a univariate regression which qualified the variables in the multivariate model by showing their level of significance. However,

the hypotheses tested were done based on the findings of the multivariate regression analysis. The models were presented below:

**Table 3.1 Summary of the Data Analysis**

<b>Objective</b>	<b>Hypothesis</b>	<b>Model</b>	<b>Purpose</b>
Influence of Anchoring Bias on Investors' Decision Making in Property Market in Plateau State, Nigeria	<b>H0<sub>1</sub>:</b> Anchoring does not significantly influence investment decision making in property market in Plateau State, Nigeria.	$Y = \beta_0 + \beta_1 X_1 + \varepsilon$ Y=Investors' Decision Making $X_1 = \text{Anchoring Bias}$ $\varepsilon = \text{Error term}$	Tested the relationship between anchoring bias and Investors' Decision Making
Influence of Overconfidence Bias on Investors' Decision Making in Property Market in Plateau State, Nigeria	<b>H0<sub>2</sub>:</b> Overconfidence does not significantly influence investment decision making in property market in Plateau State, Nigeria.	$Y = \beta_0 + \beta_2 X_2 + \varepsilon$ Y=Investors' Decision Making $X_2 = \text{Overconfidence Bias}$ $\varepsilon = \text{Error term}$	Tested the relationship between Overconfidence Bias and Investors' Decision Making
Influence of Narrow Framing Bias on Investors' Decision Making in Property Market in Plateau State, Nigeria	<b>H0<sub>3</sub>:</b> Narrow framing does not significantly influence investment decision making in property market in Plateau State, Nigeria.	$Y = \beta_0 + \beta_3 X_3 + \varepsilon$ Y=Investors' Decision Making $X_3 = \text{Narrow Framing Bias}$ $\varepsilon = \text{Error term}$	Tested the relationship between Narrow Framing and Investors' Decision Making
Influence of Representativeness Bias on Investors' Decision Making in Property Market in Plateau State, Nigeria	<b>H0<sub>4</sub>:</b> Representativeness does not significantly influence investment decision making in property market in Plateau State, Nigeria.	$Y = \beta_0 + \beta_4 X_4 + \varepsilon$ Y=Investors' Decision Making $X_4 = \text{Representativeness Bias}$ $\varepsilon = \text{Error term}$	Tested the relationship between Representativeness Bias and Investors' Decision Making
Influence of Disposition Effect Bias on Investors' Decision Making	<b>H0<sub>5</sub>:</b> Disposition effect does not significantly influence investment	$Y = \beta_0 + \beta_5 X_5 + \varepsilon$ Y=Investors' Decision Making $X_5 = \text{Disposition Effect}$ $\varepsilon = \text{Error term}$	Tested the relationship between Disposition Effect and Investors'

Objective	Hypothesis	Model	Purpose
in Property Market in Plateau State, Nigeria	decision making in property market in Plateau State, Nigeria.		Decision Making
Influence of Cognitive Biases on Investment Decision Making in Property Market in Plateau State, Nigeria	<b>H<sub>0</sub></b> : Cognitive biases do not significantly influence investment decision making in property market in Plateau State, Nigeria.	$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \epsilon$	Tested the relationship between Cognitive biases and Investors' Decision Making

Where:

Y = Represents the Investment Decision

$\beta_0$  = Model Intercept

$\beta_1$ ..... $\beta_5$  = Represents the beta coefficients

$X_1$  = Anchoring Bias

$X_2$  = Overconfidence Bias

$X_3$  = Narrow framing Bias

$X_4$  = Representativeness Bias

$X_5$  = Disposition Effect Bias

$\epsilon$  = Represents the error term of the model

To further support the linear regression model, the analysis of variance (ANOVA) was used to test the significance of the overall model at 95% level of significance. Coefficient of correlation (R) was used to determine the strength of the relationship between the dependent and independent variables. Coefficient of determination ( $R^2$ ) was also used to show the percentage for which each independent variable and all independent variables combined explained the change in the dependent variable. The decision to reject or accept the null hypothesis for each variable was guided by the level of significance of the probability values of each variable.

### 3.9.3 Operationalization and Measurement of Variables

Table 3.2 encompasses the different research variables, their indicators and the way they are to be measured to approximate the variables.

**Table 3.2 Variables Operationalization**

Variable	Operationalization	Indicator	Measurements
(Dependent Variable)	Investment decision making	<ul style="list-style-type: none"> <li>• Increase in property sales</li> <li>• Profit margins of property sold</li> <li>• Appreciation from holding property</li> </ul>	Nominal Scale
cognitive biases (Independent Variable)	Anchoring bias	<ul style="list-style-type: none"> <li>• Selling Price</li> <li>• Purchase Price</li> <li>• Current property price</li> </ul>	Nominal Scale
	overconfidence	<ul style="list-style-type: none"> <li>• Overestimate their Knowledge</li> <li>• Ability to Control Events</li> <li>• Underestimated Property Price</li> </ul>	Nominal Scale
	narrow framing	<ul style="list-style-type: none"> <li>• Propensity to positive decision making</li> <li>• Propensity to negative decision making</li> <li>• Propensity to risk-taking in decisions</li> </ul>	Nominal Scale
	Representativeness	<ul style="list-style-type: none"> <li>• Recent property prices</li> <li>• Future property prices</li> <li>• stereotypes in property market</li> </ul>	Nominal Scale
	Disposition Effect	<ul style="list-style-type: none"> <li>• Overreaction to property prices</li> <li>• Under-reaction to property prices</li> </ul>	Nominal Scale

### 3.10 Diagnostic Tests

#### 3.10.1 Factor Analysis

Factor Analysis was employed in this research to test for construct validity and highlight variability among observed variables and to also check for any correlated

variables in order to reduce redundancy in data. Mwit (2013) suggested that variables with factor loadings greater than 0.3 are the ones that had the highest significance and influence. The importance of conducting a factor analysis was to summarize the information contained in a number of original variables into a smaller number of factors without losing much information. This implies that the newly created variables should represent the fundamental constructs, which underlie the original variables (Gorsuch, 1990).

### **3.10.2 Normality Test**

A normal distribution is not skewed and is defined to have a coefficient of kurtosis of three (Brooks, 2014). This study used one-Sample Kolmogorov-Smirnov Test (KS) to test the normality of the dependent variable. It is a test based on residuals of the least squares regression model.

### **3.10.3 Multicollinearity**

Multicollinearity is a condition where two or more predictor variables in a multiple regression are highly correlated and therefore one can be linearly predicted from others with a high degree of accuracy (Kock & Lyne, 2012). This study tested for Multicollinearity using the correlation matrix and the threshold considered as 0.7 for severe multicollinearity (Cooper & Schindler, 2008). The study further used Variance Inflation Factor (VIF) which was applied using the threshold of 10 for severe multicollinearity.

### **3.10.4 Heteroscedasticity**

Homoscedasticity suggests that the dependent variable has an equal level of variability for each of the values of the independent variables (Garson, 2012). A test for homoscedasticity is made to test for variance in residuals in the regression model used. If there exist equal variance of the error term, we have a normal distribution. Lack of an equal level of variability for each value of the independent variables is known as heteroscedasticity, The Breusch-Pagan test developed by Breusch and Pagan (1979) was used to test for homogeneity in a linear regression model.

## **CHAPTER FOUR**

### **RESULTS AND DISCUSSIONS**

#### **4.1 Introduction**

The purpose of the study was to establish the influence of cognitive biases on investment decision-making in property market in Plateau State, Nigeria. The analysis presented in this chapter involved the use of descriptive analysis where frequency, percentages, mean and standard deviation were considered. Diagnostic tests and test of assumptions were further conducted to measure the suitability of the

variables for subsequent inferential analysis. Univariate, bivariate and multivariate inferential analysis were conducted to test the relationship between dependent (investment decision-making) and independent variables (anchoring bias, overconfidence bias, narrow framing bias representativeness bias and disposition effect).

#### **4.2 Response Rate**

A total number of 312 questionnaires were administered to the property investors who are investment traders at the property market in Plateau State, Nigeria who were registered and licensed to operate out of which 276 questionnaires were dully returned. This constituted 88.5% response rate. Response rate refers to the extent to which the final data set includes all sample members and is calculated as the number of people with whom interviews are completed divided by the total number of people in the entire sample, including those who refused to participate and those who were unavailable, (Fowler, 2013). Babbie (2004) asserted that return rates of 50% are acceptable to analyse and publish, 60% is good and 70% is very good.

**Table 4.1: Response Rate**

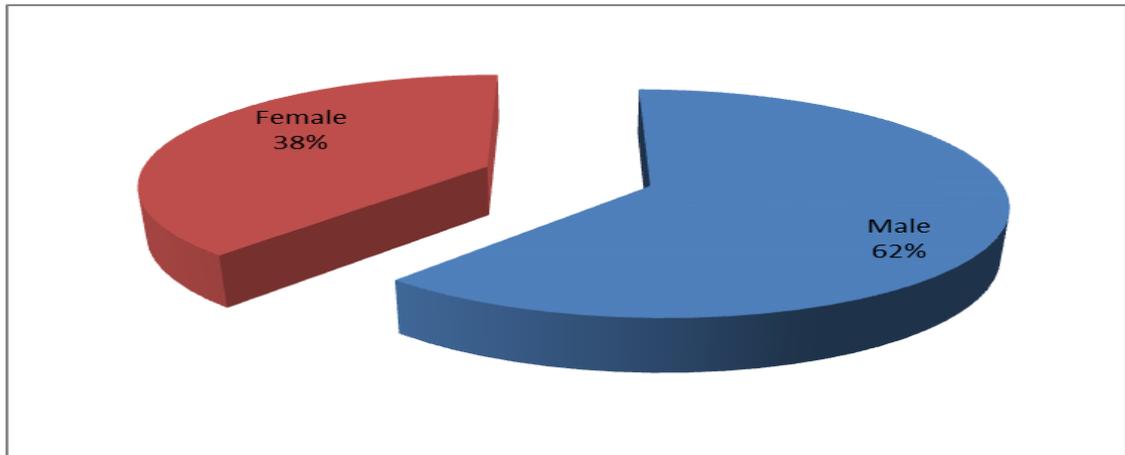
<b>Questionnaires</b>	<b>Frequency</b>	<b>Percentage</b>
Filled in Questionnaires	276	88.5
Unfilled Questionnaires	36	11.5
<b>Total</b>	<b>312</b>	<b>100.0</b>

### 4.3 Respondents Background Information

The study sought to find the background information of the respondents. Specifically the respondents were asked to indicate their gender and how long they have operated as an investor in the property market.

#### 4.3.1 Gender of Respondents

The results indicated that 62% of the respondents were male while 38% were female. This was an indication that majority of the property investors who are investment traders at the property market in Plateau State were male. This finding implies that women shy away from investing in property since it is involving a lot of capital, that is, it is capital intensive and most of them are afraid of the risk of taking huge loan. Pornchokchai (2011) also reported that females shy away from property investment because of psychological and financial reasons.

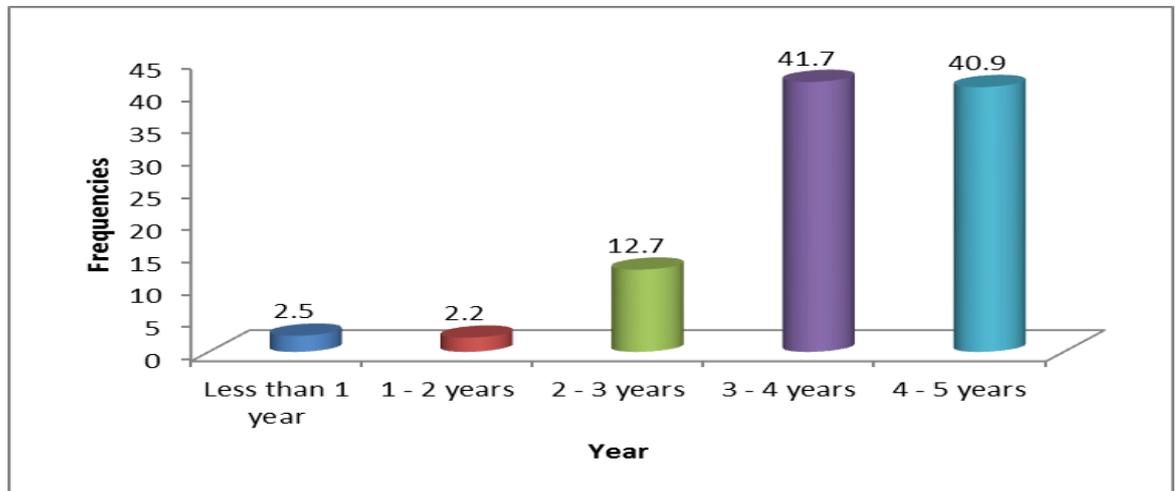


**Figure 4.2 Gender of Respondents**

#### 4.3.2 Number of Years Worked by the Respondents in Property Market

The findings in the figure 4.2 indicated that majority (41.7%) of the respondents had worked for between 3 and 4 years. Those who had worked for between 4 and 5 years were 40.9%. The respondents who had worked for less than 1 year were 2.5%. This

findings implied that majority of the respondents had worked long enough to provide the information sought by the study.



**Figure 4.3 Number of Years Worked by the Respondents**

#### **4.4 Diagnostic Tests Results**

The study performed tests on statistical assumptions such as test of regression assumptions and statistics used. This included tests of reliability, normality, linearity, independence, heteroscedasticity and multicollinearity.

##### **4.4.1 Factor Analysis**

Factor Analysis was necessary in this research to test for construct validity and highlight variability among observed variables and to also check for any correlated variables in order to reduce redundancy in data. Mwititi (2013) suggested that variables with factor loadings greater than 0.3 are the ones that had the highest significance and influence. The importance of conducting a factor analysis was to summarize the information contained in a number of original variables into a smaller number of factors without losing much information. This implies that the newly created variables should represent the fundamental constructs which underlie the

original variables (Gorsuch, 1990). Factor loadings represent how much a factor explains a variable in factor analysis. The general rule of the thumb for acceptable factor loading is 0.40 or above (David et al., 2010). All the items were accepted based on the general rule of thumb for acceptable factor loading of 0.40 above. All the variables have factor loadings above 40% and were acceptable based on the general rule as no item was removed.

