Emerald International Journal of Emerging Markets

The Role of Cognitive Heuristic-Driven Biases in Investment Management Activities and Market Efficiency: A ResearchSynthesis

Journal:	*International Journal of Emerging Markets*
Manuscript ID	IJOEM-07-2020-0749.R1
Manuscript Type:	Research Article
Keywords:	research Synthesis, Cognitive Heuristic-Driven Biases, Investment Management Activities, Market Efficiency

The following publication Ahmad, M. (2024), "The role of cognitive heuristic-driven biases in investment management activities and market efficiency: a research synthesis", International Journal of Emerging Markets, Vol. 19 No. 2, pp. 273-321 is published by Emerald and is available at https://dx.doi.org/10.1108/IJOEM-07-2020-0749.

The Role of Cognitive Heuristic-Driven Biases in Investment Management Activities and Market Efficiency: A Research Synthesis

Abstract

Purpose – This article aims to systematically review the literature published in recognized journals focused on cognitive heuristic-driven biases and their effect on investment management activities and market efficiency. It also includes some of the research work on the origins and foundations of behavioural finance, and how this has grown substantially to become an established and particular subject of study in its own right. The study also aims to provide future direction to the researchers working in this field.

Design/methodology/approach – For doing research synthesis systematic literature review approach was applied considering research studies published within the time period, i.e., 1970-2021. This study attempted to accomplish a critical review of 176 studies out of 256 studies identified, which were published in reputable journals to synthesize the existing literature in the behavioural finance domain-related explicitly to cognitive heuristic-driven biases and their effect on investment management activities and market efficiency as well as on the origins and foundations of behavioural finance.

Findings – This review reveals that investors often use cognitive heuristics to reduce the risk of losses in uncertain situations, but that leads to errors in judgment; as a result, investors make irrational decisions, which may cause the market to overreact or underreact – in both situations, the market becomes inefficient. Overall, the literature demonstrates that there is currently no consensus on the usefulness of cognitive heuristics in the context of investment management activities and market efficiency. Therefore, a lack of consensus about this topic suggests that further studies may bring relevant contributions to the literature. Based on the gaps analysis, three major categories of gaps, namely theoretical and methodological gaps, and contextual gaps, are found, where research is needed.

Practical implications – The skillful understanding and knowledge of the cognitive heuristic-driven biases will help the investors, financial institutions, and policymakers to overcome the adverse effect of these behavioural biases in the stock market. This article provides a detailed explanation of cognitive heuristic-driven biases and their influence on investment management activities and market efficiency which could be very useful for finance practitioners' such as investor who plays at the stock exchange, a portfolio manager, a financial strategist/advisor in an investment firm, a financial planner, an investment banker, a trader/ broker at the stock exchange, or a financial analyst. But most importantly, the term also includes all those persons who manage corporate entities and are responsible for making their financial management strategies.

Originality/value – Currently, no recent study exists, which reviews and evaluates the empirical research on cognitive heuristic-driven biases displayed by investors. The current study is original in discussing the role of cognitive heuristic-driven biases in investment management activities and market efficiency as well as the history and foundations of behavioural finance by means of research synthesis. This paper is useful to researchers, academicians, policymakers, and those working in the area of behavioural finance in understanding the role that cognitive heuristic plays in investment management activities and market efficiency.

Keywords – Cognitive heuristic-driven biases, Investment management activities, market efficiency, behavioural finance, Research synthesis

Paper type – Literature Review

1. Introduction

The basic motivation behind this current study is to discuss new perspectives on financial markets and institutions and provide an extensive outlook of the psychological fundamentals and their application to finance. Standard finance often alluded to as traditional finance, is grounded on various theories and principles, for instance, the arbitrage principles of Miller & Modigliani; the capital asset pricing theory of Sharpe, Lintner & Black; the portfolio principles of Markowitz; and the option-pricing theory of Black, Scholes & Merton. According to these approaches, participants in financial markets are rational; they engage in frictionless markets and make rational decisions all the time. Markowitz (1952) argued that investors are rational, risk-averse, and will prefer low risks to high risks at a given level of return. Recent studies in the field of standard finance show that investors want to make their investment decisions rationally (Kubilay & Bayrakdaroglu, 2016) and use different models and theories of traditional finance to estimate risk and expected returns when making investment decisions (Arora & Kumari 2015). Thus, financial management literature suggests that investors behave rationally and unbiasedly. Consequently, it is extremely difficult to obtain an alpha return from the market, illustrating the efficient market hypothesis (Fama, 1970).

According to Fama (1970) and other believers in the fundamental theories of conventional finance posits that markets are almost always efficient. Market efficiency means the price of securities holds with fair value, even if some investors make errors due to biases. In the efficient markets, investors are regarded as rational, unbiased, and consistent actors who make optimal investment decisions without being affected by their psyches or emotions (Ahmad, 2021). The implication of the "efficient market hypothesis" is that nobody can consistently outperform the market and get a superior return over an extended period of time. However, there is a larger number of investment funds that are generating a large extent of alphas (Yuen, 2012). If modern portfolio theory, the APT Model, and the CAPM Model are legitimate, then why do investors behave irrationally in the market? If the financial market is efficient enough to eliminate all alpha in the stock market, then why are there so many investors generating a superior return?

After the energy crisis of the 1970s, empirical investigations (Kahneman and Tversky, 1979) revealed findings that were irreconcilable with the CAPM Model, the APT Model, the EMH, and modern portfolio theory. However, today's deviation from rational decision-making has been observed in nearly every area of financial activity. The market becomes inefficient, which motivates the author to explore the reasons for such type of behavior. Just as traditional finance's dependence on the premise of rationality fails to explain variations in stock prices, it also fails to determine the actual causes of many other financial decisions. For illustrate, if an enterprise were to determine its capital structure solely on the premise of rationality, the approach would be to get a capital mix that yields the lowest weighted average cost of capital (WACC). In reality, this may not happen at all. There is no rationale for this situation in conventional finance.

Behavioural finance challenges the perspective of an efficient market and elucidates why investors behave in distinguishing ways when investing in financial assets. Its importance stems from the fact that it enables us to enrich our understanding of the financial market by including the human component into it. During the 1980s, behavioural finance materialized as a separate field of study, fusing behavioural and psychological elements in financial and economic decision-making. It is a field of study that helps us understand how persons, or groups of persons, make choices relating to managing their monetary resources to achieve their preferred objectives (Ahmad 2021). Behavioural finance suggests that the process of making investment decisions is influenced by different behavioural biases, which encourage investors to depart from rationality and make irrational investment decisions; consequently, markets become inefficient.

Understanding of behavioural finance enables us to avoid emotion-driven speculation (that may lead to losses) and equips us with a capacity to maintain a balance between rationality and personal preferences. Such a balance can be led to the development of appropriate financial management strategies.

In this study, cognitive heuristic biases and their impact on investment management activities and market efficiency, as well as the origins and foundations of behavioural finance, are systematically reviewed, and the significance of the rapidly growing field of behavioural finance is highlighted. To the author's knowledge, there is currently no systematic review of the literature on cognitive heuristic-driven biases, in which different cognitive heuristic-driven biases have been examined and discuss the history and foundations of behavioural finance in a single study. Thus, in this current study, the author focuses exclusively on the systematical literature survey-based evidence to understand and plans to seek answers for the following questions:

Q1. What are heuristics and heuristic-driven biases?
Q2. What is meant by cognitive heuristics?
Q3. How many types of cognitive heuristic-driven biases?
Q4. What are the factors causing an increased use of cognitive heuristics by investors?
Q5. What is the effectiveness of cognitive heuristics in investment management activities and market efficiency?
Q6. Could cognitive heuristics lead to investors behaving irrationally?
Q7. Could the cognitive heuristics lead to the markets toward inefficiency?
Q8. What are the origins and foundations of behavioural finance, and how this has grown substantially to become an established and particular subject of study in its own right**?**
Q9. How can a knowledge of behavioural finance be utilized to develop appropriate financial management strategies?
Q10. Where does a plethora of research exist in this discipline, and in which areas research is needed?

Both investment management organizations and academia have admitted to the presence of investment heuristics, which may culminate in a variety of behavioural biases that lead practitioners of financial management and business actors to make less-than-optimal decisions related to managing their monetary resources. These heuristic-driven biases in investing encompass many types and are yet not well understood. Investors' irrational behaviour is real, and its impacts on the economy and financial systems are ubiquitous if no steps are taken to identify and mitigate them (Ahmad et al., 2017). This review provides awareness and understanding of cognitive heuristic-driven biases and their impact on investment management activities and market efficiency, which could be very useful for finance practitioners such as investors who trade on the stock exchange, portfolio managers, financial strategists/advisors in investment firms, financial planners, investment bankers, traders/brokers at the stock exchange, and financial analysts. But, perhaps most importantly, the term encompasses all those who manage corporate organizations and are liable for making their financial decisions. This review also provides information to policymakers, academics, and market players on cognitive heuristics and their consequences, as

well as suggestions for potential future actions. With the help of this review, individuals may enhance the quality of their decision-making by diagnosing their behavioral biases, which emerge as a consequence of cognitive heuristics, and they can also discover how heuristics elements can be constructively exploited in investment management activities. There are only very few studies on the application of fast and frugal reasoning in the field of financial management. The present study thus focuses on achieving the following main objectives:

- To synthesize the existing literature on behavioural biases which occurs as a result of cognitive heuristic-driven biases in a systematic manner
- To identify the causes of these cognitive heuristic-driven biases and their consequences on investment choice,
- To explore the influence of these cognitive heuristic-driven biases in the investment decision-making process, investment performance, and market efficiency.
- To synthesize the existing literature on the origins and foundations of behavioural finance, and how this has grown substantially to become an established and particular subject of study in its own right and to evaluate the significance of the rapidly growing field of behavioural finance.
- To identify the research gaps and directions for future research in this area.

Thus, the current study makes a few contributions to the behavioural finance paradigm. First, the present study contributes toward the understanding of the role that is played by cognitive heuristic-driven biases in investment management activities and market efficiency utilizing the research synthesis approach. The current research provides an explanation about how and why investors' behaviour deviates from rationality and markets become inefficient. Second, it provides awareness and understanding of the origins and foundations of behavioural finance, and how this has grown substantially to become an established and particular subject of study in its own right. It's probably one of the pioneering studies in the literature extensively reviewed and collected nine cognitive heuristic-driven biases and discusses the history and foundations of behavioural finance into a single article. Third, it provides a financial practitioners' foundation for advancing knowledge related to an in-depth review of the historical development of behavioural finance as a distinct field of study. By contrast to traditional finance theories, this article has explained behavioural finance in detail and provided a summary of the vast amount of literature published in the field of behavioural finance. Fourth, some prospective areas can be identified where the research can be conducted in the future. Helping the researchers understand the existing body of knowledge including where excess research exists and where new research is needed in this domain. Based on the gaps analysis, three major categories of gaps, namely theoretical and methodological gaps, and contextual gaps, are found, which need to be studied in the area of behavioural finance and discussed in greater detail in the 3.6 sections. It's also probably one of the pioneering efforts in the study concerning uncovers areas where research is needed in this field.

The remainder of the article proceeds as follows: Section 2 is related to the research methodology adopted for this present study. Section 3 shows the basic concepts, and discoveries related to cognitive heuristics and biases shall be explained through a systematic review of the literature. The cognitive heuristic-driven biases, their influence on the investment management activities and market efficiency and provides the foundation for advancing knowledge related to an in-depth review of the historical development of behavioural finance as a distinct field of study.

The existing gaps in the literature are presented in section four. Section 5 shows the conclusion and contribution of this paper to the field of behavioural finance.

2. Research Methodology for the Current Study

According to Marshal (2010), an SLR is defined as "a systematic method for identifying, evaluating and interpreting work produced by researchers, scholars and practitioners". Hart (1998) defined a review of the literature as "the use of ideas in the literature to justify the particular approach to the topic, the selection of methods, and demonstration that this research contributes something new". According to Webster and Watson (2002), an effective review of the literature is one that "creates a firm foundation for advancing knowledge. It facilitates theory development, closes areas where a plethora of research exists, and uncovers areas where research is needed". A prevalent notion concerning literature reviews is that they are "not based primarily on new facts and findings but on publications containing such primary information, whereby the latter is digested, sifted, classified, simplified and synthesized" (Manten, 1973). Cooper and Hedges, (2009) assert that different terminology such as systematic review, research review, and research synthesis, are frequently used interchangeably by researchers, and there is still no consensus on whether these distinctions are probably negligible.

The guidelines provided by previous research (Levy and Ellis, 2006; Kitchenham et al., 2010) were followed for undertaking the research synthesis/systematic review. To proceed further in this study, three important steps were followed: planning, conducting, and reporting.

1) Firstly, concentrate on the research questions and objectives for undertaking an SLR.
2) Secondly, focus on the search technique:
    - Which databases and time frames should be targeted?
    - Concentrate on defining the search string. Which terms seem to be essential for searching the most related papers?
    - selection of papers and criteria for determining their quality. Essentially, this step is concerned with the selection and rejection of articles and defining some general guidelines for SLR. Then, and
    - The process of data extraction starts.
3) Finally, a synthesis of existing research findings should be carried out, along with reporting of the review that contains findings, discussion, and conclusion.

2.1 Systematic literature review approach

The research synthesis approach adopted for this study is shown in Figure 1. This review of the literature is grounded in five steps. Step one is focused on formulating the study objective. The second step explains how the author found the relevant articles by highlighting different databases and search strings. The third step is concerned with the selection and exclusion of articles for research synthesis. Extracting meaningful insight from selected studies has been done in four steps. Step five is related to the dissemination of findings and agenda for future research. A detailed discussion of the research synthesis approach adopted for this study is presented below.

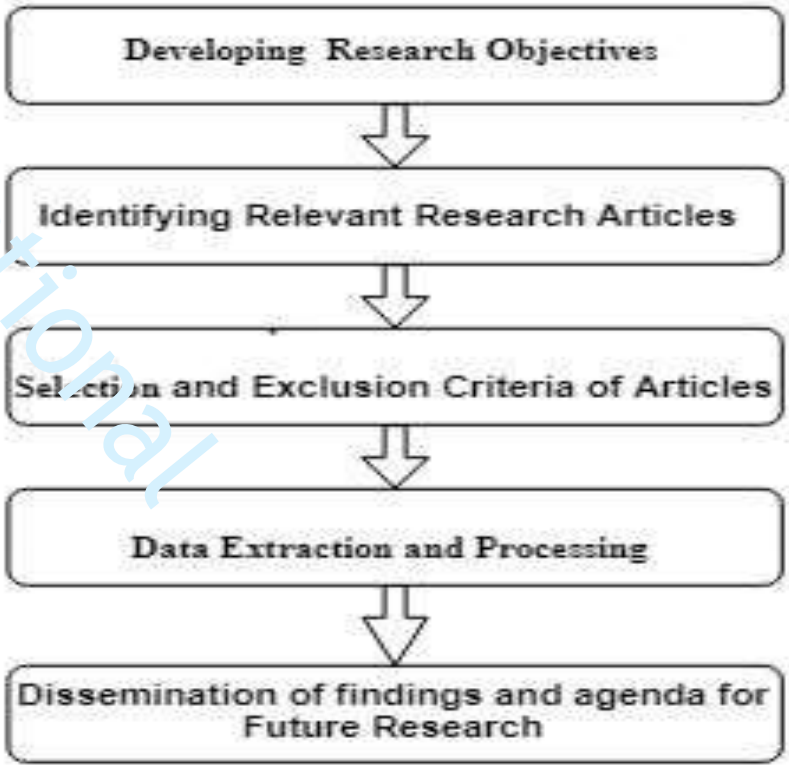

Figure 1. SLR process for the current study

2.2 Research Objectives

The present study thus intends to achieve the following objectives

RO1: To synthesize the existing literature on behavioural biases which occurs as a result of cognitive heuristic-driven biases in a systematic manner

RO2: To identify the causes of these cognitive heuristic-driven biases and their consequences on investment choice,

RO4: To explore the influence of these cognitive heuristic-driven biases in the investment decision-making process, investment performance, and market efficiency.

RO5: To synthesize the existing literature on the origins and foundations of behavioural finance, and how this has grown substantially to become an established and particular subject of study in its own right

RO6: To identify the research gaps and directions for future research in this area.

2.3 Digital Resources (Databases/Libraries)

To proceed with the systematic review/research synthesis, the scholars' decision regarding which literature vendor (Database) to consider for getting relevant papers is a challenging task (Poojary and Bagadia 2014). At the outset of the review, it is important to know where to look for and how to obtain relevant information for the study objectives or research questions (Ahmad,

2021). According to Mahmood, Khan, and Khan (2019), obtaining relevant material from myriad sources improved the overall quality of the review, and the authors can anticipate diverse opinions on similar concerns. Thus, the author used the following nine databases for the literature search listed below.

- Emerald.
- Elsevier/ScienceDirect
- JSTOR.
- Institute of Electrical and Electronics Engineers (IEEE).
- Wilson Web
- Springer Link.
- ProQuest
- Z library
- Google Scholar.

2.4 Literature Search Strings

According to Mahmood, Khan, and Bokhari, (2019) to undertake a comprehensive review of the literature, the selection of search traces or keywords play a significant role in the research activity. Collis and Hussey, (2009), assert that a literature search is defined as a systematic approach through which researchers identify the existing knowledge on a specific topic by conducting searches in various databases. According to Bryman and Bell, (2007) the literature plays an essential role in providing the conceptual and theoretical foundation of the research from which authors or researchers can substantiate their research questions. Cooper et al. (2009) revealed that it is necessary to explore the literature until one reaches the desired outcome to achieve the required objectives. A similar approach deduced by Corbin and Strauss (2008) also pressed the idea of theoretical saturation in building the literature until categories and subcategories are well developed, continued data collection and analysis provide no significant new insights and previously identified gaps in the theory are filled. The guidelines provided by prior research studies (for example Kitchenham, et al., 2010; Collis & Hussey, 2009; Kitchenham, 2007; and Levy, and Ellis, 2006) were followed for searching and writing effective literature review. The following three techniques were used to identify the most relevant literature for this study.

2.4.1 Keywords Searching

For this present study, relevant literature was searched using all possible keywords. To identify the appropriate literature, both single keywords and combined keywords were used. Some of the important keywords used for searching relevant literature cited in this current study are described here. For example: “heuristics”, “heuristic decision-making”, “cognitive heuristic-driven biases”, “cognitive heuristics”, “behavioural heuristic factors”, “market efficiency”, cognitive heuristic-driven biases and investment decision-making”, “cognitive heuristic-driven biases and investment performance”, “cognitive heuristic-driven biases and market efficiency”, “history and foundation of behavioural finance”, “behavioural finance history” etc. The researchers can gain some first insight into the field of study by doing a successful search using keywords (Levy & Ellis, 2006). To enhance the researcher's understanding of what they are

studying, more steps should be performed in the literature search. Thus, the forward and backward

search approach recommended by Levy and Ellis, (2006) was also utilized to make the search process more rigorous.

