THE INFORMATION BEHAVIOR OF INDIVIDUAL INVESTORS IN SAUDI ARABIA

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Information plays a significant role in the success of investment strategies. Within a non-advisory context, individual investors elect to build and manage their investment portfolios to avoid the cost of hiring professional advisors. To cope with markets' uncertainty, individual investors should acquire, understand, and use only relevant information, but that task can be affected by many factors, such as domain knowledge, cognitive and emotional biases, information overload, sources' credibility, communication channels' accuracy, and economic costs. Despite an increased interest in examining the financial performance of individual investors in Saudi Arabia, there has been no empirical research of the information behavior of individual investors, or the behavioral biases affecting the investment decision making process in the Saudi stock market (SSM). The purpose of this study was to examine this information behavior within a non-advisory contextualization of their investment decision-making process through the use of an online questionnaire instrument using close-ended questions. The significant intervening variables identified in this study influence the individual investors' information behavior across many stages of the decision making process. While controlling for gender, education, and income, the optimal information behavior of individual investors in the SSM showed that the Experience factor had the greatest negative effect on the Information Seeking Behavior of individual investors. Finally, the Socioeconomic Status (SES) of individual investors in Saudi Arabia was significantly influenced by the employment status, work experience, age, marital status, and income.

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LIST OF ACRONYMS

APT	Arbitrage Pricing Theory
BPB	Belief Perseverance Bias
CAPM	Capital Assets Pricing Model
CB	Cognitive Biases
CMA	Capital Market Authority
DPM	Discretionary Portfolio Management
EB	Emotional Biases
EU	Expected Utility
IPB	Information Processing Biases
ISCO	International Standard Classification of Occupations
SAGIA	Saudi Arabian General Investment Authority
SES	Socioeconomic Status
SSM	Saudi Stock Market

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

The financial crisis of 2008, which was the worst since the Great Depression in the 1930s, wiped out around $19 trillion of household wealth and resulted in the loss of about 8.8 million jobs. In fact, the median net worth of U.S. families fell 38.8% over the period of 2007-2010 due to increased uncertainty in the financial markets where major indices fell almost 50% during the same period (The financial crises response, 2012; Bricker et al., 2012). The five largest investment banks in the United States; Goldman Sachs, Morgan Stanley, Merrill Lynch, Lehman Brothers and Bear Stearns with a combined total of 549 years of experience, declared bankruptcy and disappeared (Perry, 2008, para. 10). By the end of 2008, the financial crisis affected almost all financial markets around the globe, and slowed the economic growth in many countries.

Theoretically, the net worth of individual investors is correlated with both their decision making process and the state of the economy. In reality, only the economists and financial analysts have the capabilities and tools to forecast and respond to market movements. Furthermore, studies have shown that decisions people make are hard to predict, because their present and future choices are different from each other (Simon et al., 1987, p. 26). March (1994) argues that individual decision makers only consider some of their alternatives and they ignore relevant information about the consequences of their decisions (p. 9). A recent survey shows that about 58% of Americans surveyed were confident about their financial knowledge,

but, only 35% knew the annual percentage rate on their primary credit cards, which shows a large gap between their subjective financial knowledge and actual financial knowledge (Jones, 2015, para. 3).

Case (2012) writes that the literature of information seeking behavior is closely linked to decision making (p. 96), and defines decisions as "choices made from among alternatives; that is, at least two options are available, and the decision maker may select only one of them" (p. 97), and distinguishes between decision making and problem solving. Problem solving entails "identifying issues worthy of attention, setting goals, and designing suitable courses of action" (p. 99), while the process of decision making requires "evaluating and choosing among alternative actions to take in response to a problem" (p. 99). The assumptions of neoclassical economics state that rational decision makers can maximize their expected utility by acting independently and accurately predicting the future by utilizing full relevant information (Weintraub, 1993). In other words, decision makers with full access to all relevant information will make the best deciosons.

Although relevant information supports individual decision makers by dissolving any uncertainties they may have related to preferences, consequences, situations, and identities (March, 1994, p. 207), the unique nature of information goods violates the assumptions of neoclassical economics for several reasons. First, an over abundance of information limits information seekers' receiving and processing abilities to examine all information or perfect information (Braman, 2006, p.26). Second, decision makers cannot appraise the value of all relevant information unless they gain full access to the information (Nezafat & Wang, 2013 p.327). Finally, gathering more information does not imply a reduction of a person's

uncertainty, because the new information may contradict their current knowledge, it may be difficult to understand, or it may come from a less credible source (Klein, 2009, p. 129). Hirshleifer and Riley (1992) affirm that idea by ststing that information seekers "can never buy a message but only a message service – a set of possible alternative messages" (p.168). So, their interpretation of that information will differ.

Marschak (1959) addressed that point by saying "the amount of information does not depend on the needs of any particular buyer of information" (p.81). in other words, the information available to decion makers does not neccessarily satisfy their informations needs. Therefore, Klein (2009) warns "more information can make things worse" (p. 130), and recommends using filtering strategies to get the right amount of information and focusing on analyzing existing information (p 135). In fact, previous research shows that decision makers may place too much weight on recent information and not enough on prior knowledge due to cognitive and emotional biases (De Bondt and Thaler, 1985, p. 793).

Kuhlthau (1993) defines uncertainty as "a cognitive state which commonly causes affective symptoms of anxiety and lack of confidence" (p. 347), and suggests that "the affective symptoms of uncertainty, confusion and frustration are associated with vague, unclear thoughts about a topic or question" (p. 347). Consequently, the information seeking behavior is driven by the recognition of a deficiency in the person's knowledge structure to successfully deal with uncertainty (Krikelas, 1983, p. 7). Similarly, Wilson (2000) defines the information seeking behavior as "the purposive seeking for information as a consequence of a need to satisfy some goal" (p. 49).

Within a non-advisory context, it is recommended that individual investors build and manage their financial portfolios through the following processes: “setting investment objectives, establishing the investment policy, selecting the portfolio strategy, constructing the portfolio, and evaluating performance” (Fabozzi, 2008a, p. 16). However, implementing those tasks requires time and extensive domain knowledge of the factors that affect the stock prices, as well as access to critical information that might not be available to the public. Empirical research shows that informal information resources and interpersonal resources such as family, friends, and acquaintances are the preferred sources of information for people who want to invest. Additionally, they utilize information from electronic media and their environment in the decision-making process (Case, 2012, p. 375).

Figlewski (1981) examines the effect of the naturae of information that investors hold on their investment strartegies. Specifically, investors with unfavorable information tend to react in a different way when compared to investors with favorable or neutral information. As a result, there is a systematic effect on stock prices. Information plays a significant role in the success of that strategy. Chan, Jegadeesh and Lakonishok (1996) examined the stock market’s reaction to information and concluded that markets respond gradually to new information.

For information seekers, Hirshleifer and Riley (1979) argue that using information content comes with a cost, such as the cost of waiting to get better information rather than making an immediate decision under high uncertainty. Hirshleifer, Hou, Teoh, and Zhang (2004) confirm that investors ignore information included in the financial statements of companies, and recommend that “firms, the business media and policymakers should find ways to make financial information more salient and transparent to investors” (p. 328). Similarly, Richardson,

Tuna, and Wysocki (2010) indicate that the issue is not whether stock prices reflect available information, but instead it is the tendency of investors to ignore the usefulness of accounting information in forecasting future stock returns (p. 421). Stigler (1961) argues that people are willing to pay more for information when it is presented in an enjoyable and pleasant form.

1.2 The Economic Environment in Saudi Arabia and the Saudi Stock Market

According to the Saudi Arabian General Investment Authority (SAGIA), Saudi Arabia is one of the world's 20 largest economies, and it is the largest free market in the Middle East, contributing 25% of the total Arab gross domestic product (GDP) as well as the largest oil reserves worldwide (25%). Saudi Arabia is also one of the fastest-growing countries worldwide, with the per capita income forecasted to rise from $25,000 in 2012 to $33,500 by 2020. Moreover, citizens of Saudi Arabia do not pay personal income taxes (Investment incentives, n.d., para. 1-2).

The formal Saudi Stock Market (SSM) was established in the early 1980's to regulate stock trading, and manage the support systems. However, the informal stock market can be traced back to the 1930's. The SSM is relatively young compared to some of the regional stock exchanges. Moreover, most of the enterprises are either government owned or family owned, which contributed to the slow development of the formal stock exchange.

In 2003, the Capital Market Authority (CMA) was established to oversee and regulate the Saudi Stock Exchange, protect the investors, and ensure efficiency of the market. There has been fundamental changes to the CMA since its establishment such as providing detailed ownership information, opening the market to foreign investors, launching an electronic system

for debt instruments' trading, trading of Exchange Traded Funds (ETFs), and joining the World Federation of Exchanges.

Currently, the SSM is organized into 15 sectors, with a total of 164 companies. Moreover, the SSM is considered the largest and most liquid stock exchange in the Middle East and North Africa (MENA) region. The pillars of strength for the SSM are the depth and breadth of the market, robust economic fundamentals, a strong core financial system, a technology driven strong banking system, and an evolving regulatory environment for the capital market (The Capital Market Authority- semi annual statistical bulletin, 2014).

Market diversity gives investors exposure to the economic performance of many dimensions of the Saudi economy. The Saudi government is the largest shareholder in the SSM where it controls about 40% of the market capitalization. There are a few institutional investors, which explains why individual investors dominate more than 80% of current market activity. The total number of individual Saudi investors is 4.4 million registered at the stock exchange depository, of which male investors represent almost 80%. The number of active trading portfolios is 8.1 million, which indicates that some individual investors own more than one portfolio (The Capital Market Authority- semi annual statistical bulletin, 2014).

Saudi investors transact in the stock market through any of the 30 licensed brokerage firms. Authorized brokerage firms provide services such as trading securities, custody services, investment funds management, wealth management, and investment advisory services. Investors can trade securities through many channels, including online trading, phone trading, or ATM trading. Some firms provide VIP trading lounges and personalized trading services for high-networth clients. Furthermore, major investment firms provide discretionary portfolio

management (DPM) to their corporate and high-networth clients where specialized teams manage the investment portfolios on behalf of their clients for an annual fee. Accordingly, investors will choose the firm that provides the services that fit their needs.

In Saudi Arabia, investment firms provide online trading services to their clients. The services include instantaneous clearing and settlement, real-time price monitoring (e.g., the price of the last transaction, the change in price since opening, and the highest and lowest prices since opening), financial charts, sector analysis, and order execution services. However, the regulations of the Saudi Capital Market Authority (CMA) prohibits firms from providing specific buy, sell, or hold recommendations to investors unless the investors are subscribed to the wealth management services, which require signing consent forms and receiving proper investment education.

1.3 The Research Problem

Individual investors may elect to manage their own portfolios to avoid the cost of hiring professional financial advisors, or investing in DPM portfolios. However, they are expected to make only informed decisions that are based on analyzing the market information and through the use of financial information that is available to financial advisors and market analysts. Theoretically, only economists and financial analysts with excellent credentials and extensive expertise have the skills and tools required to forecast and respond to market movements. For individual investors, the decision making process when faced with uncertainty is both a complicated and a critical task, because analyzing the performance of stock markets and

determining the relationship between the economy and their investment portfolios requires getting the right information at the right time.

Hirshleifer and Riley (1979) argue that using information content comes with a cost, such as the cost of waiting to get better information rather than making an immediate decision when faced with uncertainty. In order to cope with their uncertainty, individual investors should acquire, understand, and use only relevant information, but that task can be affected by many factors, such as cognitive and emotional biases, information overload, sources' credibility, communication channels' accuracy, and economic costs that can affect that quality of information. Lovric, Kaymak, and Spronk (2008) examined investors' information processing, and find that "the information speed, expected market impact, and anticipated market surprise are rated as more important than the reliability of the source, and the accuracy of information (p. 15).

There are many theories and studies that examine people's behavior when they seek information to bridge gaps in their knowledge. The cost-benefit paradigm of Dupuit (1844) proposed that information seekers choose information channels that satisfy their information needs, and at the same time minimizes the costs of using those channels. The paradigm assumes that information seekers are rational decision makers who will calculate the benefits of acquiring and using the most complete and precise information (Case, 2012, p. 177). On the other hand, according to Zipf's (1949) principle of least efforts, information seekers will bridge that gap by conducting the least amount of work possible to find the information, though, sometimes least efforts could result in a lower information quality (Case, 2012, p.178).

In reality, people are not rational decision makers, and they don't consider all available information in the process of decision making. Richardson, Tuna, and Wysocki (2010) indicate that the issue is not whether stock prices reflect available information, but instead the tendency of investors to ignore the usefulness of accounting information in forecasting future stock returns (p. 421). Similarly, Hirshleifer, Hou, Teoh, and Zhang (2004) confirm that investors ignore information included in the financial statements of companies and recommend that "firms, the business media and policymakers should find ways to make financial information more salient and transparent to investors" (p. 328).

Stigler (1961) argues that people are willing to pay more for information when it is supplied in an enjoyable and pleasant form. Using suboptimal (i.e., cheap) sources of information such as the Internet can be especially risky, because the quality of the information can be compromised since informal financial information resources, in which anyone can anonymously post information, are unregulated. Information posted in chat rooms, and investment forums could be anything from personal opinions, aggressive predictions, and financial rumors to fabricated lies. Those forums could be utilized to promote fraudulent activities and market manipulation (Coffee, 1997, p. 14).

1.4 Research Questions

Having addressed the research problem, the following questions are posed:

- What are the information behaviors of individual investors in the Saudi stock market and what motivates these behaviors? To what extent do they impact the information behavior of the investors?

- What is the effect of the information source characteristics and the information value on the individual investors' information behavior in the Saudi stock market?
- What is the impact of the socioeconomic status of individual investors on their information behavior?

1.5 The Purpose Statement

Thaler (1999) argues that observing the behavior of individual investors is a difficult task, because brokerage firms don't release daily trading data to anyone. Due to this, Thaler believes that trading data is essential to explain the behavior of individual investors, and to assess their financial literacy, and indicates that data mining in financial databases has been heavily utilized in the traditional finance literature (p.16). In reality, the behavior of investors has been heavily examined in the finance, economics, and behavioral finance literature (pp. 15-16). Moreover, Spink and Heinström (2011) conclude "information behavior research has been relatively isolated from the evolutionary and developmental sciences" (p. 297). Accordingly, it is logical to utilize the information behavior models developed within the field of information science to provide such an assessment.

The information behavior of individual investors has been the subject of only a handful studies in the literature of information science (e.g., Williamson & Smith, 2010; O'Connor, 2013, etc.), and has not been the main interest of the financial economics literature. Despite an increased interest in examining the financial performance of individual investors in Saudi Arabia (Abdulsalam, 1990; Al-Abdulqader, Hannah, & Power, 2007; Rahman, Chowdhury, & Sadique, 2015), it is surprising that no empirical research has been conducted to explore the information

behavior of individual investors, and the behavioral biases affecting the investment decision making process.

The purpose of this quantitative survey study was to examine the information behavior of individual investors in Saudi Arabia within a non-advisory contextualization of their investment decision-making process. Wilson's (1997) general model of information behavior was employed to examine the effects of behavioral biases on the information behavior of individual investors in a non-advisory context. The study examined behavioral biases such as cognitive biases (representativeness, hindsight, cognitive dissonance, anchoring and adjustment, mental accounting, availability, self-attribution), and emotional biases (loss aversion, overconfidence, and regret aversion).

The study was an attempt to clarify the effect of behavioral biases on the dependent variables related to the sub-sets of the information behavior, such as information seeking, information searching and acquisition, and information using, rather than examining the effect of the behavioral biases on the portfolio performance of the Saudi individual investors. This study embarked on an effort to gain insight into the primary research questions through the use of an online questionnaire instrument.

1.6 Significance of the Study

Utilizing Wilson's (1997) general model of information behavior helped in mapping the information behavior of individual investors in the Saudi stock market, who face financial uncertainty, in a non-advisory context, because it is a methodological model that fits many research objectives. Therefore, the findings of the study help to clarify the causal relationships

among the information behavior processes and the intervening variables that affect the investment decision making.

Building on previous work would help in moving from decision-based models to causal models; hence, this study contributes to the information science literature by studying the information behavior of the financial information behavior of persons-in-context (i.e., investors). There are a few studies in the behavioral finance literature that examine the decision making process of investors in developing countries. Therefore, this study added to the information science and behavioral finance fields by examining the effects of behavioral biases in Saudi Arabia where investors decision are not affected by income taxes, dominance of institutional investors, or the availability of financial derivatives.

Saudi Arabia is a developing economy and a member of the Group of Twenty (G20). The economies of the G20 members represent 80% of the world trade and about two thirds of the world population. However, empirical research in information behavior is scarce, hence this study adds value and is the beginning of more extensive research in this area because the study provides an extensive background of the decision making process.

Exploring the decision making process of investors in the SSM will assist the efforts of policymakers and the capital market authority (CMA) in finding better ways to protect the wellbeing of investors, and in establishing better information dissemination guidelines in the market. Finally, financial institutions could use the findings of this study to provide better services to their clients, which will improve their competitiveness and reputation in the market.

1.7 Delimitations, Limitations, and Assumptions of the Study

Wilson's (1997) general model of information behavior was used to map the information behavior of individual investors in the Saudi stock market. Online questionnaire instrument was used to collect primary data for the specific purpose of the research. Adult participants who hold, or have held, active investment portfolios, who are both citizens and residents, whether living in Saudi Arabia or abroad, completed the questionnaires. However, the study did not use any secondary data (e.g., market data), and won't examine the performance of the portfolios, because that is beyond the scope of the research objectives. For the purpose of this study, the impacts of the socioeconomic status (SES) of individual investors on their information behavior were determined through the optimal Model of SES, which considers investors' age, income, marital status, occupation, employment status, work experience, and education levels.

A main methodological limitation resulted from using the survey research method, because questionnaires collect data related to the participants' beliefs and convictions, rather than their real actions. Hence, it was assumed that the participants provided truthful answers to the questions, which reflected their information behavior. Another disadvantage of using online questionnaires resulted from asking questions that force participants into specific categories. However, that issue was avoided by using a 5-point Likert scale to avoid forcing the participants into either agreeing or disagreeing with the statements.

The limited time frame of the study, and small sample size and low response rates represented a great challenge to interpretation of the results and the generalizability of the findings. Delva, Kirby, Knapper, and Birtwhistle (2002) indicate that low response rates to

questionnaires affect generalization of the findings, and clarify that some participants may not have enough time to fill the questionnaire, while others may question the purpose and objects of the study those low rates. However, using the structural equation modeling helped in avoiding the negative effect of the small sample size on the generalizability of the findings, as will be discussed in Chapter Four.

Another factor that limited the number of participants in this study is their hesitation to declare their income and portfolio size. To mitigate that limitation, weekly reminders were sent to the potential participants to encourage, and remind them of the importance of their participation on the findings of the study. Furthermore, the follow up email stressed the fact that the responses, and individual information would be anonymously maintained in any publication or presentation.

1.8 Definition of Terms

Please refer to Appendix D for a list of relevant terms and their definitions.

1.9 Summary

The dissertation contributes to the information science field by providing a model based on Wilson's (1997) general information behavior model, to map the information behavior of individual investors in the Saudi stock market, who are facing financial uncertainty, in a non-advisory context. Therefore, this study adds to the information science and behavioral finance fields by determining and measuring the effects of behavioral biases, information source characteristics, socioeconomic status on the individual investors in Saudi Arabia where

investors decision are not affected by income taxes, dominance of institutional investors, or the availability of financial derivatives.

CHAPTER 2

LITERATURE REVIEW

Vakkari (1997) indicates that many researchers treat central concepts that are related to the complex and multidimensional nature of information behavior (e.g., information seeking, context, situation, etc.) as primitive concepts, although, these concepts have controversial and vague definitions (p. 460). Accordingly, this section presents an interpretative summary of existing knowledge in the fields directly relevant to this study. It first introduces the terms of information, context, situation and information needs.

Then, the concepts of information behavior and information seeking behavior are discussed to prepare the reader for a brief review of three of the most cited information behavior models. Next, the concept of information economics and its relation to the information science are reviewed. The chapter follows with an overview of the stock markets, as well as a comparative overview of the traditional finance paradigm and the behavioral finance paradigm. Finally, the some of the behavioral factors affecting the process of investment decision making are reviewed. As such, the topics are put forward so that the reader may better understand the selected research problem, and then synthesize the findings of the study.

2.1 What is Information?

Defining information is a challenging task because the term is defined differently in different contexts, and it could refer to things, processes, realities, or phenomena. A survey of information definitions found more than 700 definitions in the context of information science

(Schrader, 1983; as cited in Lenski, 2010, p. 108). Capurro & Hjørland (2003) state "in studying information it is easy to lose one's orientation. Therefore, it is important to state the pragmatic question: "What difference does it make if we use one or another theory, or concept, of information?" (p.396). Ma (2012) claims that having many definitions of information is not an issue. Instead, the real problem is that these definitions fail to recognize the similarities in their ontological and epistemological assumptions, which has been reflected on defining related concepts such as information need and information behavior (p. 717).

Likewise, Case (2012) asserts that the trouble in defining information is due to the assumptions of utility, physicality, structure/process, intentionality, and truth (pp. 56-57). Information definitions that require utility specify the characteristics for information to qualify as information, such as having a meaning or answering a question for someone (Nauta, 1972; Capurro & Hjørland, 2003). The physicality assumptions require that information should be an objective entity that has a tangible form or observable effect to be considered information, but some of those assumptions ignore the cognitive and semantic aspects of information (Shannon, 1948; Wiener, 1961).

On the other hand, some information definitions contradict the physicality assumptions and suggest that information should have a structured process with observable outcomes, or consider information to be a social construct (Boulding, 1956; Dervin, 1977; Belkin, 1978; Brookes, 1980; Losee, 1997; Cornelius, 1996; Madden, 2000). The intentionality assumptions suggest that information should be situational and dependent upon a cognitive agent (MacKay, 1969; Bateson, 1972; Bates, 2005). Finally, the truth criterion of information proposes that

information should be true, but that doesn't require the interpretation of a cognitive agent (Dretske, 1981).

Noticeably, having a universal definition of information is impossible due to the various approaches, assumptions, and representations. Nevertheless, Fox (1983) believes that the different meanings and definitions of information are not an obstacle for information scientists, because it seems that they don't have any problem in communication regarding information and its related concepts (p. 5). Case (2012) warns that introducing a universal definition of information could pose serious risks on the multidisciplinary nature of the information science and the related concepts (p.71).

On the other hand, Meadow and Yuan (1997) support introducing a universal definition, and state "the number of different definitions of information and other closely related terms and the fact that the differences significantly impede the ability of information scientists and practitioners to communicate among themselves and to build upon each others' work" (p. 697). Also, Burke (2007) stresses the risk of semantic difficulties that information scientists experience, and says that researchers are "faced with a swirl of unstable definitions of basic terms such as information" (p. 20). Therefore, introducing a universal concept would encourage cooperation among researchers, and supports the process of inquiry.

In fact, Kuhn (1962) indicates that paradigms are essential for any field to qualify as a science in order to direct the scientific inquiry of that field. He also adds that there should be "at least some implicit body of intertwined theoretical and methodological belief that permits selection, evaluation, and criticism" (pp. 16-17). Furthermore, Kuhn (1979) suggests that new discoveries are not just an addition to the existing theories and models, but they result from

investigation of the old theories and models, which leads to both discarding some parts as well as reforming the beliefs and practices around those theories (p.22). Therefore, having a universal definition would establish a paradigm that will guide the research efforts of information scientists.