**Table 4.2: Factor Analysis for all the variables**

Variables	Number of Items	Loadings	Comment
Anchoring Bias	11	Above 70	Accepted
Overconfidence Bias	12	Above 70	Accepted
Narrow Framing Bias	15	Above 50	Accepted
Representativeness Bias	14	Above 60	Accepted
Disposition Effect	8	Above 70	Accepted
Investment Decision-Making	26	Above 70	Accepted

#### 4.4.2 Reliability Test Results

The study conducted a reliability test to determine the internal consistency of the data obtained. Internal consistency method was preferred as measures whether several items that propose to measure the same general construct produce similar scores, thus a referred technique of measuring reliability (Saunders, Lewis & Thornhill, 2009). Nzuki's (2010) study on managing price risk in oil Industry used internal consistency method of measuring reliability. Chiorean, Donohoe and Sougiannis (2012) used similar method. Cronbach Alpha tests were conducted.

The findings (Table 4.3) showed that the scales were reliable as they surpassed a Cronbach Alpha threshold of 0.7. The construct of Anchoring Bias had an Alpha value of 0.717; Overconfidence Bias had an Alpha value of 0.701; Narrow Framing Bias had an Alpha value of 0.857; and, Representativeness Bias had an Alpha value of 0.741, Disposition Effect had a reported Alpha value of 0.789 while Investment Decision-Making had a Cronbach's Alpha of 0.745. Marczyk, DeMatteo and Festinger (2004) states that Cronbach Alpha value of 0.7 is the threshold for determining reliability. Therefore none of the items in the questionnaire were deleted after the pilot study. The questionnaire was adequate to be used in the final survey.

**Table 4.3: Reliability Test Results**

Variables	Cronbach's Alpha	Number of Items	Comment
Anchoring Bias	0.717	11	Accepted
Overconfidence Bias	0.701	12	Accepted
Narrow Framing Bias	0.857	15	Accepted
Representativeness Bias	0.741	14	Accepted
Disposition Effect	0.789	8	Accepted
Investment Decision-Making	0.745	26	Accepted

**4.4.2 Normality Test**

One-Sample Kolmogorov-Smirnov Test (KS) was conducted to test the normality of the dependent variable. The Kolmogorov-Smirnov test (also known as the K-S test or one sample Kolmogorov-Smirnov test) is a non-parametric procedure that determines whether a sample of data comes from a specific distribution, such as normal, uniform, Poisson, or exponential distribution. It is mostly used for evaluating the assumption of univariate normality by taking the observed cumulative distribution of scores and comparing them to the theoretical cumulative distribution for a normally distributed variable.

The null and alternative hypotheses are stated below.  $H_0$ : The data is normally distributed  $H_1$ : The data is not normally distributed The rule is that if the p-value is greater than 0.05,  $H_0$  is accepted and  $H_1$  is rejected, if the p-value is less than 0.05,  $H_0$  is rejected and  $H_1$  is accepted. The results obtained indicate that Kolmogorov-Smirnov Z statistic is 2.429 (p-value=0.089) since the statistic is high with the p-value greater than 0.05, the null hypothesis was accepted and concluded that the data was normally distributed and therefore fit for linear regression analysis.

**Table 4.4: One-Sample Kolmogorov-Smirnov Test**

		Investors Investment Decision Making
N		276
Normal Parameters <sup>a,b</sup>	Mean	4.0960
	Std. Deviation	.61887
Most Extreme Differences	Absolute	.267
	Positive	.141

	Negative	-.267
Kolmogorov-Smirnov Z		2.429
Asymp. Sig. (2-tailed)		.089
<hr/>		
a. Test distribution is Normal.		
b. Calculated from data.		

#### 4.4.3 Heteroscedasticity Test for Investors' Investment Decision

Homoscedasticity suggests that the dependent variable has an equal level of variability for each of the values of the independent variables (Garson, 2012). A test for homoscedasticity is made to test for variance in residuals in the regression model used. If there exist equal variance of the error term, we have a normal distribution. Lack of an equal level of variability for each value of the independent variables is known as heteroscedasticity. The Breusch-Pagan test developed by Breusch and Pagan (1979) was used to test for homogeneity in a linear regression model. The null and alternative hypotheses are stated below.  $H_0$ : The data is not heterogeneous in variance;  $H_1$ : The data is heterogeneous in variance

The rule is that if the p-value is greater than 0.05,  $H_0$  is accepted and  $H_1$  is rejected, if the p-value is less than 0.05,  $H_0$  is rejected and  $H_1$  is accepted. The result of the test is shown in table 4.5, which indicated that the test statistic was 6.3221 (p-value = 0.5463) with the degree of freedom. Since the test –Statistic is small with the p-value greater than 0.05, the null hypothesis was accepted and concluded that there was homoscedasticity in the data (that is, the data is not heterogeneous in variance), which satisfies the assumption of regression, hence the data was perfect for conducting inferential statistics.

**Table 4.5: Test for Heteroscedasticity in the Response and Residuals**

Test – Statistic	Degree of Freedom	P-Value
6.3221	4	0.5463

#### **4.4.6 Test for Multicollinearity**

Multicollinearity was tested by computing the Variance Inflation Factors (VIF) and its reciprocal, the tolerance. It is a situation in which the predictor variables in a multiple regression analysis are themselves highly correlated making it difficult to determine the actual contribution of respective predictors to the variance in the dependent variable. Thus, collinearity diagnostics measure how much regressors are related to other regressors and how this affects the stability and variance of the regression estimates. The existence of multicollinearity is a vital problem in applying multiple time series regression model. Multicollinearity is a situation when independent variables in the regression model are highly inter-correlated. Multicollinearity inflates the variances of the parameter estimates and hence this may lead to lack of statistical significance of individual predictor variables even though the overall model may be significant.

To detect for multicollinearity, the study examined the correlation matrix or by using Variance Inflation Factor (VIF) as shown in Table 4.6. The Variance Inflation Factor (VIF) quantifies the severity of multicollinearity in an ordinary least- squares regression analysis. VIF's greater than 10 are a sign of multicollinearity; the higher the value of VIF's, the more severe the problem. This study adopted a VIF value of 10 as the threshold. Anchoring Bias had VIF of 5.931; Overconfidence Bias had VIF of 6.051; Narrow Framing Bias had VIF of 4.021; and, Representativeness Bias had VIF of 5.745, Disposition Effect had a reported VIF value of 4.307. These results indicate that the VIF values of the independent variables were within the threshold of 10. This indicated that there was no threat of multicollinearity problem and therefore, the study used linear regression model.

**Table 4.6: Multicollinearity Test**

(Constant)	Collinearity Statistics	
	Tolerance	VIF
Anchoring Bias	0.169	5.931
Overconfidence Bias	0.165	6.051
Narrow Framing	0.249	4.021
Representative Bias	0.174	5.745
Disposition Effect	0.232	4.307

a Dependent Variable: Investors' Investment Decision

## **4.5 Descriptive Results**

This section provides descriptive results on how respondents responded to the statements in the questionnaire. The section contains descriptive results on the respondents' opinion on dependent (investment decision-making) and all independent variables (anchoring bias, overconfidence bias, and narrow framing bias, representativeness bias and disposition effect).

### **4.5.1 Anchoring Bias**

The first objective of the study was to determine the role of anchoring on investment decision making in property market in Plateau State, Nigeria. The descriptive findings are presented in Table 4.7.

**Table 4.7: Anchoring Bias**

Statement	Never	Rarely	Sometimes	Often	Always	Mean	Std Dev
Property investors set the value of the property based on the recent selling price	3.6%	4.0%	9.8%	43.5%	39.1%	4.11	0.98
Property investors use property purchase price as a reference point in trading	2.5%	3.3%	6.5%	42.0%	45.7%	4.25	0.91
Property investors set the value of the property based on the recent buying price	4.3%	4.7%	6.9%	44.6%	39.5%	4.10	1.02
Investors use a reference point to compare to the current property price	4.0%	3.6%	5.8%	42.8%	43.8%	4.19	0.98
Investors attach their thoughts to a logically irrelevant reference point	2.5%	3.3%	9.8%	44.6%	39.9%	4.16	0.91
The highest price the investor has perceived also becomes a reference point	2.5%	4.0%	7.6%	39.9%	46.0%	4.23	0.94
Investors wait for the property price to reach a reference point before trading	5.8%	4.0%	8.3%	43.5%	38.4%	4.05	1.07
Trained negotiators and real estate brokers are anchored in the negotiation process	3.6%	4.3%	10.1%	39.1%	42.8%	4.13	1.01
Property prices of today are determined by those of the past	4.3%	3.3%	5.4%	46.4%	40.6%	4.16	0.98
Investors tend to become more optimistic when the market rises	5.1%	2.9%	6.2%	41.3%	44.6%	4.17	1.03
Investors tend to become more pessimistic when the market falls	4.3%	5.4%	5.4%	44.9%	39.9%	4.11	1.03

The study sought to find out from the respondents whether the property investors in Plateau State set the value of the property based on the recent selling price, the statement had a mean response of 4.11 and a standard deviation of 0.98. This was an indication that majority of the respondents agreed that property investors often and always set the value of the property based on the recent selling price. The study

further sought to determine whether property investors used property purchase price as a reference point in trading, the statement also had a mean of 4.25 implying that majority of the respondents agreed with the statement. On whether, property investors set the value of the property based on the recent buying price, the results revealed that majority of the respondents agreed as shown by the mean of 4.10 and standard deviation of 1.02.

The study further sought to establish whether property investors used a reference point to compare to the current property price, the results showed that the statement had a mean response of 4.19 and standard deviation of 0.98 which also implied that majority of the respondents indicated always and often. The study asked the respondents whether property investors in Plateau State attached their thoughts to a logically irrelevant reference point; the statement also had a mean of 4.16 which implied that majority of the respondents indicated that investors often and always attached their thoughts to a logically irrelevant reference point. Similarly, the results indicated that majority of the respondents indicated that the highest price the investor had perceived was used as a reference point.

The study also sought to establish whether investors wait for the property price to reach a reference point before trading, whether trained negotiators and real estate brokers were anchored in the negotiation process, whether property prices of today are determined by those of the past, investors tend to become more optimistic when the market rises, and finally whether investors tend to become more pessimistic when the market falls.

The results revealed that all the above statements had a mean of above 4 which implied that property investors in Plateau State wait for the property price to reach a reference point before trading, trained negotiators and real estate brokers were anchored in the negotiation process, property prices of today were determined by those of the past, property investors become more optimistic when the market rises and finally investors tend to become more pessimistic when the market falls. These findings implied that property investors in Plateau State used anchoring in

investment decision making. The findings of this study are inconsistent with those of Parikh (2011) and Ngoc (2013) who found that even negotiators who are trained as deal makers and provided with rich and accessible information are anchored in the negotiation process. Similarly, Kim and Nofsinger (2008) findings suggested that agents are heavily influenced by anchoring and adjusting.

#### **4.5.2 Overconfidence Bias**

The second objective of the study was to determine the role of overconfidence bias on investment decision making in property market in Plateau State, Nigeria. The descriptive findings are presented in Table 4.8.

**Table 4.8: Overconfidence Bias**

	Never	Rarely	Some times	Often	Always	Mean	Std Dev
Property investors use predictive skills to time the market and make future decisions	2.9%	3.3%	10.5%	39.5%	43.8%	4.18	0.95
Property investors have high expectations on returns beyond market expectations	3.6%	5.1%	7.6%	41.3%	42.4%	4.14	1.01
Investors overestimate their knowledge and underestimate risks	3.6%	4.3%	7.2%	35.9%	48.9%	4.22	1.01
Investors exaggerate their ability to control events	4.3%	5.4%	4.7%	41.7%	43.8%	4.15	1.04
Investors overestimate their own predictive abilities	3.3%	5.1%	7.6%	40.9%	43.1%	4.16	0.99
Investors tend to be biased on the precision of information they have been given	3.6%	3.3%	8.7%	42.0%	42.4%	4.16	0.97
Investors understand their own abilities and the limits of their knowledge on property market	4.7%	3.3%	6.9%	37.7%	47.5%	4.20	1.03
Investors are overconfident to think they are better than they actually are	4.3%	4.3%	8.3%	38.0%	44.9%	4.15	1.04
Investors who are overconfident about their level of knowledge tend to think they know more than they actually do	3.6%	4.3%	6.2%	41.3%	44.6%	4.19	0.99
Investors are overconfident of their own ability when it comes to picking properties	4.3%	3.6%	7.6%	41.7%	42.8%	4.15	1.01
Investors overestimate their predictive skills and believe that they can time the market	4.7%	3.6%	6.9%	42.0%	42.8%	4.14	1.02
Investors are fond of making excessive trading due to overconfidence	4.0%	4.7%	5.4%	38.8%	47.1%	4.20	1.02

The study sought to find out whether property investors use predictive skills to time the market and make future decisions, the results showed that the statement had a mean of 4.19 which implied that majority of the respondents agreed, the study also asked respondents whether property investors had high expectations on returns beyond market expectations, similarly the statement had a mean response of 4.14 and

standard deviation of 1.01. The result also showed that majority of the respondents agreed that property investors had high expectations on returns beyond market expectations. The respondents were further asked whether investors overestimate their knowledge and underestimate risks, the statement had a mean response of 4.22 which implied that majority of the investors agreed.

The study also sought to find out whether property investors in Plateau State exaggerate their ability to control events; the statement also had a mean response of above 4 which indicated that the respondents agreed with the statements. On whether investors tend to be biased on the precision of information they have been given, the findings revealed that the respondents indicated quite often and always. The study also sought to find out whether property investors understood their own abilities and the limits of their knowledge on property market, the statement had a mean of 4.20 and standard deviation of 1.03 which also implied that majority of the respondents were in agreement with the statements.