2.4.2 Forward Searching

Foreword-searching is the act of identifying and reviewing relevant articles that cite a previously published article (Webster and Watson, 2002). According to Levy and Ellis, (2006), this type of search is concerned with the relevant literature that has been created after a particular article has been published. Forward references search and forward authors search are two distinct sub-steps of forwarding search. The term "forward references search" refers to the process of looking for subsequent papers that have cited the original work. The term "forward author search" refers to the procedure of examining the authors' subsequent articles. The forward-searching technique is also included in the current literature review to identify further articles concerning cognitive heuristic-driven biases and their consequences on investment management activities and market efficiency throughout the time frame under consideration.

2.4.3 Backward Searching

A backward literature search is the third technique in the process of searching the knowledge base for connections to the phenomenon. According to Levy and Ellis (2006), backwards-searching is the process of identifying relevant articles or literature by looking at the references or work cited in an article. For this reason, backward searching is also referred to as chain searching. There are three distinct sub-steps to the process of going backward in literature: backward authors search, backward references search, and previously used keywords. The term "backward authors search" refers to the process of examining the research work of the authors that were published previously. The term "backward references search" refers to the process of reviewing the references of the articles that were found through the keyword search described earlier. Previously used keywords referred to reviewing the keywords noted in the articles that were found using the keyword search discussed above. A backward searching technique is also used to carry out the current literature review to identify more research articles that addressed cognitive heuristic-driven biases and their impact on investment management activities and market efficiency, among other topics. This study applies a backward search technique to more recently published articles (i.e., 2021, 2020, 2019, 2018, 2017, 2016).

2.5 Research papers/articles extraction criteria

According to Cooper and Hedges (2009), after gathering sufficient relevant literature for research synthesis, one should extract those pieces of information from each publication that may be useful in answering the questions that have been raised and need to be addressed. It helps further to filter research papers assembled, thus, articles that did not address the research objectives under study were discarded. The following selection criteria were adopted to find out the most relevant articles/papers for the current research synthesis:

- Research papers published in peer-reviewed journals and appeared in the English language with full-text access were included only;
- The peer-reviewed conference papers and dissertation were also included;

- "Time frame" constraints decided at the outset of our study for selection of publications (i.e., 1970-2021) were followed strictly; and
- Articles/papers, which addressed the research questions and objectives were included only in this study.

Consequently, upon extraction criteria that were followed strictly, only 176 papers/article in a number out of 256 papers/articles identified during the search were finalized to be included to proceed with this research.

3. Review of the Literature

3.1 What are heuristics and heuristic-driven biases About?

Heuristics are efficient cognitive processes, that ignore a part of the information, consciously or unconsciously. A heuristic is a decision rule that uses a subset of the information set (Ackert & Deaves, 2009). Gigerenzer and Gaissmaier (2011) propose a definition of heuristic as "a strategy that ignores part of the information with the goals of making decisions more quickly frugally, and/ or accurately than more complex methods". According to Shah and Oppenheimer (2008), all heuristics are a form of effort reduction, using one or more of the following: analyzing only a few clues, reducing the effort of recovering cue values, integrating less information, or analyzing only a few alternatives. Thus, Heuristics is referred to as "rules of thumb" or mental shortcuts, which finance practitioners (both individual and group level) used in complex and uncertain situations to make decisions simple and efficient. Business actors and finance practitioners often use heuristics in order to simplify the decision-making process, typically these heuristics are useful and beneficial when decision-makers have limited time and information (Waweru, Munyoki, & Uliana, 2008) but sometimes they lead to systematic errors in judgment (Ritter, 2003; Tversky & Kahneman, 1974). When finance practitioners use heuristics, they reduce the mental effort in the decision-making process, which causes several behavioral biases. The list of heuristic-driven biases that finance practitioners committed is too long and impossible to be summarized here. Here we are discussing only those cognitive heuristic-driven biases that are reflected in the reviewed empirical papers.

3.2 Cognitive heuristic-driven biases

Cognitive heuristics generally refer to the influences of various cognitive shortcut strategies in decision-making due to limited cognitive ability (Wärneryd, 2001). Based on the systematically literature survey-based evidence, we explored some common cognitive heuristic-driven biases that affect the decision-making process of finance practitioners, which are listed and discussed blew.

3.2.1 Overconfidence Bias

Overconfidence is a cognitive heuristic bias, which can be defined as "unwarranted faith in one's intuitive reasoning, judgement, and cognitive abilities" (Pompian, 2011). "When people overestimate their knowledge and skills, it is a reflection of overconfidence" (De Bondt & Thaler, 1995). Psychologists have determined that overconfidence causes people to overestimate their knowledge and skill. According to Chernoff (2010), "too many people overvalue what they are not"; such people suffer from overconfidence bias. Pompain (2011) explains in his book "behavioural finance and wealth management", there are two types of overconfidence, One is known as prediction overconfidence and second is known as certainty overconfidence. In

prediction overconfidence, an investor's prediction is based on narrow information and in certainty overconfidence investors are too certain on the accuracy of their own judgment. In which investors beliefs in their own skills, they think whatever we are doing will be true.

As Simon et al. (2000) asserts that, "overconfidence may exist because individual investors do not sufficiently revise their initial assessments after receiving new information"; therefore, they do not realize how incorrect their assessments may be. They think their judgement is too certain, which is the reason for overconfidence. Some researchers state that Overconfidence bias exists in the personality of investors or human beings over time when they experience one thing again and again and attain the same results every time. Overconfidence occurs when decision-makers or financial investors are overly optimistic in their initial appraisal of a situation, and they are slow to integrate additional information about a situation into their appraisal because of their overconfidence (Busenitz & Barney 1997).

Overconfidence can induce excessive trading behaviours (Bodnaruk & Simonov, 2015; Palomino & Sadrieh, 2011; Pikulina, Renneboog, & Tobler, 2017) because overconfident investors perceived that they possess financial knowledge advantage, as a result generates high trading volumes. overconfident investors underestimate their downside risk and hold under-diversified portfolio, leading to poor returns (Pompian, 2011). According to Shefrin (2000), investors "overestimate their own ability in forecasting the trend accurately which results in bad forecasting". In short, the consequences of the Overconfidence heuristic bias are that decision-makers, who are suffering in overconfidence bias, underestimate risk factors, overestimate expected profit (Baker & Nofsinger, 2002), poorly diversified their portfolios and trading excessively as well as experience lower profit or returns than those of the market (Odean, 2002).

3.2.2 Underconfidence bias

According to Pikulina et al. (2017), underconfidence is a cognitive heuristic-driven bias in which individuals underestimate their knowledge and skills. Ahmad, (2021), asserts that "too many people undervalue what they are such people suffer from underconfidence bias". Some people think that they know little than they really do because they ponder themselves to be inexpert in decision-making, such type of behavior reflects underconfidence. An investor is considered as underconfident when her subjective knowledge is deflated (Razmdoost et al., 2015).

The three attributes explain people who are suffering from underconfidence bias: underplacement, underestimation, and underprecision. Underplacement refers to the perception that individuals consider themselves to be less efficient than others. In underestimation, people tend to focus only on their own lack of skills, the decision-makers' conviction that they a lack of financial knowledge and skills, rather than their actual skills. It can be measured through underperformance, underestimation of one's actual abilities, level of control, and the chance of success– all these attributes are known as underestimation. Investors who are overly or excessively uncertain about their judgment, and who overestimate the risk factors associated with investment decisions, are said to have underprecision (Ahmad, 2021).

Underconfidence can induce restrained trading behaviours (Pikulina et al., 2017) because underconfident investor perceived that they have a lack of financial knowledge, as a result, generates low trading volume. Underconfident investors overestimate their downside risk, resulting in suboptimal portfolio management decision-making (Ahmad, 2021).

3.2.3 Representativeness Bias

Representativeness is a "cognitive heuristic bias which can be defined as a mental shortcut that involves decisions being made according to mental stereotypes" (Shefrin, 2005). Representativeness is defined as "the degree of similarity that an event has with its parent population" (DeBondt and Thaler, 1995) or we can say that the degree to which an event represents its population (Kahneman and Tversky, 1974). Representativeness puts too much trust in stereotypes and leads individuals to make forecasts that are not appropriate for the relevant situation (Shefrin, 2008).

There are two types of representativeness bias one is known as base-rate neglect and second is known as sample-size neglect. Base-rate neglect means the decision maker considers irrelevant or incorrect information, when judging the likelihood of a particular investment outcome or we can say that they depend on stereotypes when making investment decisions, without adequately incorporating the base likelihood of the stereotype occurring (Pompain, 2006). Sample-size neglect occurs when decision makers try to generalize on the basis of too few examples (Barberis and Thaler, 2003) or "incorrectly assume that small sample sizes are representative of populations" (Pompain, 2006).

According to Kahneman and Tversky (1974), individuals use the representativeness heuristic because they do not fully understand the basic concept of forecasts, the preponderance of an event within its population of events or characteristics. Another reason is insensitivity to the sample size because it is incorrectly believed that small samples of events, people, etc. are representative of the entire populations from which the sample is drawn. People tend to overestimate the likelihood that the characteristics of a small sample of a population adequately represent those of the entire population. "We also tend to use the representativeness heuristic when we are very aware of anecdotal evidence based on a very small sample of the population" (Kahneman and Tversky, 1974). The consequences of the representativeness heuristic are that decision makers adopt forecasts based on a small sample and update beliefs using simple classifications rather than complex data (Shah, Ahmad, & Mahmood, 2018).

3.2.4 Availability Bias

Availability is a "cognitive heuristic bias that occurs when people rely too much on easily available information" (Ngoc, 2014), for example "when investors assess the likelihood of an outcome based on how easily the outcome comes to mind" (Brahmana et al., 2012; Kahneman & Tversky, 1974). There are four types of availability heuristic; one is retrievability, second categorization, third is the narrow range of experience and four is resonance.

Retrievability means idea or information easily or more quickly comes to mind than another idea or information that idea will be chosen as correct even in reality it is not (Pompian, 2006). In short, we can say that retrievability suggests that investors took decisions on the basis of information or idea that comes to mind easily. Categorization means investors took a decision based on information that they perceive as relevant search sets. In other words, we can say that investors make different categories of existing information and try to match the new information to those existing categories. If new information match with existing categories, then took the decision based on that information such type of behavior is known as Categorization (Pompian, 2006). The narrow range of experience means investors have lack of experience, due to lack of experience they have insufficient information and based on that limited information they took decision (Pompian, 2006). Resonance means some time people are biased by how closely a situation match their own personal situation or the degree to which certain, given situation match

with individuals own personal situation can also influence judgement (Pompian, 2006). In short if

new information contradicts from the investor's personal information, then they took decision based on their own personal information.

Investors who are fell prey to availability heuristic fail to diversify their investment portfolios, they select investments based on retrievability rather than a thorough analysis of the options, fail to allocate their assets appropriately and, because they limit their investment opportunities, they do not choose alternative investments when suitable.

3.2.5 Anchoring and Adjustment Bias

Anchoring and adjustment is a cognitive heuristic bias that tells us about human beings' tendency to rely excessively on the first piece of information provided (the "anchor") when making decisions. Anchoring and adjustment occurs during the decision-making process, when investors use an initial piece of information to make decisions or judgments. Once an anchor is set, then all other assessments or judgments revolve around that anchor; as a result, there is an error or bias towards interpreting other information around the anchor. Slovic and Lichtenstein (1971) explain the "anchoring and adjustment bias as people using some initial values to make an estimation that is adapted to yield the final answer". The initial value may be adjusted with the help of problem formulation, or it may be suggested by partial computation. Kahneman and Tversky (1974) argue that different starting points yield different estimates, which are biased towards the initial value. We call this phenomenon anchoring. In short, we can say that Anchoring and adjustment heuristic suggests that initially, investors make reference point based on any information then all assessment revolves around the reference point.

According to Edwards (1968), the anchoring and adjustment heuristic is a mental process in which individuals agree with prior beliefs or predictions to the detriment of new information. This bias reflects the reality that people tend to cling to their past convictions and are hesitant to revise their beliefs. This cognitive heuristic-driven bias leads to insufficient adaptations when new information is revealed. The values that are held and that are the root of the anchoring may be prior beliefs, thresholds (for stock market indices in particular), or indeed recent information.

3.2.6 Disposition Effect

The disposition effect is also heuristic-driven cognitive biases which is defined as the tendency of investors to hold the losing investments too long and to sell the winning investments too early for maximizing the returns while delaying the losses (Zahera, & Bansal, 2019). As Shefrin and Statman, (1985) assert that a situation where investors hold losing stocks for a too long period and sell winning stocks too soon such a phenomenon is known as disposition effect. This definition of disposition effect consistent with many renowned researchers' argument like Odean, (1998), Weber and Camerer (1998) and Brown et al., (2006) etc. who says that the investors which tend to close winning positions too quickly and hold losing positions too long such types of investors suffering from disposition effect. Thus, the disposition effect is defined as the tendency of investors to sell shares with capital gains too quickly and to hold shares with capital losses for an excessively long period, this is because of their reluctance to recognize shares of losers. And indeed, the disposition effect describes investors' desire to realize profits by selling stocks that have appreciated but to postpone the realization of losses. Several researchers have endeavored to recognize potential reasons for the existence of the disposition effect. There are several psychological elements like mental accounting, Thaler (1985), regret aversion, Bell (1982), prospect theory, Kahneman and Tversky (1979), seeking pride, overconfidence, and sign

realization preference, etc. that lead to the disposition effect (Zahera, & Bansal, 2019). A brief discussion regarding how these elements related to the occurrences of the disposition effect are presented below.

Prospect theory, which was explained by Kahneman and Tversky (1979), states that people make decisions based on gains and losses, rather than final outcomes, as well as making reference points and taking decisions accordingly. People value gains and losses differently and these values are calculated from reference points. In the literature of behavioural finance, the dispositional effect is explained by two main features of prospect theory. First, investors make their investment decisions in terms of potential gains and losses. In concordance with the prospect theory, they value their losses and gains with respect to some reference point. They are risk-seeking in the domain of losses and risk-averse in the domain of gains. Second, they behave as if they evaluate the consequences of the decision on an S-shaped value function, which is convex for losses and concave for gains. According to prospect theory the shape of the value function reveals diminishing marginal sensitivity of the investors concerning profits and losses. An experimental approach has been applied by Jiao (2017) to understand risk-seeking in the region of losses and risk aversion behavior in the region of profit, its influence and meaning to the investors and to signifying prospect theory as an underpinning theory for disposition effect phenomenon. According to Jiao (2017) and other authors like Lucchesi et al. (2015), Grinblatt and Han (2005), and Odean (1998), etc. prospect theory is the possible explanation regarding the occurrences of the disposition effect.

Thaler (1999) presented the mental accounting concept. Investors have different views and preferences about their multiple financial investments. Every decision is taken on the basis of mental accounting which leads toward the disposition effect (losses or gains). The mental accounting elucidates that investors allocate their gambles (investment prospects) to different accounts and gamble with its results, excluding the possibility of interaction between them. Every mental account has a different value for investors. Investors have to close their position at a loss if they realize the losses in any mental account. But it is possible for irrational investors to close any of the mental accounts at a loss; as a result, the disposition effect phenomenon emerges. Several authors like Cekauskas et al. (2011), Liu and Chen (2008), and Parveen (2016) argue convincingly that overconfident investors also suffer from the disposition effect.

Shefrin and Statman (1985) conceptualized the regret aversion concept that investors often hold onto losing stocks and sell the winning stocks due to a negative sensation that is activated after a losing investment. It concerns the feeling that arises not only from the monetary compensation but also from the feeling linked with losing or winning a stock. Investors feel of regret on realizing that the option they chose does not perform as well as the one they did not choose. However, investors feel proud when their choice performs better than the alternatives. The speculators always want to avoid regret and to seek pride consequently, they are suffering disposition effect bias. Thus, regret aversion and pride seeking behavior leads toward the disposition effect phenomenon.

The consequences of the disposition effect are that investors, who are suffering in disposition effect bias, become less sensitive to the price changes in the market and, thus, will yield smaller returns (Grinblatt, & Han 2005). Several researchers suggested that as the disposition effect increases, the stock volatility and volume of the return decreases (William 2008), on the other hand, the momentum of the stock market (Kaustia 2011; Hur et al. 2010) and the tax liability of the investors increases (Barber et al. 2011).

3.2.7 Mental Accounting

The concept of mental accounting was initially introduced by the psychologist Thaler (1980) to refer as "the set of cognitive operations used by individuals and households to organize, evaluate, and keep track of financial activities" (Thaler 1999). It is the process by which people categorize expenses into categories, assign monies to these categories, determining budgets, and doing cost-benefit assessments. The categorization of monetary resources into separate categories is a prominent element of mental accounting. Several studies in the literature have argued that this categorization of money is motivated by cognitive processes comparable to those that underpin the categorization of objects and events more broadly. Subsequently, the cognitive principles of categorization can be used to understand mental accounting (Heath and Soll 1996; Henderson and Peterson 1992). Jain, Walia, and Gupta, (2020) assert that mental accounting bias, occurs when people tend to regard each component of their portfolio independently. Investments are grouped into different subcategories based on various factors, such as the source of the funds or the purpose of the account. Mental accounting bias attempts to describe the process whereby people code, classify and assess economic outcomes.

3.2.8 Gambler's Fallacy

The gambler's fallacy arises when an individual erroneously believes that a random occurrence is less likely or more likely to occur based on the outcome of a previous event or series of events. This way of thinking is fallacious, because previous occurrences have no bearing on the likelihood of specific future events (Kenton, 2021). According to Suetens, and Tyran (2012) the gambler's fallacy is the fallacious perception that a random event is less likely to occur if the event has occurred recently. Such beliefs are untrue if the onset of events occurs independently of prior events. Wijayanti, Suganda, Thewelis, (2019) argue convincingly that the gambler's fallacy is a delusional belief that if something occurs more frequently than usual in one period of time, it will arise less frequently in the following period of time, or if something occurs less frequently than usual in one period of time, it will occur more frequently in the following period of time. Thus, the Gambler's fallacy is defined as the tendency of people to predict the future based on knowledge gained from the past.

3.2.9 Herding Bias

Another cognitive heuristic bias is defined by research scholars from the behavioural finance community in several ways. To clearly understand the concept of herding we take a look at the various definitions of herding that are already available in the literature.