According to Belkin (1978), it is possible to introduce a widely accepted concept of information rather than a universal definition. This addresses the multidisciplinary nature of information science, and has the ability to unify and facilitate the research efforts of information scientists around that concept within a defined context. The next section will review one of the concepts that could reshape the information science paradigm and support the scientific inquiry.

For the purpose of this study, information will be defined as suggested by Buckland (1991). Buckland (1991) classifies uses of the term information into three categories (p.351). The first is information-as-process, where information is intangible and denotes the "act of informing". The second principle use of the term "information" is information-as-knowledge, where information represents the intangible knowledge that results from the act of informing. However, Buckland (1991) indicates that in this sense, information could either increase or decrease uncertainty, because knowledge is personal, subjective, and conceptual. Accordingly, representing that knowledge requires defining the third principle use of the term information: information-as-thing. With this definition, information is considered to be a tangible object, such as data, documents, or artifacts; hence, information retrieval systems and expert systems can deal with it directly.

2.2 A Universal Concept of Information

Belkin (1978) suggests that researchers could overcome the problem of finding a universal definition of information by forming a unified information concept that helps them to examine information as a phenomenon within the context of their studies. Thus, the information concept could be assessed based on its value in addressing the objects of the study, rather than its truthfulness (pp.58-59). Belkin (1978) proposes eight requirements for an operationally relevant concept of information science (pp. 61-62). These requirements are listed in (Table 1).

Table 1

The Requirements of an Information Concept for Information Science

It must refer to information within the context of purposeful, meaningful communication. (D)
It should account for information as a social communication process among human beings. (D)
It should account for information being requested or required. (D)
It should account for the effect of information on the recipient. (D/B)
It must account for the relationship between information and state of knowledge (of generator and of recipient). (D/B)
It should account for varying effects of messages presented in different ways (B)
It must be generalizable beyond the individual case. (M)
It should offer means for prediction of the effect of information. (M)

Note: D: Definitional requirement B: Behavioral requirement M: Methodological requirement Requirements 1-6 are relevance requirements. Requirements 7 &8 are operational requirements. (Belkin, 1978, p. 62)

Lenski (2010) identifies a universal information concept that fulfills all the requirements of information concepts mentioned in Table 1 by addressing the core elements of information science. The information concept consists of the following principles: information as difference,

information as a process, information as transformation, modification of knowledge structures, information and knowledge, information and data, information and meaning, formalization of information, and tacit knowledge (pp. 88-93).

The principle of information as difference is the general framework that holds all the other parts of Lenski's (2010) information concept together. It is based on Bateson's (1972) abstract definition of information as "the difference which makes a difference" (Bateson, 1972, p. 460). A situation triggered the information need to satisfy the deficiency in the existing knowledge to deal with that situation by acquiring additional external knowledge (Lenski, 2010, p.108).

The information as a process principle is based on Losee's (1997) suggestion that "information is produced by all processes and it is the values in the characteristics of the processes' output that are information" (p.256). The output of processes (e.g. information seeking, information search, information retrieval) results in satisfying the information need and overcoming the situation (Lenski, 2010, p.108).

The information as transformation principle is based on Belkin & Robertson (1976) conclusion in which "information is that which capable of transforming structure" (p.198). The outcome of the "transforming structure" should help the information seekers in dealing with the situation. Otherwise, the outcome won't be considered information. This is similar to Boulding's (1956) image alteration as a result of "structured experiences" (p.9), (Lenski, 2010, p109).

Modification of knowledge structures and information and knowledge principles require that newly acquired external information (i.e., the difference) influences the internal

knowledge structure of information seekers (Lenski, 2010, p.91). The assumptions are adapted from the work of Brookes (1980), in which he assumed that subjective or objective knowledge structures are changed by information, and that information represents a small part of the knowledge structure (p.131).

The information and data principle is based on Mason's (1978) view of information as "a collection of symbols…that has the potential of changing the cognitive state of the decision-making entity" (p. 221). So, the symbols are the carriers of information in the information seeking process. Lenski (2010) explains, "pure data viewed as (syntactically) organized signs are only considered information in a suitable context, i.e., when endowed with an interpretation providing meaning" (p.92).

Information and meaning principle is essential for distinguishing between data and information that could make a difference and satisfying the information need within the context of the situation. The principle is based on Dretske's (1981) proposition that states "something only becomes information when it is assigned a significance, interpreted as a sign, by some cognitive agent" (p. vii). Hence, when cognitive agents communicate data (signs) through a channel, it is only considered information if it carries meaning (Lenski, 2010, p.92).

Formalization of information principle is, also, based on Brookes' (1980) information science formula shown in Equation 1, which maps the process of making the difference in the knowledge structure of information seekers. Where (K[S]) is the internal knowledge structure that needs to be changed by acquiring external information (**Δ** I). The difference is measured by (K[S+ **Δ**S]) , so the modified knowledge structure is (Lenski, 2010, pp.92-93).

$$K[S] + \Delta I = K[S + \Delta S]$$

Equation 1. Information science formula

Finally, Lenski (2010) includes tacit knowledge as one of the principles. Tacit knowledge is the subjective knowledge that has been implicitly acquired over time. It is different from explicit knowledge that has been explicitly learned and can be transferred to others. Tacit knowledge plays a role in filtering out the received external information that won't change the knowledge structure (i.e. will not make a difference).

2.3 Context and Situation

To better understand the process of information seeking, examining the cognitive view of information also requires examining the concepts of situation and context, because the concept of situation motivates a person to seek information at a specific moment of time, within a specific context, in order to satisfy an information need. Cool (2001) confirms that "in order to better understand information seeking behavior and information retrieval interaction, greater attention needs to be directed to the information spaces within which these activities are embedded" (p.5). Dervin (1997) describes context as "something you swim in like a fish. You are in it. It is in you" (p. 32).

Occasionally, researchers use the terms context and situation interchangeably (e.g., Allen, 1997, p. 119). In the primitive sense, context is "equivalent to an elaborated list of situational factors"; hence, the situational definition of context is "an elaborate specification of the environment within which information seeking is embedded" (Johnson, 2003, p. 739). Courtright (2007) indicates that context includes "elements that have a more lasting and

predictable influence on information practices than situation" and situation is "a potential part of context" (p.276).

Nevertheless, Sonnenwald (1999) provides a more specific definition in which context is "the quintessence of a set (or group) of past, present and future situations" (p. 3). On the other hand, a situation is "a set of related activities, or a set of related stories, that occur over time" (Sonnenwald, 1999, p. 3); hence, situations are the building blocks of context. The process of information seeking of the person-in-context happens within his or her "information horizon" that consists of:

> A variety of information resources such as: social networks, including colleagues, subject matter experts, reference librarians, information brokers, etc.; documents, including broadcast media, web pages, books, etc.; information retrieval tools, including computer-based information retrieval systems, bibliographies, etc.; and experimentation and observation in the world. (Sonnenwald, 1999, p. 8)

Similarly, Cool (2001) writes that "contexts are frameworks of meaning, and situations are the dynamic environments within which interpretive processes unfold, become ratified, change, and solidify" (p. 8). Allen and Kim (2001) assert that "the relationships between contexts, situations, and tasks are complex," contexts are "socially defined settings in which information users are found" (p. 1). For example, contexts could be a work setting, or a service setting where different situations may happen, because information seekers "may be situated in different ways in the context" (Allen and Kim, 2008, p. 2).

McCreadie and Rice (1999) define context as "the larger picture in which the potential user operates and the larger picture in which an information system is developed and operates and in which potential information may become available", and they suggest that "context includes all the precursors to information seeking such as the social, political, economic,

educational and experiential context of the individual" (p. 58). A situation is "the particular set of circumstances from which a need for information arises, along with the awareness, however unclear, that information may be useful in addressing the situation" (p. 59). McCreadie and Rice (1999) indicate that the subject knowledge of the information seeker will vary from situation to situation, which will be reflected on the process of information seeking, and would require different strategies that is represented through "the dynamic process of addressing the situation and includes both planned and unplanned actions, directions, interactions or discoveries" (p. 59).

According to Cool (2001), the concept of situation has been treated in six different ways in the information science literature. First, the problematic situation, in which the situation is considered to be an "individual-level internal cognitive state" (p. 9). Second, the socio-cognitive perspective in defining situation through understanding "the social basis of mind and ways in which meanings are constituted through interaction" (p. 9). Third, using the situation action model to "explain human action, in particular human-machine communication, as an interactive process that is responsive and adaptive to elements in the technology use environment" (pp. 9-10). Fourth, using the theory of Situation Awareness to "understand the cognitive processes, group dynamics, and communication behaviors through which individuals and team members develop and maintain correct and mutually ratified consensus about the state of affairs in complex, dynamic task environments involving interaction with information technology" (p. 10). Fifth, using the Person-in-Situation model to "explain how human information processing and decision-making capabilities, along with other individual variables, interact with situational level variables on task performance" (p. 10). Sixth, situation as an

information environment that examines situation by looking into the environment of information use such as “institutional, organizational, or work task settings; physical elements of the information resource environment; or situations of accessibility to information” (p. 10). For the purpose of this study, situation was treated based on the Person-in-Situation model that consolidates individual-level factors and situational-level factors to examine the process of information seeking behavior of investors.

2.4 Information Needs

Understanding the needs of information seekers is essential in providing the services and products that help them in satisfying their informational needs. Spink and Cole (2006) indicate that the concepts of information and information needs are essential survival tools for human beings (p. 33). Many researchers have attempted to define and examine the concept of information need in the literature of library and information science and other disciplines such as psychology, health sciences, political science, economics and management.

Nevertheless, understanding the information needs of humans has proved to be a challenging task for anyone, because informational needs could be unknown, unrecognized, undesired, misunderstood, unpredictable or multidimensional. Additionally, Wilson (1981) indicates that it is difficult to define information needs due to “the troublesome concept of information” (p.1). Accordingly, researchers must infer the information needs of people, because it is impossible to monitor information seekers during the process of information seeking and it is even more difficult to extract the exact needs from the minds of the people (Krikelas, 1983, p. 10; Belkin & Vickery, 1985; Green, 1990; Case, 2012, pp. 87-89).

Furthermore, Krikelas (1983) claims that suggesting a widely accepted definition of information needs is implicitly difficult, because it has tight relation with the concepts of information and information seeking and both concepts have many definitions and contexts (p. 6). Actually, examining the information seeking literature shows that information scientists didn't begin to focus on understanding the needs of information seekers until the 1960s (Fisher & Naumer, 2009, p. 2452). Savolainen (2012) argues, “situations in which people experience information need never manifest themselves abstractly, as time-space constellations of action *per se*”; however, examining and analyzing the situational elements could result in identifying the information need through “temporal and spatial constituents”, because “temporal and spatial constituents are particularly characteristic of situation” (p. 5).

Wilson (1999) suggests that human information needs are considered secondary to primary needs such as the ones described by Maslow (1943) and that is why the model can’t be used to theorize information needs (Wilson, 1999, p.252). Furthermore, Wilson (1981, 1999) says that the informational needs of individuals are situational (rely on personal, social, or role-related attributes), and influenced by temporal and environmental barriers. On the other hand, Derr (1983) rejects labeling information needs as situational state; he defines information need as “a relationship, which obtains between information and the information purposes of individuals. It is an objective condition rather than a psychological state” (p.276). Accordingly, the information seekers satisfy their needs “if and only if [they have] a legitimate or genuine purpose for the use of that information” (p. 277).

According to Fisher & Naumer (2009), the process of being informed is triggered by the human information needs (p. 2457). Krikelas (1983) suggests that event/environment

uncertainty generates information needs (p. 7); Thus, Krikelas distinguishes between immediate information needs, which are satisfied by information seeking, and deferred information needs, which are satisfied through information gathering (p. 8).

Grunig (1989) states that human needs in general are "characterized as an inner motivational state" (p.209, as cited in Case, 2012, p.78). Case (2012) analyzes information needs' motivators in the literature, and indicates that seeking answers, reducing uncertainty, and bridging knowledge gaps are among the most cited motivators of human information needs (pp. 81-87).

Green (1990) gives four characteristics of human needs. He states that a need is a "tool" that helps the person in context in reaching a "goal"; a need is "contestable" (unlike wants); finally, a need is a "necessity" and might carry a moral weight. The last point confirms the belief that it is difficult to examine and map human needs, because sometimes those needs are not even known to the person-in-context.

To understand human needs in context, Wilson (1997) examines the context of human needs, and proposes that context includes: needs for new information, needs to explain and confirm information, beliefs, and values held by individuals (p.553). Likewise, Savolainen (2012) examines fifty articles and papers related to the concept of information needs, and suggests three categories based on the major contexts of forming and reforming information needs in the literature of information seeking, the three contexts are: situation of action, task performance, and dialogue.

The "situation of action" context recognizes temporal and spatial factors as the main drivers of situations from which information needs arise. Wilson (1981) addresses the influence

of temporal factors on information seeking. He states that time delays in recognizing the information needs results in hindering the information seeking process (p.7). Savolainen (2012) states “Information need is conceptualized as a black-boxed factor that is assumed to trigger and drive the information seeking process in an undefined way” (p.10).

The “task performance” context is related to personal, social, or role-related tasks and problem solving processes. Savolainen (2012) examines the models of Wilson (1981, 1999) and Leckie, Pettigrew, and Sylvain (1996), and concludes that recognizing the information need is a structured process that results in summarized, but specific, requirements, because the needs are preceded by the problem recognition and expected results (p.10).

According to Savolainen (2012), a communication process between the information seeker and someone else, who might be able to satisfy the information need, represents the “dialogue” context (p.8). Savolainen, also, examined the models of Taylor (1962, 1968) and Lundh (2010) to determine the factors that influence the communication process. Savolainen (2012) finds that the factors include “the topic of conversation, the level of specificity in articulating questions, terminology used and the roles of the participants in a conversation” (p.10). He concludes “information need is shaped through the process of negotiation; thereby, information need may become subject to redefinition” (p.10).

2.5 Information Behavior and Information Seeking Behavior

In the 1990s, some researchers, or the “Old Guard” as termed by Bates (2009b), criticized using the term information behavior and justified that by saying that “information does not behave” (p.2382). However, the majority of the researchers in the field disregarded

the concerns of the Old Guard, and continued to use the term information behavior (Bates, 2009b, p. 2382). Wilson (2000) defines the information behavior as "the totality of human behavior in relation to sources and channels of information, including both active and passive information seeking, and information use" (p. 49).

Wilson then suggests that information behavior researchers should examine both active information seeking (e.g., dialogue with librarian), and passive information seeking in which people receive information without having situational needs (e.g., watching infomercials on TV, or monitoring) behaviors. Spink and Cole (2006) indicate that information behavior is characterized by active and purposeful seeking for information (p.25). Scientists suggest that behavior consists of two parts: an instinctive part, and a developing part that is influenced by the environment and experiences (Spink, 2010, p.39).

Although, Spink (2010) claims that information behavior is instinctive, Spink aligns the definition with the scientific suggestions by saying that behaviors are initially instinctive, until the behaviors change by environmental, cultural, political, and developmental factors (pp.40-41). Spink (2010) defines the concept of information behavior as:

> A cognitive process that is not taught, but it is innate to humans to the point that people are able to consciously understand that they need to undertake behavior processes of information finding, organizing and using to make sense of their environment. (p. 35)

As a cognitive process, information behavior is considered to be "a biologically secondary ability, a form of human intelligence, a socio-cognitive ability, underpinned by information processing" and "underpinned by human information processing capabilities, and has multitasking, coordinating and affective dimensions" (Spink, 2010, pp. 45-52).

Information seeking behavior is driven by the recognition of a deficiency in the person's knowledge structure to successfully deal with uncertainty in a situation or in an environment (Krikelas, 1983, p. 7). Spink and Cole (2006) consider information seeking as a subset of information behavior (p.25). Marchionini (1995) defines information seeking as "a process in which humans purposefully engage in order to change their state of knowledge" (p. 5), and he indicates that information seeking is "fundamentally an interactive process. It depends on initiatives on the part of the information seeker, feedback from information environment, and decisions for subsequent initiatives based on this feedback" (p. 17). According to Marchionini, information search is the "behavioral manifestation of humans engaged in information seeking" (p. 5).

Wilson (2000) defines the information seeking behavior as "the purposive seeking for information as a consequence of a need to satisfy some goal" (p. 49). Moreoer, he indicates that the micro-level of that behavior in which the information seeker interact with the retrieval systems, and judges the relevance of the retrieved results is known as the information searching behavior (p. 49). Afterwards, all "physical and mental acts involved in incorporating the information found into the person's existing knowledge base" (p. 50) is known as the information use behavior. For the purpose of this study, Wilson's (2000) definitions of information behavior, information seeking, information searching, and information use behavior were used.

2.6 Models of Information Behavior

This section reviews the information behavior models of Krikelas (1983), Ellis (1989), and Wilson (1999). All three researchers are highly respected researchers in the field of information behavior, and their models are considered among the most cited models in the information science literature. Furthermore, all three models are categorized as decision-based models, which is within the scope of this study. Finally, all three models are a result of years of development and empirical work, and the models are still being utilized to map the information behavior of individuals in different contexts.

2.6.1 Krikelas' Model of Information Seeking

Krikelas' (1983) model of information seeking behavior examines the elements of the information seeking activity, and explains the effect of external factors, such as uncertainty, on information seeking, information gathering, and information giving. (See Figure 1) The model depicts information seeking behavior in 13 processes in order to establish a unified framework for user studies. Krikelas defines information seeking behavior as "any activity of an individual that is undertaken to identify a message that satisfies a perceived need" (p. 6), and suggests that a need is the "recognition of the existence of uncertainty" (p. 8). That uncertainty is a direct result of environmental elements (e.g., personal, job related, etc.), or a dramatic event (p.7). Accordingly, the process of information seeking starts when someone believes that his knowledge is not enough to satisfy the need, and consequently eliminate, or reduce the uncertainty (p. 7).

Krikelas's (1983) flowchart maps the activities of information seeking, information gathering, and information giving in a single direction. In order to describe those activities, the model distinguishes between two types of realized needs based on the immediacy and nature of the problem that created the uncertainty perception. The first type is an immediate need, which motivates the individual to deal with a specific problem. The second type is deferred (potential) information need, which is described as "unconscious, hidden under layers of attitudes, impulses and values" (p. 8); deferred needs are continuous and don't need to be immediately satisfied. It is important to notice that the model doesn't address unconscious and unrealized needs, because empirical examination of such internalized needs is impossible.

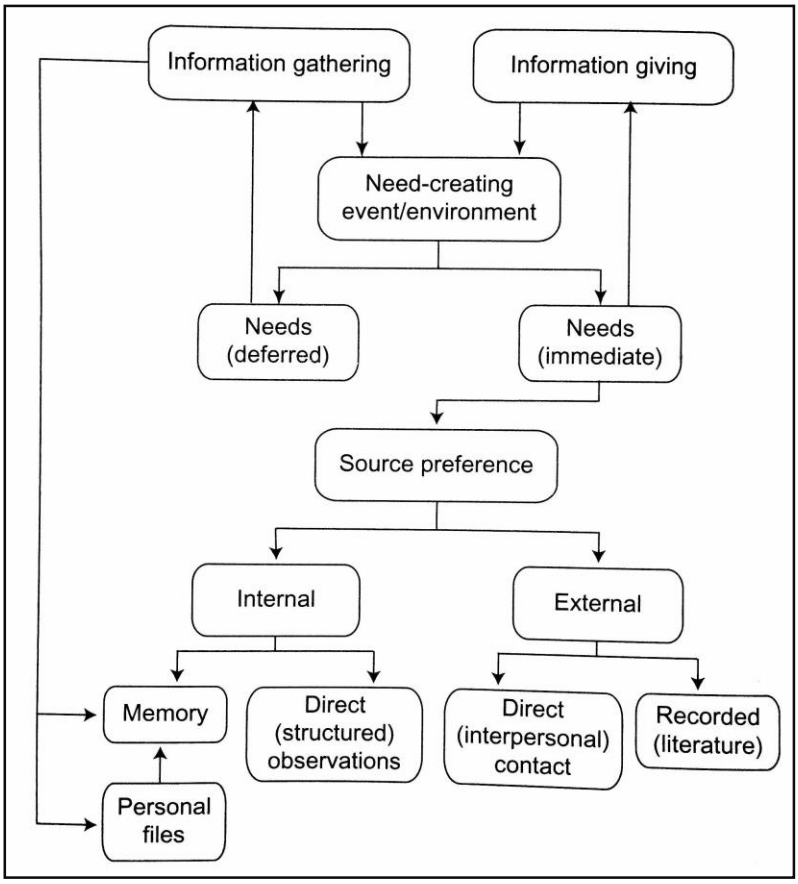


Figure 1. Krikelas' (1983) model of information seeking.

Krikelas (1983) indicates that the information seeking process is activated by immediate information needs. However, the process of information gathering addresses deferred information needs; Krikelas (1983) defines information gathering as the process through which individuals "continually construct a cognitive environmental 'map' to facilitate the need to cope with uncertainty" (p. 9); hence, information gathered is stored in the individual's internal sources such as memory or personal files to be retrieved when needed to deal with future uncertainty. Finally, the process of information giving represents "disseminating messages" in many forms such as text, verbal, visual, or tactile (p.13), so, the process of information giving represents any information that acquired through contact with an external source of information.

Afterwards, Krikelas (1983) utilizes the nature and immediacy of the need to categorize information resources. According to the model, information sources are categorized into internal sources, and external sources. Internal sources of information represent information generated by the individuals through either stored information (p. 14), or through observations. External sources of information include direct interpersonal contact with an expert (e.g., a librarian), and recorded literature (p. 15). According to Krikelas, the process of satisfying an immediate need or a deferred need can have one of the following outcomes: the process ends as a result of finding information that eliminates uncertainty, the processes yields no information in the first cycle so another cycle is needed, the process continues but with a refined information need, or a new source of information is utilized to find information (p.15).

Henefer & Fulton (2005) describe Krikelas's model as "a turning point in the field of user studies, establishing a new criteria of to guide research into information seeking" (p. 225), which makes it one of the most cited models of information behavior; specially, because it was developed through years of research and field work in libraries (p. 227). Krikelas's (1983) decision-based model is a general, and simple flowchart. It is one of the first information seeking models that emphasize the influence of uncertainty on information needs, and categorizes those needs immediate needs and deferred needs. The model highlights the role of personal knowledge structure as an internal and most preferred source of information (Case, 2012, p. 140).

Furthermore, the model sources of information such as memory, structured observations and use of literature where other models do not. Krikelas' (1983) model is characterized as a general model of information seeking, and it provides a very detailed explanation for the processes, which helps in mapping the individual information seeking behavior. However, there are no feedback loops, so it doesn't address the user's action in case of poor outcomes. Also, there is no interaction between the main processes in the model, and the role of information giving is vague. Finally, the model doesn't show information seeking as a process, so no one can determine its relation to other processes by looking at the diagram.

2.6.2 Ellis's Information Seeking Behavior Model

Ellis (1989) developed a behavioral model that is based on analysis of the information seeking patterns of academic social scientists. The analysis of the observed patterns during the interviews with the scientists was based on grounded theory research method to inductively

drive the categories and determine if further data collection is needed. The relationship among those categories is not linear; hence, the categories and the properties are the building blocks of the flexible behavioral model. Elis (1989) indicates that not all researchers follow the same pattern and some of the researchers may not follow all the activities as mapped in the model.