This study was further interested in knowing whether the property investors are overconfident to think that they are better than they actually are. The statement had a mean of 4.15 and standard deviation of 1.04 which implied that majority of the respondents agreed with the statement. On whether, property investors who are overconfident about their level of knowledge tend to think they know more than they actually do, the results indicated that the respondents agreed since the statement had a mean response of 4.19 and a standard deviation of 0.99. The study finally sought to establish whether property investors were overconfident of their own ability when it comes to picking properties, whether property investors overestimated their predictive skills and believe that they can time the market and whether property investors were fond of making excessive trading due to overconfidence. All the above statements had a mean response of above 4 which implied that majority of the respondents agreed with the statement. The findings of this study implied that property investors in Plateau State, Nigeria had overconfidence bias during investment decision making.

Kafayaat (2014) also confirmed that overconfidence led to over-optimism, as previously proved by Weinstein (1980). Chaudhary (2013) also studied on the subject perceptions of overconfidence and predictive validity in financial cues. The findings were that investors are generally overconfident regarding their ability and knowledge. They also found that investors tend to underestimate the imprecision of their beliefs or forecasts, and they tend to overestimate their ability. The findings were that investors are overconfident in their own abilities, and investors and analysts are particularly overconfident in areas where they have some knowledge.

### 4.5.3 Narrow Framing Bias

This study also sought to explain the influence of narrow framing on investment decision making in property market in Plateau State, Nigeria. The descriptive findings are presented in Table 4.9.

**Table 4.9: Narrow Framing Bias**

			Never	Rarely	Some times	Often	Always	Mean	Std Dev
Investors usually make positive decisions on property investment			3.6%	3.3%	6.9%	44.9%	41.3%	4.17	0.96
Investors usually make negative decisions on			4.3%	3.6%	6.5%	43.5%	42.0%	4.15	1.00

property investment								
Mostly, investors usually combine positive and negative decisions on property investment	2.5%	6.5%	9.1%	38.0%	43.8%	4.14	1.00	
Property investors evaluate risks while buying property	3.6%	3.6%	6.5%	44.6%	41.7%	4.17	0.96	
Property investors evaluate risks while selling property	5.8%	4.3%	8.3%	39.5%	42.0%	4.08	1.09	
Investors always evaluate risks in isolation, separately from other risks they are already facing	2.2%	4.3%	8.3%	43.5%	41.7%	4.18	0.92	
Investors derive utility from gains and losses in the value of individual properties	4.0%	4.0%	7.2%	42.0%	42.8%	4.16	1.00	

The study sought to find out whether property investors usually make positive decisions on property investment, the findings revealed that the statement had a mean of 4.17 and standard deviation of 0.96 which showed that majority of the respondents agreed with the statement. The study was further interested in whether investors usually make negative decisions on property investment; similarly the statement had a mean of 4.15 showing agreement with the statement. On whether investors usually combined positive and negative decisions on property investment, the study established that majority of the respondents indicated always and often. The study further find out that majority of the respondents indicated that property investors in Plateau State, Nigeria often and always evaluated risks while buying and selling property, evaluated risks in isolation, separately from other risks they are already facing and finally, investors derived utility from gains and losses in the value of individual properties. The findings also implied that property investors in Plateau State, Nigeria had narrow framing during investment decision making.

The study further sought to find out the causes of narrow framing among property investors. All the statements in this section had a mean of above 4 which implied that the respondents indicated that property investors in Plateau State, Nigeria often and always made positive decisions on choice of property, avoided risky decision making in property investment, some investors were more risk-averse than others and

investors base their investment decisions on the selective decisions of buying or selling property. Similarly, the respondents agreed that fear of loss and level of tolerance were elements that impacted the narrow framing of individual investors, that property investors had tendency to follow the less risky alternative in making investment decisions and finally that confident property investors rely on calculated risks for the investment decisions.

Similarly, Kahneman (2003) found that in a positive frame, the compromise between arriving at a good decision and minimizing cognitive effort is easy to achieve. Laing (2010) used a sample size of 265 to test the existence of the framing effect and sunk cost effect whilst examining the influence of cognitive factors. The findings confirmed the existence of the framing effect and a sunk cost effect. Rabin and Weizsacker (2008) demonstrated that a majority of people choose dominated strategies when prospects were presented in isolation.

**Table 4.10: Causes of Narrow Framing Bias**

	Never	Rarely	Some times	Often	Always	Mean	Std Dev
Investors usually make positive decisions on choice of property	6.2%	3.6%	7.2%	41.7%	41.3%	4.08	1.09
Investors usually make negative decisions on choice of property	4.0%	2.9%	9.1%	42.0%	42.0%	4.15	0.98
Investors avoid risky decision making in property investment	4.0%	2.5%	7.2%	42.8%	43.5%	4.19	0.97
Some investors are more risk averse than others	4.3%	3.3%	6.9%	44.2%	41.3%	4.15	0.99
Investors base their investment decisions on the selective decisions of buying or selling property	4.7%	1.8%	8.7%	42.4%	42.4%	4.16	0.99
Fear of lose and level of	3.3%	3.3%	8.3%	39.5%	45.7%	4.21	0.96

tolerance are elements that impact the narrow framing of individual investors							
Confident investors rely on calculated risks for the investment decisions	4.3%	1.8%	9.4%	42.0%	42.4%	4.16	0.98
Investors have tendency to follow the less risky alternative in making investment decision	3.6%	4.3%	7.6%	46.0%	38.4%	4.11	0.98

#### 4.5.4 Representativeness Bias

The fourth objective of the study was to establish the influence of representativeness on investment decision making in property market in Plateau State, Nigeria. The descriptive findings are presented in Table 4.11.

**Table 4.11: Representativeness Bias**

	Never	Rarely	Some times	Often	Always	Mean	Std Dev
Property investors use past performance in future decision making	3.6%	4.3%	8.0%	41.7%	42.4%	4.15	0.99
Property investors use trend analysis to make investment decisions	1.8%	3.6%	6.9%	42.0%	45.7%	4.26	0.88
Investors over-rely on stereotypes in property market	2.9%	5.1%	8.3%	39.1%	44.6%	4.17	0.98
Investors' recent success tend to continue into the future inhibiting decision making	3.3%	1.4%	6.9%	49.3%	39.1%	4.20	0.88
Investors tend to attribute good characteristics of a company directly to good characteristics of its property	4.3%	2.2%	6.5%	40.9%	46.0%	4.22	0.98
Investors assess situations based on superficial characteristics rather than underlying probabilities	4.3%	5.1%	9.1%	36.6%	44.9%	4.13	1.06
Investors view properties of a "good company" will be a good investment	2.2%	5.1%	7.6%	44.6%	40.6%	4.16	0.93

Investors consider recent past returns to be representative of what they can expect in the future	5.4%	4.3%	6.2%	40.6%	43.5%	4.12	1.07
Investors buy properties that have recently increased in value	2.5%	2.5%	8.7%	39.5%	46.7%	4.25	0.91
Investors tend to buy properties that have recently enjoyed some positive abnormal returns	5.4%	2.9%	5.4%	44.9%	41.3%	4.14	1.03
Investors are consistent with the thinking that the past price trend is representative of the future price trend	2.5%	2.2%	8.3%	46.4%	40.6%	4.20	0.88
Investors assume that there exists a significant and positive association between investors' expected returns and past market returns	4.0%	4.7%	9.1%	47.1%	35.1%	4.05	1.00
Investors seek to buy 'hot' properties and to avoid those which have performed poorly in the recent past	2.9%	4.7%	7.2%	45.7%	39.5%	4.14	0.95
Investors form judgements based on patterns that are simply random in a data and not representative of the facts	3.6%	4.0%	9.1%	40.6%	42.8%	4.15	0.99

The study sought to find out whether property investors used past performance in future decision making. The findings showed that the statement had a mean response of 4.15 which indicated majority agreed that investors often and always used past performance in future decision making. The study was also interested in whether property investors used trend analysis to make investment decisions, the findings showed that majority agreed that investors often and always used trend analysis to make investment decisions. The study further sought to find out whether investors over-rely on stereotypes in property market, investors' recent success tend to continue into the future inhibiting decision making and whether investors tend to attribute good characteristics of a company directly to good characteristics of its property. All the statement had a mean of above 4 which implied that property investors in Plateau State, Nigeria often and always over-relied on stereotypes in property market, investors' recent success tend to continue into the future inhibiting decision making and attributed good characteristics of a company directly to good characteristics of its property.

The study findings revealed that property investors in Plateau State, Nigeria often and always assessed situations based on underlying probabilities, viewed the

properties of a “good company” will be a good investment, considered recent past returns to be representative of what they can expect in the future, bought properties that have recently increased in value, and had tendency to buy properties that have recently enjoyed some positive abnormal returns. All the statements above had a mean response of above 4 and standard deviation of above 1.

The study further sought to find out whether property investors in Plateau State of Nigeria were consistent with the thinking that the past price trend is representative of the future price trend. The findings showed that the statement had a mean 4.20 and a standard deviation 0.88 which implied that majority of the respondents agreed that property investors were consistent with the thinking that the past price trend is representative of the future price trend. Similarly the findings showed that majority of the respondents agreed that property investors assumed that there existed a significant and positive association between investors’ expected returns and past market returns as shown by the mean response of 4.05. The statements “investors seek to buy ‘hot’ properties and to avoid those which have performed poorly in the recent past” and “Investors form judgements based on patterns that are simply random in a data and not representative of the facts” had mean responses of 4.14 and 4.15 respectively which showed that majority of the respondents agreed with the statements.

#### **4.5.5 Disposition Effect Bias**

The study also sought to find out the influence of disposition effect on investment decision making in property market in Plateau State, Nigeria. The descriptive findings are presented in Table 4.12.

**Table 4.12: Disposition Bias**

	Never	Rarely	Some times	Often	Always	Mean	Std Dev
Investors tend to sell winning properties too early	5.4%	4.3%	5.8%	41.7%	42.8%	4.12	1.07
Investors tend to hold losing properties too long	5.1%	4.7%	7.2%	42.8%	40.2%	4.08	1.06
Investors find it easier to discard loss-making properties when the deadline for the end of the tax year approaches	1.4%	1.1%	7.6%	40.6%	49.3%	4.35	0.79
Investors with nominal losses tend to have higher asking prices for their properties	2.9%	4.0%	6.2%	41.7%	45.3%	4.22	0.94
Property investors avoid selling property that has decreased in value	4.3%	3.6%	5.8%	42.4%	43.8%	4.18	1.00
Property investors sell property that has fast increased in value	2.9%	4.7%	5.8%	42.8%	43.8%	4.20	0.95
Property investors are risk-averse when faced with a sure gain	4.3%	2.2%	6.9%	43.1%	43.5%	4.19	0.97
Property investors are risk-takers when faced with a sure loss	2.2%	4.0%	7.2%	39.9%	46.7%	4.25	0.91

The study was interested in whether property investors had a tendency to sell winning properties too early. The findings revealed that the statement had a mean response of 4.12 which implied that majority of the respondents agreed. The study

further sought to find out whether investors tend to hold losing properties too long, the result also showed that majority of the respondents agreed. On whether investors find it easier to discard loss-making properties when the deadline for the end of the tax year approaches, the mean response of 4.35 also showed that majority of the respondents agreed.

The respondents were further supposed to reveal whether property investors with nominal losses tend to have higher asking prices for their properties, the findings showed that majority agreed as shown by the mean response of 4.22. Similarly, the mean response of 4.18 indicated that respondents agreed that property investors avoid selling property that has decreased in value and that property investors sell property that has fast increased in value. Finally the results showed that respondents agreed that property investors are risk-averse when faced with a sure gain and that property investors are risk-takers when faced with a sure loss as shown by the mean response of above 4 and slight variation in standard deviation.

#### **4.5.6 Investors' Investment Decision Making**

The study aimed to establish whether increase in property sales influenced decisions to invest in properties, whether increase in property profits influenced decisions to invest in properties, whether positive property market information influenced decisions to invest in properties, whether past trends of property influenced decisions to invest in properties, whether appreciation from holding property influenced decisions to invest in properties, whether focus on “hot” property influenced decisions to invest in properties, whether seasonal price cycles influenced decisions to invest in properties, whether investors' preferences influenced decisions to invest in properties, whether over-reaction to price changes in property influenced decisions to invest in properties, and finally whether under-reaction to price changes in property influenced decisions to invest in properties. The descriptive findings are presented in Table 4.13.

**Table 4.13: Factors Influencing Property Investment Decisions**

	Never	Rarely	Some times	Often	Always	Mean	Std Dev
Increase in property sales influence decisions to invest in properties	4.3%	5.1%	6.5%	42.4%	41.7%	4.12	1.03
Decrease in property sales influence decisions to invest in properties	3.6%	3.3%	6.9%	44.2%	42.0%	4.18	0.96
Increase in property profits influence decisions to invest in properties	4.3%	4.3%	6.2%	44.6%	40.6%	4.13	1.01
Decrease in property profits influence decisions to invest in properties	3.3%	4.7%	6.9%	44.9%	40.2%	4.14	0.97
Positive property market information influence decisions to invest in properties	2.5%	3.3%	9.4%	43.5%	41.3%	4.18	0.92
Negative property market information influence decisions to invest in properties	3.3%	4.7%	6.2%	42.8%	43.1%	4.18	0.97
Past trends of property influence decisions to invest in properties	3.3%	3.6%	6.2%	50.4%	36.6%	4.13	0.92
Appreciation from holding property influence decisions to invest in properties	2.5%	3.6%	9.4%	43.8%	40.6%	4.16	0.92
Focus on “hot” property influence decisions to invest in properties	2.5%	5.1%	8.3%	42.0%	42.0%	4.16	0.96
Seasonal price cycles influence decisions to invest in properties	2.5%	3.6%	10.1%	44.9%	38.8%	4.14	0.92
Investors’ preferences influence decisions to invest in	5.1%	2.2%	6.2%	44.9%	41.7%	4.16	1.00

properties							
Over-reaction to price changes in property influence decisions to invest in properties	4.3%	2.2%	7.2%	40.6%	45.7%	4.21	0.98
Under-reaction to price changes in property influence decisions to invest in properties	5.1%	5.1%	6.9%	38.8%	44.2%	4.12	1.08

The findings showed that the respondents agreed with the statements above. All the statements had mean respondent of above 4 which confirmed that the respondents agreed with the statements.