According to Banerjee (1992), herding is defined as "everyone doing what everyone else is doing, even when their private information suggests doing something quite different". Individuals who ignore their own beliefs and base their investment decisions solely on the collective actions of the market or imitate the actions or reactions of other investors, even when they disagree with its prediction such individuals suffer from herding (Christie and Hwang, 1995). Vieira, & Pereira (2015) propose a definition of herding as "a group of investors ignoring their own information and beliefs and following the decisions of other investors, imitating them". According to Patterson and Sharma (2007) "herding occurs when a group of investors trade on the same side of the market in the same securities over the same period of time or when investors ignore their own private information and act as other investors do".

Moreover, as Galariotis et al. (2016) and Galariotis et al. (2015), assert that herding is a

process where investors trade in the same way simultaneously, either because of mimicking each

other or because of conversion to the market average. Chen, (2013) argue convincingly, herding can be defined as an investment strategy in which investors follow the market consensus and/or mimic the actions of financial experts. According to Hwang and Salmon, (2004) hedging is defined as the situation in which investors ignore their predictions and beliefs and copy the decisions made by their peers or the movements on the market. The phenomenon of herding eventuates when a group of investors deliberately imitates the activities of other investors who they contemplate to be better knowledgeable, rather than following their own convictions and utilizing their own prediction when purchasing or selling similar stocks over a specific timeframe (Chen, 2017; Blasco & Ferreruela, 2008). Thus, when investors intentionally or unintentionally mimicking the actions or reactions of other investors and/or base their investment decisions solely on the collective actions of the market, instead of making investment decisions based on their own convictions and prediction such type of behaviour referred to as the herding.

The consequences of the herding are that decision-makers who are suffering from the herding fail to diversify their investment portfolio, which in turn adversely affects their investment performance. In financial markets herding can distort the stock prices, and other financial assets for instance currencies, because they are traded below or above from their fundamental value.

3.3 Cognitive Heuristic-Driven Biases, Investment Decision-Making, and Performance

The psychology of investors has a direct impact on the decision-making process. When applied to real-world investment scenarios, the consequences of cognitive heuristic-driven biases on stock valuation have also been discovered. Several studies had been conducted to study the relationship between cognitive heuristic driven biases and the decisions and performance of investors; some of them found that cognitive heuristic-driven biases had significant positive effect on the decision-making and performance of investors. Toma (2015) investigated the impact of behavioral bias on the decisions of individual investors trading at the Romanian stock exchange and found that cognitive heuristic-driven biases such as representativeness bias, disposition effect, and overconfidence bias positively affected investment decisions. He suggested that individual investors' returns increased due to representativeness bias. Irshad et al. (2016) also found a positive relationship between representativeness bias and investment decisions. Ikram (2016) investigated the impact of behavioural determinants on the decisions of individual investors trading on the Islamabad stock exchange and found that availability and representativeness cognitive heuristic-driven biases positively affected their investment decisions, meaning that, due to availability bias, individual investors' returns increased. Khan (2015) also found that availability bias has a significant impact on the investment decisions of individual investors.

The fuzzy analytic hierarchy process was used by Jain, Walia, and Gupta, (2020) to explore the possible effects of behavioural biases on individual equity investor's decision-making. The results reveal that eight behavioural biases i.e., herding bias, regret aversion bias, representative bias, overconfidence bias, loss aversion bias, mental accounting bias, availability bias, and anchoring bias have a significant influence on the decision making of individual equity investors. Moreover, they documented that loss aversion, herding, and overconfidence biases have appeared as important psychological biases influencing investor's decision-making. Also, as Metawa, Hassan, Metawa, & Safa, (2019) with the study of 384 individual and institutional investors, actively trading on the Egyptian Stock Market, concludes that herd behavior and overconfidence bias have a significant effect on the investment decisions. Additionally, as Madaan, & Singh

(2019) concludes that herding and overconfidence bias have a significant positive influence on investment decisions of individual investors trading the "National stock exchange" of India.

Rehan and Umer (2017) explored the possible effects of emotional and cognitive biases on the investment decisions of individual investors, actively trading on the PSX; their results show that psychological biases, i.e., regret aversion, risk aversion, representativeness, overconfidence, and anchoring, have a significant positive impact on investors' decisions, while availability and mental accounting do not have any significant impact. Moreover, by their study, Chhapra, Kashif, Rehan, and Bai (2018) also have described the investment behaviour of individual investors at the PSX. Their results provide empirical evidence for the positive effect of overconfidence bias and herding behaviour on investment decisions made by individual investors of Pakistan. A study conducted by Ishfaq and Anjum (2015) suggested that anchoring positively affects risky investment decisions. Qasim, Hussain, Mehboob, and Arshad (2019) also concluded that investment decisions of individual investors were significantly influenced by overconfidence bias and herding behaviour. A study conducted by Nalurita, Leon, and Hady, (2020) clarify the mechanism by which behavioural factors such as regret aversion, loss aversion, and market factors influence the investment decisions by taking locus of control as a moderating variable. The results show that regret aversion, loss aversion, and market factors are significantly associated with investment decisions and locus of control appears to moderate these relationships.

Parveen, Satti, Subhan, and Jamil, (2020) investigate the role of representatives on the investment decisions by taking overconfidence as mediator. The results of the study suggest that representativeness has a significant effect on investment decisions and overconfidence appears to mediate this relationship. A study conducted by Pandey, and Jessica, (2019) explore the mechanism by which behavioural biases influence the reinvestment intention by taking investment satisfaction as a mediator. The results suggested that behavioural biases have a significant effect on the reinvestment intention and investment satisfaction appears to mediate this relationship positively. Metawa, et al., (2019) investigate the role of behavioural factors namely herd behaviour, investor sentiment, overconfidence, underreaction, and overreaction in financial decisions. The findings of the study suggest that herd behaviour, investor sentiment, overconfidence, underreaction, and overreaction have a significant effect on financial decisions. Peña, and Gómez-Mejía, (2019) study the relationship between optimism, anchoring and stock market forecasts. The results suggest that optimism, anchoring have a significant impact on the forecast of stock market index.

Khan, (2020) explore the role of cognitive heuristic-driven biases namely mental accounting, disposition effect, and herding bias in investment decisions by taking financial literacy as moderator. The results of the study suggested that cognitive heuristic-driven biases have significant positive influence on the investment decision-making. Madaan, and Singh, (2019) also clarify the mechanism by which behavioural biases such as disposition effect, herding, anchoring, and overconfidence, influences the investment decisions of individual investors. The results show that behavioural biases namely herding, and overconfidence have significant positive effect on the investment decisions. Rauf, Khurshid, and Afzal, (2018) explore the relationship of loss aversion and overconfidence with investment decisions and investment performance of equity investors. The findings show that loss aversion and overconfidence are significant predictors of investment decisions and investment performance of equity investors.

Parveen, and Siddiqui, (2018) clarify the mechanism by which disposition effect, anchoring, and overconfidence influence the investment return. The results show that anchoring

and disposition effect has a positive effect on investment return and overconfidence has a negative

influence on the investment returns. Another study conducted by Parveen, and Siddiqui, (2017) to find out the influence of heuristic biases on stock market returns. They used annual data for the period from 2005 to 2014 which was collected from the financial report of 184 non-financial companies listed at the PSX. Hypotheses were tested using logit regression. The results of the study demonstrate that heuristic-driven biases have a significant positive effect on the stock market return. Katper Azam, Karim, and Zia, (2019) study the influence of behavioural biases on the investment decisions by taking socio-demographic variables as a moderator. The finding suggests that behavioural biases significantly associated with investment decisions and socio-demographic factors appear to moderate these relationships.

Javed et al., (2017) also clarify the mechanism by which heuristic-driven biases influence the investment performance. The results demonstrate that cognitive heuristic-driven biases significant positive predictors of investment performance. Tin, and Hii, (2020) explore the influence of heuristic-driven biases on investment performance on debt securities and found that representativeness and availability have a significant impact on the investment performance and overconfidence and anchoring are the insignificant predictors of investment performance. Adielyani & Mawardi (2020) examined the impact of risk tolerance, herding behaviour, and overconfidence on Stock investment decisions and found that risk tolerance, herding behaviour, and overconfidence have a significant positive influence on the Stock investment decisions. Similarly, Afriani, & Halmawati, (2019) study the impact of herding, overconfidence, and cognitive dissonance on the stock investment decisions. The results suggest that herding, overconfidence, and cognitive dissonance are the significant predictors of the stock investment decisions. Karimi, (2020) also documented that behavioural factors have a significant association with the financial decisions of investors.

A research study conducted by Sattar, Toseef, and Sattar, (2020) investigated the influence of behavioural biases on the investment decisions and found that behavioural biases are the significant predictors of investment decisions. Alrabadi et al., (2018) studied the link between psychological biases and investment performance of investors trading at the "Amman Stock Exchange". The outcomes intimate those behavioural biases namely herding, representativeness, availability, overconfidence, and familiarity have a significant positive influence on investment performance. Psychological biases such as loss aversion, disposition effect, and confirmation also have a positive effect on the investment performance, but the p-value did not reach a high significance value. Siraji, (2019) examine the correlation between heuristic-driven biases and investment performance of investor trading at the "Colombo Stock Exchange". The results of the study illustrate that representativeness, overconfidence, availability, and anchoring have a significant link with investment performance, but gamblers fallacy has an insignificant connection with investment performance.

Raheja, and Dhiman (2019) study the effect of behavioural biases on investment decisions by taking risk tolerance as a mediator. The results suggest that behavioural biases are significantly related to investment decisions. Similarly, Malik, Hanif, and Azhar, (2019) explore the influence of overconfidence on investment decisions by taking risk tolerance as a mediator. The results of the study suggest that overconfidence positively influence investment decisions and risk tolerance appears to mediate this relationship. Ramalakshmi, Pathak, Jos, and Baiju, (2019) explore the mechanism by which cognitive biases influence investment decisions. The findings indicate that herding, representativeness, regret aversion, and overconfidence have a significant impact on investment decisions. Candraningrat, and Sakar (2019) investigate disposition effect and

overconfidence and their influence on investment decisions. The findings demonstrate that disposition effect and overconfidence significantly related to investment decisions.

Some researchers disagree with the view that there is a positive relationship between heuristic-driven biases and the decisions and performance of individual investors. This school of thought is the motivating idea for this research. Individual investors who are suffering from heuristic-driven biases make trading mistakes or poor trading decisions, which lead them towards irrational behaviour. Several studies indicate that heuristic-driven biases have a significant negative effect on the investment decision-making and performance of individual investors. The paper by Shah, Ahmad, and Mahmood (2018) explores the possible effects of heuristic-driven biases in investment decision making of individual investors. The results of their study suggested individual investors use cognitive heuristics i.e., overconfidence, representativeness, availability, and anchoring when trading stocks, resulting in irrational decisions. Another study on the topic by Ahmad, and Shah (2021) asserts that when individual investors use heuristics, their technical knowledge and reasoning faculties are impaired, leading to errors in judgment. As a result, investors make irrational decisions, which in turn adversely affect their investment performance. Dangol, and Manandhar, (2020) also assert that heuristic-driven biases such as representativeness, availability, overconfidence, and anchoring, leads toward the irrational decision-making.

Furthermore, ul Abdin, Farooq, Sultana, and Farooq, (2017) seeks to highlight the consequence of heuristic-driven biases i.e., availability, representativeness, overconfidence and anchoring on investment decision and performance of individual investors. Overall results of their study indicate heuristics are the cause of stock market anomalies, resulting in irrational decision-making that affect the investment performance of investors negatively. Rasheed, Rafique, Zahid, & Akhtar, (2018), has also studied heuristic-driven biases and their influence on the investment decisions of individual investors. The results of their study divulge that the heuristic-driven biases significantly cause investors to deviate from rational decision-making. Similarly, Itzkowitz and Itzkowitz (2017) documented that during stocks trading investors use recognition-based heuristics such as name fluency (Green & Jame 2013; Anderson & Larkin 2019), name memorability (Grullon et al., 2004) and alphabetical ordering (Itzkowitz et al., 2016), consequently make irrational investment decisions.

According to Park et al. (2010), overconfidence negatively affects investment decisions and performance. Kengatharan and Kengatharan (2014) also suggest that overconfidence adversely affects investment-related choices and performance. Bashir et al. (2013) studied the impact of behavioural biases on investors' financial decision making and concluded that overconfidence bias has an impact on investors' financial decisions. Fagerstrom (2008) finds that the S&P 500 were inflated due to the problems of the overconfidence bias and the over-optimistic bias. Gervais, Simon and Odean (2001) have shown that both over-optimism, and overconfidence are personality traits which influence the decision-making process of individual investors. According to Kafayat (2014), overconfidence bias negatively affects investors' ability to make rational decisions. Akhtar and Das (2020) has pointed that overconfidence bias negatively associated with investment performance in the context of a developing market. Waseem-Ul-Hameed, Razzaq, and Humanyon, (2018) assert that due to overconfidence bias individual investor deviate from rational decision-making and take wrong investment decisions.

Chen et al. (2007) concluded that Chinese investors make trading mistakes or poor trading decisions due to representativeness bias. According to Lakonishok et al. (1994), companies engage in poor investments due to the problem of representativeness. Athur (2014) suggested that

representativeness bias negatively affects investment decisions. Yaowen et al. (2015) also found

that representativeness bias decreases decision-making. A study conducted by Onsomu (2014) describes how individual investors' decisions at the Nairobi Securities Exchange are affected by representativeness bias. Folks (1988) found that consumers' judgments of product performance were significantly influenced by the availability heuristic. A study conducted by Massa et al. (2005) indicated that individual stock picking decisions are affected by availability bias. Shah et al. (2018), assert that Clark, who is an investment advisor, investigated how availability bias (How the news can hurt your investment decisions) affects investment decisions and suggested that availability bias negatively affects individuals' investment decisions. Afi, (2017) clarify the mechanism by which the disposition effect influences the trading volume stock volatility and stock return. The results of the study demonstrate that disposition effect negatively associated with trading volume stock volatility and stock return. Ahmad, (2021) investigate the herding behaviour and its influence on perceived market efficiency and investment management activities. The results suggest that individual investors who are suffering from herding behaviour intend to perceive those markets are inefficient, trade excessively in the stock market, and their investment performance affected adversely.

After reviewing the relevant literature in a similar domain, the author has concluded that the connection between cognitive heuristic-driven biases and investment management activities of investors appears to be quite controversial. Some researchers concluded that cognitive heuristic-driven biases had no correlation with investment management activities of investors, while some scholars demonstrated a positive relationship between cognitive heuristic-driven biases and investment management activities. Some scholars disagree with both the above views that cognitive heuristic-driven biases had no relationship and/or had a significant positive relationship with investment management activities of investors. Several Scholars concluded that cognitive heuristic-driven biases had a significant negative association with the investment management activities. Thus, the literature highlight that there is still no consensus on the usefulness of cognitive heuristics in investment management activities. Therefore, a lack of consensus about this topic suggests that further studies may bring relevant contributions to the literature.

2.4 What is Market Efficiency About?

Fama (1970) explained the concept of market efficiency in his paper, "Efficient Capital Market". It is one of the most important theories of standard finance, stating that financial markets are efficient (Sewell, 2011), meaning that the price of securities holds at their fair value (Aguila, 2009), while reflecting all available information (Fuentes, 2011). So, we can say that a market in which prices always amply reflect all available information is called an "efficient market" (Fama, 1997). According to Shah et al. (2018), in efficient markets, investors are regarded as rational, unbiased, consistent, making optimal investment decisions, without psychological and emotional effects. According to the EMH, market efficiency can be classified into three types: the weak form, the semi-strong form, and the strong form. These three types of market efficiency are addressed in greater detail below.

The weak form of efficiency is defined as past prices or returns reflecting future prices or returns. When the piece of securities is adjusted based on historical information, then this information is available to everybody, and so, based on that information, nobody can earn abnormal returns (Aguila, 2009). The semi-strong form of efficiency refers to when prices of securities not only reflect historical information but also any additional publicly available information. Public information means companies' financial reports, press releases, government announcements, dividend announcements, merger and acquisition announcements, monetary

policy announcements and inflation announcements. When the price of securities responds to the public information, the public information is available to everybody, and nobody can earn abnormal returns based on this information (Aguila, 2009).

The strong form of efficiency suggests that prices of securities reflect all available information (private or public information). When the price of securities responds to private information, this information is available to everybody, and so, based on that information, nobody can earn abnormal returns. The application of the strong form of efficiency is not possible in the market (Aguila, 2009).

According to Ritter (2003), the EMH is based on the assumptions that decision makers and financial investors are rational and competes to earn abnormal profits, and that the prices of securities hold their fundamental value due to competition between different profit-oriented investors. Moreover, Shiller (2003) said that all investors integrate all available information in their decisions, which is why prices can be considered as the best for true investment. We cannot hold onto the theory of rational behaviour, however; people do not remain rational for long periods but are affected by their beliefs, mood, and emotions. So, we reject the traditional theory of finance (Shah et al., 2012).

The previous literature shows that behavioural biases can make financial markets less efficient by mispricing securities, even though there are rational arbitrageurs who bring security prices to their fundamental values (Kyle and Wang, 1997; Odean, 1998). The price of securities does not always hold with their fair value but can deviate from their fundamental value because of traders who are not fully rational (Barberis and Thaler, 2003). Shah et al. (2012) said that, due to heuristic biases and framing effects, the price of securities deviates from their fundamental value and, as a result, markets become inefficient. According to Birau (2011), it is impossible to improve markets for a longer period.

Several studies have demonstrated that, in real life, markets are inefficient because of behavioural biases, as well as other aspects of capitalism. In reality, markets are never absolutely efficient nor absolutely anomalous (Pompain, 2006). Fama (1997) explained in his paper "market efficiency, long term returns, and behavioural finance" that anomalies persist in the market for short periods of time, due to methodology, but, in the long run, the anomalies go away due to changes in proficiency. The "noise trader risk" and "limit to arbitrage" explain why so many anomalies persist in the markets that they produce inefficiency (Baker and Nofsinger, 2010). Pompain (2006) said in his book "Behavioural Finance and Wealth Management" that anomalies' persistence in the markets contradicts the EMH.

The concept of bounded rationality also persists in the market; due to bounded rationality, individual investors cannot take decisions that cover every contingency and, as a result, markets become inefficient (Dietrich et al., 2001). Russel and Torbey (2002) said that individuals have limited capability to process information; therefore, they show systematic bias in information processing, which leads them to make mistakes and, as a result, markets become inefficient. Furthermore, according to Simon (1957), the power of human thinking is limited in a critical time, and so, when solving problems, we cannot process information at our maximum capacity.