Ellis's (1989) model is a textual model that consists of the following eight activities: starting, chaining, browsing, differentiating, monitoring, extracting, verifying, and ending. The first activity is starting, which represents the beginning of the information seeking process (p. 238). Secondly, chaining, which means "following chains of citations or other forms referential connection between material" (p. 238). Chaining of references could be either backward or forward (p. 241). The third activity is browsing through which the information seeker conducts a "semi-directed or semi-focused searching in an area of potential interest" (p. 238). However, random browsing is excluded (p. 241). The fourth activity is differentiating in which the information seeker filters the information sources based on the "nature and the quality of the material examined" (p. 238). Differentiating can be utilized as strategy to "restrict a search to a limited number of sources or types of source, to exclude certain sources or types of source from the search, and to rank material identified by source or type of source" (p. 242). Fifth, monitoring, which requires "maintaining awareness of developments in a field through the monitoring of particular sources" (Ellis, 1989, p. 238). Sixth, extracting, by which the information seeker systematically examines "a particular source to identify material of interest" (p. 238). Seventh, verifying by checking the accuracy of information" (Wilson, 1999, p. 254). The last activity in the model is ending by which the information seeker ties up "loose ends through a final search" (Wilson, 1999, p. 254).

Although, the model doesn't addresses the influence of cognitive nor affective factors on the information seeking behavior of individuals (Ellis, 2009, p. 140), it is considered of the most cited models in the literature of information seeking behavior, and it has been successfully applied to map the information seeking behavior of individuals with different roles and tasks in many disciplines. The success of the model is due to the extensive empirical research during the development phases of the model (Wilson, 1999; Ellis, 2009).

2.6.3 Wilson's (1997) General Model of Information Seeking Behavior

Wilson's (1997) general model of information behavior is based on an analytical study of human information behavior to examine information seeking behavior of social workers and their managers (Wilson, 2005, p. 33). In 1981, Wilson introduced the original model, but it went through many phases of development to add more levels of detail through 20 processes, and to incorporate theories from different disciplines such as psychology, health communications, organizational decision making, information systems, and marketing (see Figure 2). Wilson (1999) added a feedback process, which is essential to address the problems in the information seeking process (p. 267).

Wilson (1997) explores the information behavior of the person-in-context that faces a situation that increases his sense of uncertainty, which increases the stress level, and requires further information that the person doesn't have in order to cope with that situation within the context. Similar to Dervin (1983), Wilson assumes that an information need as a direct result of identifying a gap in the knowledge structure of the information seeker. Hence, Wilson (1997) details what he calls the "activating mechanisms" to define attributes that would affect the

person's information seeking motivation to proceed and satisfy the information need, which could be the need for new information, the need to confirm current information, the need to explain information, the need to confirm own beliefs and values, or the need to explain own beliefs and values. However, Wilson (2000) considers information needs secondary needs, which should be satisfied after primary needs such as safety and hunger.

The first set of activating mechanisms includes elements borrowed from the theories of stress and coping. Stress is defined as "a relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and as endangering his or her well-being…Stress is a particular relationship between the person and the environment" (Folkman, 1984, p.840). For individual investors, stress could be dramatic events in the stock market, which may cause huge financial losses. Stress is correlated with the individual's ability to predict the event and the possible effects where having maximal information reduces the stress levels while having minimal information about the event increases the stress levels (Wilson, 1997, p. 554).

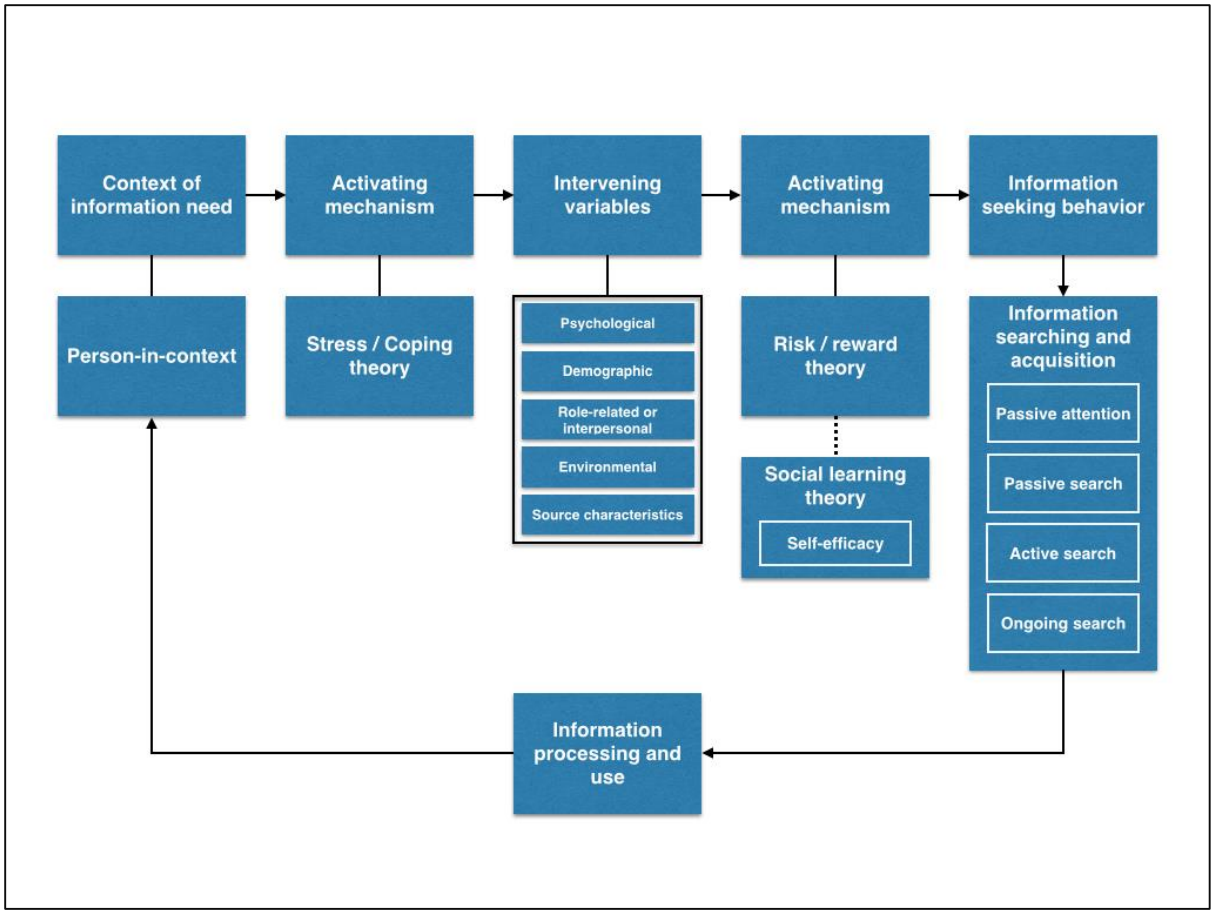


Figure 2. The general model of information behavior – Wilson (1997).

Coping with stressful situations is the "cognitive and behavioral efforts to manage (master, reduce, or tolerate) a troubled person-environment relationship" (Folkman & Lazarus, p.152). Wilson (1997) incorporates the theories of stress and coping as a theoretical approach to examine the stress level associated with the gap that triggered the information need. Specifically, the stress level guides the person's decision to either proceed and fill the gap and satisfy his or her information need by utilizing problem-focused coping strategies (i.e., information seeking) to change the circumstances of the situational need, or regulate his or her emotions and distress through emotion-focused coping (Folkman & Lazarus, p.152).

If the person-in-context decides to follow the problem-focused coping strategies, then, his or her information seeking will be influenced by what Wilson (1997) calls intervening variables. Although, these intervening variables are shown as one of the processes in the model, the variables could affect the person-in-context during all the stages of the information seeking behavior. Intervening variables could be psychological, physiological, cognitive, emotional, educational, demographic, social, interpersonal, situational, environmental, and barriers related to the information source itself.

Psychological barriers include cognitive dissonance in which conflicting cognitions make the person-in-context uncomfortable, and lead him or her to seek information to support or change current knowledge, values, or beliefs. Psychological intervening variables, also, include selective exposure and cognitive avoidance that might result in biased information seeking behavior and result in ethical dilemmas especially for information providers (Wilson, 1997, p. 557). Educational and cognitive variables are related to the knowledge base of the person-in-context, and may cause risky behaviors. Wilson (1997) explain that by saying that unlike actual knowledge, the person's perceived knowledge about an important matter makes that person form biased perceptions about his or her knowledge regarding that matter (p. 558). Cultural barriers affect the process of information acquisition as a result of differences related to power distance preferences, uncertainty avoidance, individualism-collectivism, masculinity-femininity, and long- or short-term orientation to life (p. 560).

The next process in Wilson's (1997) model includes the second set of activating mechanisms that are based on the risk and reward theory (Settle & Alreck, 1989; Murray, 1991). The risk and reward theories define a range of possible risks such as performance risk,

financial risk, physical risk, social risk, ego risk, safety risks and time/convenience loss risks (Wilson, 1997, p. 563). The risk and reward mechanism measures the influence of financial, psychological, and physical resources on the activity of information seeking. So, the information seeker compares the feasibility of the information seeking activity against the resources used; the information seeking would be reduced, delayed, or even ended if the utility of the activity is less than the resources used. Wilson (1997) indicates that the active searching for information is motivated by high levels of risk and uncertainty, and it takes place before making the decision of purchasing a product or service (p.563).

The second element of the activating mechanism is the social learning theory (Bandura, 1971), and the self-efficacy theory (Bandura, 1977). Under the assumptions of the social learning theory and the self-efficacy theory, the person-in-context has an outcome expectancy, which helps him or her to realize that a behavior results in a certain outcome, and efficacy expectancy, which is person's belief that he or she can successfully execute the required behavior to produce that certain outcome. That belief is based on the person's performance accomplishments, verbal persuasion (i.e., self-instruction), physiological states, and vicarious experience (Wilson, 1997, p.563).

Self-efficacy affects the person's choice of the coping mechanisms discussed earlier, because if the person believes that he or she knows the right behavior to produce a certain outcome and believes that he or she capable of executing that behavior, then, he or she will choose problem-focused coping rather than settling with emotion-focused coping (Wilson, 1997, p. 563).

Consequently, the person-in-context begins the information searching and acquisition process by setting goals, selecting an appropriate text, extracting and integrating information with prior knowledge, and finally evaluating the situation (Wilson, 1997, p.564). According to Wilson's definition of the information seeking behavior, the main information seeking method is active search by which "an individual actively seeks information" (p. 562); however, the model identifies other search and acquisition behaviors such as passive search, passive attention, and ongoing search.

Passive search, which signifies those occasions when one type of search (or other behavior) results in the acquisition of information that happens to be relevant to the individual" (p. 562). Passive attention, which is the unintentional information acquisition without intentional seeking (e.g., watching TV). After, actively searching for information, which results in establishing one's basic framework of knowledge, ideas, beliefs, or values, *ongoing search* expands or updates one's framework (p. 562).

The final step of the model is information processing and use, in which the needs of the person-in-context are satisfied and the gap in the knowledge structure is resolved by incorporating the information in the knowledge framework, beliefs or values. However, Wilson mentions that acquiring the information doesn't necessarily means that it will be used or processed, because information processing is subjective, and it is a mental process (Wilson, 1997, p.567). Wilson (1999) suggested that the information behavior model should include *feedback loops* by which the information seeker can deal with communication problems such as unexpected outcomes (p. 267).

For the purpose of this study, Wilson's (1997) was used as a framework to examine the information behavior of individual investors in the SSM, who are facing financial uncertainty, in a non-advisory context, because Wilson's model is a methodological model that fits many research objectives (Wilson, 1999, 257). Furthermore, the model empathizes on the information needs of the person-in-context under uncertainty, and incorporates the elements of Ellis's (1989) behavioral model to analyze the information searching and acquisition behavior of the person-in-context. Therefore, the model provides a comprehensive framework to answer questions related to some of the factors that affect the information behavior of investors during the process of financial decision-making such as: why some intervening variables, or barriers affect information seeking behavior more than others? What is the magnitude of their effects? Why some sources of information are used more than others? (Case, 2012, p. 155).

Wilson (1997) suggests that extending the model is possible; he says "there are analytical concepts, models and theories that need to be absorbed into information science as a matter of urgency" (p. 570). Accordingly, extending the model by incorporating behavioral biases had a great value on understanding individual investors' behavior, and it added to the field of information science, since building on previous work would help in moving from decision-based models towards causal models.

2.7 Information Economics

In 1961, George Stigler, winner of the Nobel Prize in Economics, said "knowledge is power" (p.213) and identified information as "valuable resource", but during that period neither academics nor economists considered taking information out of its "shy" place in the

economics field. Stigler sarcastically described information being trapped in a “slum dwelling” in the town of economics (p.213). Machlup (1962) is considered to be one of the first economists to attempt to examine and conceptualize information and knowledge economics. According to him, in 1958, the information economy represented about 29% of the US gross national product.

It wasn't until the 1970s, after the World War II, when developing countries began to believe that investing in information and communication technologies was an important factor for the economic development. Researchers started to consider the economic significance of information along with other economic resources such as capital, labor and raw material (Capurro & Hjørland, 2003, p.343), which led to the rise of the information economics as a field that examines different aspects of information, such as the products, the domain, and the functions.

Stiglitz (2000) describes the interest in studying information economics as “one of several departures from the standard paradigm that have provided important insights-views of the world … [better than] competitive equilibrium models that dominated economic theory during much of this and the preceding century” (p.1470). Furthermore, Stiglitz believes that the significance of the field of information economics lies in recognizing the significance of information goods (p.1448).

Braman (2006) indicates that “economic products and processes have always involved information, but technological innovation has changed society in such a way that information is now at the center of economic thinking and practice” (p.3). Researchers use two aspects to examine the economic behavior of information: the “economics of information’ and the

"information economics." The economics of information examines the decision making process under uncertainty and the nature of risk-taking at the microeconomic level. On the other hand, information economics examines the informational issues at the macroeconomic level. However, both aspects study how to understand information creation, processing, flows, and use from an economic perspective (Braman, 2006, p.3).

2.7.1 Information Goods as a Production Factor

Jones and Mendelson (2011) examine markets for information goods and conclude that they are significantly different from markets for industrial goods, because information goods have some unique properties due to the fact that they are considered "a collection or a bundle of many heterogeneous goods and services that together comprise an activity" (Porat, 1977, p.2). According to Porat (1977), an information market:

> Enables the consumer to know something that was not known beforehand, to exchange a symbolic experience, to learn or relearn something; to change perception or cognition, to reduce uncertainty, to expand the range of options, to exercise rational choice, to evaluate decisions, to control a process, to communicate an idea, a fact, or an opinion. (p. 22)

Porat (1977) emphasizes that the final product of information markets is knowledge, which can be used as input to produce another output. Porat differentiates between the primary information sector and the secondary information sector. The primary information sector consists of entities that produce, process, disseminate or transmit information goods and information technologies (p.15). The primary information sector includes eight classes: knowledge production and inventive industries, information distribution and communication industries, risk management industries, search and coordination industries, information

processing and transmission services, information technologies, and government and support facilities (p.15). The secondary information sector includes activities related to using acquired information as an input in the production of non-informational goods or services that are used in the planning, coordinating, monitoring, or evaluating of both public and private activities (p.16).

In information markets, transactions have two dimensions: the content and the infrastructure. The chief economist at Google, Hal Varian, defines the content aspect as the analog and digital containers of information goods (i.e., formats), such as books, magazines, software, games, stock quotes, web pages, movies, music, telephone conversations, images, and data (Varian and Shapiro, 1998, p. 106). The information infrastructure describes all the technologies that facilitate collecting, recording, processing, transmitting, distributing, and using different formats of information. Infrastructure technologies include, but are not limited to, computers and hardware platforms, enterprise resource planning tools, and telecommunication equipment such as servers, routers, and hubs (Belleflamme, 2005). Hirshleifer, J. (1973) categorizes behaviors of both possessors and seekers of economically valuable information (p. 32).

Possessors of information could privately use it, sell it, gratuitously provide it, or use it to deceive information seekers. On the other hand, information seekers could get information through internal sources, or external resources. Accordingly, information goods are exchanged in the information market based on the laws of supply and demand (Marschak, 1959; Porat, 1977). The supply and demand prices are subject to factors such as the expected benefits of

utilizing the information good in the decision-making process, and costs of producing the information goods.

Furthermore, the influence of information goods on the economic system can be measured by considering spatial and temporal constraints, and by examining certain attributes. Some of these attributes include technological and market uncertainty, abundance vs. scarcity of information, relevance, content parameters, and applicability (Hirshleifer, 1973, p.33). Spence (1974) asserts that information goods and uncertainty are "inseparable, the latter being merely a reflection of the former" (p.58).

Additionally, Spence (1974) believes that information goods have "odd properties" (p.67), which makes measuring their effect on the economic growth a complex task (p.72), because information is communicated through multiple channels such as salesmen, advertisements, price movements, reputation of brand names, and users' personal experience (p.74). Wilson (1973) explains the situational relevance of information as:

> Relevance in relation to particular concerns. Those concerns change over time, orders of preference change, and features cease to be, and come to be, of concern. So what is situationally relevant today may not be so tomorrow, and what is irrelevant today may be relevant tomorrow. (p.463)

Clearly, the situational relevance of information has a great impact on the value of information, and the price of information.

Defining cost, value, and amount of information is essential for measuring the economical influences of information goods. Marschak (1959) distinguishes between the terms amount of information, value of information, and cost of information. The cost of information is determined by the supply price of information, which is the lowest price that an information provider is willing to accept in order to cover the costs of production incurred to supply that

information good (pp. 80-81). The payoff realized by the information seeker upon receiving the information is known as the value of information, which determines the demand price of information that is the highest price that an information seeker is willing to pay for an information good in order to maximize his expected payoff function (utility). Factors like time, importance, usefulness, income, location, and relevance affect that price.

Shannon's information theory provided "a magic key to multidisciplinary understanding" (Aftab, Cheung, Kim, Thakkar, and Yeddanapudi, 2001, p.2) of information as a quantitative amount. This held a direct impact on the fields of communication and information technology (Luenberger, 2006, p.9), biology, and chemistry, (Rapoport, 1953, p.170) as well as an indirect impact on social & behavioral sciences (bates, 2009a, p.2350). Furthermore, Shannon's (1948) entropy theory has attracted a widespread interest in information economics to model the conditional distribution and make statistical inferences regarding attributes such as uncertainty, curiosity, and relevance (Marcshak, 1959; Hershliefer, 1973; Arrow, 2009; Chen, 2004, 2005; Kim, Lee, & Min, 2013). Marschak (1959) suggests utilizing Shannon's (1948) entropy to define and measure the information amount that is available to information seekers and measure the uncertainty attributes of that information. Hence, entropy can be used to measure the effect of "lack of information" on the economic system.

Hirshleifer (1973) explains information seekers' uncertainty, it is "the dispersion of individuals' subjective probability (or belief) distributions over possible states of the world. Information…consists of events tending to change these probability distributions" (p.31). On the other hand, entropy can be minimized when the information seekers have the ability to determine which information would be sufficient enough to satisfy their needs. However, the

cost of that information good would be higher, because it would have a higher production cost. It important to note that individuals rank the sufficiency of information goods based on their individual utility function, which is a subjective process (Marschak, 1959, p.86). Hence, information seekers with identical needs could end up choosing different resources (Matejka & McKay, 2015, p. 274).

2.7.2 Behavioral Effects of Information Goods (Information Asymmetry)

In 1970, George Akerlof, also a winner of Nobel Prize in Economics for his analysis of markets with asymmetric information, analyzed how asymmetric information negatively affects the market, and suggested the use of certain mechanisms to reduce uncertainty. Akerlof (1970) communicates the idea using the second hand and new automobile market as an example. In fact, Spence (1974) argues that information asymmetry leads to informational gaps and consequently having "inefficient market performance and in some instances to the collapse or non-existence of the market" (p.58). Spence indicates that information asymmetry triggers behaviors such as signaling and adverse selection by the economic agents (p.59).

The sellers of the cars have more knowledge about the quality of a car than the buyers. But for buyers, it is impossible to tell the difference between good cars and bad cars (lemons). Hence, the sellers try to sell both good and bad cars at the same price. Since both bad cars and good cars sell at the same price, it is fruitful for the sellers to just sell the lemons (which are less costly for the sellers), which can drive the good cars out of the markets. Since the buyers don't know the quality of cars; they form general impression of all the cars on sale; hence, the buyers

are willing to pay the price of average quality of cars. This discourages the good cars from being sold, which drives down the quality of the entire car market (Akerlof, 1970, pp. 489-492).

Information asymmetry can be perceived in insurance too. The buyers of the policy know their health status very well, but the insurance company does not have access to the individual's health information. Therefore, low policy prices will attract customers who will need more medical care, which will drive up the insurance costs associated with these policies. As the insurance cost goes up, more and more healthy people opt out due to an increasingly high policy prices. This leaves the market with more people with health issues who are willing to buy expensive insurance. Again, this drives up the cost of insurance policies, and thus the above situation repeats until the market vanishes. To counteract this adverse selection issue, insurance companies tend to increase policy prices for people as they age.

2.8 The Stock Market

Financial markets can be classified based on the kind of financial claims traded in these markets. For example, there are stock (equity) markets, and capital (debt) markets in which short-term debt instruments, or long-term debt instruments are traded. Newly issued financial instruments are traded in the primary markets, while previously issued financial instruments are traded in the secondary markets (Fabozzi, 2008b, p.6).

A share of ownership, or equity, in a firm is referred to as a stock. Firms issue stocks to investors to raise capital, which is used to finance new projects, expand production, support research and development, or pay debt. However, few investors would keep their investment in that firm indefinitely; hence, stock markets provide a way for these investors to trade their

shares for cash. In the trading process, the stocks are not transformed or dissolved, but transferred to a new investor through market dealers and brokers (Fabozzi, 2008a, p. 13; Teweles & Bradley, 1998, p. 3).

Investors in financial markets can be either institutional investors or individual investors. According to Stoll (2003), institutional investors (e.g., pension funds, mutual funds, foundations, and endowments, etc.) own and control the majority of financial assets, and execute high volume transactions. Because of this, they dominate the financial markets. On the other hand, individual investors execute more trades, but trade in lower volumes (Stoll, 2003, p. 560).

In 1954, the New York Stock Exchange (NYSE) conducted a survey to discover what motivates investors into owning stocks. The reasons were: long-term growth of capital, dividend payments, and hedging against inflation (Teweles & Bradley, 1998, p. 8). Most of those reasons are still valid today, in addition to other reasons such as the ability to control firms through owning voting shares. Fabozzi (2008a) suggests that investors manage their portfolios through the following processes: "setting investment objectives, establishing the investment policy, selecting the portfolio strategy, constructing the portfolio, and evaluating performance" (p. 16).

The process of trading stocks has four elements. The first is information regarding past prices and current quotes of orders placed in the market. Secondly, a mechanism for routing orders between dealers and the stock exchange. The third element is execution of orders by dealers. Lastly is the clearing of transactions between buying and selling brokers, and settlement of cash payments (Stoll, 2003, p. 563). Investors can only trade their stocks through

dealers where the investors buy stocks at the dealers' ask-price, and sell stock at the dealers' bid-price.