The study was further interested in establishing some of the behaviours of property investors and how they influence property investment decisions. The study sought to find out whether the buying decision of investors influences property investment decisions, the findings showed that majority of the respondents agreed as shown by the mean of 4.12 and a standard deviation of 1.08. The study also aimed to find out whether the increase in sales of property bought and sold influenced investment decisions. The statement had a mean of 4.15 which confirmed that majority were in agreement with the statement. Similarly, the statement whether selling decision of investors influenced property investment decisions was found to have a mean response of 4.22 which confirmed that the respondents agreed. On whether the choice of property to trade influenced property investment decisions, the results showed that majority of the respondents agreed. The findings of this study also confirmed that the appreciation on property based on length of time to hold it influenced investment decisions as indicated by majority of the respondents. Finally, the study results revealed that the profit margins of sold property influenced property investment decisions.

This finding concurs with those of Odean (2005) who confirmed the same conclusion that individual investors tend to sell properties which their values, in comparison to their original buying price, increase rather than sell the decreasing ones. Genesove and Mayer (2007) also stated that investors who sell their assets at the price less than

original purchase price usually expect the selling price is more than other sellers' asking price.

Coval and Shumway (2005) on the other hand found that investors, according to prospect theory, having gains (losses) in the first half of trading tends to take less (more) risk in the second half of trading. The findings further agreed with Grinblatt and Han (2006) who claim that the behaviour of investors which is described as the disposition effect can be considered as a puzzling characteristic of the cross-section of average returns called momentum in property returns in which, investors prefer selling a property that has helped them to gain capital.

**Table 4.14: Behaviour of Property Investors**

	Never	Rarely	Someti mes	Often	Always	Mean	Std Dev
The buying decision of investors influences property investment decisions	5.1%	5.1%	6.9%	38.8%	44.2%	4.12	1.08
The increase in sales of property bought and sold influence investment decisions	4.0%	3.3%	8.3%	42.4%	42.0%	4.15	0.99
Decrease in demand of property based on over supply of properties influence investment decisions	2.9%	3.3%	7.6%	41.3%	44.9%	4.22	0.93
The selling decision of investors influences property investment decisions	4.3%	7.6%	5.4%	46.4%	36.2%	4.03	1.06
The choice of property to trade influence property investment decisions	5.8%	3.6%	6.2%	38.8%	45.7%	4.15	1.08
The appreciation on property based on length of time to hold it influence investment decisions.	5.4%	4.3%	6.9%	39.1%	44.2%	4.12	1.08
The profit margins of sold property influence property investment decisions	2.5%	5.1%	6.9%	40.6%	44.9%	4.20	0.95

The study was also interested in investors' behaviour in making the selling/buying decisions in property market. The findings showed that 44.6% and 35.1% indicated that investors often and always decrease the selling decisions of assets that get a loss

in comparison to the initial purchasing price. The results further indicated that 40.9% and 37.3% of the respondents indicated that investors often and always tend to sell properties which their values are higher in comparison to their original buying price respectively. The study findings also confirmed that 39.5% and 37.0% of the respondents indicated that the correction of market dictated the selling price of property among investors in Plateau State. The study also sought to establish whether investors preferred selling a property that has helped them to gain capital, the statement had a mean response of above 4 which confirmed that majority of the respondents agreed. On whether investors were more interested in purchasing the high-attention properties than selling them and whether investors' behaviours impacted both selling and buying decisions at different levels, and then they also impacted the general returns of the market, the findings revealed that majority of the respondents agreed.

**Table 4.15: Investors' Behaviour in Making the Selling/Buying Decisions**

	Never	Rarely	Some times	Often	Always	Mean	Std Dev
Investors decrease the selling decisions of assets that get a loss in comparison to the initial purchasing price	4.3%	6.9%	9.1%	44.6%	35.1%	3.99	1.05
Investors tend to sell properties which their values are higher in comparison to their original buying price	5.4%	5.4%	10.9%	37.3%	40.9%	4.03	1.11
The correction of market dictates the selling price of property among investors in Plateau State	6.9%	4.7%	12.0%	39.5%	37.0%	3.95	1.14
Investors prefer selling a property that has helped them to gain capital	6.2%	4.7%	11.6%	33.3%	44.2%	4.05	1.14
Investors are more interested in purchasing the high-attention properties than selling them	5.1%	4.7%	10.5%	43.5%	36.2%	4.01	1.06
Investors' behaviours impact both selling and buying decisions at different levels, and then they also impact the general returns of the market	5.4%	5.8%	13.0%	42.4%	33.3%	3.92	1.09

#### 4.6 Pearson Correlation Results

According to Kothari (2014), the correlation coefficient can range from -1 to +1, with -1 indicating a perfect negative correlation, +1 indicating a perfect positive correlation, and 0 indicating no correlation at all. A linearity test was conducted as evidenced by the Pearson correlation coefficient. Kothari (2014) further stated that the importance of correlation is to determine the extent to which changes in the value of an attribute is associated with changes in another attribute.

**Table 4.16: Overall Pearson Correlation Matrix**

		AB	OB	NF	RB	DE
Anchoring Bias Mean	Pearson Correlation	1				
	Sig.					
	N	276				
Overconfidence Bias	Pearson Correlation	0.652**	1			
	Sig.	0.000				
	N	276	276			
Narrow Framing	Pearson Correlation	0.241**	-0.088**	1		
	Sig.	0.000	0.145			
	N	276	276	276		
Representativeness Bias	Pearson Correlation	0.319**	0.085	0.132	1	
	Sig.	0.000	0.157	0.028		
	N	276	276	276	276	
Disposition Effect	Pearson Correlation	0.331**	0.107	0.140	0.630	1
	Sig.	0.000	0.077	0.02	0.000	
	N	276	276	276	276	276
Investment Decision Making	Pearson Correlation	0.682**	0.409**	0.480**	0.553**	0.503**
	Sig.	0.000	0.000	0.000	0.000	0.000
	N	276	276	276	276	276

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

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

#### **4.6.1 Anchoring Bias and Investment Decision Making**

The results of correlation analysis indicated that anchoring bias had a positive and significant correlation with investors' investment decision making ( $r=0.682$ ,  $p=0.000$ ). The findings imply that increase in anchoring bias would result in increase in investors' investment decision making. The findings of this study are consistent with those of Parikh (2011) and Ngoc (2013) who found that even negotiators who are trained as deal makers and provided with rich and accessible information are anchored in the negotiation process. Similarly, Kim and Nofsinger (2008) findings suggested that agents are heavily influenced by anchoring and adjusting.

#### **4.6.2 Overconfidence Bias and Investment Decision Making**

The study also employed Pearson correlation test to ascertain the association between Overconfidence and investors' investment decision making. The results of correlation analysis indicated that overconfidence bias had a positive and significant correlation with investors' investment decision making ( $r=0.409$ ,  $p=0.000$ ). The findings implied that investors with overconfidence bias easily make investment decision making compared to those without overconfidence bias. Individual investors who are overconfident about their abilities tend to think they are better than they actually are. Kafayaat (2014) also confirmed that overconfidence led to over-optimism, as previously proved by Weinstein (1980). Chaudhary (2013) also studied on the subject perceptions of overconfidence and predictive validity in financial cues. The findings were that investors are generally overconfident regarding their ability and knowledge. They also found that investors tend to underestimate the imprecision of their beliefs or forecasts, and they tend to overestimate their ability. The findings were that investors are overconfident in their own abilities and investors and analysts are particularly overconfident in areas where they have some knowledge.

#### **4.6.3 Narrow Framing Bias and Investment Decision Making**

The correlation analysis results revealed that narrow framing and investors' investment decision making had a positive and significant association ( $r=0.480$ ,  $p=0.000$ ). Similarly, Kahneman (2003) found that in a positive frame, the

compromise between arriving at a good decision and minimizing cognitive effort is easy to achieve. Laing (2010) used a sample size of 265 to test the existence of the framing effect and sunk cost effect whilst examining the influence of cognitive factors. The findings confirmed the existence of the framing effect and a sunk cost effect. Rabin and Weizsacker (2008) demonstrated that a majority of people choose dominated strategies when prospects were presented in isolation.

#### **4.6.4 Representativeness Bias and Investors' Investment Decision Making**

The results of correlation analysis also indicated that representativeness bias had a positive and significant correlation with investors' investment decision making ( $r=0.553$ ,  $p=0.000$ ). The findings imply that increase in representativeness bias would positively impact on investors' investment decision making. Representativeness is concerned with determining conditional probabilities. Representativeness is said to be usually employed by property investors while making judgments under uncertainty. Yosra and Boujelbene (2013) also showed that the sample of investors extrapolates future performance of the Stock Market in the recent past events rather than tending to consider recent events, investors are led to overestimate the probability of the occurrence of a future event.

Wen and Jianfeng (2011) on the other hand found that while making investments, individual investors tend to attribute good characteristics of a company directly to good characteristics of its property. Similarly Antony (2009) study found that investors' psychology plays a great role in determining investment decision and market prices. Finally Dhar and Kumar (2001), found that investors tend to buy properties that have recently enjoyed some positive abnormal returns. This finding is consistent with the thinking that the past price trend is representative of the future price trend.

#### **4.6.5 Disposition Effect Bias and Investors' Investment Decision Making**

The results of correlation analysis also indicated that disposition effect bias had a positive and significant correlation with investors' investment decision making

( $r=0.503$ ,  $p=0.000$ ). The findings imply that increase in disposition effect bias would positively impact on investors' investment decision making. According to Henderson (2012) disposition effect is the tendency of an investor to sell winners too early and hold losers too long. Crane and Hartzell (2007) findings showed that there was strong statistical evidence consistent with the existence of the disposition effect among REIT management – REITs tend to sell winners and hold losers.

#### **4.7 Regression Results**

Regression modeling was adopted to link the independent variables to the dependent variable. According to Kothari (2014), regression is the determination of a statistical relationship between two or more variables. In simple regression, there are two variables, one variable (defined as independent) is the cause of the behavior of another one (defined as dependent variable). Kothari (2014) further described ANOVA as a procedure for testing the difference among different groups of data for homogeneity. The essence of ANOVA is that the total amount of variation in a set of data is broken down into two types, that amount which can be attributed to chance and that amount which can be attributed to specified causes while F- test was also used in the context of the analysis of variance (ANOVA) for judging the significance of multiple correlation coefficients.

##### **4.7.1 Anchoring Bias and Investors' Investment Decision Making**

##### **Univariate Regression Results for anchoring Bias and Investors' Investment Decision Making**

The first objective of the study was to determine the role of anchoring bias on investors' investment decision making in property market in Plateau State, Nigeria. Under anchoring bias, the study sought to find out the effect of recent selling price, recent buying price and purchase price biases on investment decision in property market.

##### **Table 4.17: Model Summary for Anchoring Bias**

Model	1
R	.663a
R Square	0.439
Adjusted R Square	0.433
Std. Error of the Estimate	0.46587
F (Sig.)	71.077 (0.000)

The results indicated that the model had R-square of 0.439 which implied that recent selling price, recent buying price and purchase price anchoring biases jointly explained 43.9% of the variation in investment decision making. The F-statistic obtained was 71.077 with a p-value of 0.000 which further confirmed that there was a significant relationship between recent selling price, recent buying price and purchase price; anchoring biases and investment decision making.

**Table 4.18: Coefficients for Anchoring Bias Variables and Investment Decision Making**

	B	Std. Error	Beta	t	Sig.
(Constant)	1.859	0.176		10.558	0.000
Recent Buying Price	0.291	0.031	0.463	9.325	0.000
Purchase Price	0.221	0.034	0.323	6.504	0.000
Recent Selling Price	0.07	0.056	0.057	1.247	0.213

a Dependent Variable: Investment Decision

**Investment Decision Making** = 1.859 + 0.291 (*Recent Buying Price*) + 0.221 (*Purchase Price*) + 0.07 (*Recent Selling Price*) + ε

The results of regression coefficients revealed that recent buying price anchoring bias and purchase price anchoring bias had a statistically significant relationship with investment decision making since p-value was less than 0.05. However the regression coefficients between recent selling price bias and investment decision making had insignificant relationship since the p-value was greater than 0.05.

The findings of this study are consistent with those of Parikh (2011) and Ngoc (2013) who found that even negotiators who are trained as deal makers and provided with rich and accessible information are anchored in the negotiation process. Similarly, Kim and Nofsinger (2008) findings suggested that agents are heavily influenced by anchoring and adjusting.

**Overall Regression Results for anchoring Bias and Investors’ Investment Decision Making**

The results showed a relationship  $R= 0.682$ , indicating a strong positive association between anchoring bias and investors’ investment decision making.  $R\text{-squared}= 0.466$  indicated that 46.6% of variation in the investors’ investment decision making can be explained by anchoring bias while the remaining percentage of 53.4% is explained by other variables not in the model.

**Table 4.19: Model Summary for Anchoring Bias and Investment Decision Making**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.682 <sup>a</sup>	.466	.464	.45315

a. Predictors: (Constant), Anchoring Bias

F-test was carried out to test the null hypothesis that there is no significant impact of anchoring bias and investors' investment decision making in property market in Plateau State in Nigeria. The results of ANOVA test show that the F value is 238.852 with a significance of p-value = 0.000 which is less than 0.05, meaning that null hypothesis is rejected and conclude that there is a relationship between anchoring bias and investors' investment decision making in property market in Plateau State in Nigeria. The results further implied that anchoring bias was a significant predictor of investors' investment decision making. Similarly, Kim and Nofsinger (2008) findings suggested that agents are heavily influenced by anchoring and adjusting.

**Table 4.20: ANOVA Results for Anchoring Bias and Investment Decision Making**

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	49.048	1	49.048	238.852	.000 <sup>b</sup>
1	Residual	56.265	274	.205		
	Total	105.313	275			

a. Dependent Variable: Investment Decision Making

b. Predictors: (Constant), Anchoring Bias

The results on the beta coefficient of the resulting model showed that the constant  $\alpha = 1.438$  was significantly different from 0, since the p-value = 0.000 was less than 0.05. The coefficient  $\beta = 0.64$  was also significantly different from 0 with a p-value = 0.000 which was less than 0.05. The results imply that a unit change in anchoring

bias would result in 0.64 units change in investment decision making in property market in Plateau State in Nigeria. This further confirmed that there was a significant positive linear relationship between anchoring bias and investors' investment decision making in property market in Plateau State in Nigeria.