According to the limit of arbitrage theory, if "irrational traders cause deviations from fair or fundamental values, then rational traders are powerless to do anything about it" (Shleifer and Vishny, 1997). Behavioural finance indicates that deviations from fair or fundamental values are caused by traders, who are not fully rational (Barberis and Thaler, 2003). This mispricing is evidence of limited arbitrage, which is why the prices of securities change even if their fundamental value does not change. According to Jo and Kim (2008) when "rational and irrational

traders interact, irrationality can have a substantial and long-term impact on prices". Daniel et al. (2001) state that arbitrageurs are risk averse; therefore, they may not be able to correct all systematic mispricing. According to Shleifer and Vishny (1997) and Shleifer (2000), arbitrage opportunity is the basis of EMH but, in a real situation, arbitrage is not only risky but also limited.

A common reason for the disappearance of the EMH is that investors normally do not gather complete information and thus their trading behaviour is based on incomplete data. For example, investors may respond to functioning, selling stock in which they face losses and buying stock in which they face a gain; such a response leads to the price of stock deviating from its fair or fundamental value (Ajmal et al., 2011). Both underreaction and overreaction persist in the market because of trading behaviour, which Fama (1997) described as confirmation that anomalies persist in the market; as a result, the EMH changed. Shah et al. (2012) suggest that market inefficiency exists because the price of securities may not correctly reflect all available information. Some securities may be overvalued or undervalued. The concept of market efficiency is wrong because efficient market theory may lead to totally incorrect interpretation of events, such as a "major stock market bubble" (Shiller, 2003).

3.4.1 Cognitive Heuristic-Driven Biases and Market Efficiency

Many studies have been conducted on cognitive heuristic-driven biases and their effect on market efficiency; some of them found a positive relationship between cognitive biases and market efficiency, which means that market efficiency increased due to cognitive heuristic biases. According to Ko and Huang (2007), irrational behaviour does not always decrease market efficiency. Several authors documented that overconfident investors believe that they can earn abnormally large returns by outperforming the market. Investors that are overconfident can help increase market efficiency because they spend enough time and resources collecting more and more information, which is why prices of securities are close to their fundamental value. Investors use their resources to collect new information; sometimes they underestimate information from others and try to get more and more information on their own behalf (Gruber, 1996; Malkiel, 1995; Elton et al., 1993).

Furthermore, Ko and Huang (2007) found that overconfidence bias improves market efficiency because overconfident investors bring more and more information into the market, so the chance of mispricing is very small as a result of a high level of rationality in the market. Thus, in the studies concluding in favour of overconfidence bias and market efficiency, researchers argue that overconfident investors can help increase market efficiency because they spend time and resources' collecting more and more information and that is why the prices of securities are closer to their fundamental value as a result, the market becomes efficient.

Some researchers disagree with the view that there is positive relationship between cognitive heuristic-driven biases and market efficiency. The previous literature shows that behavioural biases can make financial markets less efficient by mispricing securities, even though there are rational arbitrageurs who bring security prices to their fundamental values (Kyle and Wang, 1997; Odean, 1998). The price of securities does not always hold with their fair value but can deviate from their fundamental value because of traders who are not fully rational (Barberis and Thaler, 2003). Shah et al. (2012) said that, due to heuristic biases and framing effects, the price of securities deviates from their fundamental value and, as a result, markets become inefficient. Hadi (2017) studies the effect of behavioural biases on the market efficiency. The results show that financial markets move toward inefficiency due to behavioural biases i.e., illusion of control bias, and availability bias. Shah, Ahmad, and Mahmood (2018) have explained the impact of

various heuristic biases and their effect on the investor decision-making and market efficiency. The results are in the context of the PSX, and it has proved that when investors use heuristics, they reduce the mental effort in the decision-making process, but that leads to errors in judgment and, as a result, investors make incorrect investment decisions, which could lead to the market becoming inefficient.

According to Malkiel (2003), when investors experience success again and again, they suffer from overconfidence bias and become irrational in their decision-making, which leads to market inefficiency. Hirshleifer et al. (1994) conducted a study in which they found that overconfidence bias can lead to inefficient results. Overconfident investors in the market engage in excessive trading and, therefore, markets become inefficient (Debondt and Thaler, 1995; Statman et al., 2006). A study conducted by Inaishi et al. (2010) to investigate the effect of overconfident investor behaviour on stock markets concluded that, due to increasingly overconfident investors, the market increases or rising trends occur in the market.

Several investors assert that the representativeness heuristic negatively affects market efficiency, as people make probabilistic judgments using it (Tversky & Kahneman, 1973); the "positive feedback hypothesis" states that correct or incorrect information causes respectively positive or negative attitudes, that emphasize the impact of information on an asset's price. One particular form of representative heuristic operates when people over-emphasize their most recent experiences (Clapp & Tirtiroglu, 1994). This representative heuristic affects the market when investors are either over-optimistic due to their past successes, or over-pessimistic due to past losses; subsequently the price of securities deviates from their intrinsic or fair value (Chong et al., 2011) and, as a result, the market becomes inefficient. Individual investors believe that past returns are indicative of future returns (Chen et al., 2007), which reflects representativeness. According to DeBondt and Thaler (1985), over-optimism due to past successes and over-pessimism due to past losses could affect the decision-making of individual investors and subsequently prices deviate from their fundamental levels and the market becomes inefficient.

Tversky and Kahneman (1973) suggest that individuals determine the chances of an event by using the availability heuristic. In their study, they explain that the availability heuristic causes individuals to suffer from "systematic biases," which leads them to overestimate the probability of an event being repeated. People use the availability heuristic in probabilistic situations to avoid risk, which then negatively affects their decision making (Keller et al., 2006) and, as a result, the market becomes inefficient. According to Clark (2014), when individuals "hear dramatically bad news", they tend to overrate the chance of it repeating; this phenomenon is known as the availability heuristic or availability bias. He also explains that the availability bias negatively affects individuals' investment decisions and, as a result, markets become inefficient. Ali, (2019) examine overconfidence and self-attribution and their influence on market efficiency. the results intimated that overconfidence and self-attribution negatively influence the market efficiency.

After reviewing the literature in a similar domain, the author observed that the connection between cognitive heuristic-driven biases and market efficiency appears to be quite controversial. Some researchers concluded that cognitive heuristic-driven biases have no correlation with market efficiency while some a scholars demonstrated a positive relationship between cognitive heuristic-driven biases and market efficiency Some scholars disagree with both above views that cognitive heuristic-driven biases have no relationship and/or have significant positive relationship with market efficiency. Several Scholars arrived at the conclusion that cognitive heuristic-driven biases have significant negative relationship with market efficiency, which means markets become inefficient, when investment strategies rely on fast and frugal cognitive heuristic factors. The

literature highlight that there is still no consensus on the usefulness of the cognitive heuristics in the financial markets. Thus, a lack of consensus about this topic suggests that further studies may bring relevant contributions to the literature.

3.5 Behavioral Finance: History and Foundations

The prime objective of this section is to highlight the historical background and significance of the rapidly growing field of behavioral finance. A detailed discussion regarding the history and foundation of behavioral finance is presented below.

3.5.1 What is Behavioral Finance About?

A very simple approach to understanding the scope and essence of a subject is to study the composition of the term used to describe it. The term 'Behavioral Finance' has two words: Behavior and Finance. Let us look at the meaning of these words separately. Behavior refers to the range of actions and mannerisms used by individuals (or groups of individuals, like a company) in relation to themselves or their environment, which include the other people or groups as well as physical environment. It depicts the manner in which a person, or a group of people, reacts to a given situation, or generally makes a decision, whether consciously or subconsciously.

Several factors influence these reactions, for example psychological, cognitive, social and environmental factors. This at least partly explains why different people make different choices under seemingly similar situations. While the word Finance has several technical meanings, in simpler terms it commonly refers to managing the money. This includes raising money for a purpose, investing surplus money, and generally regulating the inflow and outflow of money to achieve one's chosen objectives. Now if we put the two words (Behavior and Finance) together, we will arrive at a simplistic yet fairly comprehensive meaning of the term Behavioral Finance. The author will try to formally define the subject later in this section, but for the time being let us look at it in a simplified form. It is a field of study that helps us understand how persons, or groups of persons, make choices relating to management of their monetary resources, in order to achieve their preferred objectives.

3.5.2 A Common Misconception

It is commonly believed that people who deal in finance are very sensible people, that is they make their decisions very carefully and rationally. If this assumption were correct, all the investors at any given financial market (e.g., stock exchange) would behave in virtually the same way; the market would almost always be perfect and fluctuations in share prices would be minimal, infrequent, and dependent only on extraordinary events. However, history has shown us that investors do behave irrationally, almost no financial market is ever perfect and share prices fluctuate disproportionately to any given piece of new information. This paradox can only be explained by accepting the fact that investors do not always make rational decisions individually and as a consequence the financial markets (euphemism for all the investors collectively) are seldom close to perfection. A study of Behavioral Finance can help us understand why different individuals (or groups of individuals) react differently to a situation and how financial markets are affected by the differences in decision-making styles of investors. As we will see later in this section, the roots of this influence lie in psychology, sociology, and other similar sciences.

3.5.3 Historical Background of Behavioral Finance

Perhaps the first attempt to connect human behavior with investment decisions was made in a book "Psychology of the Stock Market" by Selden in 1912. This was the first book to claim that movements in share prices are remarkably dependent on the psychological state of mind of the investors. Selden also said that human sentiments have a major influence in the "game of stock market". In 1955 Herbert Simon came out with his models of bounded rationality and 1956 Fessinger presented the concept of cognitive dissonance. A few years later, in 1964, Pratt discussed risk aversion and the utility function. In 1974 Kahneman and Tversky published their paper on "Judgment under uncertainty: heuristics and biases", introducing the concepts of heuristic biases such as anchoring, adjustment, representativeness, and availability. While many present-day researchers think that Kahneman and Tversky's 1973-74 studies were the informal origin of the behavioral finance as a distinct field of study; it is now widely believed that the formal emergence of behavioral finance was also caused by the same pair in 1979 when they published their landmark paper on "Prospect Theory: A Study of Decision-making under Risk". They criticized the expected utility theory of standard finance as a descriptive model of decision making under risk. Their paper offered critiques to the generally accepted models of the standard finance such as rational choice in decision making and expected utility theory - and provided an alternative model in the form of Prospect Theory. Kahneman earned the Nobel Prize in Economics in 2002, principally because of his work in the psychology of decision making and judgment as well as behavioral economics.

Another major breakthrough in behavioral finance came in 1980 when Richard Thaler wrote his article "Towards a Positive theory of Consumer Choice" in which he endorsed Kahneman and Tversky's Prospect Theory as the basis for an "alternative descriptive theory". Thaler asserted that in well-defined situations consumers act irrationally. This behavior is quite inconsistent with the theories of standard finance. He offered different reasons to explain why consumers acts irrationally and why this inconsistency occurs, for example endowment effect, sunk cost effect and regret aversion etc. Later Richard Thaler collaborated with Kahneman and Tversky and the three behavioral scientists are today considered as founding fathers of behavioral finance. Richard Thaler was also awarded the Nobel Prize in Economic Sciences for his contributions in the field of behavioral finance in 2017. In 1985, De Bondt and Thaler published another significant research article "Does the Stock Market Overreact?" which provided empirical evidence on irrationality and inconsistency in investors' decisions. The paper tabulated evidence of investors over-reaction on unexpected and dramatic occurrence of certain events at the stock market. The results of this research were inconsistent with the weak form efficiency as propounded by Fama in 1970 in his Efficient Market Hypothesis. A startling discovery of this study was the evidence that losing stocks earned more than the winners' stocks after certain period. This evidence defied the Capital Assets Pricing Theory. Further developments in the field of behavioral finance came in the form of Shefrin and Statman's Behavioral Asset Pricing Theory in 1994, and Barberis, Shleifer and Vishny's "Investor Sentiment Model for Under-reaction and Over-reaction on Stock Prices", published in 1998.

In 1999, Thaler published a paper entitled "Mental Accounting Matters, in which he defined mental accounting as the set of cognitive operations used by individuals and households to organize, evaluate, and keep track of financial activities". In 2000 Shefrin, and Statman, presented a Behavioral Portfolio Theory. In the same year, Andrei Shleifer published his book "Inefficient Market: An Introduction to Behavioral Finance" that firmly established behavioral

finance as a separate field of finance, an alternate to the standard finance. In this book he criticized

the efficient market hypothesis on the basis of psychological evidence. Then he explained the behavioral finance aspects and the role of arbitrageurs, investors and noise traders in the financial decision making. He showed how psychological factors like agency problems and risk aversion can impose limits on arbitrage. Arbitrage theories were quite opposite to the efficient market theory. In the last section of his book, Shleifer discussed the investors sentiment: how it is built and how it affects the investors' financial decision process. He provided empirical evidence on how price bubbles violate the theory of efficient markets. This book succeeded in replacing the fundamentals of the efficient market hypothesis with Behavioral Finance approach as a more reliable model for understanding the investors actions under different situations.

In summary, the author believes that the birth of present-day Behavioral Finance took place with the book by Selden as it presented the concept of share prices being dependent on psychological framework of investors. Kahneman and Tversky's work on Prospect Theory was also inspirational in offering an alternative to the idea of rational choice and Expected Utility Model. Another major contributor to this field is Thaler who presented successfully demonstrated, with empirical evidence, the impact of psychology on the financial decision-making processes. And lastly Shleifer's book was also a significant contribution to the field of behavioral finance by formally introducing an alternative approach for studying financial markets.

3.5.4 Definitions of Behavioral Finance

In every field of study human nature want to define every concept but the behavioral finance field not relay on a single concept/ definition, indeed scholarly community define behavioral finance formally in their own way. Multiple definition provides multidimensional view helping in understanding the behavioral finance in better ways. It would be helpful if we take a look at various definition of Behavioral Finance that are already available.

- ***Shefrin, 1999***

"Behavioral Finance is the application of psychology to financial behavior – the behavior of investment practitioners"

- ***Fromlet 2001***

"Behavior of investor is a part of behavioral finance, which helps to understand and predict systematic financial market implications of psychological decision processes. Behavioral Finance closely combines individual behavior and market phenomena and uses knowledge taken from both the psychological field and financial theory"

- ***Pompain, 2006***

"Behavioral Finance is the application of psychology to finance"

- ***Forbes 2009***

"Behavioral Finance is defined as a science regarding how psychology influences financial market. This view emphasizes that the individuals are affected by psychological factors like cognitive biases in their decision-making, rather than being rational and wealth maximizing"

- ***Sewell 2010***

"Behavioral Finance is the study of the influence of psychology on the behavior of financial practitioners, both individual and group level, and the subsequent effect on markets - it helps to explain why and how markets might be inefficient"

- ***Zindel, et al., 2014***

"Behavioral Finance is a science that includes the knowledge of cognitive psychology, economics and finance in order to understand the financial decision-making processes"

- ***Author's View***

One thing that clearly emerges from the above definitions is the fact that Behavioral Finance does not aim at explaining how finance practitioners should make their decisions. Instead, its focus is on clarifying why these practitioners make the decisions that they do make. Three points need to be paid attention to here:

- Behavioral Finance aims to study those factors that influence the decision-making thought process of an individual (or group).
- Because different finance practitioners have different psychological mind sets, they end up making different decisions under seemingly similar situations.
- The individual behavior of finance practitioners has a collective effect on the market in which they operate.

Author therefore propose the following definition: "Behavioral Finance is the study of the manner in which various psychological and social factors influence the individual decision-making thought processes of finance practitioners and the collective impact it creates on the conduct of the markets in which they operate." As a field of study, it does not prescribe a particular model which may be superior to others for the purpose of making a financial decision– not does it proffer a cause-and-effect table to encompass all possible reactions to all possible biases arising out of different psychological and social factors.

3.5.5 Types of Behavioral Finance

According to Pompain (2011), a study of Behavioral Finance can be carried out at two distinct levels: Micro and Macro.

3.5.5.1 Behavioral Finance at Micro Level

This is related to the underlying foundations of behavioral biases and mechanisms by which individuals (or bodies) make their financial decisions. While the bulk of existing literature on the subject focuses on how individuals make investment decisions, it is the considered view of the author of this dissertation that Micro Level Behavioral Finance covers all finance related decisions (including investments in financial and/or physical assets, selection of sources of finance, capital structures, etc.) by all finance practitioners. Pompain argued that when discussion is with respect

to Micro behavioral finance, the debate asks: Can emotional and cognitive biases influence financial decisions of individual investors or are they perfectly rational?

Much of financial and economic theory depends on the concept that individuals behave logically and consider all "available information" when making decisions. In scholastic investigations scholars have recognized ample proof of irrational behavior and repeated biases in judgment by experienced human subjects. While we agree with Pompain's assertion, we would like to replace the words "individual investors" with "individual finance practitioners" so as to include all those individuals who are tasked with responsibility of making all sorts of financial decisions, not just investment of surplus funds. Thus, micro behavioral finance study the behavior of individual practitioners, identify their behavioral biases and explore their impact on resource "allocation" choices. Consequently, the effects of those behavioral biases on the investment management activities can be managed.

3.5.5.2 Behavioral Finance at Macro Level

Macro Level Behavioral Finance concerns the study of financial markets and how they are impacted by the decision of individual finance practitioners. According to Pompain, macro behavioral finance detects and defines anomalies in the financial markets. An anomaly is a deviation from the normal situation. Behavioral Finance at Macro level identifies anomalies in the EMH that may be explained by behavioral model. In other words, "macro behavioral finance focuses on explaining how and why markets deviate from what we would term efficient in traditional finance" Schweser (2012). Illiashenko (2017) asserts that "macro behavioral finance" is mostly related to the financial market "anomalies" and the question of financial market efficiency. Thus, macro behavioral finance studies the behavior of capital market, identifies anomalies in the capital market and explores their impact on market efficiency. This study can help all concerned to manage the effects of those anomalies on the market efficiency. Pompain, (2011) argued that when discussion is with respect to Macro behavioral finance the debate asks: "Are markets efficient, or are they subject to behavioral effects"?

According to Fama (1970) and other believers in the fundamental theories of standard finance, markets are almost always efficient meaning that the price of securities holds with fair value, even if some investors do make errors due to biases. In efficient markets, investors are regarded as rational, unbiased, and consistent actors, who make optimal investment decisions, without being affected by their psyches or emotions (Ahmad 2021). Several studies, however, have demonstrated that in reality markets are inefficient, because of individual biases that give rise to anomalies which in turn lead to market inefficiency (Ajmal, Mufti & Shah, 2011). Due to behavioral biases Investors make trading mistakes (Baker and Nofsinger, 2002), which have a significant impact on market prices (Maheran and Muhammad, 2009), resulting inefficient markets.