The ask price is the price that the dealer is willing to sell the stock at, and the bid price is the price that the dealer is willing to buy the stock at. The market liquidity is determined by the bid-ask spread, which is the difference between the bid price and the ask price. Some of the factors that determine the bid-ask price include order-handling costs, non-competitive pricing rules by market makers, inventory risk of market dealers, new prices of placed orders, and the effect of asymmetric information. The latter will be discussed later in the literature review. (Stoll, 2003, p. 563).

There are various risks associated with stock ownership such as: total risk, systematic risk, unsystematic risk, inflation risk, liquidity risk, and currency risk. Total risk is the risk that investors assume when the actual return is less than their expected return; hence, holding a diversified portfolio minimizes the total risk. Total risk is a function of both systematic risk and unsystematic risk (Fabozzi, 2008a, p. 11). Systematic risk is the "the minimum level of risk that can be attained for a portfolio by means of diversification across a large number of randomly chosen assets… [It] results from general market and economic conditions that cannot be diversified away" (Fabozzi, 2008a, p. 12). Unsystematic risk is the "the portion of an asset's variability that can be diversified away [it] is unique to a company, such as a strike, the outcome of unfavorable litigation, or a natural catastrophe" (Fabozzi, 2008a, p. 12).

Inflation risk, or purchasing power risk, "arises because of the variation in the value of an asset's cash flows due to inflation, as measured in terms of purchasing power" (Fabozzi, 2008a, p. 12). For example, if the expected return of the asset is 7% and the inflation is 3%,

then the purchasing power of the investor is 4%; hence, any increase in the inflation rate would affect the purchasing power. Liquidity risk arises when investors sell their shares, understanding that the price could be less than the fundamental price of the asset. Liquidity risk is measured as "the size of the spread between the bid price, and the ask price; the wider the bid-ask spread, the greater the liquidity risk" (Fabozzi, 2008a, p. 13). Finally, currency risk is "the risk of receiving less of the domestic currency than is expected at the time of purchase when an asset makes payments in a currency other than the investor's domestic currency" (Fabozzi, 2008a, p. 13).

Dailami and Atkin (1990) indicate that firms that issue stock shares benefit from risk sharing (i.e. sharing the profits or the losses) because the risks associated with new projects can be spread across many stockholders who can minimize the risk through holding diversified portfolios. However, one of the disadvantages of widening the ownership of the firm is the dilution of control, as well as the severe informational asymmetry between the managers, and the stockholders (pp. 24-25). According to Dailami and Atkin, the control issue is one of the reasons why some family-owned firms don't go public, especially in developing countries (p. 25).

Obstfeld (1994) argues that risk sharing through riskier high-yield capital can have positive effect on the growth of the economy (pp. 1326-27). Similarly, Devereux and Smith (1994) suggest that risk sharing has a positive impact on the economy when the risk is related to the rate-of-return uncertainty (p. 546). Saint-Paul (1992) linked the riskiness of the financial portfolios to the viability of the financial market; therefore, although strong financial markets

are riskier, they have a greater impact on the economy than the impact that underdeveloped financial markets (p. 765).

Bayar, Kaya, and Yildirim (2014) found that the economic growth in Turkey is positively affected by the stock market development. Furthermore, Bayar et al. (2014) determined that there is a long run relationship between stock market development and the economic growth. Therefore, stock markets accelerate growth by "facilitating the ability to trade ownership of firms without disrupting the productive processes occurring within firms, and allowing investors to hold diversified portfolios…. The more resources allocated to firms, the more rapid will be economic growth" (Levine, 1991, pp. 1458-59). However, Bosworth, Hymans, and Modigliani (1975) argue that even though stock markets and economic activities might follow similar cycles, that phenomenon does not imply a causal relationship between stock markets and the economy. Hence, analysts should not use only major economic cycles when studying the behavior of stock market, because they would be ignoring periods in which the economy was stable while there were volatile fluctuations in the stock market (p.258).

According to Arestis, Demetriades, and Luintel (2001), stock markets have many positive effects on the economy such as encouraging specialization, information acquisition, and dissemination, reducing the cost of transferring savings, and accelerating investment opportunities (p.18). Furthermore, stock markets enhance the corporate governance in firms through aligning the interests of managers and shareholders (Arestis et al., 2001, p.18).

Fabozzi (2008b) defines three major economic functions of stock markets. First, they facilitate the price discovery process by which investors can determine the price of the traded asset, and indicate to the firms the investors' required rate of return. Second, organized stock

markets reduce the cost of acquiring information that helps the investors in evaluating the financial health of firms, as well as forecasting the future cash flows of operations. Third, stock markets give the opportunity to investors to trade their financial instruments when they are forced or motivated to sell those instruments; hence, stock markets offer instant liquidity to investors (Fabozzi, 2008b; Bencivenga, Smith, & Starr, 1996). Holmström and Tirole (1993) indicate that market liquidity affects the amount of information embedded in the stock price, which helps investors in monitoring the performance of managers in the firms (p. 18).

2.9 Traditional Finance vs. Behavioral Finance

The traditional finance paradigm examines the consumption and investment decisions of individuals and firms in order to explain their process of decision-making. The main pillars of traditional finance are: the expected utility theory (EU), the portfolio selection theory, the capital asset pricing model (CAPM), the arbitrage pricing theory (APT), The Black–Scholes options pricing model, and the efficient market hypothesis.

The expected utility theory proposed by Neumann and Morgenstern (1947) defines the axioms of choice under uncertainty, which are: completeness, transitivity, measurability, ranking, and independence. According to the theory, the rational decision-making behavior requires that “all individuals are assumed to always make completely rational decisions”, and “people are assumed to be able to make these rational decisions among thousands of alternatives” (Copeland, Weston, Shastri, and Katz, 2005, pp. 68-72). Rationality also implies not only that investors should update the conditional probability distribution of their beliefs based on Bayes’ law whenever they receive new information, but that the investors have

enough subject knowledge about the economic activity in order to know the correct conditional distribution of the variables (Pitman, 1997; Thaler & Barberis, 2005).

The portfolio selection theory of Markowitz (1952) inspired the development of the CAPM model, which was developed independently by Treynor (1961), Sharpe (1964), Lintner (1965), Mossin (1966), and Black (1972). Theoretically, the CAPM is used to determine the proper measures of risk for any financial asset, the market price of risk, and the required rate of return for financial assets. To achieve that goal, the CAPM assumes that all investors are rational and risk averse, that there is perfect competition in securities markets (i.e., all investors are price takers), there is no transaction costs for trading, there are no taxes, all investors can borrow and lend unlimited amount at the risk free rate, all financial assets are perfectly divisible and marketable, there are no constraining regulations, all markets are frictionless, and all markets are informationally efficient (i.e., information is costless and symmetric). Obviously, those assumptions are only applicable in a hypothetical world with perfect financial markets (Copeland et al., 2005, pp. 169-170).

The arbitrage theory is an asset-pricing model that is similar to the CAPM, but more general. Ross (1976) created the APT, which assumes that the rate of return on any financial asset can be predicted by identifying the macroeconomic and common risk factors that affect the return of that financial asset. Arbitrageurs utilize the APT to profit from mispriced financial assets (Copeland et al., 2005, pp. 198-202). In theory, arbitrage is costless and risk free because the arbitrageur "buys a cheaper security and sells a more expensive one, his net future cash flows are zero for sure, and he gets his profits up front. However, the process of executing

arbitrage contracts requires sophisticated knowledge, and a lot of financial resources in order to take profitable positions (Shleifer and Vishny, 1997, pp. 35-36).

The Black–Scholes options pricing model was developed by the economists Black and Scholes (1973), and Merton (1973) in order to calculate the theoretical prices of financial derivatives by using theories from mathematics and physics (e.g., the Brownian motion). Chance and Brooks (2010) define derivatives as "financial instruments whose returns are derived from those of other financial instruments… their performance depends on how other financial instruments perform" (p. 1). The options pricing model is one of most well-known financial models, and it is widely used by options traders to price financial derivatives, and to hedge against risk (Copeland et al., 2005, p. 250).

Fama (1970) uses the efficient market hypothesis to define the efficient capital markets as the markets in which "the current price of a security obviously 'fully reflects' all available information" (p. 387). Fama argues that the sufficient, but not necessary, conditions for that kind of efficiency are "no transaction costs in trading securities", "all available information is costlessly available to all market participants", and "all agree on the implications of current information for the current price and distributions of future prices of each security" (p. 387). He then adds "the market may be efficient if 'sufficient numbers' of investors have ready access to available information" (p. 388).

Furthermore, Fama argues that "disagreement among investors about the implications of given information does not in itself imply market inefficiency" (p. 388). Based on theoretical and empirical work of Fama (1970), he asserts that stock prices adjust to the available

information, hence, the capital market efficiency can be classified into three sub-categories: weak-form efficiency, semi-strong-form efficiency, and strong-form efficiency.

Under the weak-form market efficiency hypothesis, the market is efficient and stock prices reflects all available information, so the past market returns do not have any effect on the future market returns (Fama, 1970, p. 389; Copeland et al., 2005, p. 377). Under semi-strong-form market efficiency hypothesis, no investor can earn excess returns by trading rules based on publicly available information, because prices adjust instantaneously without any bias (Fama, 1970, p. 404; Copeland et al., 2005, p. 377). Finally, under strong-form market efficiency hypothesis, no investor can earn excess returns by trading strategies developed by using neither public nor private information; hence, prices will fully reflect all information even if corporate insiders and specialists hold it (Fama, 1970, p. 409; Copeland et al., 2005, p. 377).

In fact, only few of the theories and models reviewed in the previous paragraphs are consistent with empirical evidence. Fama and French (2004) criticize the CAPM, and suggest that “the CAPM's empirical problems may reflect theoretical failings, the result of many simplifying assumptions” (p. 25). Rather, Fama & French warn that “the failure of the CAPM in empirical tests implies that most applications of the model are invalid” (p. 26).

Grossman and Stiglitz (1980) examine the efficient market hypotheses, and argue that stock “prices reflect the information of informed individuals (arbitrageurs) but only partially, so that those who expend resources to obtain information do receive compensation” (p. 393). Moreover, Grossman and Stiglitz (1980) refute the efficient market hypothesis assumption of costless information, because only costly information can have an effect on stock prices in competitive markets (p. 404). Then, they argue that:

> Equilibrium in stock prices happens either when information is very inexpensive, or when informed traders get very precise information, then equilibrium exists and the market price will reveal most of the informed traders' information. However, …such markets are likely to be thin because traders have almost homogeneous beliefs. (p. 404)

Accordingly, information has a qualitative value. Grossman and Stiglitz conclude by stating "there is a fundamental conflict between the efficiency with which markets spread information and the incentives to acquire information" (p. 405).

De Bondt and Thaler (1985) examine if investors overreact to new, unexpected, and dramatic news events. The findings of the study support the overreaction hypothesis. 36 months after the portfolio formation losers' portfolios of 35 stocks outperformed the market by, on average, 19.6%, while winners' portfolios of 35 stocks underperformed the market by 5% (p. 799). The difference in the average compound annual return (ACAR) indicates that losers earned 24.6% more than winners, even though winners are significantly riskier (p. 804). The results confirm the existence of a violation of Fama's (1970) weak-form market efficiency (p. 795). Sewell (2011) indicates that the work of De Bondt and Thaler (1985) is considered to be the start of the behavioral finance paradigm (p. 5).

The capital market efficiency also has been challenged in many studies that explored stock prices' anomalies, momentum effect, stock returns, and investment strategies such as contrarian investment, and value investing. Contrarian investment strategy enables investors to use the sub-optimal behavior of typical investors in order to get higher stock returns. Lakonishok, Shleifer and Vishny (1994) recommend that "contrarian investors should sell stocks with high past growth as well as high expected future growth and buy stocks with low past growth as well as low expected future growth" (p. 1551).

Obviously, not all investors are rational. They don't build their financial portfolios according to the portfolio selection assumptions of Markowitz and the CAPM, they ignore some arbitrage opportunities when financial assets are mispriced, they don't have perfect information, and they don't respond to new information in a Bayesian way (Statman, 1995, p. 8). De Bondt and Thaler (1985) explain "Bayes' rule is not an apt characterization of how individuals actually respond to new data (Kahneman et al.). In revising their beliefs, individuals tend to overweight recent information and underweight prior (or base rate) data" (p. 793). Indeed, "people are 'rational' in standard finance; they are 'normal' in behavioral finance" (Statman, 1999, p. 26).

Shiller (2003) states that by the end of the 1980s, many researchers adopted new theories to examine the stock market behavior, because of the failure of the efficient market hypothesis in effectively explaining the stock market behavior, and associating it with fundamentals (p. 90). Bloomfield (2006) reviews the disagreements between traditional finance and behavioral finance, and says:

> By adopting a Kuhnian perspective, behavioralists implicitly brand their opponents as old, fading Luddites. By emphasizing instrumental positivism, the traditionalists imply that behavioralists are arguing their case on the basis of realism rather than predictive power, and suggest that behavioralists are not even real scientists because they proffer an irrefutable theory that can be adapted ex post to accommodate almost any observation. (Bloomfield, 2006, p. 7)

The behavioral finance paradigm relaxes some, or all the assumptions traditionally accepted under the market efficiency hypothesis, the expected utility theory, and the expected rational behavior (Thaler & Barberis, 2005, p. 1). Behavioral finance accepts human irrationality; therefore, it utilizes cognitive psychology theories, and the limits to arbitrage theory to explain market inefficiencies, cognitive biases, and people's preferences (Thaler & Barberis, 2005, p.

12). Moreover, behavioral finance accepts the fact that markets could sometimes have information inefficiencies (Ritter, 2003, pp. 1-2).

2.10 Behavioral Biases Affecting Investors' Decision Making Process

Pompian (2012) categorizes behavioral biases that affect the financial decision making of investors into cognitive biases and emotional biases. Pompian defines cognitive biases as errors that "stem from basic statistical, information processing, or memory errors; cognitive errors may be considered the result of faulty cognitive reasoning" (p. 25), and suggests that cognitive errors are "blind spots or distortions in the human mind" (p. 26). Emotional biases are defined as errors that result from "impulse or intuition and may be considered to result from reasoning influenced by feelings" (p. 25). Emotional biases include biases such as loss aversion, overconfidence, self-control, status quo, endowment, regret aversion, and affinity.

Pompian (2012) classifies cognitive biases into two types. First, belief perseverance biases (BPB), which include biases that result from the "tendency to cling to one's previously held or recently established beliefs irrationally or illogically. Investors continue to hold and justify the belief because of their bias toward belief in themselves or their own ideals or abilities" (p. 27). BPB includes biases such as conservatism, confirmation, representativeness, illusion of control, hindsight, and cognitive dissonance. Second, information processing biases (IPB) describe "how people process information either illogically or irrationally in financial decision making. (p. 27). IPB includes biases such as anchoring and adjustment, mental accounting, framing, availability, self-attribution, outcome, and recency.

For the purpose of this study, only the effect of the following biases on investors' behavior were examined: representativeness, hindsight, cognitive dissonance, anchoring and adjustment, mental accounting, availability, self-attribution, loss aversion, overconfidence, and regret aversion. The following sections will define each one of these biases, and link it to the investors' behavior.

2.10.1 Cognitive Biases: Belief Perseverance Biases (BPB)

Representativeness is a heuristic by which people "classify new information based on past experiences and classifications "(Pompian, 2012, p. 29). Representativeness is useful, because it helps investors to "reduce the complex tasks of assigning probabilities and predicting values to simpler judgmental operations" (Tversky and Kahneman, 1974, p. 1124). However, Tversky and Kahneman (1974) warn that representativeness may lead to severe biases in judgment due to factors such as insensitivity to prior probability of outcomes (i.e., base rate neglect), insensitivity to sample size (i.e., sample size neglect), the illusion of validity, regression towards the mean, and insensitivity to predictability (pp. 1124-1126). Tversky and Kahneman (1974) explain representativeness through this example:

> Suppose one is given a description of a company and is asked to predict its future profit. If the description of the company is very favorable, a high profit will appear most representative of that description; if the description is mediocre, a mediocre performance will appear most representative. (p. 1126)

Hindsight bias happens when investors perceive historical stock prices as having been unsurprising and sensible to anticipate. Pompian (2012) argues that "people tend to remember their own predictions of the future as more accurate than they actually were because they are

biased by the knowledge of what has actually happened" (p. 31). Pompian suggests that hindsight bias is a coping mechanism that is utilized by people to deal with stressful events, and is facilitated through their "reconstructive nature of memory… they tend to fill in the gaps with what they prefer to believe" (p. 31). Hindsight bias may lead investors to overestimate the accuracy of their estimations, which may contribute to an overconfidence bias.

Cognitive dissonance is "the existence of nonfitting relations among cognitions…cognition [is] any knowledge, opinion, or belief about the environment, about oneself, or about one's behavior. [It is] an antecedent condition which leads to activity oriented toward dissonance reduction" (Festinger, 1962, p. 3). The person will actively try to reduce dissonance and achieve consonance, but that person will also actively avoid situations and information that will increase dissonance (Festinger, 1962, p. 3). Consonance can be achieved through either changing the actions and behaviors to match the newly acquired knowledge, or changing the knowledge structure regarding the effects of his actions (Festinger, 1962, p. 6).

According to Pompian (2012), the cognitive dissonance bias contributes to the existence of many belief perseverance biases. As a result, investors may continue to hold, or even invest more, in losing portfolios in order to avoid regret. Similarly, investors may continue avoiding information, and believe that their current situation is different than others (p. 32).

2.10.2 Cognitive Biases: Information Processing Biases (IPB)

According to Tversky and Kahneman (1974), people form initial estimates of their subjective probability distributions by anchoring these estimates to initial starting points, but "different starting points yield different estimates" (p. 1128). Similarly, adjustment from an

anchor value is “usually employed in numerical prediction when a relevant value is available” (p. 1131). Anchoring and adjustment biases lead to either overestimating or underestimating the results. Tversky and Kahneman (1974) argue that “in reality, subjective probabilities determine preferences among bets and are not derived from them, as in axiomic theory of rational decisions” (p. 1129). When an investor is asked to determine if future profits of the market will exceed a certain point, the investor will use that exact certain point (as an anchor) to predict the future performance. Then, the investor may adjust the estimation up or down based on the economic information released in the news.

Mental accounting is the “the set of cognitive operations used by individuals and households to organize, evaluate, and keep track of financial activities” (Thaler, 1999, p. 183). Pompian (2012) defines mental accounting bias as a process in which “people treat one sum of money differently from another equal-sized sum based on which mental account the money is assigned to” (p. 33). During the mental accounting process, Barberis and Huan (2001) suggest that “people engage in narrow framing, that is, they often appear to pay attention to narrowly defined gains and losses” (p. 1248). Thaler and Barberis (2005) add, “when offered a gamble, people often evaluate it as if it is the only gamble they face in the world, rather than merging it with pre-existing bets to see if the new bet is a worthwhile addition” (p. 20). Investors may use mental accounting to have separate investment portfolios, and they treat each one separately, because each portfolio has a different return and risk level, but the total performance of the portfolios may be negative.

The availability heuristic is a useful tool to evaluate the probability that an event would happen based on how easily and quickly the event comes to mind (Tversky and Kahneman,

1974, p. 1127). Nevertheless, availability may lead to biases due to different levels of retrievability of instances (familiarity, salience, and recency), the effectiveness of search, imaginability (they don't come to mind, or hard to conceive), and the illusory correlation effect by which "the frequency is based on the strength or associative relationship between events…the effect is extremely resistant to contradictory data" (p. 1128). Investors may use the availability heuristic to build their portfolios through selecting stocks that appear more frequently in the news, rather than thorough analysis, or only selecting stock of local firms (Pompian, 2012, p. 35). Although, portfolios that are less geographically diversified are riskier than others, Huberman (2001) concludes that individual investors are more likely to invest in a local rather than a distant phone company, and attributes their preference to familiarity (p. 678).

Self-attribution bias is "the tendency of individuals to ascribe their successes to innate aspects, such as talent or foresight, while more often blaming failures on outside influences, such as bad luck" (Pompian, 2012, p. 35). It is believed that the self-attribution bias is one of the main factors that lead to the overconfidence bias (Thaler & Barberis, 2005, p. 12). Moreover, the self-attribution bias results in a selective-information processing and usage, due to the fact that investors use that information as a way to justify their investment decisions (Pompian, 2012, p. 36).

2.10.3 Emotional Biases

Losses have been found to have a great effect on investors. Tversky and Kahneman (1979) explain that "the value of negative changes is greater (in absolute value) than the value

of positive changes, that is, losses loom larger than gains" (1977, p. 2-5). Actually, Odean (2000) evidences that investors' "significant preference for selling winners and holding losers, except in December when tax-motivated selling prevails" (p. 21) is driven by loss aversion. Pompian (2012) indicates that investors' loss aversion bias results in portfolio behaviors such as holding losers longer than justified by fundamental analysis, selling winners earlier than justified by fundamental analysis, and holding portfolios that have a higher risk due to keeping losers and selling winners (p. 39). Apparently, investors get utility from different levels of gains and losses rather than from the aggregate levels of the portfolio (Barberis and Huang, 2001, p. 1248).

The overconfidence bias arises when individuals are overconfident about their judgments, which results in assigning narrow confidential intervals for the estimates, and overestimating probabilities. The first effect of the overconfidence bias on investors may lead them to overestimate their analytical skills, and market knowledge, which make them able to beat the market, Barber and Odean (2013) call it the "better-than-average effect" (p. 1547). The second effect leads investors into having narrow distributions for events that they are certain about, Barber and Odean (2013) call it the "miscalibration", or "overprecision" (p. 1548). For example, investors may be certain that the price of stock Z will be between $10 and $12 with 90% probability, but in reality that confidence interval should be set between $9 and $14. Therefore, they form beliefs that are most advantageous to them (Thaler & Barberis, 2005, p. 12; Hvide, 2002, p. 19).

Gervais and Odean (2001) examined the behavior of informed traders who "update their beliefs too much when they are right" (p. 3). Gervais and Odean indicate that investors who have high levels of overconfidence trade more aggressively, which is reflected on the

volume and volatility of the trades, and find that the level of overconfidence is higher in younger investors who are early in their careers experience than level of overconfidence in older investors (p. 19). Moreover, Gervais and Odean say that "Overconfidence does not make traders wealthy, but the process of becoming wealthy can make them overconfident" (p. 19). They conclude by stating that successful investors have better information gathering capabilities than overconfident investors, but successful investors may not utilize their information efficiently (p. 20). The overconfidence bias is induced by the self-attribution bias and hindsight bias (Thaler & Barberis, 2005, p. 12).

Regret is "an emotional feeling associated with the ex post knowledge that a different past decision would have fared better than the one chosen" (Shefrin and Statman, 1985, p. 781). Pompian (2012) indicates that regret aversion bias is "an emotional bias in which people tend to avoid making decisions that will result in action out of fear that the decision will turn out poorly" (p. 41). Accordingly, investors may take very conservative trading decisions, or follow other investors' trading behavior (i.e., herding) in order to avoid the consequences of regret.