**Table 4.21: Coefficient for Anchoring Bias and Investment Decision Making**

	<b>B</b>	<b>Std. Error</b>	<b>Beta</b>	<b>t</b>	<b>Sig.</b>
(Constant)	1.438	0.174		8.261	0.000
Anchoring Bias	0.64	0.041	0.682	15.455	0.000

a Dependent Variable: Investment Decision Making

The findings of this study were consistent with those of Parikh (2011) and Ngoc (2013) who found that even negotiators who are trained as deal makers and provided with rich and accessible information are anchored in the negotiation process. Similarly, Kim and Nofsinger (2008) findings suggested that agents are heavily influenced by anchoring and adjusting.

#### **4.7.2 Overconfidence and Investors' Investment Decision Making**

The study further sought to establish the relationship between overconfidence bias and investors' investment decision making among property investors in Plateau State in Nigeria. The study used regression analysis to test this relationship.

Overconfidence bias was measured using overestimation of their knowledge, belief in ability to control events and underestimation of property price.

### **Univariate Regression Results For overconfidence Bias and Investors' Investment Decision Making**

The study conducted a univariate regression analysis to test the effects of overconfidence bias variables on the investment decision making by property investors in Plateau state in Nigeria.

**Table 4.22: Model Summary for Overconfidence Bias and Investment Decision Making**

Model	1
R	.759a
R Square	0.576
Adjusted R Square	0.571
Std. Error of the Estimate	0.4052
F (Sig.)	123.218 (0.000)

The results indicated that the model had R-square of 0.576 which implied that overestimation of their knowledge, belief in ability to control events and underestimation of property price anchoring biases jointly explained 57.6% of the variation in investment decision making. The F-statistic obtained was 123.218 with a p-value of 0.000 which further confirmed that there was a significant relationship

between overestimation of their knowledge, belief in ability to control events and underestimation of property price and investment decision making.

**Table 4.23: Coefficients for Overconfidence Bias and Investment Decision Making**

	B	Std. Error	Beta	t	Sig.
(Constant)	1.545	0.136		11.363	0.000
Ability to Control Events	0.232	0.028	0.377	8.153	0.000
Overestimate their Knowledge	0.216	0.028	0.333	7.616	0.000
Underestimated Property Price	0.163	0.028	0.265	5.75	0.000

a Dependent Variable: Investment Decision

$$\text{Investment Decision Making} = 1.545 + 0.232 (\text{Ability to Control Events}) + 0.216 (\text{Overestimate their Knowledge}) + 0.163 (\text{Underestimated Property Price}) + \varepsilon$$

The findings for regression coefficients further revealed that overestimation of their knowledge, belief in ability to control events and underestimation of property price had a significant relationship with investment decision making. The effect of belief in ability to control events was greater, followed by overestimation of their

knowledge, then underestimation of property price had the least influence on investment decision making.

Chaudhary (2013) also studied on the subject perceptions of overconfidence and predictive validity in financial cues. The findings were that investors are generally overconfident regarding their ability and knowledge. They also found that investors tend to underestimate the imprecision of their beliefs or forecasts, and they tend to overestimate their ability. The findings were that investors are overconfident in their own abilities, and investors and analysts are particularly overconfident in areas where they have some knowledge.

### **Overall Regression Results for Overconfidence Bias and Investors' Investment Decision Making**

The results summaries for ANOVA are provided in the tables below. The results of the model summary indicated that overconfidence bias accounted for 16.7% of the variation in investors' investment decision making.

**Table 4.24: Model Summary for overconfidence and Investment Decision Making**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.409 <sup>a</sup>	.167	.164	.56579

a. Predictors: (Constant), Overconfidence Bias

F-test was further carried out to test the null hypothesis that there is no significant impact of overconfidence bias and investors' investment decision making in property market in Plateau State in Nigeria. The results of ANOVA test show that the F value

is 54.982 with a significance of p-value = 0.000 which was less than 0.05, meaning that null hypothesis was rejected and conclude that there is a relationship between overconfidence bias and investors' investment decision making in property market in Plateau State in Nigeria. The results further implied that overconfidence bias was a significant predictor of investors' investment decision making.

**Table 4.25: ANOVA Results for Overconfidence Bias and Investment Decision Making**

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	17.601	1	17.601	54.982	.000 <sup>b</sup>
1	Residual	87.712	274	.320		
	Total	105.313	275			

a. Dependent Variable: Investment Decision Making

b. Predictors: (Constant), Overconfidence Bias

The results on the beta coefficient of the resulting model showed that the constant  $\alpha = 2.531$  was significantly different from 0, since the p-value = 0.000 was less than 0.05. The coefficient  $\beta = 0.375$  was also significantly different from 0 with a p-value = 0.000 which was less than 0.05. The results imply that a unit change in overconfidence bias would result in 0.375 units change in investment decision making in property market in Plateau State in Nigeria. This further confirmed that there was a significant positive linear relationship between overconfidence bias and investors' investment decision making in property market in Plateau State, Nigeria.

**Table 4.26: Coefficient for Overconfidence Bias and Investment Decision Making**

	B	Std. Error	Beta	t	Sig.
(Constant)	2.531	0.214		11.839	0
Overconfidence Bias	0.375	0.051	0.409	7.415	0

a Dependent Variable: Investment Decision Making

Kafayaat (2014) also confirmed that overconfidence led to over-optimism, as previously proved by Weinstein (1980). Chaudhary (2013) also studied on the subject perceptions of overconfidence and predictive validity in financial cues. The findings were that investors are generally overconfident regarding their ability and knowledge. They also found that investors tend to underestimate the imprecision of their beliefs or forecasts, and they tend to overestimate their ability. The findings were that investors are overconfident in their own abilities, and investors and analysts are particularly overconfident in areas where they have some knowledge.

### **4.7.3 Narrow Framing and Investors' Investment Decision Making**

#### **Univariate Regression Analysis for narrow framing and Investors' Investment Decision Making**

The study further sought to find out the relationship between narrow framing and investors' investment decision making. The study used regression model to test the relationship between narrow framing and investors' investment decision making among property investors in Plateau State in Nigeria. The study measured

overconfidence bias using propensity to positive decision making, propensity to negative decision making and propensity to risk-taking in decisions.

**Table 4.27: Model Summary for Narrow Framing Bias and Investment Decision Making**

Model	1
R	.748a
R Square	0.56
Adjusted R Square	0.555
Std. Error of the Estimate	0.41267
F (Sig.)	115.460 (0.000)

The results indicated that the model had R-square of 0.560 which implied that propensity to positive decision making, propensity to negative decision making and propensity to risk-taking in decision biases jointly explained 56.0% of the variation in investment decision making. The F-statistic obtained was 115.460 with a p-value of 0.000 which further confirmed that there was a significant relationship between propensity to positive decision making, propensity to negative decision making and propensity to risk-taking in decisions and investment decision making.

**Table 4.28: Coefficient for Narrow Framing Bias and Investment Decision Making**

	B	Std. Error	Beta	t	Sig.
(Constant)	1.599	0.138		11.576	0.000
Propensity to risk-taking in decisions	0.233	0.029	0.377	8.002	0.000
Propensity to negative decision making	0.203	0.028	0.328	7.205	0.000
Propensity to positive decision making	0.166	0.029	0.256	5.655	0.000

a Dependent Variable: Investment Decision

**Investment Decision Making** = 1.599 + 0.233 (*Propensity to risk-taking in decisions*) + 0.203 (*Propensity to negative decision making*) + 0.166 (*Propensity to positive decision making*) + $\epsilon$

Propensity to positive decision making, propensity to negative decision making and propensity to risk-taking in decisions were all found to have a positive and significant relationship with investment decision since their respective p-values was less than 0.05. However, the influence of propensity to risk-taking in decisions was greater as shown by the  $\beta = 0.233$ , followed by propensity to negative decision making ( $\beta=0.203$ ). Finally, propensity to positive decision making had the least effect on investment decision making.

### **Overall Regression Analysis for Narrow Framing and Investors' Investment Decision Making**

The overall model summary revealed that R squared was 0.230 which implied that 23.0% of the variation in investors' investment decision making could be explained by narrow framing bias.

**Table 4.29: Model Summary for Narrow Framing and Investment Decision Making**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.480 <sup>a</sup>	.230	.228	.54386

a. Predictors: (Constant), Narrow Framing Bias

F-test was further carried out to test the null hypothesis that there is no significant impact of narrow framing bias and investors' investment decision making in property market in Plateau State in Nigeria. The results of ANOVA test show that the F value is 82.042 with a significance of p-value = 0.000 which was less than 0.05, meaning

that null hypothesis was rejected and conclude that there is a relationship between narrow framing bias and investors' investment decision making in property market in Plateau State, Nigeria. The results also implied that narrow framing bias was a significant predictor of investors' investment decision making.

**Table 4.30: ANOVA Results for Narrow Framing and Investment Decision Making**

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	24.267	1	24.267	82.042	.000 <sup>b</sup>
1	Residual	81.046	274	.296		
	Total	105.313	275			

a. Dependent Variable: Investment Decision Making

The results on the beta coefficient of the resulting model showed that the constant  $\alpha = 2.542$  was significantly different from 0, since the p-value = 0.000 was less than 0.05. The coefficient  $\beta = 0.391$  was also significantly different from 0 with a p-value = 0.000 which was less than 0.05. The results imply that a unit change in Narrow Framing bias would result in 0.391 units change in investment decision making in property market in Plateau State, Nigeria. This further confirmed that there was a significant positive linear relationship between Narrow Framing bias and investors' investment decision making in property market in Plateau State in Nigeria.

**Table 4.31: Coefficient for Narrow Framing and Investment Decision Making**

	B	Std. Error	Beta	t	Sig.
(Constant)	2.542	0.175		14.551	0.000

Narrow Framing	0.391	0.043	0.48	9.058	0.000
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a Dependent Variable: Investment Decision Making

Similarly, Kahneman (2003) found that in a positive frame, the compromise between arriving at a good decision and minimizing cognitive effort is easy to achieve. Laing (2010) used a sample size of 265 to test the existence of the framing effect and sunk cost effect whilst examining the influence of cognitive factors. The findings confirmed the existence of the framing effect and a sunk cost effect. Rabin and Weizsacker (2008) demonstrated that a majority of people choose dominated strategies when prospects were presented in isolation.

#### **4.7.4 Representativeness Bias and Investors' Investment Decision Making**

##### **Univariate Regression Results for Representativeness Bias and Investors' Investment Decision Making**

This study was further interested in the relationship between representativeness bias and Investors' Investment Decision Making among property investors in Plateau State, Nigeria. Regression analysis was employed to ascertain this relationship. The study used recent property prices, future property prices and stereotypes in property market to measure representative bias among property investors in Plateau state, Nigeria.

**Table 4.32: Model Summary for Representativeness Bias and Investment Decision Making**

Model	1
R	.707a
R Square	0.5
Adjusted R Square	0.494
Std. Error of the Estimate	0.44009

The results showed that the model had R-square of 0.5 which implied that recent property prices, future property prices and stereotypes in property market accounted for 50% of the variation in investors' investment decision making. The results further showed that the model had F-statistic of 90.585 ( $p=0.000$ ). The findings further confirmed that there existed a significant relationship between recent property prices, future property prices and stereotypes in property market and investment decision making among property investors in Plateau state of Nigeria.

**Table 4.33: Coefficient for Representativeness Bias and Investment Decision Making**

	B	Std. Error	Beta	t	Sig.
(Constant)	1.577	0.162		9.719	0.000
Stereotypes in Property Market	0.271	0.03	0.43	9.152	0.000
Recent property prices	0.18	0.03	0.288	5.917	0.000
Future property prices	0.151	0.033	0.213	4.624	0.000

a Dependent Variable: Investment Decision

$$\text{Investment Decision Making} = 1.577 + 0.271 (\text{Stereotypes in Property Market}) + 0.180 (\text{Recent property prices}) + 0.151 (\text{Future property prices}) + \varepsilon$$

The findings of regression coefficients showed that recent property prices had  $\beta = 0.18$  and  $p = 0.000$ . Future property prices had  $\beta = 0.151$  and  $p = 0.000$  and finally stereotypes in property market had a  $\beta = 0.271$  and  $p = 0.000$ . The results implied that these measures of representativeness bias had a positive and significant relationship with investment decision making.

#### **Overall Regression Analysis for Representativeness Bias and Investors' Investment Decision Making**

The model summary revealed that R squared was 0.305 which implied that 30.5% of the variation in investors' investment decision making could be explained by representativeness bias.

**Table 4.34: Model Summary for representativeness and Investment Decision Making**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.553 <sup>a</sup>	.305	.303	.51667

a. Predictors: (Constant), Representative Bias

F-test was carried out to test the null hypothesis that there is no significant effect of representativeness bias on Investment Decision Making among property investors in Plateau State in Nigeria. The results of ANOVA test show that the F-value was 120.504 with a significance of p-value = 0.000 which was less than 0.05, meaning that null hypothesis was rejected and conclude that there is a relationship between representativeness bias on Investment Decision Making among property investors in Plateau State in Nigeria.

**Table 4.35: ANOVA Results for representativeness and Investment Decision Making**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	32.169	1	32.169	120.504	.000 <sup>b</sup>
	Residual	73.144	274	.267		
	Total	105.313	275			

a. Dependent Variable: Investment Decision Making

b. Predictors: (Constant), Representative Bias

The results on the beta coefficient of the model linking Representative Bias and Investment Decision Making showed that the constant  $\alpha = 2.241$  was significantly different from 0, since the p-value = 0.000 was less than 0.05. The coefficient  $\beta = 0.477$  was also significantly different from 0 with a p-value = 0.000 which was less than 0.05. The results imply that a unit change in Representative Bias would result in 0.477 units change in investment decision making in property market in Plateau State, Nigeria. This further confirmed that there was a significant positive linear relationship between Representative Bias and investors' investment decision making in property market in Plateau State, Nigeria.