3.5.6 What is Conventional Finance About?

Statman (1992) argues that "Conventional Finance is the body of knowledge built on the pillars of the arbitrage principles of Miller and Modigliani, the portfolio principles of Markowitz, the capital asset pricing theory of Sharpe, Lintner, and Black, and the option pricing theory of Black, Scholes, and Merton". According to Pompian (2006), traditional finance is based on unreal assumptions and on rules directing how ideal investors should behave in a given situation, not on rules describing how real investors actually behave. Traditional finance explains the financial

behavior of markets using models in which the participants are regarded as purely rational and change their beliefs when they gain new information, making decisions in accordance with the new information. Unfortunately, over time, it was clear that this model could not explain all the market's behavior. According to Barberis and Thaler, (2002) some behavior of markets can be better elucidated using models in which "participants" are regarded as irrational.

3.5.7 Conventional Finance versus Behavioral Finance

Conventional, or standard, finance is prescriptive; it lays down how investors should act on the basis of mathematical models and finance or economic theories. On the other hand, behavioral finance is descriptive in nature; it attempts to explain the observed decision-making process of investors which may lead to a decision that may not be entirely logical or rational. This aspect of financial decision making is not generally explained by conventional finance.

According to standard finance, price of securities equals its "fundamental value" and no conflict exists between a security's price and it fundamental value, based on the assumption that financial players are rational at all times. The fundamental value means intrinsic value, or in accounting terms it is taken to be the "discounted sum of expected future cash flows". Investors have been able to process all available information accurately, and the intrinsic value or discount is in line with acceptable selection criteria. (Barberis and Thaler, 2003). The EMH supports the view that prices reflect fundamental values. According to Behavioral Finance scientists, however, financial markets do not always have "informational efficiency" (Ritter, 2003). Behavioral Finance believes that cognitive and emotional biases exist in the "personality of every individual" that prevent him from making rational decisions. A study of Behavioral Finance therefore plays an important role in financial management as it explains how cognitive psychology can help us understand human behaviors.

The prime difference between conventional finance and behavioral finance lies in the basic assumption of rationality. Under conventional finance it is assumed that all financial decision makers are rational and free of any biases or emotional influences. Hence, if ten different persons were given the same set of information and asked to make a decision, they will all arrive at the same decision. Under behavioral balance, the assumption of rationality is replaced by the assumption that different persons have difference cognitive and emotional biases which influence their respective decisions. If ten different persons were given the same set of information and asked to make a decision, they are most likely to arrive at six or seven different decisions. Behavioral Finance helps us understand why that happens and how cognitive and emotional influences shape a person's final decision. While assumption of rationality allows decision makers to rely on statistical models, assumption of presence of different biases among decision makers makes it necessary to see the final decision in this context.

Conventional finance studies its assumption in idealizes financial behavior on the other hand behavioral finance studies its assumption in observed behavior. In short, we can say that, in conventional finance, people are regarded as rational and working without emotion. But people in behavioral finance are regarded as normal (Statman, 1999); they work with emotions and use their mental ability to achieve or avoid subjective outcomes (Pompain, 2006).

3.5.8 Significance of Behavioral Finance

The author of this paper is essentially against the idea of confining behavioral finance studies to investors at capital market. However, if we take a look at any secondary capital market

(like the PSX), we observe that investors regularly display irrational behaviors: "they purchase stock without looking at its fundamental value, trade excessively, base their decisions on past performance, buy stocks which their friends are buying, and retain loss-making stocks while selling winning stocks" (Shah et al., 2018). Investors frequently make simpler their decision-making processes by using behavioral heuristics, which can cause systematic errors in judgement or lead to apparently satisfactory investment choices, but which do not maximize utility (Kahneman & Tverskey, 1979). The implication of "efficient market hypothesis" is that no one can constantly beat the market and get a superior return over the long period of time. However, there are large number of investment funds that fairly consistently generate large extent of alphas (Yuen, 2012).

Just as conventional finance's reliance on assumption of rationality fails to explain the fluctuations in share prices, it also fails to identify real causes of a large number of other financial decisions. Let's say, if a company were to make a decision on its capital structure purely on rationality grounds, the answer would be to have a capital mix that produces the lowest WACC (weighted average cost of capital). In reality this may not happen at all. Decision will be based on company sponsors' attitude to debt, their views about possible fluctuations in interest rates, their desire to maintain a control over the voting shares, etc. Taking this point further, we see in Pakistan that despite tremendous opportunities of raising finance (and expanding operations) through getting companies listed at the PSX, less than 10% of the public limited companies are listed. Standard finance has no explanation for this state of affairs, behavioral finance does.

As a separate field of study, Behavioral finance has succeeded in attracting the attention of researchers and academicians. Over the last few years, a large number of studies have been made in this area. Earlier studies in Behavioral Finance were generally theoretical in nature but subsequent research has come up with a considerable quantum of empirical evidence to prove the importance of studying Behavioral Finance. Dr. Richard Thaler, a pioneer in behavioral finance, states that "this area of study attempts to clarify and augment comprehension of the reasoning patterns of financial specialists, including the emotional procedures encompassed and the degree to which they influence the decision-making process. Basically, it attempts to clarify what, why, and how of finance and investing, from a human point of view." It can be said that a person who knows and comprehends these behavioral patterns gains ability to evaluate his own capacities, harness his strengthens and tamper his negative emotions in order to arrive at better decisions.

Behavioral finance researchers have developed a good number of theories over the recent past that explore the behavioral patterns of individuals and groups operating in the financial markets, such as prospect theory, mental accounting, heuristics theory, bounded rationality, loss aversion, gambler's fallacy, herd behavior, greed and fear, endowment effect, disposition effect, cognitive framing, disappointment, behavioral portfolio theory, behavioral biases, behavioral asset pricing theory and sunk-cost fallacy etc. Understanding Behavioral Finance enables us to avoid emotion-driven speculation (that may lead to losses) and equips us with a capacity to maintain a balance between rationality and personal preferences. Such a balance can led to development of appropriate financial management strategies.

3.5.9 Behavioral Finance in Asia

Pakistan is an emerging country in Asia. Pakistan's financial markets have many cultural characteristics similar to those of other Asian financial markets. This section provides an overview of behavioural finance in Asia as well as the importance of behavioural finance in the Asian context, particularly in Pakistan.

Asia is known as for its different level of capitalism, and financial experience of its participants, as the different experience and knowledge leads to difference in financial decision making. Due this reason it is interesting platform for studying behavioural finance. Furthermore, Asian people are suffering more in cognitive biases as compared to Western people and individual investors of Asia considered as gamblers (Kim and Nofsinger, 2008). Studies of risk perception conducted by Weber and Hsee (1998) also found that people in Asian cultures are less risk averse and more overconfident than people in Western cultures. Chen et al., (2007) provided additional knowledge about the behavior of Asian people and how their behavior effects the financial decisions; they confirmed that Chinese investors display more overconfidence bias and disposition effect than individual U.S. investors.

Theoretically, social scientists and psychologists believe that inclinations for psychological biases are nurtured by their respective culture, although its impact may differ (Yates et al., 1997). Hofstede (1980) and Kim & Nofsinger (2008) differentiate among cultures with an individualism and collectivism continuum. Asian countries reflect collectivism, and an investor in collectivistic country suffer from overconfidence that leads to psychological biases in decision-making (Luong and Ha 2011). Cultural differences, notably life experience, social values, and education, can influence individual behaviors; thus, it reckoned that inclinations towards psychological biases might vary from culture to culture. Limited literature is available to prove that Asian people often fell prey to behavioural biases than people raised in Western countries (Yates et al., 1997).

Admittedly, there are some literatures regarding the behavioural biases distinction between Western individuals and Asian individuals, but that literature is still quite skimpy. According to Weber and Hsee, (2000) "the bottom line is that the topic of culture and decision making has not received much attention from either decision researchers or cross-cultural psychologists". Shah, Ahmad, and Mahmood, (2018) argue convincingly "most studies focus on well-developed financial markets and very little is known about investors behavior in emerging markets or collectivist-dominated cultures". So, empirical research is necessary to understand the behavioural patterns of investors and to improve their financial stability in context of collectivist-dominated cultures or emerging markets like Pakistan. Kim and Nofsinger, (2008) assert that Asian financial markets are considered as largest financial markets as compared to others financial markets of the world and there is some evidence – anecdotic, empirical, and theoretical – that Asians fell prey from psychological biases on a different level in comparison to individuals of other cultures. Thus, Asian financial markets could be a fertile testing ground for behavioural finance scholars.

Thaler (1999) had a wish, to conduct research on behavioural finance in future. He wished to conduct behavioural finance research on corporate finance. Kim and Nofsinger (2008) also had a wish, to conduct more behavioural finance research on Asian financial markets. As the gaps analysis suggesting that investment heuristics and their effect on investment management and market efficiency are highly demanded areas, needed to be explored in the field of behavioural finance in the context of emerging countries.

4. Research gaps in the existing literature

The research articles, with a particular emphasis on the behavioral finance paradigm, has been evaluated by the authors to identify areas where there are significant gaps. Below is a brief review of prior research on the behavioral finance paradigm and the considerable gaps that have been identified.

Early research by Oprean (2014) studies the irrational and rational behavior of investors in the financial markets. The investigation recognizes the existence of confidence, optimism,

pessimism, and the rationale of Romanian and Brazilian investors. The results of the study confirm that investors behave irrationally in stock markets. He suggested further studies should explore more factors which could lead investors to behave irrationally and how these irrational behaviors exist in different economic circumstances in various countries. A study by Kumar and Goyal (2015) systematically reviewed quantitative investigations into investment decisions from around three-and-a-half decades prior to 2015 to find areas for future research in behavioural finance. Based on the existing literature, they recommended further studies concentrating on the following.

a) Further studies can be performed focusing on emerging stock markets, as there is limited research in developing economies in this field.
b) Further studies should use primary data-based empirical research to investigate investors' behavior while making investment decisions, as the vast majority of the studies have used secondary data-based empirical research which does not depict the actual behavior of individual and institutional investors.
c) Further studies can be performed to investigate herding in investment decision making, as there is a lack of empirical research on people who display herd behavior.
d) Further research can be directed by comparing different types of investors, such as individual and institutional (investment advisors, pension funds, mutual funds, hedge funds, etc.) investors, to discover how their behaviors differ and the impact of behavioral biases in their financial decisions.

Kumar and Goyal (2016) investigate the influence of behavioral factors on the rational decision making of investors in the financial markets. The study recognizes that Indian investors are susceptible to the disposition effect and overconfidence. The results of the study confirm that rational decision making has a statistically significant association with psychological fundamentals, i.e., behavioral biases. The results of the study indicate that rational decision-making is a time-varying phenomenon. Investors start by following a rational decision-making process. However, psychological factors emerge at different times when decisions are being made, causing investors to behave irrationally. They suggested further studies can be performed by considering more psychological biases in various economic conditions and interrelationships between various behavioral biases could also be investigated. Jaiyeoba and Haron (2016) studied the investment behavior of retail investors in Malaysia, using a qualitative research method. They showed that retail investors' decisions depend on feelings of comfort or convention, rather than quantitative analysis. They recommended further research using a mixed-methods approach to study investors' behavior when they make decisions.

Kumari and Sar (2017) studied the impact of herd behavior bias, overconfidence biases, and risk tolerance bias on the performance of Indian investors. Results with a sample of 106 investors show that herd behavior bias, overconfidence biases, and risk tolerance bias affects investment performance. The further research can be conducted, including additional biases to learn their effect on investment performance. Ahmad, Ibrahim, and Tuyon (2017) systematically reviewed quantitative research to synthesize the empirical evidence on the effects of psychological factors on institutional investors at work and to find gaps for future research in behavioral finance. The findings of their study reveal that, in behavioral finance research, the theoretical underpinning of the irrational behavior of investors has been neglected. Behavioral heuristics and biases are dynamic and complex. Sympathetic behavioral biases, foundation, causes, and end results require interdisciplinary viewpoints from the fields of biology, psychology, and sociology. Based on the

syntheses of theory and empirical evidence, they recommended further studies be conducted focusing on the following.

a) To explores the possible effects of cognitive heuristics, i.e., anchoring, availability, confirmation, disposition effect, gambler's fallacy, hot hand fallacy, overconfidence, and representativeness, etc. and effective biases (mood, emotion, and sentiment), on investment decision making and performance.
b) To test whether institutional traits, cultural traits, and individual traits moderate the relationship between cognitive heuristics and investment decision-making.
c) To test whether institutional traits, cultural traits, and individual traits moderate the relationship between affective biases and investment decision-making.
d) Further research can be directed by considering the differences between individual and institutional investors, to identify the heterogeneity of human behaviors.
e) The best approach to understand investors' behavior is to study their financial decisions through controlled experiments, observations, and detailed interviews. The literature is deficient with regards to research about in these perspectives in finance.

The paper by ul Abdin, Farooq, Sultana, and Farooq (2017) seeks to highlight the effect of certain heuristics, i.e., representativeness, availability, overconfidence, and anchoring, on the decisions and performance of individual investors with the mediating role of fundamental anomalies and technical anomalies. The results of the study suggested only fundamental anomalies mediate the relationship between heuristics and investment performance. Psychologically, this all means that heuristics are the cause of fundamental anomalies. Overall results indicate heuristics are the cause of stock market anomalies, resulting in irrational decisions that affect investment performance. According to them, further research can be carried out:

a) By including additional biases, like the illusion of knowledge, illusion of control, conservatism, and gambler fallacy, in the study.
b) By exploring the effect of heuristics, i.e., representativeness, availability, overconfidence, and anchoring, on the investment decisions and performance of institutional investors with the mediating role of fundamental anomalies and technical anomalies and
c) These factors can be studied by taking moderator variables.

The paper by Shah et al., (2018) explores the possible effects of heuristic biases on investment decision making of individual investors and market efficiency. The results of their study suggest that cognitive heuristics, i.e., overconfidence, representativeness, availability, and anchoring, have a significant negative effect on market efficiency and investment decision-making of individual investors. They suggested further research can be carried out by including mediator and moderator variables in the study, to better understand the impact of psychological factors on investment-related choices and market efficiency. The studies also further tested to find the impact of heuristics on both short-term and long-term investments. The effect of heuristics, namely availability, and representativeness, on investment decision making with the moderating role of locus of control has been studied by Rasheed Rafique Zahid and Akhtar (2018). Their results conclude that both these heuristics cause investors to deviate significantly from rational decision making, while the locus of control has no significant moderating effect. They recommended the study be further extended by including all relevant heuristics in the model.

A qualitative approach was employed by Jaiyeoba, Adewale, Haron, and Ismail (2018) to understand behavioral biases and their influence on the investment decisions of individual and institutional investors trading at the Malaysian stock exchange. And, to identify how to mitigate the effect of emotion, behavioral biases, sentiments, and challenges faced by investors while

making decisions. The results revealed that Malaysian individual and institutional investors suffer from psychological biases. Furthermore, the findings exhibited that individual investors are likely to be more influenced by the emotions and psychological biases than institutional investors. They also highlighted that institutional investors can mitigate the impact of psychological biases and emotions by maintaining self-discipline, talking about investment intentions in meetings of the board of trustees, following guiding principles of investment, before investing or putting resources in a company to seek information relevant to the company to know their business activities and receive investment advice from the investment team and occasionally from other portfolio managers. Moreover, individual investors can minimize the influence of emotions and psychological biases by reading newspapers, magazines, seeking investment advice from financial strategist/advisor's reports, family members, friends, traders in the stock market, online forums, and online search. They recommended further studies used a mixed-methods approach to clearly understand this phenomenon.

Chaudary (2019) explored the effect of the "salience heuristic" on both short-term and long-term investment decisions and determined whether it influences both individual and institutional investors equally. The results demonstrate that the salience heuristic has a significant positive influence on investment decisions, both in the short and long run. Furthermore, individual investors suffer more from the salience heuristic than institutional investors, specifically for short-run investment choices. She suggested further studies could include other heuristic-driven biases that may affect both short- and long-term investment decisions. Jaiyeoba, Abdullah, & Ibrahim (2020) studied the investment behavior of Malaysian individuals and institutional investors in an attempt to determine whether behavioral biases influence these groups of investors equally. Their results indicate that institutional and individual investors are equally influenced by psychological biases, i.e., anchoring bias, overconfidence bias, and representativeness heuristic, and differently influenced by herding bias and religious bias. They suggested that further study can be performed to find additional psychological biases and their impact on the decisions of individual and institutional investors, and to illustrate the differential effect of these behavioral biases in their financial behavior.

The effect of overconfidence on individual investors' decisions and performance, with the mediating role of risk perception and the moderating role of financial literacy, was studied by Ahmad and Shah (2021). They conclude that risk perception fully mediates the relationships between overconfidence and investment decisions and performance. At the same time, financial literacy appears to moderate these relationships. The results suggest that overconfidence can impair the quality of investment decisions and performance, while financial literacy and risk perception can improve their quality. According to them, the research can be extended by including additional biases like alphabetical ordering, name memorability, and name fluence, because only limited research has been carried out on these name-based heuristics among investors. Furthermore, they suggested applying behavioral finance theories to study other behavioral factors, which influence the decisions of individual investors and significantly affect their performance, as mediated by risk perception, and moderated by financial literacy. Other mediating variables studied could include fundamental and technical anomalies. A study covering data from three different markets, such as a developed country, a developing country, and a not so developed economy, might also be helpful. Such a comparative study could be a meaningful addition to the literature on behavioral finance.

Ahmad (2021) explored the mechanism by which the underconfidence heuristic-driven bias influences short-term and long-term investment decisions of individual investors, actively trading

on the PSX. The results of this study suggest that the underconfidence bias has a markedly negative influence on both types of decision made by investors in developing markets. The researcher suggests exploring other heuristic-driven biases that may influence both short-term and long-term investment decisions, also considering fundamental and technical anomalies as a mediator and financial literacy as a moderator variable to clearly understand how psychological factors affect investment-related choices. Indeed, future work should explore whether institutional and individual investors are equally affected by behavioral biases that occur as a result of cognitive heuristics (i.e., herding, availability, representativeness, overconfidence and anchoring, etc.). Furthermore, it may also be helpful if a study was carried out that used a mixed-methods approach to clearly understand heuristic-driven biases and their effect on investment management activities. As well as identifying the factors causing an increased use of heuristics by investors, it could suggest how to overcome the negative effects of heuristic-driven biases and how they might be utilized positively in investment strategies. Khan, Afeef, Jan, and Ihsan (2021) explored the influence of heuristic biases, notably representativeness bias and availability bias, on investment decisions of individual investors trading at the PSX with moderating role of long-term orientation. The study revealed that availability and representativeness biases have a significant beneficial impact on the investment decisions of investors and long-term orientation appears to moderate the relationship between representativeness bias and investment decisions of investors. They suggested further studies could include other behavioral biases namely disposition effect, herding and overconfidence that may affect investment decisions of investors with moderating role of long-term orientation. Other moderating variables studied could include uncertainty avoidance and masculinity.