2.11 Summary

The studies presented in this chapter identify the gap in the literature, and provide an opportunity to link the information science and behavioral finance fields by establishing the theoretical basis for the information behavior of individual investors model. Only few studies in the behavioral finance literature examined the decision making process of investors in developing countries. Therefore, the proposed model clarifies the causal relationships among

the information behavior and the intervening factors that influence the individual investors' decision making in Saudi Arabia.

CHAPTER 3

RESEARCH METHODOLOGY

The development of humankind depends on researchers' attempts to understand the world by answering questions that ultimately help them to find the truth about many different matters. The truth is "a claim in the form of hypothesis or predicate, an affirmation or denial of something" (Lincoln & Guba, 1985, p.14). Kuhn (1962) asserts that a field is considered a normal science when the entire community's research is guided by a paradigm, which Kuhn defines as "the body of accepted theory, successful applications, and compare these applications with exemplary observations and experiments" (p.10). Therefore, finding the truth leads to defining the accepted paradigm of scientific fields and recognizing those fields as normal science.

Creswell (2013) examines some of the major research paradigms such as: positivism/post-positivism (scientific method or empirical research) interpretivism (social constructivism), and pragmatism (pp.5-11). Lincoln and Guba (1985) suggest that research paradigms are differentiated according to five axioms in order help researchers in determining which paradigm is a better fit to the phenomenon studied. The axioms are: ontology, epistemology, the possibility of generalization, the possibility of causal linkages, and axiology (Lincoln & Guba, 1985, p.37).

The axioms of post-positivism are: a single and tangible social reality that is subject to uncertainty and probability, the researcher and the participants are dependent, generalizable findings and actions can be probabilistically explained by causes, and the inquiry is value-free due to the research methodology selected (Lincoln & Guba, 1985, p.37-38).

Quantitative research methodology is the predominant research methodology in the post-positivistic paradigm (Pickard, 2007, p.7), which explains why the quantitative studies are considered objective, and follows the scientific confirmatory method approach to research. This consists of the following steps: building specific hypotheses based on a theory, collecting the quantitative data to perform the empirical hypothesis testing under controlled conditions, and deciding to accept or reject the hypothesis based on the collected data and test results (Johnson & Christensen, 2010, p.19).

This quantitative study relied on the post-positivistic paradigm with the position to employ any approach as required to serve the study. The study's intent was to examine the information behavior of individual investors in the Saudi stock market, in a non-advisory context. The following subsections will discuss the research design of this study, which will be used to generate, collect, analyze data, and report findings.

3.1 Research Design

After selecting the appropriate research methodologies, researchers have to select the research method for the empirical investigation. Strategies of inquiry are also influenced by the paradigmatic preference of the researcher where factors such the nature of reality, and relationship of the researcher and participants are crucial in the selection process, because both influence the sampling and data collection techniques (Pickard, 2007, p.84).

The process of empirical investigation in this study used the survey method as the strategy of inquiry. The survey method depends on questioning a representative sample of the population to generate quantitative data that helps in describing trends, attitudes, or opinions

of the population by studying the relationships between specific variables that have been previously identified and stated in the hypotheses (Pickard, 2007, p.95; Creswell, 2013, p. 155). It is important to differentiate between surveys “as a research method” and questionnaires “as a data collection method”. Although surveys are considered mainly quantitative, the research method could have a limited qualitative (anecdotal) element (Pickard, 2007, p.95). For the purpose of this study, the quantitative data was collected by the survey method to address the research questions.

3.2 Research Questions

- What are the information behaviors of individual investors in the Saudi stock market and what motivates these behaviors? To what extent do they impact the information behavior of the investors?
- What is the impact of the socioeconomic status of individual investors on their information behavior?
- What is the effect of the information source characteristics and the information value on the individual investors’ information behavior in the Saudi stock market?

3.3 Population and Sample

The sampling techniques utilized in research have a great impact on the quality of the research and the confidence in the results, because the sampling process depends on the researcher’s judgment in choosing the sampling technique. Sampling is the process of selecting observations (or observation units) from a larger population that the research is studying

(Babbie, 2012, p.188). A representative sample has characteristics similar to the population, but with fewer participants.

Quantitative research methods use random probability sampling to generate a representative sample in which everyone in the population has an equal opportunity of being sampled. There are different types of random sampling that differentiated according to the unit of measurement such as: simple random sampling, systematic random sampling, stratified random sampling, and cluster random sampling. Nevertheless, random sampling could be impossible to achieve in some situations. Thus, researchers use nonrandom sampling techniques such as: convenience sampling, quota sampling, and purposive sampling. It is important to note that research studies that utilize nonprobability-sampling techniques have limited generalization ability of the findings from the sample to the population (Pickard, 2007, pp.61-4; Johnson & Christensen, 2010, pp.200-16; Babbie, 2012, pp.191-94).

There are many factors beside the honesty and clear judgment of the researcher that can determine the selection of the sampling method, such as time, location, and resources available. Therefore, quantitative researchers should avoid conscious and unconscious-sampling biases that are based on personal judgments and preferences, because the generalizability and trustworthiness of the empirical research findings rely on sampling (Pickard, 2007, p.67).

3.3.1 The Individual Investors in the Saudi Stock Market

According to the Central Department of Statistics and Information, the total Saudi population was 29.2 million as of 2010 (n.d., para. 2). Saudis between the ages of 15 and 54

years represent about 65% of the population. Figure 3 shows the age structure in Saudi Arabia (The World Factbook, 2014).

The semiannual statistical bulletin of the Capital Market Authority shows that as of the first half of 2014 the total number of individual Saudi investors is 4.4 million, from which male investors represent almost 80%. The number of active trading portfolio is 8.1 million, which indicates that some individual investors own more than one portfolio (p. 7). Saudi citizens control about 34% of the total value of listed companies, while residents own only 0.22% (p. 8). For the purpose of this study, the participant population will consist of adult individual investors, who hold active investment portfolios or have held investment portfolios in the Saudi stock market, both citizens and residents, whether they are living in Saudi Arabia or abroad.

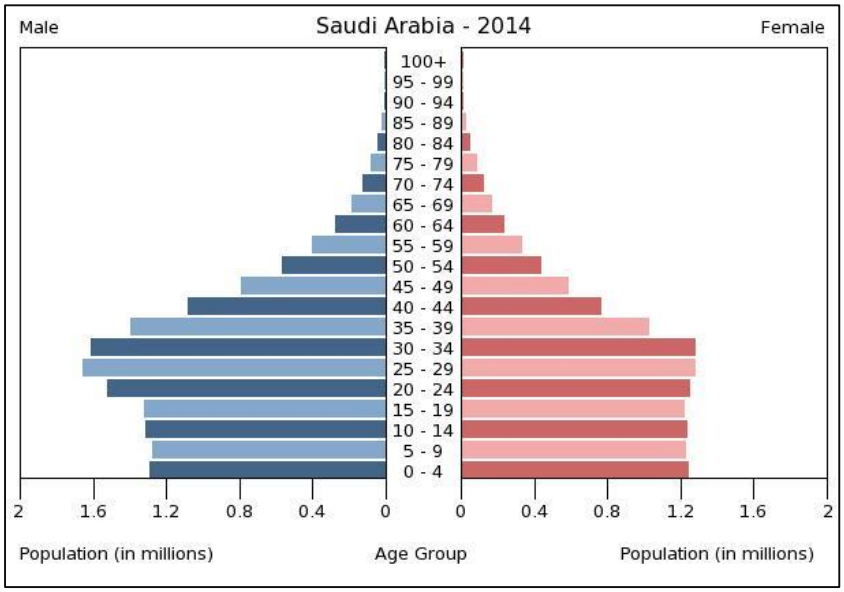


Figure 3. Saudi Arabia's population pyramid (Adapted from: The world factbook, 2014).

3.4 The Institutional Review Board (IRB) Application

According to the IRB regulations, this study was considered an international research, because the survey was sent via email to individual investors in Saudi Arabia. Hence, there were

some additional requirements to protect the rights and welfare of participants, such as detailed information about the research location, information about the investigator's knowledge of the local research context, including information about the current social, economic, and political conditions. Also, information about whether there are any additional risks subjects might face as a result of the population being studied and/or the local research context.

The IRB required that the consent form be in the same language of the participants, which is Arabic. In addition, a "back translated" copy of the informed consent was submitted to the IRB. A back translation is a document that "translates the informed consent from the subjects' language into English by a native speaker of that language other than the Investigator" (Research and economic development: Informed consent: Informed consent for non-English speaking subjects, 2015). Finally, IRB recommends using these statements in the online consent form "confidentiality will be maintained to the degree possible given the technology and practices used by the online survey company. Your participation in this online survey involves risks to confidentiality similar to a person's everyday use of the internet" (Template f, 2007, p. 2).

In this study only minimum risks to participants were expected, so, a minimal review application was submitted to the Office of Research and Economic Development at the University of North Texas (UNT). The protocol used in the study was approved by the Institutional Review Board (IRB) of UNT. The approval letter is attached in Appendix C.

3.5 Survey Instrument Development and Pilot Testing

This study gained insight of the primary research questions through the use of an online questionnaire instrument, which is a self-report instrument that contains close-ended questions that are filled out by the participants. The online questionnaire provided a convenient approach to gather accurate information from individual investors in the Saudi Arabia. However, online questionnaires have well known disadvantages such as limiting the sample to participants that have email or access to a computer, which also assume a minimal level of computer literacy. Moreover, some participants may be uncomfortable to fill online questionnaires and exclude themselves where language used in the online questionnaire could be a barrier to some participants. Finally, some participants may need further explanation regarding some of the questions that are not clear to them, but due to the lack of interaction with the researcher, their decisions could create serious issues in the data collected (Rea & Parker, 2012, pp. 12-13).

Questionnaires utilize multiple response categories for closed-ended questions such as Likert scale, rankings, semantic differentials, and checklists. Some of the limitations of using questionnaires include the use of leading questions, low response rates, nonresponse to some questions, and low validity of open-ended questions (Johnson & Christensen, 2010, pp.164-78). Using multiple items Likert scales generate scores that are more reliable and yield more variability in the collected responses, which enable the researchers to better understand the sample (Johnson & Christensen, 2010, p.175). The scaled responses should not lead the participants into only one direction of the answer. For example, the questions should consider both options such as “please indicate the degree to which you agree or disagree with the

following statements", rather than "please evaluate the degree of your agreement with the following statements". Finally, the rating scales in this study will include a middle, or neutral, alternative to avoid leading the participants to choose one extreme or another (Johnson & Christensen, 2010, p. 171; Rea & Parker, 2012, pp. 62-70).

For the purpose of this study, the online questionnaire used Qualtrics (www.qualtrics.com), which is an Internet based survey engine provided for free for researchers at the University of North Texas, as the instrument to collect responses, because it is easier to reach participants in Saudi Arabia when using an online questionnaire, and it reduces the costs associated with traveling to administer the surveys. Before administering the questionnaire to actual participants, a pilot test was conducted by the researcher in Saudi Arabia where a group of two experts and five investors individually reviewed both versions of the questionnaire (Arabic and English). Accordingly, the questionnaire was modified based on the experts' comments and recommendations, which was reflected on the validity of the questionnaire. The primary language of the questionnaire was Arabic, because it is the official language in Saudi Arabia, but there was an option to answer the questions in English. The English version of the questionnaire is in Appendix A and the Arabic version is provided in Appendix B.

In order to protect the identity of the participants, the main questionnaire did not collect any identifying personal information such as name, and contact numbers. However, a second questionnaire was created to collect first name, surname, phone number, email address, and the best time to contact the participants decided to participate in further research interviews. Therefore, a link to the contact questionnaire (Figure 4) was provided at the end of

the main survey to protect the participants' identity by separating their answers and contact information.

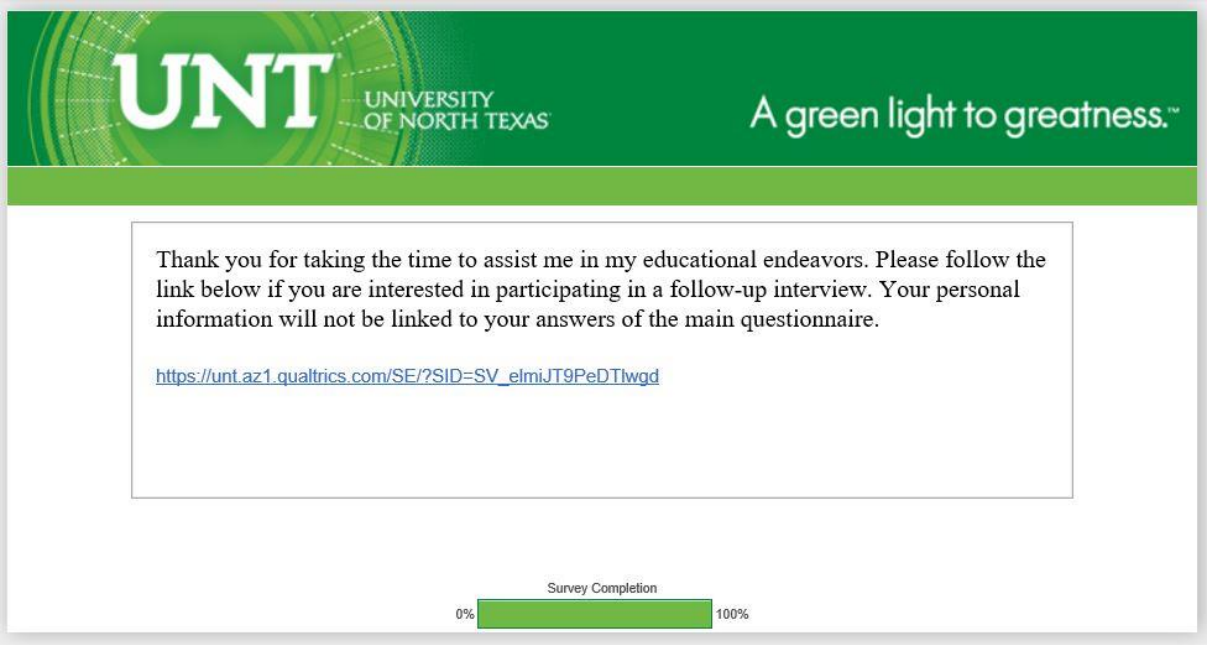


Figure 4. End of survey message with a link to the contacts survey.

An anonymous survey link to the main questionnaire was sent to prospect participants through email, and mobile messaging applications such as iMessage and WhatsApp. Furthermore, the anonymous link was posted the researchers personal social media accounts such as Twitter (www.twitter.com), Facebook (www.facebook.com), and LinkedIn (www.linkedin.com). The following tweet promoted the questionnaire on Twitter: "I'm inviting you to participate in a study about the information behavior of investors. Your input will assist me in my educational endeavors." To prevent multiple responses by the same participant, Qualtrics uses the IP address to limit the number of times the questionnaire can be taken. According to Qualtrics, the IP address is not considered identifying information, and it has been used only to prevent multiple responses and will not be included in the data analysis file.

Once participants agreed to participate in the study, they were able to take the survey from anywhere in the world with a computer or mobile phone that had access to the Internet. When participants first accessed the questionnaire webpage, a general information and consent declaration was presented, which explained the purpose, benefits, and risks of participating in the study. The declaration also supplied contact information of the researcher and explained the rights of the participant, most importantly, the right to end participation in the study at any time.

The first question established the age of participants, which only allowed them to proceed if they are aged 18 or older and give their consent to fully participate in the study. Therefore, it was confirmed that all participants are adults who are legally able to have and manage an investment portfolio in the SSM. Those who acknowledged that they were under 18, or wished not to participate, and therefore not be part of the subject population, were thanked for their time and prevented from proceeding to other parts of the questionnaire. The questionnaire then proceeded into collecting quantifiable data.

Rea and Parker (2012) suggest placing sensitive questions (e.g., income) at the end of the questionnaire for two reasons. First, if the participant decided to stop answering the questions, then all previous answers will be usable. Second, if the participants got engaged and was interested in the research subject, then they may provide very detailed answers to sensitive questions (p. 36). Accordingly, all sensitive questions related to the research subject of this study were placed in the last two blocks of the questionnaire.

The first block in the questionnaire asked the participants about the frequency of using financial information sources in the process of investment decision making. A 5-point Likert

scale was used to rate the frequency of using these information sources ranging from Never (0) to Always (5). Afterward, the second block asked the participants to rate the quality of the financial information sources that they utilize in their investment decision making. A 5-point Likert scale was used to rate the quality of these information sources from very poor (1) to excellent (5), or not applicable (0). The statements in the first two blocks serve as an introduction to the questionnaire and they were easy to understand by participants, which prepares them for the following more detailed questions.

The third block of questions asked the participants to indicate their agreement, or disagreement with 16 statements related to the information behavior. 14 items were adapted from a validated scale in the literature (Bearden, Hardesty, & Rose, 2001). A 5-point Likert scale was used to evaluate the degree of agreement, or disagreement with the statements ranging between strongly disagree (1), disagree (2), neither agree nor disagree (3), agree (4), and strongly agree (5). The fourth set of statements measured the participants' subjective financial knowledge and financial self-efficacy using a 5-point Likert scale to evaluate the degree of agreement or disagreement with the statements ranging from strongly disagree (1) to strongly agree (5) where higher scores indicated higher subjective financial knowledge. The subjective financial knowledge scale was adapted from Goldsmith, and Goldsmith (1997), and the self-efficacy item was adapted from Danes, and Haberman (2007).

The fifth part of the questionnaire included items to examine the individual investors' behavior in the SSM through utilizing items related to behavioral biases, herding behavior (three items adapted from Luong, & Ha, 2011), social interaction (three items adapted from Li, Lee, & Cude, 2002), and market factors. This study examined three main categories of

behavioral biases: belief perseverance biases, information processing biases, and emotional biases. The behavioral finance literature did not have any validated scales to measure behavioral biases, therefore, the items in this part of the questionnaire were constructed according to the definitions of those behavioral biases. The last part of the survey gathered demographic information (age, gender, income, education, occupation, employment status, work experience, and geographic location), and asked the participants some questions that helped in establishing and understanding the investment profile of the sample.

3.6 Variables in the Study

The main questionnaire had 106 items that were constructed to explore the relationship between the independent variables (i.e., behavioral biases, demographics, socioeconomic status, information access, and information quality) and the dependent variable (information behavior). Some of the questionnaire items were conceptualized from validated instruments in the literature to measure the attitudes and information behaviors of the individual investors in the SSM (Nagy & Obenberger, 1994; Goldsmith & Goldsmith, 1997; Bearden, Hardesty, & Rose, 2001; Li, Lee, & Cude, 2002; Danes & Haberman, 2007; Luong, & Ha, 2011; Nazarinia, Archuleta, & Grable, 2011). On the other hand, items related to information seeking behavior, information search, information acquisition, behavioral biases, and information source characteristics were conceptualized based on the definitions of the terms, and the related theories within Wilson's (1997) information behavior model (Figure 5). The variables and their corresponding questions are presented in Table 2.

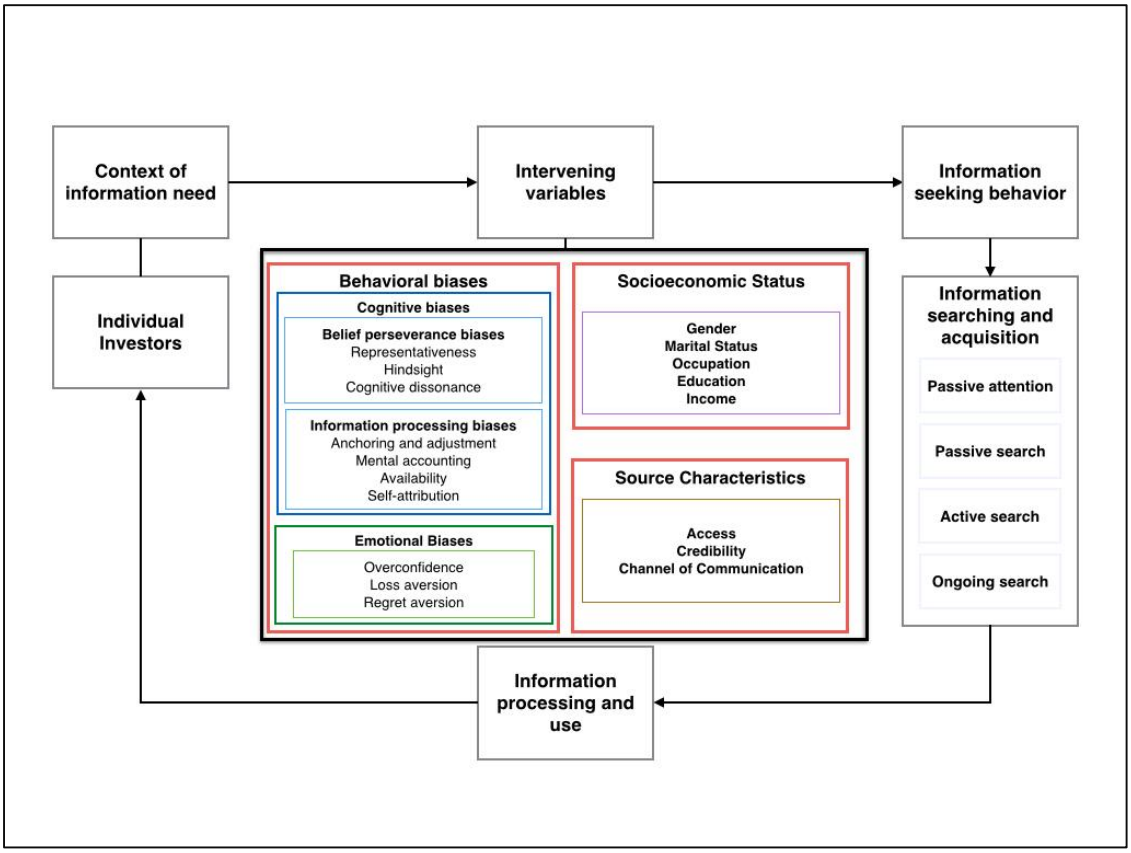


Figure 5. The information behavior of individual investors in the Saudi stock market (based on the general information behavior of Wilson (1997)).