Wen and Jianfeng (2011) also found that while making investments, individual investors tend to attribute good characteristics of a company directly to good characteristics of its property. Similarly, Antony (2009) study found that investors' psychology plays a great role in determining investment decision and market prices. Finally Dhar and Kumar (2001), found that investors tend to buy properties that have recently enjoyed some positive abnormal returns. This finding is consistent with the thinking that the past price trend is representative of the future price trend.

**Table 4.36: Coefficient for Representative Bias and Investment Decision Making**

	B	Std. Error	Beta	t	Sig.
(Constant)	2.241	0.172		13.047	0.000
Representative Bias	0.477	0.043	0.553	10.977	0.000

a Dependent Variable: Investment Decision Making

Yosra and Boujelbene (2013) also showed that the sample of investors extrapolates future performance of the Stock Market in the recent past events rather than tending to consider recent events, investors are led to overestimate the probability of the occurrence of a future event. Wen and Jianfeng (2011) on the other hand found that while making investments, individual investors tend to attribute good characteristics of a company directly to good characteristics of its property. Similarly, Antony (2009) study found that investors' psychology plays a great role in determining investment decision and market prices. Finally Dhar and Kumar (2001), found that investors tend to buy properties that have recently enjoyed some positive abnormal returns. This finding is consistent with the thinking that the past price trend is representative of the future price trend.

#### **4.7.5 Disposition Effect Bias and Investors' Investment Decision Making**

##### **Univariate Regression Results for Disposition Effect Bias and Investors' Investment Decision Making**

The study also sought to determine the effect of disposition effect bias on investors' investment decision making in property market in Plateau State, Nigeria.

**Table 4.37: Model Summary for Disposition Effect Bias and Investment Decision Making**

Model	1
R	.742
R Square	0.55
Adjusted R Square	0.545
Std. Error of the Estimate	0.41742
F (Sig.)	110.805 (0.000)

The findings revealed that the model had R-squared of 0.55 which implied that under-reaction to property prices, overreaction to property prices and risk-taking explained 55.0% of the variation in Investment Decision Making. The F-statistic of

110.805 with a p-value of 0.000 revealed that there was statistical significant relationship between the independent variables and the dependent variable.

**Table 4.38: Coefficients for Disposition Effect Bias and Investment Decision Making**

	B	Std. Error	Beta	t	Sig.
(Constant)	1.549	0.159		9.742	0.000
Under-reaction to property prices	0.233	0.026	0.402	8.852	0.000
Overreaction to property prices	0.213	0.027	0.364	7.986	0.000
Risk-Taking	0.164	0.034	0.209	4.848	0.000

a Dependent Variable: Investment Decision

**Investment Decision Making** = 1.549 + 0.233 (*Under-reaction to property prices*) + 0.213 (*Overreaction to property prices*) + 0.164 (*Risk-Taking*) +  $\varepsilon$

The findings of regression coefficients showed that Under-reaction to property prices had  $\beta = 0.233$  and  $p = 0.000$ . Overreaction to property prices had  $\beta = 0.213$  and  $p = 0.000$  and finally Risk-Taking had a  $\beta = 0.164$  and  $p = 0.000$ . The results implied that these measures of Disposition Effect Bias had a positive and significant relationship with investment decision making. However, the effect of Under-reaction to property prices was greater, followed by Overreaction to property prices and finally Risk-Taking.

According to Henderson (2012) disposition effect is the tendency of an investor to sell winners too early and hold losers too long. Crane and Hartzell (2007) findings showed that there was strong statistical evidence consistent with the existence of the disposition effect among REIT management; REITs tend to sell winners and hold losers.

**Overall Regression Results for disposition effect and Investors' Investment Decision Making**

The results showed a relationship  $R = 0.505$ , indicated a strong positive association between disposition effect and investors' investment decision making.  $R\text{-squared} = 0.255$  indicated that 25.5% of variation in the investors' investment decision making can be explained by disposition effect while the remaining percentage of 74.5% is explained by other variables not in the model.

**Table 4.39: Model Summary for Disposition Effect and Investment Decision Making**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.505 <sup>a</sup>	.255	.253	.53497

a. Predictors: (Constant), Disposition Effect

F-test was further carried out to test the null hypothesis that there is no significant effect of Disposition Effect bias on Investment Decision Making among property investors in Plateau State, Nigeria. The results of ANOVA test showed that the F-value was 93.973 with a significance of  $p\text{-value} = 0.000$  which was less than 0.05, meaning that null hypothesis was rejected and conclude that there is a relationship between Disposition Effect on Investment Decision Making among property investors in Plateau State in Nigeria.

**Table 4.40: ANOVA Results for Disposition Effect and Investment Decision Making**

Model		Sum Squares	ofdf	Mean Square	F	Sig.
	Regression	26.895	1	26.895	93.973	.000 <sup>b</sup>
1	Residual	78.418	274	.286		
	Total	105.313	275			

a. Dependent Variable: Investment Decision Making

b. Predictors: (Constant), Disposition Effect

The results on the beta coefficient of the model linking Disposition Effect Bias and Investment Decision Making showed that the coefficient  $\beta = 0.433$  was significantly different from 0 with a p-value = 0.000 which was less than 0.05. The results imply that a unit change in Disposition Effect Bias would result in 0.433 units change in investment decision making in property market in Plateau State in Nigeria. This further confirmed that there was a significant positive linear relationship between Disposition Effect Bias and investors' investment decision making in property market in Plateau State in Nigeria.

**Table 4.41: Coefficient for Disposition Effect Bias and Investment Decision Making**

	B	Std. Error	Beta	t	Sig.
(Constant)	2.398	0.178		13.466	0.000
Disposition Effect	0.433	0.045	0.505	9.694	0.000

a Dependent Variable: Investment Decision Making

According to Henderson (2012) disposition effect is the tendency of an investor to sell winners too early and hold losers too long. Crane and Hartzell (2007) findings showed that there was strong statistical evidence consistent with the existence of the disposition effect among REIT management – REITs tend to sell winners and hold losers.

#### 4.7.6 Multivariate Regression results

A multivariate regression model was conducted to test the joint relationship of all the independent variables and the dependent variable. The results showed that jointly anchoring bias, overconfidence bias, narrow framing bias representativeness bias and disposition effect had a significant association with investment decision making (R=0.835). The results further revealed that anchoring bias, overconfidence bias, narrow framing bias, representativeness bias and disposition effect accounted for 69.8% of the variation in investors’ investment decision making in property market in Plateau State, Nigeria.

**Table 4.42: Model Summary for Multivariate Regression Analysis**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.835 <sup>a</sup>	.698	.692	.34343

a. Predictors: (Constant), Disposition Effect, Overconfidence Bias, Narrow Framing, Anchoring Bias, Representative Bias

The results of ANOVA indicated that anchoring bias, overconfidence bias, narrow framing bias, representativeness bias and disposition effect were significant predictor variables of investors’ investment decision making in property market in Plateau State, Nigeria. This was indicated by the F-statistic results (F=124.580, p=0.000)

indicating that the model used to link the independent variables and dependent variable was statistically significant.

**Table 4.43: Multivariate Regression Analysis ANOVA Results**

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	73.468	5	14.694	124.580	.000 <sup>b</sup>
	Residual	31.845	270	.118		
	Total	105.313	275			

a. Dependent Variable: Investment Decision Making

b. Predictors: (Constant), Disposition Effect Mean, Overconfidence Bias Mean, Narrow Framing Mean, Anchoring Bias Mean, Representative Bias Mean

In the multivariate regression model, anchoring bias, overconfidence bias, narrow framing bias and representativeness bias were found to have a positive but significant influence on investors' investment decision making in property market in Plateau State, Nigeria because the p-value was less than 0.05. Disposition effect was found, in this model, to have an insignificant influence on investors' investment decision making in property market in Plateau State, Nigeria.

**Table 4.44: Multivariate Regression Coefficient Results**

	B	Std. Error	Beta	t	Sig.
(Constant)	0.398	0.198		2.007	0.046
Narrow Framing	0.291	0.030	0.357	9.754	0.000
Anchoring Bias	0.343	0.048	0.365	7.163	0.000
Representativeness Bias	0.311	0.052	0.360	5.957	0.000
Overconfidence Bias	0.156	0.044	0.170	3.581	0.000
Disposition Effect	0.015	0.052	0.017	0.284	0.777

a Dependent Variable: Investment Decision

## Multivariate Regression Model

The multivariate equation  $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon$  hence became

$$\text{Investment Decision Making} = 0.398 + 0.343 (\text{Anchoring Bias}) + 0.156 (\text{Overconfidence Bias}) + 0.291 (\text{Narrow Framing}) + 0.311 (\text{Representativeness Bias}) + \varepsilon$$

The results in the optimal model imply that a unit increase in anchoring bias would result in an increase of 0.343 units in Investment Decision Making while a unit increase in overconfidence bias would result to an increase of 0.156 units in Investment Decision Making. The results further indicated that an increase of one unit in narrow framing would cause an increase of 0.291 units in Investment Decision Making. Similarly, a unit increase in representativeness bias would cause an increase of 0.311 units in investment decision making and finally a unit increase in disposition effect would cause an increase of 0.015 units in investment decision making.

However, the influence of disposition effect on investment decision making was found to be insignificant, therefore the variable was excluded in the multivariate model. The findings of this study were consistent with those of Parikh (2011) and Ngoc (2013) who found that even negotiators who are trained as deal makers and provided with rich and accessible information are anchored in the negotiation process. Similarly, Kim and Nofsinger (2008) findings suggested that investors are heavily influenced by anchoring and adjusting.

Chaudhary (2013) also studied on the subject perceptions of overconfidence and predictive validity in financial cues. The findings were that investors are generally overconfident regarding their ability and knowledge. They also found that investors tend to underestimate the imprecision of their beliefs or forecasts, and they tend to overestimate their ability. The findings were that investors are overconfident in their

own abilities, and investors and analysts are particularly overconfident in areas where they have some knowledge.

The findings confirmed the existence of the framing effect and a sunk cost effect. Rabin and Weizsacker (2008) demonstrated that a majority of people choose dominated strategies when prospects were presented in isolation. Dhar

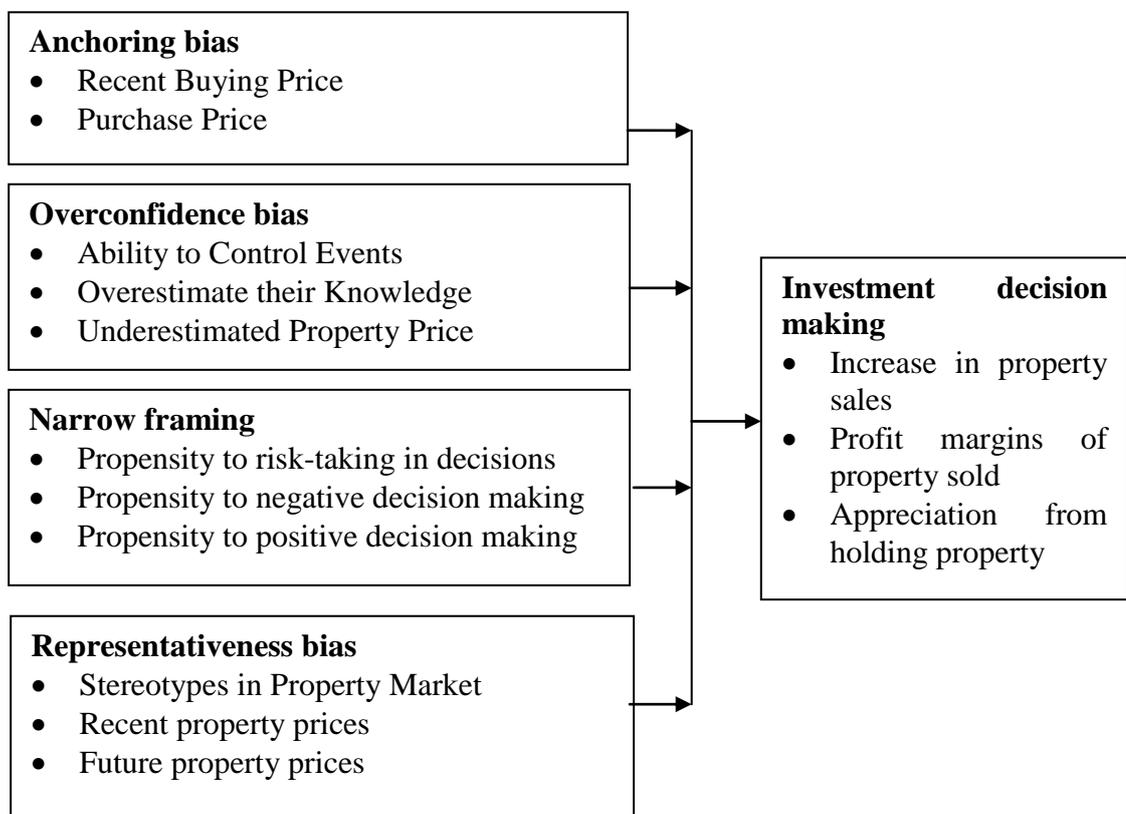
and Kumar (2001) on the other hand found that investors tend to buy properties that have recently enjoyed some positive abnormal returns. This finding is consistent with the thinking that the past price trend is representative of the future price trend. According to Henderson (2012), disposition effect is the tendency of an investor to sell winners too early and hold losers too long, and that some investors sell the losers quickly after studying the market trend, instead of holding on to them, to avoid further loss in the value of their properties.

#### **4.8 Revised Conceptual Framework**

This section contains the revised conceptual framework containing the multivariate relationships between the study variables. Only those variables that were significant in the multivariate regression analysis were included in the revised conceptual framework. Disposition effect bias had a significant effect in univariate analysis but the results in the multivariate showed that the variable had an insignificant effect on investment decision making. The study tested the hypothesis based on the findings of multivariate regression analysis; hence disposition effect was not included in the revised conceptual framework based on the findings of multivariate regression analysis.