Recognizing the importance of investment heuristics and their effect in investment management activities, a multinational research firm "Hillcrest asset management" called special issues on a regular basis from 2014 to 2018 on the topic of "The impact investment heuristics can have on rational asset selection and practical approaches to overcoming them". This shows the importance and interest of finance practitioners toward exploring how investment heuristics influence investment management activities.

Hence many researchers from the scholarly community, like Kumar and Goyal (2016), Kumari and Sar (2017), Ahmad, Ibrahim, and Tuyon (2017), ul Abdin, Farooq, Sultana, and Farooq (2017), Shah et al., (2018), Rasheed, Rafique, Zahid and Akhtar (2018), Chaudary (2019), Jaiyeoba, Abdullah, & Ibrahim (2020), Ahmad and Shah (2021), Khan, Afeef, Jan, and Ihsan (2021), Ahmad, (2021), have suggested that it is important to explore cognitive heuristic biases which influence market efficiency, investment decisions and performance of investors, and to consider mediating and moderating variables in order to clearly understand how heuristic factors affect investment related choices and market efficiency, particularly in an emerging economy. Many highly reputable journals like Management Decision, International Journal of Emerging Market, Review of Behavioral Finance, Studies in Economics, sustainability and Finance, Qualitative Research in Financial Markets, etc. call for papers for special issues on behavioral finance, including topics relating to heuristics, anomalies in the financial market, investors' behavior and sentiments and investors' judgment and decision making, etc., as well as the institutional investment management firm "Hillcrest Asset Management" as mentioned above.

Thus, both research scholars from the behavioral finance community and institutional finance practitioners have highlighted that investment heuristics and their effect on investment management activities and market efficiency are high profile areas, needed to be explored further in the field of behavioural finance. To fill this gap in the current body of literature on behavioral

finance in this part of the globe, future research studies explore and clarifies the mechanism by which heuristic-driven biases influences investment management activities and market efficiency. Also Discuss a practical approach to overcoming the negative effects of heuristic factors so that finance practitioners can avoid repeating the expensive mistakes that happen as a consequence of heuristic-driven biases, as well as discussing how heuristic factors can be positively utilized in investment management activities. Furthermore, on the basis of the gaps analysis, three major categories of gaps, namely theoretical and methodological gaps and contextual gaps are found, which need to be studied in the area of behavioural finance and discussed in greater detail in the following sections.

4.1 Theoretical Gaps

After reviewing the literature in similar domain, the authors concluded that many studies have examined the relationship between cognitive/psychological biases and investment decisions, investment performance, and market efficiency, but there is still a gap to explore the direct relationship between them because limited research has been carried out on heuristic-driven biases used by investors. As Itzkowitz and Itzkowitz (2017) have suggested, further studies are needed to explore investors' use of heuristics. Also, as Ahmad, Ibrahim and Tuyon (2017) reported in their systematic review of the psychological biases of institutional investors in investment management activities, research can be conducted which explores the effect of cognitive heuristics, i.e., anchoring, availability, confirmation, disposition effect, gambler's fallacy, mental accounting, overconfidence, and representativeness, etc., on investment decision-making and investment performance of investors.

Moreover, ul Abdin et al. (2017) studied heuristic factors like overconfidence bias, representativeness bias, availability bias, and anchoring bias affecting the investment decisions and performance of individual investors. According to them, further studies can be conducted including additional heuristic factors like the illusion of knowledge, illusion of control, conservatism, and gambler fallacy in the research. Hadi (2017) studied the impact of representativeness, availability, and the illusion of control bias on perceived market efficiency. According to him, further studies can be performed to find additional biases and their impact on the investors' decisions and perceived market efficiency. Research by Shah et al., (2018) suggests that it is important to explore heuristics biases that influence the market efficiency and investment decisions of investors, particularly in a developing economy like Pakistan. Another, later, study by Ahmad and Shah (2021) has recommended exploring the impact of heuristics on investors' decisions and performance, because limited research has been carried out on investment heuristics among investors. Similarly, the research work by Khan, Afeef, Jan, and Ihsan (2021) have suggested further studies could include other behavioral biases namely disposition effect, herding and overconfidence.

So, first, we hope in future work to quantify a comprehensive theoretical and empirical analysis exploring the influence of cognitive heuristic-driven biases on investment decision making, investment performance and market efficiency. In this context, future research should incorporate nine components of cognitive heuristics: the gambler's fallacy, mental accounting, disposition effect, herding, availability, representativeness, underconfidence, overconfidence, anchoring and treats them independently to evaluate their differential impact on investment decision-making, investment performance and market efficiency because limited research has been carried out on these heuristic-driven biases among investors. Understanding the distinctions between these components will help investors comprehend their stock selection behavior and make

better investment decisions (ul Abdin et al., 2017), which could lead to the market becoming more efficient. Another reason for choosing these heuristics factors is that the impact of these heuristics is not limited to laymen but have been shown to affect experienced investors. According to Rasheed et al. (2018), it is not surprising that investors use heuristics in making decisions, but it is curious that experienced investors do not use their knowledge and experience when applying basic statistical principles to making rational decisions, and instead use heuristics to make their decisions. Their mentality is such that they are not willing to acknowledge rational analysis, but use psychological biases, which result in sub-optimal decisions (Moser, 1989).

The empirical literature also suggests new mediators and moderators need to be introduced to understand clearly how heuristic factors affect investment-related choices, investment performance and market efficiency. Contingency theory holds that bivariate relationships are not linear but depend on the level of a third variable (Rosenberg, 1968), such as a moderator variable or a mediator variable, which is why introducing moderators and mediators into bivariate relationships is important. The research work by Shah, Ahmad, and Mahmood (2018) suggests that it is important to explore heuristic biases which influence the investment decisions of investors, and to consider mediator and moderator variables to clearly understand how psychological factors affect investment related choices and market efficiency, particularly in a developing economy like Pakistan. Ul Abdin et al., (2017) argue convincingly that while many studies have examined the direct relationship between heuristic biases, investment decisions and performance, they have paid less consideration to the underlying mechanism through which these relationships and effects flow. The latest work by Ahmad and Shah (2021) recommends exploring the heuristic biases which influence the decisions of individual and have a significant effect on their performance, as mediated by risk perception, and moderated by financial literacy. They suggest that fundamental and technical anomalies might also be used as mediating variables. Ahmad (2021) also argues convincingly for considering fundamental and technical anomalies as a mediator and financial literacy as a moderator variable to clearly understand how psychological factors affect investment-related choices.

Hence, second, the future research studies will carry out a comprehensive theoretical and empirical evaluation of the mediating role of fundamental and technical anomalies in the relationship between cognitive heuristic-driven biases and investment management activities (investment decision-making, investment performance) and between cognitive heuristic-driven biases and marker efficiency. Other mediating variable studied could include risk perception. The mediation analysis should be considered in order to better comprehend the complexities of the relationship between heuristic-driven biases, investment decision-making, investment performance, and market efficiency. Farooq et al. (2017) described how, by investigating mediation mechanisms, we can better understand the processes, address the question of causality (Peloza, 2009), and demonstrate the nature of the relationship between heuristics and investment performance (ul Abdin et al., 2017), investment decisions and market efficiency. Understanding those mechanisms also provides the level of detail required by an investor who trades on a stock exchange, a portfolio manager, a financial planner, a financial strategist/advisor in an investment firm, a trader/broker at a stock exchange, an investment banker, or a financial analyst, as well as all those who manage corporate entities and are responsible for making its financial decisions; it enhances the pragmatic applications/implications of research (Peloza, 2009) and enables finance practitioners to better manage their investment activities (ul Abdin et al., 2017).

Third, the future research studies will exploring the moderating effect of financial literacy on the relationships between cognitive heuristic-driven biases and investment management

activities (investment decision-making, investment performance) and between cognitive heuristic-driven biases and marker efficiency. Other moderating variables studied could include locus of control, long-term orientation. Understanding moderation mechanisms enhances practical applications of the research, enabling finance practitioners to improve their investment management activities. Several studies have demonstrated the role of financial literacy, known as being financially knowledgeable, on financial behavior (Dinç, Aydemir, & Aren, 2017). These examinations have discovered the positive effects of financial literacy on a variety of financial behaviors (Aren & Aydemir, 2014). In addition, earlier research focused on its direct impact, but limited research has been carried out on the indirect effects. In *the future* studies, the authors consider indirect effects, in that financial literacy, as a moderator variable, may change the relationships between heuristic-driven biases and investment management activities (investment decision-making, investment performance) and between heuristic-driven biases and market efficiency. In this way, we would learn whether and how heuristic factors interact with financial knowledge in influencing investment decision-making, investment performance, and market efficiency.

Most previous studies relating to the behavioral finance paradigm focus on individual investors or institutional investors as a unit of analysis and, therefore, empirical research is necessary to considered both individual and institutional investors as a unit of analysis in order to discover the differences in their behavior and the impact of cognitive heuristic-driven biases on their financial decision-making and performance. According to Itzkowitz and Itzkowitz (2017) all investors are not the same; institutional investors have a greater variety of trading experiences and more training than individual investors and, as a result, cognitive heuristic-driven biases may not influence all investors equally. Many behavioral finance scholars (e.g., Kumar and Goyal 2015; Ahmad, Ibrahim and Tuyon 2017; and Jaiyeoba, Abdullah, & Ibrahim, 2020, Ahmad, 2021) strongly recommended that further research should focus on different types of investors, such as individual and intuitional investors, to identify the heterogeneity and homogeneity of their behavior and to exemplify the differential effect of cognitive heuristic-driven biases in their financial behavior. *Therefore, fourth, further research can be directed by comparing different types of investors, such as individual and institutional (investment advisors, pension funds, mutual funds, hedge funds, etc.) investors, to discover how their behaviours differ and explore which type of investors are less affected by heuristic-driven biases.*

Furthermore, the majority of studies, with one identifiable exception, have just explained the investment decision-making of investors as a whole and have not tested the relationship of heuristics biases on both short-term and long-term investments. It has been noted that heuristics may be quite useful but can sometimes lead to systematic errors or errors in prediction or estimation (Tversky & Kahneman, 1974). Consequently, empirical research is necessary to understand whether and how heuristic factors are beneficial or harmful to both long-term and short-term investment decision-making. Shah et al. (2018), Chaudary (2019) and Ahmad 2021 suggested further that a study can be performed to find the impact of heuristic-driven biases on both long-term and short-term investment decision-making. *Thus, fifth, the future research studies will be exploring and clarify the mechanism by which heuristic-driven biases influence both long-term and short-term investment decisions. In this way, we would know whether and how heuristics are influencing both short-term and long-term investment decisions.*

4.2 Methodological Gap

Zahera and Bansal (2018) systematically reviewed studies on investment decisions to identify gaps for future research in behavioral finance. Their investigation found that correlation analysis, chi-square test, regression analysis, t-statistics, analysis of variance (ANOVA), structural equation modeling, simulation, Mann–Whitney U-test, and multiple techniques are the common analysis tools used in this area of study (Kumar & Goyal, 2015). Looking at the rationale behind the studies reviewed by Zahera and Bansal (2018) and Kumar and Goyal (2015), we can conclude that this research has exhibited both theoretical and practical benefits. However, none of them have employed a mixed methods approach to discover how the influence of behavioral biases is mitigated by investors, despite the growing consensus that a mixed methods approach could lead to a better understanding of how investment decisions are made, and the influence of behavioral biases are mitigated.

As Jaiyeoba and Haron (2016) recommended, further studies should preferably use a mixed-methods approach in this area of study. Similarly, Ahmad (2021) also recommended further studies use a mixed-methods approach to clearly understand heuristic-driven biases and their effect on investment management activities, as well as to identify the factors causing an increased use of heuristics by investors, how to overcome the negative effects of heuristic-driven biases, and how they can be positively utilized in investment strategies. *Considering this limitation, the authors recommended that the future research studies employ mixed methods (i.e., sequential explanatory design and/or sequential exploratory design) to investigate the role of heuristic-driven biases, in investment related choices of investors (individuals and institutional) and market efficiency, to better acknowledge and familiarize readers with this area of study, other important aspects of investment decisions, investment performance, and market efficiency.*

4.3 Contextual Gap

As the area of behavioral finance is relatively new, the majority of empirical research studies (Kudryavtsev 2018; Barber and Odean, 2001; Barber and Odean, 2000; Odean, 1999; Daniel et al., 1998; Grinblatt et al., 1995 and others) have been carried out in developed economies, especially in the USA, UK, and Europe, to obtain a strong understanding of investors' behavior (Zahera & Bansal, 2018). The reason behind this could be that, in developing nations, markets are emerging which have low growth potential. In the past decade, the scholarly community in emerging markets is making efforts to work in this domain (Nga & Yien, 2013). According to Kumar and Goyal (2015), after globalization, emerging and developing economies have higher development potential and investors (institutional and individuals) are more prone to invest in the share market, which leaves a wide field for future research. Thus, future research will focus on emerging stock markets, as there is limited research in emerging and developing economies in this field. According to Zahera and Bansal (2018), the economy of developing nations is as yet progressing; there is a lack of studies of investor behavior, the variety of investment patterns, and how behavioral elements impact the pricing.

The research by Shah et al. (2018) asserts that "most studies concentrate on individualistic cultures and well-developed financial markets, and very little is known about the profiles, inspirations, and behavior of investors in collectivist cultures and less developed markets". The latest research by Ahmad (2021) also highlights the lack of research regarding heuristic-driven biases and their effect on investment management activities in the context of emerging economies like Pakistan. Hence future research studies can focus on emerging stock markets because emerging markets contain more conditions of uncertainty when compared with the developed markets. The uncertainty prevails in the form of more sparse informational environments, fewer

analysts following, reduced accounting disclosure, and the like. In such a context, fast and frugal reasoning works better, which needs to be studied further. *Thus, the future research studies will fill this vacuum in the literature by considering how investors' behavior is influenced by psychological factors, how investor behavior influences markets, and how markets become inefficient in collectivist societies, particularly in an emerging country like Pakistan.*

5. Conclusion

The primary aim of this study was to examine the impact of cognitive heuristic-driven biases on investment management activities and market efficiency, as well as to investigate why investors' behavior deviates from rationality and markets become inefficient. A systematic literature review approach was used to understand the role that cognitive heuristic plays in investment management activities and market efficiency. This study has presented a detailed analysis of topics from 176 papers published between 1970 and 2021, and it has done it in a systematic manner. There is substantial literature on investors who are thought to make irrational decisions with the effect of various financial behavioural tendencies, which adversely affect their investment performance and lead to the market becoming inefficient.

The studies indicate that investors often use cognitive heuristics to reduce the risk of losses in uncertain situations but that leads to errors in judgment; as a result, investors make irrational decisions, which may cause the market to overreact or underreact – in both situations the market becomes inefficient. Most investors consistently rely on cognitive heuristic-driven biases, i.e., gambler's fallacy, mental accounting, disposition effect, herding, availability, representativeness, underconfidence, overconfidence, anchoring, when trading stocks, resulting in irrational decisions. Due to these behavioural heuristics, investors underestimate downside risk, make inadequate or risky investments and trade excessively, which can have a detrimental effect on their returns and market efficiency. The author has also identified that cognitive heuristics can also lead to underinvestment behaviors because investors who are suffering from cognitive heuristic-driven biases sometimes overestimate the downside risk; as a result, generating low trading volume, which harms investment performance and market efficiency. In overall, the literature demonstrates that there is currently no consensus on the usefulness of cognitive heuristics in the context of investment management activities and market efficiency. Therefore, a lack of consensus about this topic suggests that further studies may bring relevant contributions to the literature.

Many scholars in financial economics argue that cognitive heuristics can influence financial decision-making and forecasting financial variables, such as earnings or material profit (Abarbanell and Bernard, 1992; Klein, 1990; Debondt and Thaler, 1990), as well as influencing financial markets' behavior (Debondt and Thaler, 1985). Standard finance does not demonstrate these patterns satisfactorily; they normally hurt the investor's portfolio performance. But behavioural finance provides a satisfactory demonstration and understanding of why investors trade, how they choose their portfolios and how they perform (Subrahmanyam, 2008). Behavioural finance is the study of the manner in which various psychological and social factors influence the individual decision-making thought processes of finance practitioners and the collective impact it creates on the conduct of the markets in which they operate. As a field of study, it does not prescribe a particular model which may be superior to others for the purpose of making a financial decision – not does it proffer a cause-and-effect table to encompass all possible reactions to all possible biases arising out of different psychological and social factors. Behavioural finance's importance stems from the fact that it enables us to enrich our understanding of the financial market by including the human elements into it. It illustrates the investing pattern of investors, notably

those who exhibit underreaction in the short run and overreaction in the long run. It could present a model of integration of principles of psychology and economics. Understanding of behavioral finance enables us to avoid emotion-driven speculation (that may lead to losses) and equips us with a capacity to maintain a balance between rationality and personal preferences. Such a balance can led to development of appropriate financial management strategies.

5.2 Contributions to the field of behavioral finance

Thus, it makes a few contributions to the behavioural finance paradigm. First, the present study contributes toward the understanding of the role that is played by cognitive heuristic-driven biases in investment management activities and market efficiency utilizing research synthesis approach. The current research provides an explanation about how and why investors' behaviour deviates from rationality and markets become inefficient. Second, it provides awareness and understanding of origins and foundations of behavioural finance, and how this has grown substantially to become an established and particular subject of study in its own right. It's probably one of the pioneering studies in the literature extensively reviewed and collected nine cognitive heuristic-driven biases and discusses the history and foundations of behavioural finance into a single article. Third, it provides a financial practitioners' foundation for advancing knowledge related to an in-depth review of the historical development of behavioural finance as a distinct field of study. By contrast to traditional finance theories, this article has explained behavioural finance in detail and provided a summary of the vast amount of literature published in the field of behavioural finance. Fourth, some prospective areas can be identified where the research can be conducted in the future. Based on the gaps analysis, three major categories of gaps, namely theoretical and methodological gaps, and contextual gaps, are found, which need to be studied in the area of behavioural finance and discussed in greater detail in the 4.3 sections. It's also probably one of the pioneering efforts in the study concerning uncovers areas where research is needed.

5.2 Practical Implications

In addition to the above theoretical contributions, the findings of this research have also generated important policy implications for finance practitioners' such as investor who plays at the stock exchange, a financial strategist/advisor in an investment firm, a portfolio manager, a financial planner, an investment banker, a trader/ broker at the stock exchange, or a financial analyst. But most importantly, the term also includes all those persons who manage corporate entities and are responsible for making its financial decisions. For instance, the findings of the present research suggest that finance practitioners' should not rely on cognitive heuristic-driven biases while making decisions related to investment management activities, but conduct a proper analysis of investment opportunities, develop quantitative investment criteria and establish investment objectives and constraints, base decisions on their financial capability and experience levels instead of making investment decisions by using cognitive heuristic-driven biases and sentiments, to make better investment decisions, and move towards appropriate investment opportunities. It provides awareness and understanding of cognitive heuristic-driven biases in investment management activities and perceived market efficiency, which could be very useful for investors when making investments in the stock market.