Table 2

Study Variables

Variable	Coding	Description
IA1	1=Never , 5=Always	Financial statements of publically listed companies
IA2	1=Never , 5=Always	Announcements of publically listed companies
IA3	1=Never , 5=Always	Websites of publically listed companies
IA4	1=Never , 5=Always	Financial reports issued by local investment firms (Jadwa economic research)
IA5	1=Never , 5=Always	Financial reports issued by international investment firms (UPS economic research, HSBC economic outlook)
IA6	1=Never , 5=Always	Economic reports issued by banks (NCB economic review)
IA7	1=Never , 5=Always	Official Statistical reports (CMA, SAMA)
IA8	1=Never , 5=Always	Online independent research (MorningStar, Yahoo! Finance)
IA9	1=Never , 5=Always	Research from online databases (Zawya)
IA10	1=Never , 5=Always	Books
IA11	1=Never , 5=Always	News papers
IA12	1=Never , 5=Always	TV
IA13	1=Never , 5=Always	Informal online forums and chat rooms
IA14	1=Never , 5=Always	Social media
IA15	1=Never , 5=Always	Advice from friends and family
IA16	text	Additional Information sources
IQ1	1=Excellant , 5=Very Poor, 0=NA	Financial statements of publically listed companies

(table continues)

Table 2 (continued)

Variable	Coding	Description
IQ2	1=Excellant , 5=Very Poor, 0=NA	Announcements of publically listed companies
IQ3	1=Excellant , 5=Very Poor, 0=NA	Websites of publically listed companies
IQ4	1=Excellant , 5=Very Poor, 0=NA	Financial reports issued by local investment firms (Jadwa economic research)
IQ5	1=Excellant , 5=Very Poor, 0=NA	Financial reports issued by international investment firms (UPS economic research, HSBC economic outlook)
IQ6	1=Excellant , 5=Very Poor, 0=NA	Economic reports issued by banks (NCB economic review)
IQ7	1=Excellant , 5=Very Poor, 0=NA	Official Statistical reports (CMA, SAMA)
IQ8	1=Excellant , 5=Very Poor, 0=NA	Online independent research (MorningStar, Yahoo! Finance)
IQ9	1=Excellant , 5=Very Poor, 0=NA	Research from online databases (Zawya)
IQ10	1=Excellant , 5=Very Poor, 0=NA	Books
IQ11	1=Excellant , 5=Very Poor, 0=NA	News papers
IQ12	1=Excellant , 5=Very Poor, 0=NA	TV
IQ13	1=Excellant , 5=Very Poor, 0=NA	Informal online forums and chat rooms
IQ14	1=Excellant , 5=Very Poor, 0=NA	Social media
IQ15	1=Excellant , 5=Very Poor, 0=NA	Advice from friends and family
IS1	1=strongly disagree , 5=strongly agree	You purposively seek information to help you in making a critical investment decision
IS2	1=strongly disagree , 5=strongly agree	You are knowledgeable about the Saudi stock market
IS3	1=strongly disagree , 5=strongly agree	I know where to find the information I need prior to making a decision
IS4	1=strongly disagree , 5=strongly agree	I am confident in my ability to research important decisions
IS5	1=strongly disagree , 5=strongly agree	I know the right questions to ask when looking for information
IS6	1=strongly disagree , 5=strongly agree	I can focus easily on a few good sources of information when making a decision
IS7	1=strongly disagree , 5=strongly agree	I know where to look to find the information I need
IS8	1=strongly disagree , 5=strongly agree	I am confident in my ability to recognize sources of information worth considering
IS9	1=strongly disagree , 5=strongly agree	I can tell which sources of information meet my expectations
IS10	1=strongly disagree , 5=strongly agree	I trust my own judgment when deciding which source of information to consider
IS11	1=strongly agree , 5=strongly disagree	I never seem to find the right information for me (Reverse Coded)
IS12	1=strongly agree , 5=strongly disagree	Too often the sources of information I use are not satisfying (Reverse Coded)
IS13	1=strongly agree , 5=strongly disagree	I often have doubts about the sources of information I use (Reverse Coded)
IS14	1=strongly agree , 5=strongly disagree	I frequently agonize over which sources of information to consider (Reverse Coded)
IS15	1=strongly agree , 5=strongly disagree	I often wonder if I've chosen the right source of information (Reverse Coded)
IS16	1=strongly disagree , 5=strongly agree	I have the skills required to obtain needed information before making important decisions
SK1	1=strongly disagree , 5=strongly agree	I know pretty much about investing
SK2	1=strongly agree , 5=strongly disagree	I do not feel very knowledgeable about investing (Reverse Coded)

(table continues)

(table continues)

Table 2 (continued)

Variable	Coding	Description
SK3	1=strongly disagree , 5=strongly agree	Among my circle of friends, I'm one of the "experts" on investments
SK4	1=strongly agree , 5=strongly disagree	Compared to most other people, I know less about investing (Reverse Coded)
SK5	1=strongly disagree , 5=strongly agree	I have heard of most of the new investments that are around
SK6	1=strongly agree , 5=strongly disagree	When it comes to trading shares, I really don't know a lot (Reverse Coded)
SK7	1=strongly disagree , 5=strongly agree	I believe the way I manage my money will affect my future
BPB1	1=strongly disagree , 5=strongly agree	You invest in popular stocks with high earnings growth, and avoid stocks that have performed poorly in the recent past.
BPB2	1=strongly disagree , 5=strongly agree	You invest in stocks after predicting their future movements through analyzing the trends of some representative stocks.
BPB3	1=strongly disagree , 5=strongly agree	You believe that the historical stock prices in the Saudi stock market have been predictable and reasonable to expect.
BPB4	1=strongly disagree , 5=strongly agree	You invest more in a losing stock that you own after it has further gone down.
IPB1	1=strongly disagree , 5=strongly agree	You make new investment decisions based on your previous forecasted performance of the Saudi stock market.
IPB2	1=strongly disagree , 5=strongly agree	You forecast the future performance of a stock based on the current stock prices.
IPB3	1=strongly disagree , 5=strongly agree	You consider some of the stocks in your portfolio as low risk investments, while at the same time you consider some other stocks as high risk investments.
IPB4	1=strongly disagree , 5=strongly agree	You ignore the connection between low risk stocks and high risk stocks in your investment portfolio.
IPB5	1=strongly disagree , 5=strongly agree	You invest in stocks that appear more frequently in the news or advertisements.
IPB6	1=strongly disagree , 5=strongly agree	You prefer to buy local stocks than international stocks because the information of local stocks is more available.
EB1	1=strongly disagree , 5=strongly agree	You are normally able to anticipate the end of good or poor market returns at the Saudi stock market.
IPB7	1=strongly disagree , 5=strongly agree	The success of your past investment decisions is due to your ability to forecast the performance of the Saudi stock market.
IPB8	1=strongly disagree , 5=strongly agree	You believe the successful trading is attributed to your skills rather than luck.
EB2	1=strongly disagree , 5=strongly agree	You believe that your skills and knowledge of the Saudi stock market can help you to outperform the market.
EB3	1=strongly disagree , 5=strongly agree	You hold some losing stocks in your portfolio because they will break-even someday.
EB4	1=strongly disagree , 5=strongly agree	You sell some winning stocks in your portfolio because you are afraid to lose this profit.
EB5	1=strongly disagree , 5=strongly agree	You make conservative and low risk investment decisions after realizing losses on risky stocks in the past.
EB6	1=strongly disagree , 5=strongly agree	It is safer to invest in popular well-known stocks.
HERD1	1=strongly disagree , 5=strongly agree	You make investment decisions based on trading decisions of other investors (e.g., family, friends, colleagues, etc.).
HERD2	1=strongly disagree , 5=strongly agree	Your trading volume may be based on the trading volume of other investors (e.g., family, friends, colleagues, etc.).
HERD3	1=strongly disagree , 5=strongly agree	You usually react quickly to the changes of other investors' decisions and follow their reactions to the stock market.
MARK1	1=strongly disagree , 5=strongly agree	It is important to make informed investment decisions based on information regarding the Saudi stock market and the Saudi economy.
MARK2	1=strongly disagree , 5=strongly agree	You prefer to invest in stocks with government ownership.
MARK3	1=strongly disagree , 5=strongly agree	You prefer to invest in stocks that are Sharia compliant
MARK4	1=strongly disagree , 5=strongly agree	You examine the market fundamentals of underlying stocks before making investment decisions.
HERD4	1=strongly disagree , 5=strongly agree	Chatting with the people I know at financial institutions is an important part of doing financial business for me
HERD5	1=strongly agree , 5=strongly disagree	The less I talk to financial institution personnel the better (Reverse Coded)

Table 2 (continued)

Variable	Coding	Description	
HERD6	1=strongly agree , 5=strongly disagree	I prefer to make most of my financial decisions in person (Reverse Coded)	
GENDER	male= 1 , female= 2	Gender	
AGE	years	Age	
MS	1=single, 2=married, 3=divorced, 4=widowed	Marital Status	
city_ksa	1=abroad, 2=Riyadh, 3=Jeddah, 4=Makkah, 5=Madinah, 6=Khobbar, 7=Dammam, 8=Hassa, 9=Qatif, 10=Khamis Mushait, 11=Muzailef, 12=Haffouf, 13=Almubaraz, 14=Taif, 15=Najran,16=Hafr Albaten, 17=Jubail, 18=Deba'a, 19=Kharj, 20=Yanbu, 21=Tabuk, 22=Ara'ar, 23=Hawyah, 24=Oniza, 25=Sakaka, 26=Jizan, 27=Qurayat, 28=Dhahran, 29=Baha, 30=Zelfi, 31=Alrras, 32=Wadi Aldawswer, 33=Besha, 34=Saihat, 35=Sharrora, 36=Bahra, 37=Tarout, 38=Dawademy, 39=Sabia'a, 40=Beesh, 41=Ohoud Rofaida, 42=Fareesh, 43=Bareq, 44= Houta, 45=Alaflaj City (KSA)		
abroad	1=USA, 2=Canada, 3=UAE	Outside KSA	
edu	1=Primary or less, 2=Intermediate, 3=High school graduate, 4=Diploma, 5=Bachelor's degree, 6=Master's degree, Professional degree	Education	
employ_st	1=Employed, 2=Retired, 3=Self-employed, 4=Out of work and looking for work, 5=Out of work but not currently looking for work, 6= A homemaker, 8= Other		Employment status
work_exp	Years	Work Experience	
occu	9=Legislators, senior officials, managers and Armed forces, 8=Professionals, 7=Technicians and associate professionals, 6=Clerks, 5=Service workers and shop and market sales workers, 4=Skilled agricultural and fishery workers, 3=Craft and related trade workers, 2=Plant and machine operators and assemblers, 1=Elementary occupations		Occupation
incom	Saudi Riyals 000's	Monthly Income (SAR 000's)	
trad_exp	Years	Trading Experience	
stocks	number	Number of stocks in your portfolio	
size	1=Less than 50,000, 2=50,000 to 99,999, 3=100,000 to 149,999, 4=150,000 to 299,999, 5=300,000 to 499,999, 6=500,000 to 1,000,000, 7= Over 1,000,000		Portfolio size (SAR 000's)
courses_1	1=Yes, 2=No	Investment courses	
courses_2	Text	What investment courses	
stock_hold	1=Less than a month, 2=1-3 months, 3=4-6 months, 4=7-9 months, 5=10-12 months, 6=More than a year		Stock holding period
invMo_G	1=Growth	Investment Motivation - Growth	
invMo_S	1=Saving	Investment Motivation - Saving	
invMo_R	1=I love risk	Investment Motivation - I love risk	
invMo_ret	1=Retirement	Investment Motivation - Retirement	
invMo_other_1	1=Other	Investment Motivation - Other (Please Specify)	
invMo_other_2	Text	Other Investment motivation	
trad_freq_1	1=Every day, 2=Once a week, 3=Once a month, 4=Other	How often do you execute buy/sell orders	
trad_freq_2	Text	Other trading frequency	
trad_num	number	How many trades per week do execute?	
tradExe_1	1=Phone, fax	Trading Execution - Phone, fax	
tradExe_2	1=online	Trading Execution - online	
tradExe_3	1=Mobile Applications	Trading Execution - Mobile Applications	
tradExe_4	1=going personally to the bank	Trading Execution - going personally to the bank	
tradExe_5	1=Other	Trading Execution - Other (Please Specify)	
tradExe_6	Text	Other Trading execution methods	
econo	1=Yes, 2=No	Are you an economist, banker, or financier?	
riskAp	1=Very low risk taker, 2=Low risk taker, 3=Average risk taker, 4=High risk taker, 5=Very high risk taker		Risk Apetite
muFund	1=Yes, 2=No	mutual Funds / DPM	
fundInv_per	percentage	Investment in Funds (%)	
specPort	1=Yes, 2=No	Speculation portfolio	
multiPort	1=Yes, 2=No	Do you own more than one portfolio?	
portNum	Text	Number of portfolios	

3.7 Data Analysis

Quantitative research uses statistics as the major analytical technique. Descriptive statistical methods are used to describe, summarize, and explain the quantitative data set. Furthermore, inferential statistical methods are used to test the significance of group differences based on the hypotheses, and infer further characteristics of the population based on the selected sample (i.e. estimation of group membership, structure and time). This acts to establish confidence in the underlying assumptions of the research (Beck & Manuel, 2008, p.156; Lukenbill, 2012, p.253-68).

Descriptive analysis assists in determinnig the effect size that "identifies the strengths of the conclusions about group differences or the relationships among variables" (Creswell, 2013, p. 165). Descriptive statistics summarizes the quantitative data by: constructing frequency distributions to indicate the frequency of occurrence for each value in the data set, stating the measures of central tendency to summarize the demographics of the data set, stating the measures of variability, providing the measures of relative standing, and examining the relationship among the variables (Johnson & Christensen, 2010; Babbie, 2012).

Inferential statistical methods assume that variables have been randomly selected to represent the population; hence, the laws of probability can be applied and the sampling distribution can be determined. Then, inferential statistics can help in generating both point estimates of the population, such as population mean or population correction, and interval estimates. Inferential statistics can also help in testing the statistical significance of relations by using parametric significance tests to determine if the observed relationships in the sample are due to sampling error alone.

It is important to be carefully interpret these tests because the sampling error is the inverse of the sample size, which affects the results. Inferential statistics could also cause a statistical threat on the validity and reliability the findings due to the assumption that the sample has been randomly generated, which is impossible to achieve in a quantitative survey method. Calculating the standard error assumes 100% completion rate, but it is impossible to get a completed questionnaire from every participant in the sample. Finally, the assumptions of inferential statistics don't include the effect of subjective errors such coding mistakes by the researcher, and misunderstanding the questions by participants (Babbie, 2012, pp.478).

3.7.1 Evaluating the Quality of the Study

Pickard (2007) indicates that establishing rigor in quantitative research depends on what is called “the trinity of validity, reliability, and generalizability” (p.21). Pickard suggests the following definitions: internal validity is “the extent to which [the researcher] can demonstrate any change in the dependent variable as a direct result of change made to the independent variables, all other things being equal,” external validity is “the extent to which the findings from the investigation can be generalized to the wider concept,” reliability is the “stability of the research findings over time and across locations,” and objectivity is measured by “the extent to which the findings from an investigation would remain constant regardless of the character of the researcher” (pp.21-22). Obviously, all three assumptions’ validity, reliability, and objectivity are based on the axioms of the post-positivistic research paradigm.

In this study, conclusions and inferences were withdrawn from the results of the research questions. Any personal views that may lead to include data, support or reject only some of assumptions were avoided, and both positive and negative results were disclosed.

3.7.2 Exploratory Factor Analysis (EFA)

In order to explore the structure of the collected data, this study used Exploratory Factor Analysis (EFA), which is a multivariate analysis method used to analyze the structure of the correlations among a large set of variables to produce highly interrelated factors that represent different dimensions of the data without losing any information contained in the original set of variables. Therefore, the objectives of EFA are data summarization and data reduction, which generates the summated factors that are used in subsequent analysis.

The recommended sample size to perform EFA is 100 observations or more. Some researchers require at least 5 observations for every variable analyzed (5:1 ratio) (Hair et al., 2010, p.102). However, it has been noted that 40.5% of the EFAs reported in social science journals reported sample size to variables ratio of less than 5:1. Smaller samples may not produce a solution or could affect the generalizability of the findings. It is important to clarify that EFA is an exploratory tool and should not be used for hypotheses testing (Costello, & Osborne, 2011, pp.4-9). Arrindell and Van der Ende (1985) indicate that the stability of the EFA is not affected by the sample size nor by the observations to variables ratio, and they found evidence that a ratio of 1.3:1 was sufficient to produce factor solutions (p. 175). The total number of completed questionnaires received was 128 responses, and there were 81 variables to be included in the EFA analysis, which results in a ratio of 1.5:1 (responses: items).

For the purpose of this study, the principle component analysis (PCA), which considers all available variances, was used to generate the factor solutions, because the primary objective of conducting this EFA was to reduce the variables to a few constructs that explain the variances in the information behavior of individual investors. The rotational method used in this study was the oblique rotation (Promax), because it assumes that the factors are correlated as specified by the theoretical framework of the study. The produced factor pattern matrices contains the factor loadings for each variable on each one of the identified factors. To achieve statistical significance and confirm construct validity, factor loadings should be greater than 0.50 (>.50) based on 0.05 significance level (α). However, factor loadings between ±0.30 and ±0.40 are considered to meet the practical significance level (Hair et al., 2010, p.115).

The EFA factors can be tested by the Kaiser-Mayer-Olkin (KMO) measure of sampling adequacy, the Bartlett's sphericity test, and the Cronbach's alpha. The KMO verifies the sampling adequacy and the possibility of factorizing the variables where values closer to 1 indicate more reliable and distinctive factors. As a general rule, values greater than 0.9 are marvelous, values between 0.9 and 0.8 are meritorious, values between 0.8 and 0.7 are middling, values between 0.7 and 0.6 are mediocre, values between 0.6 and 0.5 are miserable, and values below 0.5 are not acceptable. The Bartlett's sphericity test checks if there is a correlation among variables to produce the factors (Hair et al., 2010, p.104). Therefore, if the result of the Bartlett test is significant it indicates that variables can be clustered because the correlations between them is different from zero. Construct reliability measures the reliability and internal consistency of the variables that construct a factor, and it should be addressed before evaluating the factor's validity (Hair et al., 2010, p.669). The constructs reliability is

measured by Cronbach's alpha where values should be greater than 0.7 to ensure the reliability of the factors (Hair et al., 2010, p.104).

Construct validity is the extent to which the variables of a factor accurately reflects the theoretical framework of that factor. To assess EFA validity the researcher should examine face validity, nomological validity, convergent validity, and discernment validity. Face validity is the extent to which the variables of a single factor represent the definition of that factor. Usually, face validity is confirmed during the pilot study phase by the researcher. Nomological validity is the extent to which the correlations among factors make sense (Hair et al., 2010, p.688). Convergent validity is defined as the degree to which the variables of a factor share a high proportion of the variance in common (Hair et al., 2010, p.686). Convergent validity can be tested by examining the factor loadings where all loadings should be greater than 0.5 and should be statistically significant. Discernment validity shows how distinct the factors are from each other in terms of shared correlation with other factors in the EFA and the ability of its variables to represent that factor only. Therefore, in order to have discernment validity the model should not have any cross loadings greater than 0.50.

3.7.3 Structural Equation Modelling (SEM)

Structural Equation Modeling (SEM) is a multivariate statistical method that is used by researchers to indirectly examine unobservable constructs (i.e., dependent variables) by using indicator variables and analyzing the variances of those independent variables (Hair, Hult, G. T. Ringle, & Sarstedt, 2014, p.4). One of the approaches of SEM is to use the Partial Least Squares (PLS) regression based method to estimate the relationships and the path coefficients that

reduce the amount of unexplained variances in the model (Hair et al., 2014, p.14). PLS-SEM overcomes most of the weaknesses associated with other multivariate analysis methods such as the EFA, because PLS-SEM does not require a minimum sample size or normally distributed data, and it produces models with high levels of statistical significance with small samples. Therefore, it has been widely utilized in social science studies. However, it is recommended to have a sample size equivalent to 10 times the largest number of arrows pointing at a construct in the model (Hair et al., 2014, p.20).

A theory is represented by the PLS-SEM model, and it is defined as "a systematic set of relationships providing a consistent and comprehensive explanation of phenomena" (Hair et al., 2010, p.617). The path model of any PLS-SEM consists of the structural model (the inner model) and the measurement model (outer model). The path model has both exogenous constructs (independent), and endogenous constructs (dependent). Specifying the exogenous and the endogenous constructs depends on the research questions. The structural model is "a set of one or more dependence relationships linking the hypothesized model's constructs… [it is] useful in representing the interrelationships of variables between constructs" (Hair et al., 2010, p.616). On the other hand, the measurement model represents the "dependence relationship between indicators or measured variables and their associated construct(s)" (Hair et al., 2010, p.616).

The mode of the measurement model can be either a reflective or formative model. The indicator variables of the reflective model have positive and high intercorrelations. Moreover, the indicators have a similar relation with the magnitudes and background of the latent construct. On the other hand, the indicator variables of the formative model do not share the

same aspects, there is no intercorrelation among them, and they do not share a unified theme (Coltman, Devinney, Midgley, & Venaik, 2008). In this study, the measurement models were reflective models.

3.7.3.1 Assessing the PLS-SEM Model Fit and Quality

The structural model can be evaluated by examining the coefficient of determination (R-squared) value for the endogenous construct, which is the percentage of variance explained by the exogenous constructs (Kock, 2015b, p.48). Furthermore, the path coefficients should be evaluated for sign, magnitude, and statistical significance (Henseler, Ringle, & Sinkovics, 2009, p.303). After confirming the validity and reliability of the structural model, the measurement model should be evaluated.

The assessment of the reflective measurement model examines both the reliability and validity of the constructs. For reliability assessment, the composite reliability and Cronbach's alphas of the measurement items should be examined. The second step requires assessing the constructs' validity.

The construct validity is the "extent to which a set of measured items actually reflects the theoretical latent construct those items are designed to measure" (Hair et al., 2010, p.686). Construct validity is confirmed by examining convergent validity, discriminant validity, face validity, and nomological validity. Convergent validity is confirmed when all the indicators of a construct "share a high proportion of variance in common" (Hair et al., 2010, p.686). Discriminant validity is level to which "a construct is truly distinct from other constructs" (Hair et al., 2010, p.687). Face validity is the assessment of the correspondence of the indicators

included in a construct and its conceptual definition, which is confirmed during the pilot testing of the study (Hair et al., 2010, p.125). Finally, nomological validity is confirmed by examining the degree to which the constructs' correlation matrix make sense (Hair et al., 2010, p.688).

Convergent validity can be confirmed after examining the factor loadings, the average variance extracted (AVE), and the composite reliability. The composite reliability examines the constructs' internal consistency in a similar manner as the Cronbach's alpha does, but the composite reliability calculation method considers the different loadings of the indicators, which provides a better assessment for internal consistency (Henseler, Ringle, & Sinkovics, 2009, p.299). Discriminant validity can be examined by the conservative method of Fornell-Larcker, which indicates that the square root of every construct's AVE should be greater than its highest correlation with other constructs in the model (Hair et al., 2014, p.105). However, newly developed constructs could have weaker AVE values in the social science studies (Hair et al., 2014, p.103). Discriminant validity can be determined on the indicator level by examining the indicators' cross-loadings, which should be less than 0.50 (Henseler et al., 2009, p.300). The rules of acceptable fit are summarized in Table 3.

Table 3

Measurement Model Validity and Reliability Requirements

Component	Rule	Source
Factor loadings	• 0.50 or higher, ideally 0.70 or higher • At a minimum, all factor loadings should be statistically significant at alpha = 0.05 • Values less than 0.5 indicate that more error still remains in the items of a factor.	(Hair et al., 2010, p.686)
AVE	Adequate convergence 0.5 or higher	(Hair et al., 2010, p.687)
Composite Reliability	0.70 or higher indicates good reliability	(Hair et al., 2010, p.687)
Cronbach's Alpha	0.70 or higher indicates good reliability. 0.60 - 0.70 is minimum acceptable level	(Hair et al., 2010, p.92)
Fornell-Larcker method	The square root of every construct's AVE should be greater than its highest correlation with other constructs in the model	(Hair et al., 2014, p.105)

Component	Rule	Source
Cross-loadings	All indicator's Cross-loadings should be less than 0.50	(Henseler et al., 2009, p. 301)

3.8 Survey Administration and Data Cleaning

The minimal review application was submitted to the Office of Research and Economic Development at the University of North Texas (UNT), and once approved the survey was sent to participants. Qualtrics, and Microsoft Excel were used to clean up the data file by removing some of the columns that were not related to the analysis such the IP address, response time, response date, filtration questions, and the location information. Then, all columns in the data files were coded using 8 letters or less to create the variable names according to the established code book. Finally, after checking the coding of the questions and especially the reverse coded ones, the data file was exported to SPSS for analysis through the use of descriptive statistics to identify variables in the study, and to conduct the EFA. Finally, questionnaire items that were collected from participants in Saudi Arabian Riyal (SAR) but converted to U.S. Dollars, where 3.75 Saudi Arabian Riyals equals $1, to make the analysis more intuitive.