**Independent variable**

**Dependent Variable**



**Figure 4.4 Revised Conceptual Framework**

## **4.9 Hypotheses Testing**

This section contains testing of the research hypotheses based on the findings presented in this chapter. The study contained five research hypotheses that were to be tested. The study used inferential results in testing the research hypotheses.

### **4.9.1 Hypothesis One: anchoring and Investors' Investment Decision Making**

**H<sub>01</sub>:** Anchoring does not significantly influence investment decision making in property market in Plateau State, Nigeria.

F-test was carried out to test the null hypothesis that there is no significant impact of anchoring bias on investors' investment decision making in property market in Plateau State in Nigeria. The results of ANOVA test showed that the F-value was 238.852 with a significance of p-value = 0.000 which was less than 0.05. The coefficient  $\beta = 0.64$  was also significantly different from 0 with a p-value = 0.000 which was less than 0.05. This further confirmed that there was a significant positive linear relationship between anchoring bias and investors' investment decision making in property market in Plateau State in Nigeria meaning that the null hypothesis was rejected and concluded that anchoring bias played a significant role in investors' investment decision making in property market in Plateau State, Nigeria.

The study findings concurs with the prospects theory which states that people make decisions based on the potential value of losses and gains rather than the final outcome. The findings of this study are consistent with those of Parikh (2011) and Ngoc (2013) who found that even negotiators who are trained as deal makers and provided with rich and accessible information are anchored in the negotiation process. Similarly, Kim and Nofsinger (2008) findings suggested that agents are heavily influenced by anchoring and adjusting.

#### **4.9.2 Hypothesis Two: overconfidence and Investors' Investment Decision Making**

**H<sub>0</sub><sub>2</sub>:** Overconfidence does not significantly influence investment decision making in property market in Plateau State, Nigeria.

F-test was further carried out to test the null hypothesis that there is no significant impact of overconfidence bias and investors' investment decision making in property market in Plateau State, Nigeria. The results of ANOVA test show that the F-value is 54.982 with a significance of p-value = 0.000 which was less than 0.05, meaning that the null hypothesis was rejected and conclude that there is a relationship between overconfidence bias and investors' investment decision making in property market in Plateau State, Nigeria. The coefficient  $\beta = 0.375$  was also significantly different from 0 with a p-value = 0.000 which was less than 0.05. The results imply that a unit change in overconfidence bias would result in 0.375 units change in investment decision making in property market in Plateau State, Nigeria. This further confirmed that there was a significant positive linear relationship between overconfidence bias and investors' investment decision making in property market in Plateau State, Nigeria.

The study findings concurs with herding theory which argues that behavioural factors impact the investment decisions of investors in the financial markets, especially in the real estate markets. Kafayaat (2014) also confirmed that overconfidence led to over-optimism, as previously proved by Weinstein (1980). Chaudhary (2013) also studied on the subject perceptions of overconfidence and predictive validity in financial cues. The findings were that investors are generally overconfident regarding their ability and knowledge. They also found that investors tend to underestimate the imprecision of their beliefs or forecasts, and they tend to overestimate their ability. The findings were that investors are overconfident in their own abilities, and investors and analysts are particularly overconfident in areas where they have some knowledge.

### **4.9.3 Hypothesis Three: narrow framing and Investors' Investment Decision Making**

**H0<sub>3</sub>:** Narrow framing does not significantly influence investment decision making in property market in Plateau State, Nigeria.

F-test was further carried out to test the null hypothesis that there is no significant impact of narrow framing bias and investors' investment decision making in property market in Plateau State in Nigeria. The results of ANOVA test show that the F value is 82.042 with a significance of p-value = 0.000 which was less than 0.05, meaning that null hypothesis was rejected and conclude that there is a relationship between narrow framing bias and investors' investment decision making in property market in Plateau State in Nigeria. The coefficient  $\beta = 0.391$  was also significantly different from 0 with a p-value = 0.000 which was less than 0.05. The results imply that a unit change in Narrow Framing bias would result in 0.391 units change in investment decision making in property market in Plateau State in Nigeria. This further confirmed that there was a significant positive linear relationship between Narrow Framing bias and investors' investment decision making in property market in Plateau State, Nigeria.

According to the proponents of heuristic theory, more specifically, in property market, Gamblers' fallacy arises when people predict inaccurately the reverse points which are considered as the end of good. Similarly, Kahneman (2003) found that in a positive frame, the compromise between arriving at a good decision and minimizing cognitive effort is easy to achieve. Laing (2010) used a sample size of 265 to test the existence of the framing effect and sunk cost effect whilst examining the influence of cognitive factors. The findings confirmed the existence of the framing effect and a sunk cost effect. Rabin and Weizsacker (2008) demonstrated that a majority of people choose dominated strategies when prospects were presented in isolation

#### **4.9.4 Hypothesis Four: representativeness and Investors' Investment Decision Making**

**H0<sub>4</sub>:** Representativeness does not significantly influence investment decision making in property market in Plateau State, Nigeria.

The results of ANOVA test show that the F-value was 120.504 with a significance of p-value = 0.000 which was less than 0.05, meaning that null hypothesis was rejected and conclude that there is a relationship between representativeness bias on Investment Decision Making among property investors in Plateau State, Nigeria. The coefficient  $\beta = 0.477$  was also significantly different from 0 with a p-value = 0.000 which was less than 0.05. The results imply that a unit change in Representative Bias would result in 0.477 units change in investment decision making in property market in Plateau State, Nigeria. This further confirmed that there was a significant positive linear relationship between Representative Bias and investors' investment decision making in property market in Plateau State, Nigeria.

In summary, the heuristic theory, prospect theory, theory of planned behaviour, herding theory and fuzzy trace theory (FTT), support the findings of this study. Yosra and Boujelbene (2013) also showed that the sample of investors extrapolates future performance of the Stock Market in the recent past events rather than tending to consider recent events, investors are led to overestimate the probability of the occurrence of a future event. Wen and Jianfeng (2011) on the other hand found that while making investments, individual investors tend to attribute good characteristics of a company directly to good characteristics of its property. Similarly, Antony (2009) study found that investors' psychology plays a great role in determining investment decision and market prices. Finally, Dhar and Kumar (2001), found that investors tend to buy properties that have recently enjoyed some positive abnormal returns. This finding is consistent with the thinking that the past price trend is representative of the future price trend.

#### **4.9.5 Hypothesis Five: disposition effect and Investors' Investment Decision Making**

**H0<sub>5</sub>:** Disposition effect does not significantly influence investment decision making in property market in Plateau State, Nigeria.

The results on the beta coefficient of the model linking Disposition Effect Bias and Investment Decision Making showed that the coefficient  $\beta = 0.015$  was significantly different from 0 with a p-value = 0.777 which was greater than 0.05. Hence the study failed to reject the null hypothesis that Disposition effect does not significantly influence investment decision making in property market in Plateau State, Nigeria. This further confirmed that Disposition Effect Bias does not significantly influence investors' investment decision making in property market in Plateau State in Nigeria. According to Henderson (2012) disposition effect is the tendency of an investor to sell winners too early and hold losers too long. Crane and Hartzell (2007) findings showed that there was strong statistical evidence consistent with the existence of the disposition effect among REIT management – REITs tend to sell winners and hold losers

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSION AND RECOMMENDATIONS**

#### **5.1 Introduction**

This chapter presented the summary of research findings, the general background information, and the statistical analyses of specific objectives/research hypotheses. The conclusion and recommendations relating to specific objectives as well as suggestions for further research were highlighted.

#### **5.2 Summary of Findings**

The main objective of this study was to establish the influence of cognitive biases on investment decision-making in property market in Plateau State, Nigeria. The study specifically sought to determine the influence of anchoring bias, overconfidence, narrow framing, representativeness and disposition effect on investment decision making in property market in Plateau State, Nigeria. The study used both quantitative and qualitative research approaches. The study population comprised of property investors who were investment traders at the property market in Plateau State who were registered and licensed to operate. The focus was on registered office and rental residential properties in a sample of the seventeen Local Government headquarters of Plateau state. The target population comprised of a list of 1650 registered property investors which was the total number of registered property investors in the property market in Plateau state who have been licensed to operate in all the Local Government Areas including the capital city of the state.

To determine the sample size for small populations, the normal approximation to the hyper-geometric distribution was used due to its ability to estimate sample sizes from small populations accurately. Primary data was collected using a questionnaire where a standard questionnaire with both closed and open ended questions were administered to capture the important information about the population. A 5-point Likert scale was utilized asking the individual investors to indicate their opinions on the aspects of cognitive biases on their investment decision making. The study

employed both descriptive and inferential statistical techniques to allow presentation of data in a more meaningful way and thus simpler interpretation of data. Responses from open ended questions were coded, interpreted and their frequencies determined through cross-tabulation on differences between respondents and the central tendencies of respondents to each factor.

### **5.2.1 Anchoring Bias and Investors' Investment Decision Making**

The first objective of the study was to determine the role of anchoring bias on investors' investment decision making in property market in Plateau State, Nigeria.

The descriptive results revealed that all the above statements had a mean of above 4 which implied that property investors in Plateau State wait for the property price to reach a reference point before trading, trained negotiators and real estate brokers were anchored in the negotiation process, property prices of today were determined by those of the past, property investors become more optimistic when the market rises and finally investors tend to become more pessimistic when the market falls. These findings implied that property investors in Plateau State used anchoring in investment decision making.

The results of correlation analysis indicated that anchoring bias had a positive and significant correlation with investors' investment decision making. The regression analysis results further confirmed that there was a significant positive linear relationship between anchoring bias and investors' investment decision making in property market in Plateau State, Nigeria meaning that null hypothesis was rejected and concluded that anchoring bias played a significant role in investors' investment decision making in property market in Plateau State in Nigeria. In the multivariate regression model, anchoring bias was found to have a positive but significant relationship with investors' investment decision making in property market in Plateau State, Nigeria.

### **5.2.2 Overconfidence and Investors' Investment Decision Making**

The second objective of the study was to determine the role of overconfidence bias on investment decision making in property market in Plateau State, Nigeria. The descriptive analysis findings of this study revealed that property investors in Plateau State in Nigeria exhibited overconfidence bias during investment decision making. The study also employed Pearson Correlation test to ascertain the association between Overconfidence and investors' investment decision making. The results of correlation analysis indicated that overconfidence bias had a positive and significant correlation with investors' investment decision making.

The results of univariate regression analysis further confirmed that overconfidence bias played a significant role in investment decision making therefore the result implied that null hypothesis was rejected and conclude that there is a relationship between overconfidence bias and investors' investment decision making in property market in Plateau State in Nigeria. The results further implied that overconfidence bias was a significant predictor of investors' investment decision making. In the multivariate regression model, overconfidence bias was found to have a positive but significant relationship with investors' investment decision making in property market in Plateau State, Nigeria. The results imply that a unit change in overconfidence bias would result in 0.375 units change in investment decision making in property market in Plateau State in Nigeria. This further confirmed that there was a significant positive linear relationship between overconfidence bias and investors' investment decision making in property market in Plateau State in Nigeria.

### **5.2.3 Narrow Framing and Investors' Investment Decision Making**

This study also sought to explain the role of narrow framing on investment decision making in property market in Plateau State, Nigeria. The descriptive findings revealed that property investors in Plateau State, Nigeria employed narrow framing during investment decision making. The correlation analysis results also revealed that narrow framing and investors' investment decision making had a positive and significant association.

F-test was further carried out to test the null hypothesis that there is no significant role of narrow framing bias on investors' investment decision making in property market in Plateau State in Nigeria. The results of ANOVA test showed that the F-value was significant at 0.05 significance level, meaning that null hypothesis was rejected and conclude that narrow framing bias played a significant role in investors' investment decision making in property market in Plateau State in Nigeria. The multivariate results also attest to the findings that narrow framing had a positive and significant relationship with investment decision making.

#### **5.2.4 Representativeness and Investors' Investment Decision Making**

The fourth objective of the study was to establish the influence of representativeness on investment decision making in property market in Plateau State, Nigeria. The descriptive finding showed that representative bias was common among property investors in plateau state in Nigeria. The results of correlation analysis also indicated that representativeness bias had a positive and significant correlation with investors' investment decision making. The results of ANOVA test showed that the F-value was significant at 0.05 level of significance, meaning that the null hypothesis was rejected and concluded that there is a relationship between representativeness bias on Investment Decision Making among property investors in Plateau State in Nigeria.

The coefficient  $\beta = 0.477$  was also significantly different from 0 with a p-value = 0.000 which was less than 0.05. This further confirmed that there was a significant positive linear relationship between Representative Bias and investors' investment decision making in property market in Plateau State in Nigeria. In the multivariate regression model, representativeness bias was found to have a positive but significant relationship with investors' investment decision making in property market in Plateau State, Nigeria.

#### **5.2.5 Disposition Effect and Investors' Investment Decision Making**

The study also sought to find out the influence of disposition effect on investment decision making in property market in Plateau State, Nigeria. The descriptive results

showed that respondents agreed that property investors are risk-averse when faced with a sure gain and that property investors are risk-takers when faced with a sure loss as shown by the mean response of above 4

The results of correlation analysis indicated that disposition effect bias had a positive and significant influence on investors' investment decision making. F-test was further carried out to test the null hypothesis that there is no significant effect of Disposition Effect bias on Investment Decision Making among property investors in Plateau State in Nigeria. The results of ANOVA test showed that the F-value was significant at 0.05 significance level, meaning that the null hypothesis was rejected and concluded that there is a relationship between Disposition Effect on Investment Decision Making among property investors in Plateau State in Nigeria.

The univariate regression results on the beta coefficient of the model linking Disposition Effect Bias and Investment Decision Making found that Disposition Effect Bias had a significant influence on investors' investment decision making in property market in Plateau State in Nigeria. However, in the multivariate regression analysis, disposition effect was found to have a positive insignificant relationship with investors' investment decision making in property market in Plateau State, Nigeria.