To mitigate the detrimental impact of cognitive heuristic-driven biases and to understand how it can be positively utilized in investment management activities, finance practitioners should follow guiding principles provided by different researchers. Consider the work of Otuteye and

Siddiquee (2015), who asserts that one way to reduce the likelihood of falling prey to cognitive heuristic-driven biases is to stipulate the algorithm for investment management activities in advance and to execute it dispassionately. They also demonstrated that disciplined application of heuristics in investing strategies would help to avoid the common pitfalls of cognitive heuristic biases. According to Ahmad and Shah (2021) financial knowledge plays a key role in combatting the detrimental effects of cognitive heuristic-driven biases. If investors utilized heuristics in conjunction with financial knowledge, the adverse effects of heuristic elements would be reduced; consequently, an investor would be able to make better use of heuristics in their investment management activities. Gigerenzer, and Gaissmaier (2011) argue convincingly; heuristics can be more accurate than progressively complex techniques, although they analyse less information. They also contend that a heuristic is not irrational or rational, bad, or good; the structure of the environment determines its accuracy. With adequate experience, individuals learn how to choose appropriate heuristics from their adaptive toolkit.

Jaiyeoba and colleagues (2018) revealed that institutional investors could mitigate the impact of psychological biases and emotions by undertaking self-discipline, following guiding principles of investment, discussing investment intentions with the board of trustees, seeking relevant information about a company to understand their business activities before investing or putting resources in a company, and receive investment advice from the investment team and occasionally from other portfolio managers. Moreover, individual investors can mitigate the impact of emotions and psychological biases if desired by reading newspapers and magazines, seeking investment advice from financial strategists/reports, advisor's family members, friends, traders in the stock market, as well as participating in online forums and conducting online searches. According to the findings of Anandarajan et al. (2008), experience reduces the probability of inadvertent consequences of cognitive heuristic-driven biases.

This study suggests that investors select better investment tools and avoid repeating the expensive errors that occur due to cognitive heuristic-driven biases. They can improve their performance by recognizing their biases and errors of judgment, to which we are all prone, resulting in a more efficient market. The study also aims to facilitate financial advisors in gaining a better understanding of their customers' psychology. It helps them in devising a behaviourally modified portfolio, which best suits their customers' inclination. It assists investment bankers in understanding market emotions because these sentiments create public issues for their companies. It helps the financial strategists to make better forecasts; and aids security analysts in formulating efficient stock recommendations. This paper is useful to researchers, academicians, policymakers, and those working in the area of behavioural finance in understanding the role that cognitive heuristic plays in investment management activities and market efficiency and is beneficial for new researchers who want to understand behavioural finance as a separate discipline

References

Ackert, L., & Deaves, R. (2009). *Behavioral finance: Psychology, decision-making, and markets*: Cengage Learning.

Adielyani, D., & Mawardi, W. (2020). The Influence of Overconfidence, Herding Behavior, and Risk Tolerance on Stock Investment Decisions: The Empirical Study of Millennial Investors in Semarang City. Jurnal Maksipreneur: Manajemen, Koperasi, dan Entrepreneurship, 10(1), 89-101.

Afi, H. (2017). An examination of the relationship between the disposition effect and stock return, volatility, and trading volume: the evidence in US stock markets. International Journal of Managerial and Financial Accounting, 9(3), 242-262.

Afriani, D., & Halmawati, H. (2019). Pengaruh Cognitive Dissonance Bias, Overconfidence Bias Dan Herding Bias Terhadap Pengambilan Keputusan Investasi. Jurnal Eksplorasi Akuntansi, 1(4), 1650-1665.

Aguila, N.D. (2009),"Behavioral finance: from market anomalies and psychological factors", Journal of Revista de Instituciones, Ideasy Mercados, Vol. 5, pp. 47-104.

Ahmad, M. (2021), "Does underconfidence matter in short-term and long-term investment decisions? Evidence from an emerging market", Management Decision, Vol. 59 No. 3, pp. 692-709. https://doi.org/10.1108/MD-07-2019-0972

Ahmad, M. (2021), "The role of recognition-based heuristics in investment management activities: are expert investors immune? – A systematic literature review", Qualitative Research in Financial Markets, Vol. ahead-of-print No. ahead-of-print. https://doi.org/10.1108/QRFM-07-2021-0109

Ahmad, M. and Shah, S.Z.A. (2021), "Overconfidence heuristic-driven bias in investment decision-making and performance: mediating effects of risk perception and moderating effects of financial literacy", Journal of Economic and Administrative Sciences, Vol. ahead-of-print No. ahead-of-print. https://doi.org/10.1108/JEAS-07-2020-0116

Ahmad, Z., Ibrahim, H. and Tuyon, J. (2017), "Institutional investor behavioral biases: syntheses of theory and evidence", Management Research Review, Vol. 40 No. 5, pp. 578-603. https://doi.org/10.1108/MRR-04-2016-0091

Ajmal, S., Mufti, M. and Shah, Z.A. (2011), "Impact of illusion of control on perceived efficiency in pakistani financial markets", Abasyn Journal of Social Sciences, Vol. 5 No. 2, pp. 100-110.

Akhtar, F. and Das, N. (2020), "Investor personality and investment performance: from the perspective of psychological traits", Qualitative Research in Financial Markets, Vol. 12 No. 3, pp. 333-352. https://doi.org/10.1108/QRFM-11-2018-0116

Ali, W. (2019). The Impact Of Self-attribution Bias and Overconfidence Bias on Perceived Market Efficiency. Available at SSRN 3417271.

Alrabadi, D. W. H., Al-Abdallah, S. Y., & Aljarayesh, N. I. A. (2018). Behavioral biases and investment performance: Does gender matter? Evidence from Amman Stock Exchange. Jordan Journal of Economic Sciences, 5(1), 77-92.

Anderson, A. G., & Larkin, Y. (2019). Does noninformative text affect investor behavior?. Financial Management, 48(1), 257-289.

Arora, M. and Kumari, S. (2015), "Risk taking in financial decisions as a function of age, gender: mediating role of loss aversion and regret", International Journal of Applied Psychology, Vol. 5 No. 4, pp. 83-89.

Athur, A. D. (2014). Effect of behavioural biases on investment decisions of individual investors in Kenya (Doctoral dissertation, University of Nairobi).

Baker, H. K., & Nofsinger, J. R. (2002). Psychological biases of investors. Financial services review, 11(2), 97.

Baker, H. K., & Nofsinger, J. R. (Eds.). (2010). Behavioral finance: investors, corporations, and markets (Vol. 6). John Wiley & Sons.

Banerjee, A. V. (1992). A simple model of herd behavior. The quarterly journal of economics, 107(3), 797-817.

Barber, B.M., Lee, Y., Liu, Y. and Odean, T. (2011), "The cross-section of speculator skill: evidence from Taiwan", available at: http://ssrn.com/abstract=529063.

Barberis, N. and Thaler, R. (2003), "A survey of behavioral finance", Journal of Finance, Vol. 50 No. 2, pp. 549-572.

Barberis, N., & Thaler, R. (2003). Behavioral finance. George M. Constan.

Bell, D. E. (1982). Regret in decision making under uncertainty. Operations research, 30(5), 961-981.

Birau, R. (2011), "Efficient Capital market", Young Economists Journal (Revista tinerilo Economis_ti), Vol. 17, pp. 15-19.

Blasco, N., & Ferreruela, S. (2008). Testing intentional herding in familiar stocks: An experiment in an international context. Journal of Behavioral Finance, 9(2): 72-84.

Bodnaruk, A., & Simonov, A. J. J. o. f. I. (2015). Do financial experts make better investment decisions? , 24(4), 514-536.

Brown, P., Chappel, N., da Silva Rosa, R., & Walter, T. (2006). The reach of the disposition effect: Large sample evidence across investor classes. International Review of Finance, 6(1-2), 43-78.

Busenitz, L. W., & Barney, J. B. (1997). Differences between entrepreneurs and managers in large organizations: Biases and heuristics in strategic decision-making. Journal of business venturing, 12(1), 9-30.

Candraningrat, I. R., & Sakir, A. (2019, October). Behavioural Biases of Overconfidence and Disposition Effect and their Impact on Investment Decision in the Indonesian Capital Market. In 2019 International Conference on Organizational Innovation (ICOI 19). Atlantis Press.

Cekauskas, K., Liatukas, V., Verlaine, M. and Putninš, T. (2011), "Behavioural biases of the disposition effect and overconfidence and their impact on the estonian stock market", Bachelor Thesis.

Chaudary, S. (2019), "Does salience matter in investment decision? Differences between individual and professional investors", Kybernetes, Vol. 48 No. 8, pp. 1894-1912. https://doi.org/10.1108/K-09-2018-0490

Chen, G., Kim, K.A., Nofsinger, J.R. and Rui, O.M. (2007), "Trading performance, disposition effect, overconfidence, representativeness bias, and experience of emerging market investor", Journal of Behavioral Decision Making, Vol. 20 No. 4, pp. 425-451.

Chen, T. (2013). Do investors herd in global stock markets?. Journal of Behavioral Finance, 14(3), 230-239.

Chen, T. (2017). Investor attention and global stock returns. Journal of Behavioral Finance, 18(3), 358-372.

Chhapra, I. U., Kashif, M., Rehan, R., & Bai, A. (2018). An empirical investigation of investors behavioral biases on financial decision making. Asian Journal of Empirical Research, 8(3), 99-109.

Chong, F.N., Ahmad, Z. and Ali, R. (2011), "Representative heuristic and after market dynamic of the new listing in Malaysia", Journal of International Business and Finance, Vol. 9, pp. 1675-7262.

Christie, W. and Huang, R. (1995), "Following the pied piper: do individual returns herd around the market?", Financial Analysts Journal, Vol. 51 No. 4, pp. 31-37.

Clapp, J.M. and Tirtiroglu, D., (1994), "Positive feedback trading and diffusion of asset price changes: evidence from housing transactions", Journal of Economic Behavior & Organization, Vol. 24 No. 3, pp. 337-355.

Clark, S. (2014), "The availability bias: how the news can hurt your investment decisions", An Excerpt from Perspectives, Vol. 3 No. 1.

Cooper, H. and Hedges, L.V. (2009), Research Synthesis as a Scientific Process. The Handbook of Research Synthesis and Meta-Analysis, 2nd ed., Sage Publications, New York, NY.

Dangol, J., & Manandhar, R. (2020). Impact of Heuristics on Investment Decisions: The Moderating Role of Locus of Control. Journal of Business and Social Sciences Research, 5(1), 1-14.

Daniel, K., Hirshleifer, D. and Subrahmanyam, A. (2001), "Overconfidence, arbitrage and equilibrium asset pricing", Journal of Finance, Vol. 56 No. 3, pp. 921-965.

De Bondt, W. F., & Thaler, R. H. (1995). Financial decision-making in markets and firms: A behavioral perspective. Handbooks in operations research and management science, 9, 385-410.

DeBondt, W.F.M. and Thaler, R. (1985), "Does the stock market overreact?", Journal of Finance, Vol. 40 No. 3, pp. 793-805.

DeBondt, W.F.M. and Thaler, R.H. (1995), "Financial decision making in markets and firms: a behavioral perspective", Handbooks in Operations Research and Management Science, Vol. 9 No. 13, pp. 385-410.

Dietrich, J.R., Kachelmeier, S.J., Kleinmuntz, D.N. and Linsmeier, T.J. (2001), "Market efficiency, bounded rationality, and supplemental business reporting disclosures", Journal of Accounting Research, Vol. 39 No. 2, pp. 243-268.

Edwards, W. (1968). Conservatism in human information processing. Formal representation of human judgment.

Elton, E.J., Gruber, M.J., Das, S. and Hlavka, M. (1993), "Efficiency with costly information: a reinterpretation of evidence from managed portfolios", Review of Financial Studies, Vol. 6 No. 1, pp. 1-22.

Fagerstrom (2008), Behavioral Finance: The Psychological Impact and Overconfidence in Financial Markets, University of Skovde, Skovde.

Fama, E.F. (1970), "Efficient Capital markets: a review of theory and empirical work", The Journal of Finance, Vol. 25 No. 2, pp. 383-417.

Fama, E.F. (1997), "Market efficiency long term return and behaviour finance", Journal of Financial Economic, Vol. 49 No. 3, pp. 283-306.

Fromlet, H. (2001), "Behavioral finance – theory and practical application", Business Economics, Vol. 7 No. 1, pp. 63-69.

Fuentes, R. (2011), "Efficiency of travel agencies: a case study of Alicante, Spain", Tourism Management, Vol. 32 No. 1, pp. 75-87.

Galariotis, E.C., Rong, W., Spyrou, S.I., 2015. Herding on fundamental information: a comparative study. J. Bank. Financ. 50, 589–598.

Gervais, S., Simon, H. and Odean, T. (2001), "Learning to be overconfident", The Review of Financial Studies, Vol. 14 No. 1, pp. 1-27.

Gigerenzer, G., & Gaissmaier, W. (2011). Heuristic decision making. *Annual review of psychology*, *62*, 451-482.

Green, T. C., & Jame, R. (2013). Company name fluency, investor recognition, and firm value. Journal of Financial Economics, 109(3), 813-834.

Grinblatt, M. and Han, B. (2005), "Prospect theory, mental accounting, and momentum", Journal of Financial Economics, Vol. 78 No. 2, pp. 311-339.

Gruber, M.J. (1996), "Another puzzle: the growth in actively managed mutual funds", Journal of Finance, Vol. 51 No. 3, pp. 783-810.

Grullon, G., Kanatas, G., & Weston, J. P. (2004). Advertising, breadth of ownership, and liquidity. The Review of Financial Studies, 17(2), 439-461.

Hadi, F. (2017). Effect of Emotional Intelligence on Investment Decision Making With a Moderating Role of Financial Literacy. China-USA Business Review, 16(2), 53-62.

Hart, C. (1998). Doing a literature review: Releasing the social science research imagination. London, UK: Sage Publications.

Heath, C., & Soll, J. B. (1996). Mental budgeting and consumer decisions. *Journal of Consumer Research, 23*(1), 40–52. https://doi.org/10.1086/209465

Henderson, P. W., & Peterson, R. A. (1992). Mental accounting and categorization. Organizational Behavior and Human Decision Processes, 51(1), 92-117.

Hirshleifer, D., Subrahmanyam, A. and Titman, S. (1994), "Security analysis and trading patterns when some investors receive information before others", The Journal of Finance, Vol. 49 No. 5, pp. 1665-1698.

Hur, J., Pritamani, M. and Sharma, V. (2010), "Momentum and the disposition effect: the role of individual investors", Financial Management, Vol. 39 No. 3, pp. 1155-1176, available at: https:// doi.org/10.1111/j.1755-053X.2010.01107

Hwang, S., & Salmon, M. (2004). Market stress and herding. Journal of Empirical Finance, 11(4), 585-616.

Ikram, Z. (2016). An empirical investigation on behavioral determinants on, impact on investment decision making, moderating role of locus of control. Journal of Poverty, Investment and Development, 26.

Illiashenko, P. (2017). Behavioral Finance: History and Foundations. Visnyk of the National Bank of Ukraine, (239), 28-54.

Inaishi, R., Toya, K., Zhai, K. and Kita, E. (2010), "Effect of overconfident investor behavior to stock market", Journal of Advanced Computational Intelligence and Intelligent Informatics, Vol. 14 No. 6

Irshad, S., Badshah, W. and Hakam, U. (2016), "Effect of representativeness bias on investment decision making", Management and Administrative Sciences Review, Vol. 5 No. 1, pp. 26-30.

Ishfaq, M., & Anjum, N. (2015). Effect of anchoring bias on risky investment decision. Evidence from Pakistan equity market. International Journal of Engineering and Management Research (IJEMR), 5(4), 32-38.

Itzkowitz, J., & Itzkowitz, J. (2017). Name-based behavioral biases: are expert investors immune?. Journal of Behavioral Finance, 18(2), 180-188.

Itzkowitz, J., Itzkowitz, J., & Rothbort, S. (2016). ABCs of trading: Behavioural biases affect stock turnover and value. Review of Finance, 20(2), 663-692.

Jain, J., Walia, N. and Gupta, S. (2020), "Evaluation of behavioral biases affecting investment decision making of individual equity investors by fuzzy analytic hierarchy process", Review of Behavioral Finance, Vol. 12 No. 3, pp. 297-314. https://doi.org/10.1108/RBF-03-2019-0044

Jaiyeoba, H.B. and Haron, R. (2016), "A qualitative inquiry into the investment decision behaviour of the Malaysian stock market investors", Qualitative Research in Financial Markets, Vol. 8 No. 3, pp. 246-267. https://doi.org/10.1108/QRFM-07-2015-0027

Jaiyeoba, H.B., Abdullah, M.A. and Ibrahim, K. (2020), "Institutional investors vs retail investors: Are psychological biases equally applicable to investor divides in Malaysia?", International Journal of Bank Marketing, Vol. 38 No. 3, pp. 671-691. https://doi.org/10.1108/IJBM-07-2019-0242

Jaiyeoba, H.B., Adewale, A.A., Haron, R. and Che Ismail, C.M.H. (2018), "Investment decision behaviour of the Malaysian retail investors and fund managers: A qualitative inquiry", Qualitative Research in Financial Markets, Vol. 10 No. 2, pp. 134-151. https://doi.org/10.1108/QRFM-07-2017-0062

Javed, H., Bagh, T., & Razzaq, S. (2017). Herding effects, over confidence, availability bias and representativeness as behavioral determinants of perceived investment performance: an empirical evidence from Pakistan stock exchange (PSX). Journal of Global Economics, 6(01), 1-13.

Jiao, P. (2017). Belief in mean reversion and the disposition effect: An experimental test. Journal of Behavioral Finance, 18(1), 29-44.

Kafayat, A. (2014), "Interrelationship of biases: effect investment decisions ultimately", Theoretical and Applied Economics, Vol. 21 No. 6, pp. 85-110.

Kahneman, D. and Tversky, A. (1979), "Prospect theory: an analysis of decision-making under risk",Journal of Econometrica, Vol. 47 No. 2, pp. 263-291.

Karimi, G. (2020). the effect of behavioral factors on investors'financial decisions: in companies listed in tehran stock exchange. Journal of Academic Minds Vol, 6, 1.

Katper, N. K., Azam, M., Karim, N. A., & Zia, S. Z. (2019). Behavioral biases and investors' decision-making: The moderating role of socio-demographic variables. International Journal of Financial Engineering, 6(03), 1950020.