3.9 Estimating the Socioeconomic Status of Individual Investors

The American psychological association (2015) defines socioeconomic status (SES) as "the social standing or class of an individual or group", and indicates that "it is often measured as a combination of education, income and occupation" (para. 1). Nevertheless, Braveman et al. (2005) indicate that different socioeconomic factors could impact individuals at different times

of their lives, at different magnitudes, and via many causal paths (p. 2879). As a result, the integrity of the conclusions may be impacted by the socioeconomic factors.

Therefore, this study had to find the unique composition of factors that affect the society in Saudi Arabia, rather than using the standardized factors of SES. These factors may include religious traditions, political influences, economic, and tribal orientation. Batterjee (2013) examines the impact of SES on the giftedness of Saudi students aged 9 to 18 years. To determine the SES, Batterjee used the four factor index of social status developed by Hollingshead (1974). Afterwards, Batterjee (2013) compared his results to the social strata constructed by Hollingshead (1974), and successfully determined the social status of Saudi families (Batterjee, 2013, pp. 28-24). Batterjee (2013) used the SES index to predict the cognitive abilities of the Saudi students, and argued that the cognitive abilities of students in the general population sample were significantly predicted by SES factors such as student's age, father's income, mother's education and parents' marital status at student's birth (p. 34).

For the purpose of this study the SES of individual investors in the Saudi stock market was determined by using Hollingshead's (1974) model. The model was of a perfect fit to measure the socioeconomic status of individual investors in Saudi Arabia because there exists an unequal status structure in the society. Also, the model relates critical factors such as occupation level, education level, marital status, and gender to the participation in the labor force or being retired. As a result, the SES index was expected to provide a fast, reliable, and significant procedure to estimate the SES of individual investors in the Saudi market (Hollingshead, 1974, p. 22).

Batterjee (2013) argues that determining the occupation level of people is a difficult task due to the fact that "some scales put the focus on skill levels while others emphasize the social status of an individual's position" (p. 15). To mitigate that obstacle, this study categorized the occupations of the participants as recommended by the International Standard Classification of Occupations (ISCO-88), which is the official standard in classifying occupations in Saudi Arabia. ISCO-88 defines skill level as "a function of the range and complexity of the tasks involved," and mentions skills are "acquired through experience and through informal training, although formal training plays a larger role in some countries than in others and a larger role at the higher skill levels than at the lower" (ISCO-88, 2004b, para. 4).

The ISCO-88 uses a 9-category classification, which is similar to the classification of Hollingshead (1974). The questionnaire asked the participants about their education level, and current occupations, or their occupations before retirement. Then, the occupations were categorized based on the ISCO-88 classification (Appendix E), and calculated the occupational level of individual investors by multiplying the scale value from Table 4 by a weight of five (Hollingshead, 1974, p. 39). Similarly, this study calculated the educational level of individual investors by multiplying the scale value from Table 5 by a weight of 3 (Hollingshead, 1974, p. 39). For example, the SES score of a clerk that holds a BA degree is calculated as: (6x5)+(5x3)= 45, while the SES score of a technician who has a high school diploma is (7x5)+(3x3)= 44, which indicates that having a higher occupation level doesn't imply higher SES score.

Table 4

Scoring Occupation Level (Hollingshead, 1974, p. 24; ISCO-88)

Occupational group	Scale value

Legislators, senior officials, managers, and Armed forces	9
Professionals	8
Technicians and associate professionals	7
Clerks	6
Service workers and shop and market sales workers	5
Skilled agricultural and fishery workers	4
Craft and related trades workers	3
Plant and machine operators and assemblers	2
Elementary occupations	1

Table 5

Scoring Education Level (Hollingshead, 1974, p. 24)

Level of Education	Scale value
Professional degree (MD, DDS, JD), or Doctorate degree (Ph.D., Ed.D)	7
Master's degree (for example: MA, MS, MEng, MEd, MBA)	6
Bachelor's degree (for example: BA, BS)	5
Some college	4
High school graduate - high school diploma	3
Intermediate	2
Primary or less	1

3.10 Summary

Primary sources of data helped to obtain information that matched the research objectives of this study. Therefore, an online questionnaires instrument was chosen for this study to obtain primary data related to the attitudes, behaviors, and investment profiles helped in measuring different aspects of the information behavior of the individual investors in the Saudi stock market. Subsequently, using the exploratory factor analysis (EFA) and the partial least squares structural equation modeling (PLS-SEM) helped to assess the validity and reliability of the proposed information behavior model, which was used to address the research questions. The statistical methods used in this research facilitated mapping the information behavior of individual investors in Saudi Arabia.

CHAPTER 4

STUDY RESULTS

As stated in Chapter 1, this study examined in detail the information behavior of individual investors in the Saudi Stock market within a non-advisory contextualization of their investment decision-making process. The first section in this chapter will introduce the demographics, and the investment profile of the individual investors in the SSM. Then, the procedure of conducting the exploratory factor analysis (EFA), and the structural equation modeling (SEM) is discussed. Finally, the results of estimating the socioeconomic status of individual investors are presented.

4.1 Demographics and Investment Profile of Individual Investors

The sampling window was between October 13, 2015 and November 13, 2015. The total number of questionnaires received was 296 responses, and the trimmed mean time for taking the survey was 19 minutes. There were 4 participants (1%) under 18 years old so they were not allowed to take the questionnaire, and their sessions were terminated. Also, there were 41 participants (14%) who did not want to take the survey out of the 296 responses. Therefore, the total number of participants who proceeded to the questions was 251 participants (85%). However, only 128 participants (50%) answered all the questions.

The collected data was transferred to SPSS, and analyzed to explore the statistical distribution of the participants in the questionnaire. The demographic data of the participants in the questionnaire is presented in Table 6. The analysis of the demographic data showed that 79.7% of the study participants were male and 20.3% were female, which is in line with the

CMA gender split ratios that was discussed earlier in the sample description. Of the 128 participants, 22.7% were between ages 18 and 32, 43.8% were between ages 31 and 42, 17.2% were between ages 43 and 53, and 16.4% were older than 53 years.

About 10% of the participants were single, 84.4% were married, and 5.5% were divorced. The educational level of the participants was relatively high, where about 90% held at least a bachelor's degree. Currently employed participants represented 64.1%, 13.3% were retired, and 10.9% were self-employed. 30.5% of the participants had less than 10 years of work experience, 34.4% had between 11 and 18 years of work experience, and 35.2% of the participants had more than 20 years of work experience. Of the 128 participants who reported their monthly income, 38.3% had an annual income under $60.8k, 38.3% had an annual income between $64k and $141k, 15.6% had an annual income between $144k and $294k, and 7.8% had an annual income between $307k and $640k.

Table 6

Demographic Data (n=128)

		Number of Participants	Percentage of Respondents
Gender	Male	102	79.7%
	Female	26	22.7%
Age	18-32	29	22.7%
	33-42	56	43.8%
	43-53	22	17.2%
	Older than 53	21	16.4%
Relationship Status	Single	13	10.2%
	Married	108	84.4%
	Divorced	7	5.5%
Educational Level	High school graduate	2	1.6%
	Diploma	11	8.6%
	Bachelor's degree	55	43%
	Master's degree	42	32.8%
	Professional degree	18	14.1%
Annual Income (USD)	Under $60.8k	49	38.3%
	$64k-141k	49	38.3%

	$144k-$294k	20	15.6%
	$307-$640k	10	7.8%

Data about the trading experience in the SSM were collected, and 49.2% had less than 10 years of trading experience, 43% had between 10 and 20 years of trading experience, and 7.8% had more than 20 years of trading experience (Table 7). The participants also reported their investment portfolio size, and 47.7% had portfolios under $40k, 29% had portfolios between $40k and $266k, and 23% had portfolios over $266k. Of the 128 participants, 37.5% held the stocks in their investment portfolios for less than 6 months, 10.9% held the stocks in their investment portfolios for a period between 7 and 12 months, and the remaining 51.6% were long term investors where they held the stocks in their portfolios for more than a year. The participants were asked if they invested in mutual funds, discretionary portfolio funds or real-estate funds and 68.8% indicated that they hadn't invested in any funds. A total of 80% said that they have invested 42% of their money in mutual funds.

The participants were asked to assess their risk appetite, and 32.8% indicated that they are low risk takers, 45.3% were average risk takers, and 21.9% were high risk takers. The participants were asked if they owned more than one investment portfolio, and 25.8% said that they did own more than one investment portfolio. About 31.3% of the participants confirmed that they designated one of their portfolios for speculation trading.

Table 7

Investors' Profile (n = 128)

		Number of Participants	Percentage of Respondents
Trading Experience	Less than 10 years	63	49.2%
	10-20	55	43%
	Over 20 years	10	7.8%
Portfolio Size	Under $40k	61	47.7%
	$40k-$266k	37	29%
	Over $266k	30	23%

(table continues)

Table 7 (continued)

		Number of Participants	Percentage of Respondents
Stock Holding Period	Less than a month	10	7.8%
	1-3 months	26	20.3%
	4-6 months	12	9.4%
	7-9 months	7	5.5%
	10-12 months	7	5.5%
	Over a year	66	51.6%
Mutual Funds, DPM, Real-estate funds Participation	Yes	40	31.3%
	No	88	68.8%
Percentage Invested in Mutual Funds, DPM, Real-estate funds of total funds invested in SSM	na	52	40.6%
	1-20%	47	36.7%
	24-40%	10	7.8%
	42-80%	11	8.6%
	86-100%	8	6.3%
Risk Appetite	Very low risk taker	13	10.2%
	Low risk taker	29	22.7%
	Average risk taker	58	45.3%
	High Risk taker	22	17.2%
	Very high risk taker	6	4.7%
Multiple Investment Portfolios	Yes	33	25.8%
	No	95	74.2
Speculation Portfolio	Yes	40	31.3%
	No	88	68.8%

4.2 Conducting the EFA

The EFA was performed in an iterated manner to generate the model with the best fit, which required dropping unqualified items that did not load on any components, had loadings less than 0.50, or cross loadings higher than 0.50.

4.2.1 Information Access

Information source characteristics affect the information seeking behavior of individual investors (Wilson, 1997), which includes information source accessibility. Information access was measured with 15 items in the questionnaire, where the participants chose the information sources that they usually use in the process of investment decision making. Moreover, there

was an additional item in which the participants added any other information sources that were not included in the 15 item list. The information sources are listed in Table 8.

Table 8

Information Access Measurement Items

	Measurement items
IA1	Financial statements of publically listed companies
IA2	Announcements of publically listed companies
IA3	Websites of publically listed companies
IA4	Financial reports issued by local investment firms
IA5	Financial reports issued by international investment firms
IA6	Economic reports issued by banks
IA7	Official Statistical reports
IA8	Online independent research
IA9	Research from online databases
IA10	Books
IA11	News papers
IA12	TV
IA13	Informal online forums and chat rooms
IA14	Social media
IA15	Advice from friends and family

A principle component analysis (PCA) was conducted using SPSS on the 15 information access items with oblique rotation (Promax) to extract components with eigenvalues greater than 1. Table 9 shows the pattern matrix that contains the loadings after rotation where four components had eigenvalues over 1, and in combination explained 64% of the variance. Items that cluster on the same component suggested that component 1 represented economic and financial reports, component 2 online sources and books, component 3 informal information sources, and component 4 media. All items loaded above the minimum threshold of 0.5 while all cross-loadings are less than maximum limit of 0.50, confirming convergent and discriminant validity of the scales.

Table 9

EFA for Information Access (1): Reliability, and Pattern Matrix with Loadings, and Cross-Loadings

	Component			
Table 9 (continued)	Economic & Financial Reports	Online Sources & Books	Informal Information Sources	Media
Number of Items (loadings > 0.5)	6	4	3	2
Cronbach's Alpha	.834	.799	.670	.739
Cumulative % of Variance Explained	34.149	49.371	57.165	64.018
IA6	**.854**	-.065	.216	-.090
IA4	**.842**	.121	.019	-.261
IA5	**.745**	.081	.023	-.064
IA2	**.658**	-.247	-.218	.389
IA1	**.595**	.031	-.212	.160
IA7	**.525**	.267	.006	.037
IA9	.060	**.825**	.073	-.072
IA8	.046	**.796**	.007	-.064
IA10	-.126	**.753**	-.219	.320
IA3	.368	**.488**	.091	.021
IA15	-.139	-.035	**.761**	-.090
IA14	.012	.028	**.724**	.282
IA13	.196	-.033	**.695**	.232
IA11	-.030	.040	.098	**.856**
IA12	-.099	.029	.252	**.748**

Note: Items that loaded above the 0.5 threshold are in bold

The calculated Kaiser-Mayer-Olkin (KMO) verified the sampling adequacy for the analysis, KMO = 0.823, which is a meritorious value (Hair et al., 2010, p.104). The Bartlett's test of sphericity χ^2 (105) = 739.398, $p < 0.001$, indicated that correlations between items were sufficiently large for PCA. Three of the factors showed Cronbach's alphas over the 0.70 threshold (Hair et al., 2010, p.104), which indicated that components 1, 2, and 4 had strong reliability. However, Component 3 had a Cronbach's alpha of 0.67, which is marginally lower than the threshold.

The scree plot (Figure 6) showed inflection points that justified running the principle component analysis (PCA) again on the 15 information access items with oblique rotation

(table continues)

(Promax), but with limiting the number of components extracted to only 2. Both components were very interpretable, where component 1 represented formal information sources, and component 2 represented informal information sources. Both components had eigenvalues greater than 1, and in combination explained 49.37% of the variance (Table 10).

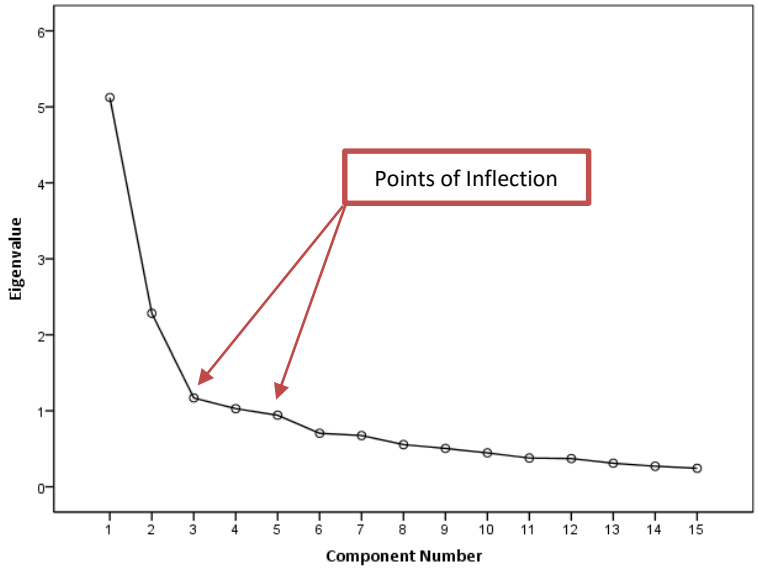


Figure 6. The EFA scree plot of information access.

The Calculated Kaiser-Mayer-Olkin (KMO) verified the sampling adequacy for the analysis, KMO = 0.823, which is a meritorious value (Hair et al., 2010, p.104). The Bartlett's test of sphericity χ^2 (105) = 739.398, $p < 0.001$, indicated that correlations between items were sufficiently large for PCA (Table 10). Both components showed Cronbach's alphas over the 0.70 threshold (Hair et al., 2010, p.104), which indicated strong reliability. All items loaded above the minimum threshold of 0.5, while all cross-loadings were less than the maximum limit of 0.50, showing convergent and discriminant validity of the scales.

Table 10 (continued)

Table 10

EFA for Information Access (2): Reliability, and Pattern Matrix with Loadings, and Cross-Loadings

	Component	
	Formal Information Sources	Informal Information Sources
Number of Items (loadings > 0.5)	10	5
Cronbach's Alpha	.880	.707
Cumulative Variance Explained	34.149%	49.371
IA4	**.796**	-.183
IA5	**.736**	-.060
IA3	**.717**	.127
IA7	**.715**	.026
IA1	**.690**	-.120
IA9	**.669**	.122
IA6	**.664**	.060
IA8	**.652**	.068
IA10	**.642**	.116
IA2	**.606**	-.028
IA14	-.060	**.783**
IA13	.054	**.708**
IA12	.110	**.673**
IA11	.259	**.605**
IA15	-.384	**.593**

Note: Items that loaded above the 0.5 threshold are in bold

4.2.2 Information Quality

This part of the questionnaire investigated the perceived quality of information sources that individual investors usually use in the process of investment decision making as part of the information source characteristics that affect the information seeking behavior of individual investors in the SSM. A 5-point Likert scale was used to rate the quality of those information sources ranging from very poor (1) to excellent (5), or not applicable (0). The items are listed in Table 11.

(table continues)

Table 11 (continued)

Table 11

Information Quality Measurement Items

	Measurement Items
IQ1	Financial statements of publically listed companies
IQ2	Announcements of publically listed companies
IQ3	Websites of publically listed companies
IQ4	Financial reports issued by local investment firms
IQ5	Financial reports issued by international investment firms
IQ6	Economic reports issued by banks
IQ7	Official Statistical reports
IQ8	Online independent research
IQ9	Research from online databases
IQ10	Books
IQ11	News papers
IQ12	TV
IQ13	Informal online forums and chat rooms
IQ14	Social media
IQ15	Advice from friends and family

A principle component analysis (PCA) was conducted using SPSS on the 15 information quality items with oblique rotation (Promax) to extract components with eigenvalues greater than 1. Table 12 shows the pattern matrix that contains the loadings after rotation. Three components had eigenvalues over 1, and in combination explained 63.6% of the variance. Items that cluster on the same component suggested that component 1 represented economic and financial reports, component 2 represented research and books, and component 3 represented informal information sources. All items loaded above the minimum threshold of 0.5 while all cross-loadings were less than the maximum limit of 0.50, showing convergent and discriminant validity of the scales.

(table continues)

Table 12

EFA for information Quality (1): Reliability, and Pattern Matrix with Loadings, and Cross-Loadings

	Component		
	Economic And Financial Reports	Research And Books	Informal Information Sources
Number of Items (loadings > 0.5)	5	5	5
Cronbach's Alpha	.878	.846	.774
Cumulative Variance Explained	40.758%	53.445%	63.611%
IQ2	**.888**	-.040	.003
IQ1	**.874**	-.079	.048
IQ7	**.780**	.049	-.059
IQ3	**.664**	.112	.160
IQ6	**.645**	.290	-.064
IQ9	-.004	**.789**	.051
IQ8	-.024	**.786**	.136
IQ10	-.140	**.719**	.188
IQ5	.264	**.714**	-.213
IQ4	.367	**.650**	-.168
IQ13	-.139	.182	**.782**
IQ14	-.201	.302	**.769**
IQ12	.392	-.200	**.652**
IQ11	*.402*	-.111	**.619**
IQ15	.000	-.086	**.556**

Note: Items that loaded above the 0.5 threshold are in bold

The Calculated Kaiser-Mayer-Olkin (KMO) verified the sampling adequacy for the analysis, KMO = 0.841, which is a meritorious value (Hair et al., 2010, p.104). The Bartlett's test of sphericity χ^2 (105) = 1004.845, $p < 0.001$, indicated that correlations between items were sufficiently large for PCA. All three components had Cronbach's alphas over the 0.70 threshold (Hair et al., 2010, p.104), which indicated strong components' reliability.

Table 12 shows that item IQ11 (Newspapers) had a higher than expected cross-loading (.402) on component 1. Therefore, the item was removed, and the analysis was run again to verify the effect of removing IQ11 on the reliability and validity of the scales (Table 13). However, that did not have any significant change in the cumulative variance explained, reliability, or validity of the scales.

Table 13

EFA for information Quality (2): Reliability, and Pattern Matrix with Loadings, and Cross-Loadings

	Component		
	Economic And Financial Reports	Research And Books	Informal Information Sources
Number of Items (loadings > 0.5)	5	5	4
Cronbach's Alpha	.878	.846	.719
Cumulative Variance Explained	41.271%	54.192%	64.484%
IQ1	**.908**	-.123	.082
IQ2	**.892**	-.046	.002
IQ7	**.796**	.015	-.029
IQ3	**.695**	.078	.180
IQ6	**.635**	.284	-.062
IQ8	-.058	**.828**	.101
IQ9	-.016	**.786**	.065
IQ10	-.158	**.745**	.167
IQ5	.214	**.737**	-.218
IQ4	.328	**.663**	-.172
IQ13	-.049	.138	**.795**
IQ14	-.109	.248	**.794**
IQ15	.107	-.178	**.614**
IQ12	.414	-.144	**.558**

Note: Items that loaded above the 0.5 threshold are in bold

Finally, the EFA analysis was conducted on the 15 information quality items with oblique rotation (Promax), but with limiting the number of components extracted to only two. Both components were very interpretable, where component 1 represented formal information sources and component 2 represented informal information sources. Both components had eigenvalues greater than 1, and in combination explained 55.213% of the variance (Table 14). However, IQ10 (Books) had a very low loading on Component 1 (.369) which affects the convergent validity of the results, so (Table 15) shows the results of the analysis after removing IQ10 (Books).

Table 14

EFA for Information Quality (3): Reliability, and Pattern Matrix with Factor Loadings, and Cross-Loadings

	Component	
	Formal Information Sources	Informal Information Sources
Number of Items (loadings > 0.5)	10	5
Cronbach's Alpha	.897	.774
Cumulative Variance Explained	40.758%	53.445%
IQ4	**.845**	-.103
IQ6	**.826**	-.060
IQ2	**.802**	-.051
IQ5	**.802**	-.135
IQ7	**.776**	-.096
IQ1	**.754**	-.008
IQ3	**.681**	.148
IQ9	**.567**	.167
IQ8	**.534**	.256
IQ10	*.369*	*.307*
IQ14	-.079	**.860**
IQ13	-.111	**.853**
IQ12	.126	**.634**
IQ11	.205	**.612**
IQ15	-.144	**.571**

Note: Items that loaded above the 0.5 threshold are in bold

Component 1 (formal information sources) and component 2 (informal information sources) had eigenvalues greater than 1, and in combination explained 55.213% of the variance (Table 15). The Calculated Kaiser-Mayer-Olkin (KMO) verified the sampling adequacy for the analysis, KMO = 0.838, which is a meritorious value (Hair et al., 2010, p.104). The Bartlett's test of sphericity χ^2 (91) = 938.857, $p < 0.001$, indicated that correlations between items were sufficiently large for PCA (Table 14). Both components had strong reliability with Cronbach's alphas over the 0.70 threshold (Hair et al., 2010, p.104). All items loaded above the minimum threshold of 0.5 while all cross-loadings were less than maximum limit of 0.50, showing convergent and discriminant validity of the scales.