### **5.3 Conclusion**

The study established that anchoring bias had a significant influence on investment decision making. The study therefore concluded that investors' decision making in the property market in Nigeria is often influenced by either the recent buying price, purchase price or the recent selling price of the property which serves as anchor to the investors in their decision making policies. Investors display many behavioural biases that influence their investment decision-making processes. Extreme movements in global indices and stock prices because of fear and anticipation has, as it is supposed to, made life tough for a rational investor. Market sentiments have been observed to sway wildly from positive to negative and back, in the shortest

timeframes like weeks, days and hours. In this context, understanding irrational investor behavior deserves more importance than it has ever had.

The study also established that overconfidence bias had a significant influence on investment decision making. That the investors display their overconfidence bias through the ability to control events, by overestimating their knowledge or being overoptimistic of their abilities and underestimating property prices. These actions have significant influence on investment decisions.

The study further established that narrow framing bias had a significant influence on investment decision making. The propensity to risk-taking in decisions, propensity to negative decision making and propensity to positive decision making were adjudged as the influencing factors. The study concluded that due to the influence of narrow framing effect, investors could make different choices according to the same information but under different statement frames.

The study also intended to find out the influence of Representativeness on investment decision making among property market investors in Plateau State in Nigeria. The study established that representativeness bias had a significant influence on investment decision making. The study concluded that representativeness is one of the most common biases affecting investment decisions making because people's judgments are based on stereotypes or recent and future property prices.

Finally the study established that disposition effect had an insignificant influence on investment decisions making. The study found out that the joint relationship between all the independent variables and the dependent variable showed that the influence of either overreaction to property prices or underreaction to prices and risk-taking in investment decision had an insignificant influence on investment decision making. Based on the findings, this study concluded that disposition effect bias does not alter rationality in investment decision making.

Although investors cannot avoid all biases, they can reduce their effects. This requires understanding one's cognitive biases, resisting the tendency to engage in such behaviours, and developing and following objective investment strategies and trading rules. Investors also need to invest for the long-term, identify their level of risk tolerance, determine an appropriate asset allocation strategy, and rebalance portfolios at least yearly. Because many experienced and seasoned investors have learned that success often comes from reining in emotions and overcoming their biases, they often avoid making the same mistakes as many new investors.

## **5.4 Recommendations of the Study**

### **5.4.1 Recommendations for Practice**

The recommendations are based on the specific objectives of the study. Anchoring describes the tendency that people's evaluation on certain event is usually based on the initial value that has been given out. Therefore, this study recommends that property investors should adjust their predictions enough to reflect new information, and they should not be conservative to the initial reference point. The study further recommends the need for investors to establish the type of anchor that is likely to influence their investment decision making. It was also recommended that investors in the property market need to consult widely before making decisions in order to overcome the anchoring bias.

On the Overconfidence Bias, people need to identify the biases and develop the strategies to overcome these biases and people require proper allocations strategies and identify the risk and return in investment decision. The study recommends that investment consultants should conduct trainings for investors to help them identify the biases and hence develop strategies against excessive trading as a result of bias which lead to poor investment decision.

Due to the influence of framing effect, investors may make different choices according to the same information but under different statement frames. The study therefore recommends the need for investors to make constant attempts to increase

their awareness on behavioral biases by educating themselves on the field. Studying about the biases and reflecting on their decisions are likely to help achieve better self-understanding of the extent and the manner to which they get influenced by emotions while making financial decisions under uncertainty. Even after satisfactory awareness is achieved, it is highly recommended that they maintain a chart of the behavioral biases they are likely to be vulnerable to. This should be reviewed periodically in order to recollect and refresh their memories, thus giving themselves a better chance to make improved financial decisions in the property market. Most essentially, what remains unanswered is whether greater awareness of investors about behavioral biases is likely to increase the market efficiency.

Representativeness is one of the most important principles affecting financial decisions because people's judgments are based on stereotypes. The study recommends that property investors should avoid evaluating frequency or probability of events according to the times such events comes to their minds. This is because when too much weight is put on the easy-recalled information, rational behavior will be limited and rational investment decision making could be deviated. Therefore investors across various cycles need to be careful when making decisions as a result of representativeness. The study further recommends that awareness about disposition effect biases and its application in the course of making investment decision would increase the rationality of investment decisions thus making way for higher market efficiency.

#### **5.4.1 Recommendations for Policy Makers**

Policy makers both at the organisational level and government regulation bodies that regulate investment in property market should ensure that all the dealers and investors in property market are informed on the influence of cognitive biases by their dealers prior to making of any purchase. It should be a duty of licensed property dealers to educate investors on the role of various cognitive biases on their investment decision making.

## **5.5 Suggestions for Further Research**

This study focused on establishing the influence of cognitive biases on investment decision-making in property market in Plateau State, Nigeria. The findings provide evidence that various cognitive biases influence investors' investment decision making in the property market. The variables were restricted to anchoring bias, overconfidence bias, narrow framing, and representativeness and disposition effect biases.

The study could be extended in details to other behavioural biases that could have an impact on investors' investment decision. Empirical findings further attest to this where it was found out that the cognitive biases influence investors' investment decision making by 69.8 percent which imply that there are other variables that explains investors' investment decision making apart from the ones discussed in this study.

Therefore, future studies should focus on establishing other factors that influence investment decision making other than cognitive biases such as experience of the investor, resources available to the investors among others. This study further found out that in the joint relationship between the independent variables and the dependent variable, the disposition effect had an insignificant influence on the investment decision making, therefore, the study suggested that further studies should focus on establishing the effect of disposition effect on investment decision making in other markets or other regions for comparison purposes, and the study could also be replicated in other states in Nigeria in order to establish the influence of cognitive biases on investment decision-making in property market and more so for comparative purposes.

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## APPENDICES

### Appendix 1: Introductory Letter

Dear respondents,

RE: PERMISSION TO COLLECT DATA

I am a student pursuing a degree of Doctor of Philosophy in Finance from Jomo Kenyatta University of Agriculture and Technology. I am attempting to “establish the influence of cognitive biases on investment decision making in property market in Plateau State, Nigeria”. I therefore wish to request for permission to collect information of the entrepreneurs. Your genuine response will be appreciated. High level of confidentiality will be assured. The information obtained will be used purely for academic reasons.

Thank you all in advance.

Yours Sincerely,

Dashol Ishaya Usman

HD435 – 1653/2015

Jomo Kenyatta University of Agriculture and Technology

.....**Appendix 2: Respondents Questionnaire**

Please you are requested to complete the questionnaire honestly and possibly give as much details as possible. Where necessary, tick (√) appropriately.

**SECTION A: DEMOGRAPHIC DATA OF THE RESPONDENT**

1. Gender:

- a) Female ( )
- b) Male ( )

2. How long have you operated as an investors in property market?

- a) Less than 1 year ( )
- b) 1 - 2 years ( )
- c) 2 - 3 years ( )
- d) 3 - 4 years ( )
- e) 4 - 5 years ( )

**SECTION B: ANCHORING BIAS**

3. What do property investors set the value of the property based on in Plateau State?

- a) The recent selling price ( )
- b) The recent buying price ( )
- c) Others ( )

4. Please evaluate the degree of your agreement with the influence of the following aspects of anchoring bias on your investment decision making: **Use the scale of 1: Never, 2: Rarely, 3: Sometimes, 4: Often, 5: Always**

Factors	1	2	3	4	5
Property investors set the value of the					

property based on the recent selling price.					
Property investors use property purchase price as a reference point in trading.					
Property investors set the value of the property based on the recent buying price.					
Investors use a reference point to compare to the current property price.					
Investors attach their thoughts to a logically irrelevant reference point.					
The highest price the investor has perceived also becomes a reference point.					
Investors wait for the property price to reach a reference point before trading.					
Trained negotiators and real estate brokers are anchored in the negotiation process.					
Property prices of today are determined by those of the past.					
Investors tend to become more optimistic when the market rises.					
Investors tend to become more pessimistic when the market falls.					

**SECTION C: OVERCONFIDENCE BIAS**

5. Please indicate your opinion on the influence of the following aspects of overconfidence bias on your investment decision making: **Use the scale of 1: Never, 2: Rarely, 3: Sometimes, 4: Often, 5: Always**

Overconfidence	1	2	3	4	5
Property investors use predictive skills to time the market and make future decisions.					
Property investors have high expectations on returns beyond market expectations.					
Investors overestimate their knowledge and underestimate risks.					
Investors exaggerate their ability to control events.					
Investors overestimate their own predictive abilities.					
Investors tend to be biased on the precision of information they have been given.					
Investors understand their own abilities and the limits of their knowledge on property market.					
Investors are overconfident to think they are better than they actually are.					
Investors who are overconfident about their level of knowledge tend to think they know more than they actually do.					
Investors are overconfident of their own ability when it comes to picking properties.					
Investors overestimate their predictive skills and believe that they can time the market.					
Investors are fond of making excessive trading due to overconfidence.					

**SECTION D: NARROW FRAMING**

6. Please indicate your opinion to the following aspects by ticking the appropriate corresponding choice. Use the key: **1: Never, 2: Rarely, 3: Sometimes, 4: Often, 5: Always**

Narrow framing	1	2	3	4	5
Investors usually make positive decisions on property investment.					
Investors usually make negative decisions on property investment.					
Mostly, investors usually combine positive and negative decisions on property investment.					
Property investors evaluate risks while buying property.					
Property investors evaluate risks while selling property.					
Investors always evaluate risks in isolation, separately from other risks they are already facing.					
Investors derive utility from gains and losses in the value of individual properties.					

7. Indicate your opinion on the causes of narrow framing among property investors in Nigeria. Use the key: **1: Never, 2: Rarely, 3: Sometimes, 4: Often, 5: Always**

Cause of narrow framing	1	2	3	4	5
Investors usually make positive decisions on choice of property.					
Investors usually make negative decisions on choice of property.					
Investors avoid risky decision making in property investment.					
Some investors are more risk averse than others.					
Investors base their investment decisions on the selective decisions of buying or selling property.					

Fear of lose and level of tolerance, are elements that impact the narrow framing of individual investors.					
Confident investors rely on calculated risks for the investment decisions.					
Investors have tendency to follow the less risky alternative in making investment decision.					

#### SECTION E: REPRESENTATIVENESS BIAS

8. Please indicate your opinion on the following aspects by ticking the appropriate corresponding choice. Use the key: **1: Never, 2: Rarely, 3: Sometimes, 4: Often, 5: Always**

Representativeness	1	2	3	4	5
Property investors use past performance in future decision making.					
Property investors use trend analysis to make investment decisions.					
Investors' over-rely on stereotypes in property market.					
Investors' recent success; tend to continue into the future inhibiting decision making.					
Investors tend to attribute good characteristics of a company directly to good characteristics of its property.					
Investors assess situations based on superficial characteristics rather than underlying probabilities.					
Investors view properties of a "good company" will be a good investment.					
Investors consider recent past returns to be representative of what they can expect in the future.					

Investors buy properties that have recently increased in value.					
Investors tend to buy properties that have recently enjoyed some positive abnormal returns.					
Investors are consistent with the thinking that the past price trend is representative of the future price trend.					
Investors assume that there exists a significant and positive association between investors' expected returns and past market returns.					
Investors seek to buy 'hot' properties and to avoid those, which have performed poorly in the recent past.					
Investors form judgements based on patterns that are simply random in a data and not representative of the facts.					

#### SECTION F: DISPOSITION EFFECT

9. Please indicate your opinion based on the following aspects by ticking the appropriate corresponding choice. Use the key: **1: Never, 2: Rarely, 3: Sometimes, 4: Often, 5: Always**

Disposition effect	1	2	3	4	5
Investors tend to sell winning properties too early.					
Investors tend to hold losing properties too long.					
Investors find it easier to discard loss-making properties when the deadline for the end of the tax year approaches.					
Investors with nominal losses tend to have higher asking prices for their properties.					
Property investors avoid selling property that has decreased in value.					
Property investors sell property that has fast increased in value.					
Property investors are risk-averse when faced with a sure gain					

Property investors are risk-takers when faced with a sure loss.					
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SECTION G: INVESTORS' INVESTMENT DECISION MAKING

10. Kindly indicate your opinion on the influence of the following factors on the property investment decisions. Use the key: **1: Never, 2: Rarely, 3: Sometimes, 4: Often, 5: Always**

	1	2	3	4	5
Increase in property sales influence decisions to invest in properties.					
Decrease in property sales influence decisions to invest in properties.					
Increase in property profits influence decisions to invest in properties.					
Decrease in property profits influence decisions to invest in properties.					
Positive property market information influence decisions to invest in properties.					
Negative property market information influence decisions to invest in properties.					
Past trends of property influence decisions to invest in properties.					
Appreciation from holding property influence decisions to invest in properties.					
Focus on "hot" property influence decisions to invest in properties.					
Seasonal price cycles influence decisions to invest in properties.					
Investors' preferences influence decisions to invest in properties.					
Over-reaction to price changes in property influence decisions to invest in properties.					
Under-reaction to price changes in property influence decisions to invest in properties.					

11. Please indicate your opinion based on the behaviour of property investors influences property investment decisions based on the following factors: Use the key: **1: Never, 2: Rarely, 3: Sometimes, 4: Often, 5: Always**

Decision	1	2	3	4	5
The buying decision of investors influences property investment decisions.					
The increase in sales of property bought and sold influence investment decisions.					
Decrease in demand of property based on over supply of properties influence investment decisions.					
The selling decision of investors influences property investment decisions.					
The choice of property to trade influence property investment decisions.					
The appreciation on property based on length of time to hold it influence investment decisions.					
The profit margins of sold property influence property investment decisions.					

12. Indicate your opinion based on the following investors' behaviour in making the selling/buying decisions in property market. Use the key: **1: Never, 2: Rarely, 3: Sometimes, 4: Often, 5: Always**

	1	2	3	4	5
Investors decrease the selling decisions of assets that get a loss in comparison to the initial purchasing price.					
Investors tend to sell properties which their values are higher in comparison to their original buying price.					
The correction of market dictates the selling price of property among investors in Plateau State.					
Investors prefer selling a property that has helped them to gain capital.					
Investors are more interested in purchasing the high-attention properties than selling them.					
Investors' behaviours impact both selling and buying decisions at different levels, and then they also impact the general returns of the market.					