Kaustia, M. (2011), "Disposition effect. Behavioral finance: investors, corporations, and markets", pp. 169-189, available at: https://doi.org/10.1002/9781118258415.ch10

Keller, C., Siegrist, M. and Gutscher, H. (2006), "The role of the affect and availability heuristics in risk communication", Risk Analysis: An Official Publication of the Society for Risk Analysis, Vol. 26 No. 3, pp. 631-639

Kengatharan, L. and Kengatharan, N. (2014), "The influence of behavioral factors in making investment decisions and performance: study on investors of Colombo Stock Exchange, Sri Lanka", Asian Journal of Finance & Accounting, Vol. 6 No. 1, p. 1.

Khan, D. (2020). Cognitive Driven Biases, Investment Decision Making: The Moderating Role of Financial Literacy. The Moderating Role of Financial Literacy, Available at SSRN: https://ssrn.com/abstract=3514086 or http://dx.doi.org/10.2139/ssrn.3514086

Khan, I., Afeef, M., Jan, S. and Ihsan, A. (2021), "The impact of heuristic biases on investors' investment decision in Pakistan stock market: moderating role of long term orientation", Qualitative Research in Financial Markets, Vol. 13 No. 2, pp. 252-274. https://doi.org/10.1108/QRFM-03-2020-0028

Khan, M.Z.U. (2015), "Impact of availability bias and loss aversion bias on investment decision making, moderating role of risk perception", Journal of Research in Business Management, Vol. 1 No. 2.

Khresna Brahmana, R., Hooy, C. and Ahmad, Z. (2012), "Psychological factors on irrational financial decision making: Case of day-of-the week anomaly", Humanomics, Vol. 28 No. 4, pp. 236-257. https://doi.org/10.1108/08288661211277317

Kim, K. A., & Nofsinger, J. R. (2008). Behavioural finance in Asia. Pacific-Basin Finance Journal, 16(1-2), 1-7.

Kitchenham, B.A. (2007), "Guidelines for performing systematic literature reviews in software engineering", in Technical report, Ver. 2.3 EBSE Technical Report, EBSE. sn

Kitchenham, B.A., Brereton, P., Turner, M., Niazi, M.K., Linkman, S., Pretorius, R. and Budgen, D. (2010), "Refining the systematic literature review process—two participant-observer case studies", Empirical Software Engineering, Vol. 15 No. 6, pp. 618-653.

Ko, K.J. and Huang, Z.J. (2007), "Arrogance can be a virtue: Overconfidence, information acquisition, and market efficiency", Journal of Financial Economics, Vol. 84 No. 2, pp. 529-560.

Kubilay, B., & Bayrakdaroglu, A. (2016). An empirical research on investor biases in financial decision-making, financial risk tolerance and financial personality. International Journal of Financial Research, 7(2), 171-182.

Kudryavtsev, A. (2018). The Availability Heuristic and Reversals Following Large Stock Price Changes. Journal of Behavioral Finance, 19(2), 159-176.

Kumar, S. and Goyal, N. (2015), "Behavioural biases in investment decision making – a systematic literature review", Qualitative Research in Financial Markets, Vol. 7 No. 1, pp. 88-108. https://doi.org/10.1108/QRFM-07-2014-0022

Kumar, S., & Goyal, N. (2016). Evidence on rationality and behavioural biases in investment decision making. Qualitative Research in Financial Markets, 8(4), 270-287.

Kumari, N., & Sar, A. K. (2017). Cognitive and behavioral biases influencing investment performance. ZENITH International Journal of Multidisciplinary Research, 7(8), 49-62.

Kyle, A.S. and Wang, F.A. (1997), "Speculation duopoly with agreement to disagree: can overconfidence survive the market test?", Journal of Finance, Vol. 52 No. 5, pp. 2073-2090.

Lakonishok, J., Shleifer, A., & Vishny, R. W. (1994). Contrarian investment, extrapolation, and risk. The journal of finance, 49(5), 1541-1578.

Levy, Y. and Ellis, T.J. (2006), "A systems approach to conduct an effective literature review in support of information systems research", Informing Science, Vol. 9.

Liu, D. and Chen, S. (2008), "Disposition effects and investor overconfidence: evidence from trading volume in China stock market", 4th International Conference on Wireless Communications, Networking and Mobile Computing, WiCOM'08, IEEE, pp. 1-4.

Lucchesi, E.P., Yoshinaga, c.E. and Castro Junior, f. H. F.D. (2015), "Disposition effect among Brazilian equity fund managers", Revista de Administração de Empresas, Vol. 55 No. 1, pp. 26-37.

Madaan, G., & Singh, S. (2019). An Analysis of Behavioral Biases in Investment Decision-Making. International Journal of Financial Research, 10(4), 55-67.

Madaan, G., & Singh, S. (2019). An analysis of behavioral biases in investment decision-making. International Journal of Financial Research, 10(4), 55-67.

Maheran, N., & Muhammad, N. (2009). Behavioral finance vs tradicional finance. Advance Management Journal, 2(6), 1-10.

Mahmood, F., Khan, A. Z., & Khan, M. B. (2019). Digital organizational transformation issues, challenges and impact: A systematic literature review of a decade. Abasyn University Journal of social sciences, 12(2).

Mahmood, F., Khan, A.Z. and Bokhari, R.H. (2020), "ERP issues and challenges: a research synthesis", Kybernetes, Vol. 49 No. 3, pp. 629-659. https://doi.org/10.1108/K-12-2018-0699

Malik, M. S., Hanif, D. I., & Azhar, M. (2019). The Impact of Overconfidence Bias on Investment Decisions: Mediating Role of Risk Tolerance. International Journal of Research and Innovation in Social Science, 3(8), 154-160.

Malkiel, B.G. (1995), "Returns from investing in equity mutual funds, 1971-1991", The Journal of Finance, Vol. 50 No. 2, pp. 549-572.

Manten, A.A. (1973), Scientifi c Literature Review, Vol. 5, Scholarly Publishing, 75-89.

Markowitz, H. (1952), "Portfolio selection", The Journal of Finance, Vol. 7 No. 1, pp. 77-91.

Marshal, G. (2010),"Writing ... literature review", Synergy, Imaging and Therapy Practice, pp. 20-23.

Metawa, N., Hassan, M. K., Metawa, S., & Safa, M. F. (2019). Impact of behavioral factors on investors' financial decisions: case of the Egyptian stock market. International Journal of Islamic and Middle Eastern Finance and Management. Vol. 12 No. 1, pp. 30-55.

Metawa, N., Hassan, M.K., Metawa, S. and Safa, M.F. (2019), "Impact of behavioral factors on investors' financial decisions: case of the Egyptian stock market", International Journal of Islamic and Middle Eastern Finance and Management, Vol. 12 No. 1, pp. 30-55. https://doi.org/10.1108/IMEFM-12-2017-0333

Nalurita, F., Leon, F. M., & Hady, H. (2020). Factor Influencing Investor's Decision Making in Indonesia: Moderating the Role of Locus of Control. International Journal of Business and Applied Social Science, 6(4), 49-56

Ngoc, L.T.B. (2014), "Behavior pattern of individual investors in stock market", International Journal of Business and Management, Vol. 9 No. 1, p. 1.

Odean, T. (1998), "Are investors reluctant to realize their losses?", The Journal of Finance, Vol. 53 No. 5, pp. 1775-1798.

Odean, T. (2002), "Volume, volatility, price and profit when all traders are above average", The Journal of Finance.

Onsomu, Z.N. (2014), "The impact of behavioural biases on investor decisions in Kenya: male vs female", International Journal of Research in Humanities, Arts and Literature, Vol. 2 No. 6

Oprean, C. (2014). Effects of behavioural factors on human financial decisions. Procedia economics and finance, 16, 458-463.

Palomino, F., & Sadrieh, A. J. J. o. F. I. (2011). Overconfidence and delegated portfolio management. 20(2), 159-177.

Pandey, R. and Jessica, V.M. (2019), "Sub-optimal behavioural biases and decision theory in real estate: The role of investment satisfaction and evolutionary psychology", International Journal of Housing Markets and Analysis, Vol. 12 No. 2, pp. 330-348. https://doi.org/10.1108/IJHMA-10-2018-0075.

Park, J., Konana, P., Gu, B., Kumar, A. and Raghunathan, R. (2010), "Confirmation bias, overconfidence, and investment performance: evidence from stock message boards", available at: http://misrc.umn.edu/wise/papers/p1-3.pdf.

Parveen, S. (2016), "Exploring disposition effect and overconfidence in Pakistani investors in KSE listed sectors", Research Journal of Finance and Accounting, Vol. 7 No. 7, pp. 72-85.

Parveen, S., & Siddiqui, M. A. (2017). Decision making and behavioral heuristics of investors in non-financial sector: A case of Pakistan Stock Exchange. Journal of Managerial Science, 11(3), 9-126.

Parveen, S., & Siddiqui, M. A. (2018). Anchoring Heuristic, Disposition Effect and Overconfidence Bias in Investors: A Case of Pakistan Stock Exchange. Abasyn Journal of Social Sciences, 11(2), 280-294.

Parveen, S., Satti, Z. W., Subhan, Q. A., & Jamil, S. (2020). Exploring market overreaction, investors' sentiments and investment decisions in an emerging stock market. Borsa Istanbul Review, 20(3), 224-235.

Patterson, D. M., & Sharma, V. (2007). Did herding cause the stock market bubble of 1998–2001? University of Michigan-Dearborn.

Peña, V. A., & Gómez-Mejía, A. (2019). Effect of the anchoring and adjustment heuristic and optimism bias in stock market forecasts. Revista Finanzas y Política Económica, 11(2), 389-409.

Pikulina, E., Renneboog, L. and Tobler, P.N. (2017), "Overconfidence and investment: an experimental approach", Journal of Corporate Finance, Vol. 43, pp. 175-192.

Pompain, M.M. (2006), Behavioral Finance and Wealth Management (How to Build Optimal Portfolio That Account for Investor Biases), 1st ed., John Wiley&Sons, New Jersey, Canada.

Pompian, M. M. (2011). Behavioral finance and wealth management: how to build investment strategies that account for investor biases (Vol. 667): John Wiley & Sons.

Poojary, S.A. and Bagadia, J.D. (2014), "Reviewing literature for research: doing it the right way", Indian Journal of Sexually Transmitted Diseases and Aids, Vol. 35 No. 2, pp. 85-91.

Qasim, M., Hussain, R., Mehboob, I., & Arshad, M. (2019). Impact of herding behavior and overconfidence bias on investors' decision-making in Pakistan. Accounting, 5(2), 81-90.

Raheja, S., & Dhiman, B. (2019). Relationship between behavioral biases and investment decisions: The mediating role of risk tolerance. DLSU Business & Economics Review, 29(1), 31-39.

Ramalakshmi, V., Pathak, V. K., Jos, C. M., & Baiju, E. (2019). impact of cognitive biases on investment decision making. Journal of Critical Reviews, 6(6), 59-66.

Rasheed, M.H., Rafique, A., Zahid, T. and Akhtar, M.W. (2018), "Factors influencing investor's decision making in Pakistan: Moderating the role of locus of control", Review of Behavioral Finance, Vol. 10 No. 1, pp. 70-87. https://doi.org/10.1108/RBF-05-2016-0028

Rauf, A., Khurshid, M. K., & Afzal, M. (2018). Impact of Overconfidence and Loss Aversion Biases on Equity Investor's Decision-Making Process and Performance. NICE Research Journal, 156-180.

Razmdoost, K., Dimitriu, R. and Macdonald, E.K. (2015), "The effect of overconfidence and underconfidence on consumer value", Psychology and Marketing, Vol. 32 No. 4, pp. 392-407.

Rehan, R., & Umer, I. (2017). Behavioural biases and investor decisions. Market Forces, 12(2).

Ritter, J.R. (2003), "Behavioral finance", Journal of Pacific-Basin Finance, Vol. 11 No. 4, pp. 429-437.

Russel, P.S. and Torbey, V.M. (2002), "The efficient market hypothesis on trial: a survey", Business Quest Journal, pp. 1-19.

Sattar, M. A., Toseef, M., & Sattar, M. F. (2020). Behavioral Finance Biases in Investment Decision Making. International Journal of Accounting, Finance and Risk Management, 5(2), 69.

Selden, G. C. (1912), Psychology of the Stock Market. Ticker Publishing Company, New York.

Sewell,M. (2011), "History of the efficient market hypothesis", available at: www.cs.ucl.ac.uk/fileadmin/UCLCS/images/Research_Student_Information/RN_1 04.pdf

Shah, A. K., & Oppenheimer, D. M. J. P. b. (2008). Heuristics made easy: An effort-reduction framework. *134*(2), 207.

Shah, S.F., Raza, M.W. and Khurshid, M.R. (2012), "Overconfidence and perceived market efficiency", Interdisciplinary Journal of Contemporary Research in Business, Vol. 3 No. 10.

Shah, S.Z.A., Ahmad, M. and Mahmood, F. (2018), "Heuristic biases in investment decision-making and perceived market efficiency: A survey at the Pakistan stock exchange", Qualitative Research in Financial Markets, Vol. 10 No. 1, pp. 85-110. https://doi.org/10.1108/QRFM-04-2017-0033

Shefrin, H. (2005), A Behavioural Approach to Asset Pricing, Elsevier, Burlington, MA.

Shefrin, H. (2008), Behavioral Approach Asset Pricing, 2nd ed., Elsevier, London.

Shefrin, H., & Statman, M. (1985). The disposition to sell winners too early and ride losers too long: Theory and evidence. The Journal of finance, 40(3), 777-790.

Shefrin, H., & Statman, M. (1985). The disposition to sell winners too early and ride losers too long: Theory and evidence. The Journal of finance, 40(3), 777-790.

Shiller, R. (2003), "From efficient market theory to behavioral finance", Cowles Foundation Discussion Paper 1385.

Shleifer, A. (2000). Inefficient markets: An introduction to behavioural finance. OUP Oxford

Shleifer, A. (2000). Inefficient markets: An introduction to behavioural finance. OUP Oxford

Shleifer, A. and Vishny, R. (1997),"The limits of arbitrage", Journal of Finance, Vol. 52 No. 1, pp. 35-55

Simon, H. A. (1955). A behavioral model of rational choice. The quarterly journal of economics, 69(1), 99-118.

Simon, H.A. (1957), Models of Man; Social and Rational, Wiley, Oxford

Simon, M., Houghton, S.M. and Aquino, K. (2000), "Cognitive biases, risk perception, and venture formation: how individuals decide to start companies", Journal of Business Venturing, Vol. 15 No. 2, pp. 113-134.

Siraji, M. (2019). Heuristics Bias and Investment Performance: Does Age Matter? Evidence from Colombo Stock Exchange. Siraji, M.(2019). Heuristics Bias and Investment Performance: Does Age Matter, 1-14.

Slovic, P. and Lichtenstein, S. (1971), "Comparison of Bayesian and regression approaches to the study of information processing in judgment", Organizational Behavior and Human Performance, Vol. 6 No. 6, pp. 649-744.

Statman, M., Thorley, S. and Vorkink, K. (2006), "Investor overconfidence and trading volume", Review of Financial Studies, Vol. 19 No. 4, pp. 1531-1565.

Suetens, S., & Tyran, J. R. (2012). The gambler's fallacy and gender. Journal of Economic Behavior & Organization, 83(1), 118-124.

Thaler, R. (1985). Mental accounting and consumer choice. Marketing science, 4(3), 199-214.

Thaler, R. H. (1999). Mental accounting matters. Journal of Behavioral decision making, 12(3), 183.

Thaler, Richard (1980), "Toward a Positive Theory of Consumer Choice," Journal of Economic Behavior and Organization, 1 (March), 39-60.

Tin, O. S., & Hii, J. W. S. (2020). The Relationship Between Heuristics Behaviour and Investment Performance on Debt Securities in Johor. Journal of Arts & Social Sciences, 3(2), 53-74.

Toma, F.M. (2015), "Behavioral biases of the investment decisions of Romanian Investors on the Bucharest Stock Exchange", Procedia Economics and Finance, Vol. 32, pp. 200-207.

Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *science*, *185*(4157), 1124-1131.

ul Abdin, S. Z., Farooq, O., Sultana, N., & Farooq, M. (2017). The impact of heuristics on investment decision and performance: Exploring multiple mediation mechanisms. Research in International Business and Finance, 42, 674-688.

Vieira, E. F. S., & Pereira, M. S. V. (2015). Herding behavior and sentiment: Evidence in a small European market. Revista de Contabilidad, 18(1), 78-86.

Waseem-Ul-Hameed, S. A. S., Razzaq, S., & Humanyon, A. A. (2018). The Influence Of Behavioural Biases On Investment Decision Making: A Moderating Role Of Religiosity Among Pakistani Investors. International journal of management research and emerging sciences, 8(1), 87-98.

Waweru, N. M., Munyoki, E., & Uliana, E. (2008). The effects of behavioural factors in investment decision-making: a survey of institutional investors operating at the Nairobi Stock Exchange. *International Journal of Business and Emerging Markets*, *1*(1), 24-41.

Weber, E., & Hsee, C. (2000). Culture and individual judgment and decision making. Applied Psychology, 49(1), 32-61.

Weber, M., & Camerer, C. F. (1998). The disposition effect in securities trading: An experimental analysis. Journal of Economic Behavior & Organization, 33(2), 167-184.

Webster, J., & Watson, R. T. (2002). Analyzing the past to prepare for the future: Writing a literature review. MIS Quarterly, 26(2), 13-23.

Wijayanti, D., Suganda, T. R., & Thewelis, F. S. (2019). Gambler's Fallacy as Behavioural Bias Of Young Investor. Journal of Business and Behavioural Entrepreneurship, 3(2), 72-80.

Yaowen, X.U.E., Suqing, S.U.N., Zhang, P. and Tian, M.E.N.G. (2015), "Impact of cognitive bias on improvised decision-makers' risk behavior: an analysis based on the mediating effect of expected revenue and risk perception", Management Science and Engineering, Vol. 9 No. 2, pp. 31-42.

Yates, J.F., Lee, J. and Bush, J.G. (1997), "General knowledge overconfidence: cross national variations, response style, and 'reality'", Organizational Behavior and Human Decision Processes, Vol. 70 No. 2, pp. 87-94.

Yuen, R. W. P. (2012). Importance of Behavioral Finance. available at https://www.researchgate.net/publication/256019261

Zahera, S. A., & Bansal, R. (2018). Do investors exhibit behavioral biases in investment decision making? A systematic review. Qualitative Research in Financial Markets, 10(2), 210-251.

Zahera, S. and Bansal, R. (2019), "A study of prominence for disposition effect: a systematic review", Qualitative Research in Financial Markets, Vol. 11 No. 1, pp. 2-21.