Table 15

EFA for Information Quality (4): Reliability, and Pattern Matrix with Factor Loadings, and Cross-Loadings

	Component	
	Formal Information Sources	Informal Information Sources
Number of Items (loadings > 0.5)	9	5
Cronbach's Alpha	.894	.774
Cumulative Variance Explained	41.672%	55.213%
IQ4	**.849**	-.117
IQ6	**.825**	-.044
IQ5	**.807**	-.156
IQ2	**.792**	-.020
IQ7	**.766**	-.072
IQ1	**.744**	.028
IQ3	**.680**	.174
IQ9	**.580**	.129
IQ8	**.546**	.212
IQ13	-.092	**.846**
IQ14	-.063	**.832**
IQ12	.130	**.657**
IQ11	.209	**.630**
IQ15	-.134	**.585**

Note: Items that loaded above the 0.5 threshold are in bold

4.2.3 Information Behavior

The third part of the questionnaire, which asked the participants to rate statements related to information behavior using a 5-point Likert scale, was used to evaluate the degree of agreement or disagreement with the statements ranging from strongly disagree (1), disagree (2), neither agree nor disagree (3), agree (4), to strongly agree (5). The statements are listed in Table 16.

Table 16

Information Behavior Measurement Items

Measurement items

IS1	You purposively seek information to help you in making a critical investment decision
IS2	You are knowledgeable about the Saudi stock market
IS3*	I know where to find the information I need prior to making a decision
IS4*	I am confident in my ability to research important decisions
IS5*	I know the right questions to ask when looking for information
IS6*	I can focus easily on a few good sources of information when making a decision
IS7*	I know where to look to find the information I need
IS8*	I am confident in my ability to recognize sources of information worth considering
IS9*	I can tell which sources of information meet my expectations
IS10*	I trust my own judgment when deciding which source of information to consider
IS11*RC	I never seem to find the right information for me
IS12* RC	Too often the sources of information I use are not satisfying
IS13* RC	I often have doubts about the sources of information I use
IS14* RC	I frequently agonize over which sources of information to consider
IS15* RC	I often wonder if I've chosen the right source of information
IS16* RC	I have the skills required to obtain needed information before making important decisions

Note: Items in bold are reverse coded.
* Adapted from Bearden, Hardesty, & Rose, (2001)
RC = Reverse coded items

A principle component analysis (PCA) was conducted using SPSS on the 16 information behavior items with oblique rotation (Promax) to extract components with eigenvalues greater than 1. Table 17 shows the pattern matrix that contained the loadings after rotation where three components had eigenvalues over 1, and in combination explained 62.6% of the variance. Items that clustered on the same component suggested that component 2 represented acquisition skepticism and component 3 information search confidence. However, it was difficult to interpret the items in component 1, because they did not collectively represent a meaningful dimension of the data.

Table 17

EFA for Information Behavior (1): Reliability, and Pattern Matrix with Loadings, and Cross-Loadings

	Component		
	Trust, Relevence, Confidence & Seeking	Acquisition Skepticism	Information Search Confidence
Number of Items (loadings > 0.5)	7	5	4

	Component		
	Trust, Relevence, Confidence & Seeking	Acquisition Skepticism	Information Search Confidence
Cronbach's Alpha	.912	.831	.670
Cumulative % of Variance Explained	43.987%	55.984%	62.604%
IS10	**.946**	-.013	-.158
IS9	**.849**	-.075	.032
IS8	**.843**	-.026	.062
IS16	**.782**	-.019	.105
IS5	**.527**	-.037	.374
IS7	*.475*	.121	.383
IS4	*.447*	.162	.398
IS13	-.031	**.908**	-.091
IS12	-.294	**.802**	.384
IS14	.193	**.769**	-.332
IS11	-.149	**.725**	.222
IS15	.428	**.609**	-.313
IS1	-.079	-.121	**.655**
IS2	.327	-.070	*.488*
IS6	.413	-.041	*.482*
IS3	.343	.110	*.406*

Note: Items that loaded above the 0.5 threshold are in bold

Table 17 shows that items IS2 (You are knowledgeable about the Saudi stock market), IS3 (I know where to find the information I need prior to making a decision), IS4 (I know where to find the information I need prior to making a decision), IS6 (I can focus easily on a few good sources of information when making a decision), and IS7 (I know where to look to find the information I need) had loadings less than the threshold of 0.50, which invalidates convergent validity of the scales, and were removed in a successive EFA iteration. As a result, 11 items loaded into 2 components, as shown in Table 18.

Table 18

EFA for Information Behavior (2): Reliability, and Pattern Matrix with Loadings, and Cross-Loadings

	Component	
	Information Acquisition & Information Search	Acquisition Skepticism
Number of Items (loadings > 0.5)	6	5
Cronbach's Alpha	.877	.831
Cumulative % of Variance Explained	42.275%	57.425%
IS9	**.848**	-.018
IS8	**.818**	.049
IS16	**.818**	.032
IS10	**.796**	.056
IS5	**.754**	.004
IS2	**.641**	-.047
IS1	.393	-.132
IS13	-.136	**.923**
IS12	-.051	**.794**
IS14	-.036	**.784**
IS11	.018	**.714**
IS15	.193	**.642**

Note: Items that loaded above the 0.5 threshold are in bold

Only one item, IS1 (You purposively seek information to help you in making a critical investment decision), did not load on any component, and was removed in the third EFA iteration. After removing IS1, the remaining items loaded into two components, as shown in Table 19. It was reasonable that IS1 did not load on any of the two components, because it represented information seeking, while component 1 represented information acquisition and information search, and Component 2 represented acquisition skepticism.

Table 19 (continued)

Table 19

EFA for Information Behavior (3): Reliability, and Pattern Matrix with Loadings, and Cross-Loadings

	Component	
	Information Acquisition & Information Search	Acquisition Skepticism
Number of Items (loadings > 0.5)	6	5
Cronbach's Alpha	.877	.831
Cumulative % of Variance Explained	46.646%	61.907%
IS9	**.850**	-.027
IS8	**.841**	.024
IS16	**.833**	.013
IS10	**.802**	.045
IS5	**.774**	-.018
IS2	**.640**	-.053
IS13	-.102	**.906**
IS12	-.040	**.794**
IS14	-.014	**.773**
IS11	.024	**.717**
IS15	.224	**.622**

Note: Items that loaded above the 0.5 threshold are in bold

All items loaded above the minimum threshold of 0.5 while all cross-loadings were less than maximum limit of 0.50, showing the convergent and discriminant validity of the scales. The Calculated Kaiser-Mayer-Olkin (KMO) verified the sampling adequacy for the analysis, KMO = 0.850, which is a meritorious value (Hair et al., 2010, p.104). The Bartlett's test of sphericity χ^2 (55) = 700.595, $p < 0.001$, indicated that correlations between items were sufficiently large for PCA. Both components had Cronbach's alphas over the 0.70 threshold (Hair et al., 2010, p.104), which indicated strong reliability.

Finally, another EFA iteration was run with restricting the number of components to be extracted to two components (Table 20), and including all the deleted items in the previous iterations, because those deleted items had a significant role in explaining the information behavior of individual investors.

(table continues)

Table 20 (continued)

Table 20

EFA for Information Behavior (4): Reliability, and Pattern Matrix with Loadings, and Cross-Loadings

	Component	
	Information Behavior	Acquisition Skepticism
Number of Items (loadings > 0.5)	11	5
Cronbach's Alpha	.908	.831
Cumulative % of Variance Explained	43.987%	55.984%
IS8	**.823**	.015
IS9	**.807**	-.031
IS16	**. 800**	.015
IS5	**.775**	-.040
IS6	**.754**	-.058
IS10	**.746**	.052
IS7	**.730**	.118
IS4	**.713**	.156
IS2	**.681**	-.093
IS3	**.625**	.097
IS1	***.439***	-.182
IS13	-.129	**.927**
IS14	-.104	**.818**
IS12	.002	**.765**
IS11	.011	**.709**
IS15	.131	**.667**

Note: Items that loaded above the 0.5 threshold are in bold

The pattern matrix that contained the loadings after rotation, and both components had eigenvalues over 1, and in combination explained 55.984% of the variance. Items that clustered on the same component suggested that component 1 represented information behavior, and component 2 represented acquisition skepticism. All items except IS1, loaded above the minimum threshold of 0.5, while all cross-loadings were less than maximum limit of 0.50, showing the convergent and discriminant validity of the scales. Keeping IS1 in component 1 was essential, because IS1 represents the definition of information seeking behavior, which is an integral part of this study. Hair et al. (2010) suggests that having factor loadings ranging

(table continues)

between ±0.30 and ±0.40 confirms the practical significance in interpreting the structure (p.117).

The Calculated Kaiser-Mayer-Olkin (KMO) verified the sampling adequacy for the analysis, KMO = 0.899, which is a meritorious value (Hair et al., 2010, p.104). The Bartlett's test of sphericity χ^2 (120) = 1097.187, $p < 0.001$, indicated that correlations between items were sufficiently large for PCA. Both components had Cronbach's alphas over the 0.70 threshold (Hair et al., 2010, p.104), which indicated strong reliability.

4.2.4 Subjective Financial Knowledge and Financial Self-Efficacy

Measuring the subjective financial knowledge was very important because investors' subjectivity influences the decision making process, and could change the way in which investors search for information and evaluate risk. Moorman, Diehl, Brinberg, and Kidwell (2004) found evidence that subjective knowledge affects search and choice due to the motivation of people to behave consistently with their subjective knowledge in relation to their goals (p.678). Items SK1 to SK6 were adapted from Goldsmith, and Goldsmith (1997), and SK7 (financial self-efficacy) was adapted from Danes, and Haberman (2007). The measurement items of the subjective financial knowledge of individual investors in the SSM are shown in Table 21.

Table 21

Subjective Financial Knowledge and Financial Self-Efficacy Measurement Items

	Measurement items
SK1*	I know pretty much about investing
SK2*^{RC}	I do not feel very knowledgeable about investing

SK3*	Among my circle of friends, I'm one of the "experts" on investments
SK4* RC	Compared to most other people, I know less about investing
SK5*	I have heard of most of the new investments that are around
SK6* RC	When it comes to trading shares, I really don't know a lot
SK7*	I believe the way I manage my money will affect my future

Note: * Adapted from Goldsmith & Goldsmith (1997)
** Adapted from Danes & Haberman (2007)
RC = Reverse coded items

A principle component analysis (PCA) was conducted using SPSS on the seven subjective financial knowledge items with oblique rotation (Promax) to extract components with eigenvalues greater than 1. Table 22 shows the pattern matrix that contained the loadings after rotation, where three components had eigenvalues over 1, and in combination explained 75.138% of the variance. Only one item loaded on component 3, which was SK7 (I believe the way I manage my money will affect my future). Also, component 2 had a very low reliability, with a Cronbach's alpha of 0.635. Therefore, a second EFA iteration was run with only two components, as shown in Table 22.

Table 22

EFA for Subjective Financial Knowledge (1): Reliability, and Pattern Matrix with Loadings, and Cross-Loadings

	Component		
	1	2	3
Number of Items (loadings > 0.5)	4	2	1
Cronbach's Alpha	.802	.635	-
Cumulative % of Variance Explained	46.018%	60.777%	75.138%
SK4	**.909**	-.205	-.061
SK2	**.800**	.110	-.019
SK6	**.797**	-.128	-.029
SK1	**.525**	*.437*	.150
SK5	-.282	*1.043*	-.070
SK3	.376	**.579**	-.013
SK7	-.066	-.060	*1.011*

Note: Items that loaded above the 0.5 threshold are in bold

However, Table 23 shows that one item (SK7) did not load on any component, and component 2 had a relatively low Cronbach's alpha at 0.635. The scree plot of the EFA (Figure 7) shows that the best fit model will be with only one component. Therefore, another EFA iteration was run with only one component to confirm the unidimensionality of the scale, as shown in Table 24.

Table 23

EFA for Subjective Financial Knowledge (2): Reliability, and Pattern Matrix with Loadings, and Cross-Loadings

	Component	
	1	2
Number of Items (loadings > 0.5)	4	2
Cronbach's Alpha	.802	.635
Cumulative % of Variance Explained	46.018%	60.777%
SK4	**.914**	-.242
SK2	**.814**	.080
SK6	**.803**	-.155
SK1	**.547**	.458
SK5	-.254	**.999**
SK3	.399	**.549**
SK7	-.057	.264

Note: Items that loaded above the 0.5 threshold are in bold

Table 24 (continued)

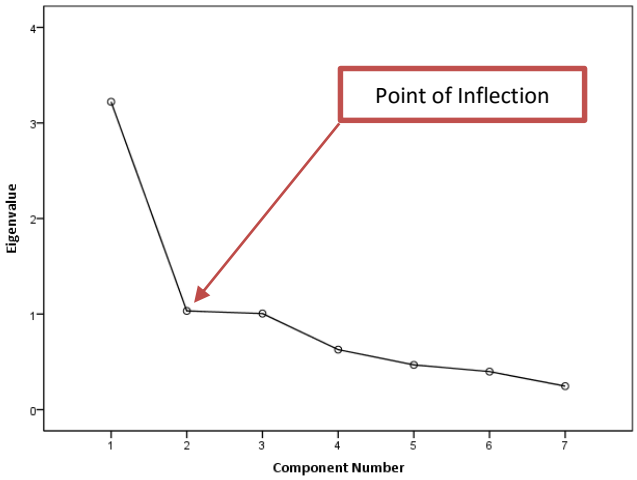


Figure 7. EFA scree plot of subjective financial knowledge.

Table 24

EFA for Subjective Financial Knowledge (3): Reliability, and Pattern Matrix with Loadings, and Cross-Loadings

	Component
	Subjective Financial Knowledge
Number of Items (loadings > 0.5)	6
Cronbach's Alpha	.775
Cumulative % of Variance Explained	46.018%
SK1	**.862**
SK2	**.832**
SK3	**.789**
SK4	**.686**
SK5	**.646**
SK6	**.505**
SK7	.144

Note: Items that loaded above the 0.5 threshold are in bold

The financial self-efficacy item (SK7: I believe the way I manage my money will affect my future) had a loading less than 0.5, which was expected because it is not correlated with the subjective financial knowledge items adapted from Goldsmith and Goldsmith (1997), and was removed in the last EFA iteration to examine the reliability and validity of items SK1 to SK6, as shown in Table 25.

(table continues)

Table 25

EFA for Subjective Financial Knowledge (4): Reliability, and Pattern Matrix with Loadings, and Cross-Loadings

	Component Subjective Financial Knowledge
Number of Items (loadings > 0.5)	6
Cronbach's Alpha	.815
Cumulative % of Variance Explained	53.45%
SK1	**.858**
SK2	**.834**
SK3	**.790**
SK4	**.689**
SK6	**.647**
SK5	**.507**

Note: Items that loaded above the 0.5 threshold are in bold

The Calculated Kaiser-Mayer-Olkin (KMO) verified the sampling adequacy for the analysis, KMO = 0.801, which is a meritorious value (Hair et al., 2010, p.104). The Bartlett's test of sphericity χ^2 (15) = 283.391, $p < 0.001$, indicated that correlations between items were sufficiently large for PCA. The subjective financial knowledge scale had Cronbach's alphas over the 0.70 threshold (Hair et al., 2010, p.104), which indicated strong reliability. All items loaded above the minimum threshold of 0.5, showing the convergent and discriminant validity of the scale.

4.2.5 Investors' Behavior

This study examined three main categories of behavioral biases: belief perseverance biases, information processing biases, and emotional biases. Additionally, there were items to examine herding behaviors, as well as other market factors. The behavioral finance literature does not have many validated scales to measure behavioral biases that would have fit the

objective of this study, therefore, the items in this part of the questionnaire were constructed according to the definitions of those behavioral biases. The measurement items are presented in Table 26.

Table 26

Investors' Behavior Measurement Items

			Measurement items
Belief Perseverance Biases	Representativeness	BPB1	You invest in popular stocks with high earnings growth, and avoid stocks that have performed poorly in the recent past.
		BPB2	You invest in stocks after predicting their future movements through analyzing the trends of some representative stocks.
	Hindsight	BPB3	You believe that the historical stock prices in the Saudi stock market have been predictable and reasonable to expect.
	Cognitive Dissonance	BPB4	You invest more in a losing stock that you own after it has further gone down.
Information Processing Biases	Anchoring and Adjustment	IPB1	You make new investment decisions based on your previous forecasted performance of the Saudi stock market.
		IPB2	You forecast the future performance of a stock based on the current stock prices.
	Mental Accounting	IPB3	You consider some of the stocks in your portfolio as low risk investments, while at the same time you consider some other stocks as high risk investments.
		IPB4	You ignore the connection between low risk stocks and high risk stocks in your investment portfolio.
	Availability Heuristic	IPB5	You invest in stocks that appear more frequently in the news or advertisements.
		IPB6	You prefer to buy local stocks than international stocks because the information of local stocks is more available.
	Self-Attribution	IPB7	The success of your past investment decisions is due to your ability to forecast the performance of the Saudi stock market.
		IPB8	You believe the successful trading is attributed to your skills rather than luck.
Emotional Biases	Overconfidence	EB1	You are normally able to anticipate the end of good or poor market returns at the Saudi stock market.
		EB2	You believe that your skills and knowledge of the Saudi stock market can help you to outperform the market.
	Loss Aversion	EB3	You hold some losing stocks in your portfolio because they will break-even someday.
		EB4	You sell some winning stocks in your portfolio because you are afraid to lose this profit.
	Regret Aversion	EB5	You make conservative and low risk investment decisions after realizing losses on risky stocks in the past.
		EB6	It is safer to invest in popular well-known stocks.
Herding Behavior *		HERD1	You make investment decisions based on trading decisions of other investors (e.g., family, friends, colleagues, etc.).
		HERD2	Your trading volume may be based on the trading volume of other investors (e.g., family, friends, colleagues, etc.).
		HERD3	You usually react quickly to the changes of other investors' decisions and follow their reactions to the stock market.
Social Interaction **		HERD4	Chatting with the people I know at financial institutions is an important part of doing financial business for me
		HERD5	**The less I talk to financial institution personnel the better**
		HERD6	**I prefer to make most of my financial decisions in person**
Market Factors		MARK1	It is important to make informed investment decisions based on information regarding the Saudi stock market and the Saudi economy.
		MARK2	You prefer to invest in stocks with government ownership.
		MARK3	You prefer to invest in stocks that are Sharia compliant
		MARK4	You examine the market fundamentals of underlying stocks before making investment decisions.

Note: Items in bold were reverse coded. * Adapted from Luong, & Ha (2011) ** Adapted from Li, Lee, & Cude (2002)

First, a principle component analysis (PCA) was conducted using SPSS on 12 cognitive bias's items and six emotional bias's items with oblique rotation (Promax) to extract components with eigenvalues greater than 1. Table 27 shows the pattern matrix that contains the loadings after rotation where four components had eigenvalues over 1, and in combination explained 42.622% of the variance.

Table 27

EFA for Investors' Behavior (1): Reliability, and Pattern Matrix with Loadings, and Cross-Loadings

	Component		
	1	2	3
Number of Items (loadings > 0.5)	7	6	5
Cronbach's Alpha	.758	.622	*.587*
Cumulative % of Variance Explained	20.742%	34.427%	42.622%
IPB7	**.754**	.107	-.011
IPB8	**.754**	-.008	-.173
EB2	**.747**	-.134	-.073
EB1	**.611**	-.076	.217
BPB3	**.585**	-.163	.118
IPB3	**.**493	.272	.022
IPB2	.342	.248	.227
BPB2	.127	**.754**	-.208
BPB1	-.100	**.685**	-.182
EB5	-.160	**.637**	.227
EB4	-.160	.444	.323
EB3	-.029	.403	.263
IPB1	.305	.387	-.091
IPB4	-.088	-.206	**.766**
IPB5	.188	-.224	**.754**
EB6	-.140	.227	**.538**
BPB4	.143	.218	.347
IPB6	.222	.222	.341

Note: Items that loaded above the 0.5 threshold are in bold

Some items from Table 27 that had loadings less than 0.50 were removed, and the principle component analysis (PCA) was run again on the 11 items of the cognitive biases (BPB and IPB) and emotional biases with oblique rotation (Promax) to extract 3 components with

eigenvalues greater than 1, and in combination explained 55.25% of the variance, as shown in Table 28.

Table 28

EFA for Investors' Behavior (2): Reliability, and Pattern Matrix with Loadings, and Cross-Loadings

	Component		
	1	2	3
Number of Items (loadings > 0.5)	5	3	3
Cronbach's Alpha	.642	*.563*	*.555*
Cumulative % of Variance Explained	24.43%	42.295%	55.258%
IPB8	**.793**	.115	-.162
IPB7	**.764**	.138	.024
EB2	**.748**	-.079	-.082
EB1	**.626**	-.037	.207
BPB3	**.599**	-.116	.155
BPB1	-.051	**.743**	-.156
BPB2	.149	**.743**	-.119
EB5	-.089	**.664**	.255
IPB4	-.071	-.152	**.756**
IPB5	.240	-.106	**.725**
EB6	-.070	.366	**.631**

Note: Items that loaded above the 0.5 threshold are in bold

Table 28 shows that the components' reliability values were below the accepted 0.70 level, where it is expected for newly developed scales in social science to have lower than reliability values (Field, 2009, p.680). Additionally, there are many factors that affect Cronbach's alpha such as the number of items loading on each component where components that have less items tend to have a lower Cronbach's alpha. Actually, the lower bound of Cronbach's alpha can be lowered from 0.70 to 0.60 in exploratory studies, which suggested that component 1 was reliable (Hair et al., 2010, p.125).

Therefore, the EFA analysis in table 28 was considered to have a moderate reliability. All items loaded above the minimum threshold of 0.5 while all cross-loadings were less than

maximum limit of 0.50, confirming the convergent and discriminant validity of the scale. The Calculated Kaiser-Mayer-Olkin (KMO) verified the sampling adequacy for the analysis, KMO = 0.638, which is a mediocre value (Hair et al., 2010, p.104). The Bartlett's test of sphericity χ^2 (55) = 289.242, $p < 0.001$, indicated that correlations between items were sufficiently large for PCA.

In order to address the moderate reliability values in the EFA model presented in Table 28, another EFA iteration was run for the 28 items related to behavioral, herding behavior, social interaction, and market factors. The principle component analysis (PCA) was conducted using SPSS on the 28 items with oblique rotation (Promax) to extract 4 components with eigenvalues greater than 1. Table 29 shows the pattern matrix that contains the loadings where all components had eigenvalues over 1, and in combination explained 39.931% of the variance.

Table 29

EFA for Investors' Behavior (3): Reliability, and Pattern Matrix with Loadings, and Cross-Loadings

	Component			
	1	2	3	4
Number of Items (loadings > 0.5)	8	9	5	6
Cronbach's Alpha	-	-	-	-
Cumulative % of Variance Explained	15.158%	27.255%	34.327%	39.931
IPB7	**.770**	.159	-.055	-.140
IPB8	**.763**	-.072	-.013	-.199
EB2	**.743**	-.186	-.011	-.022
EB1	**.618**	-.068	.211	.156
BPB3	**.522**	-.016	.008	-.066
IPB3	.458	.239	-.008	.122
IPB2	.421	.271	.152	-.116
HERD6	.355	-.294	.153	.142
BPB2	.064	**.724**	-.316	.018
EB5	-.112	**.702**	.019	-.050
BPB1	-.033	**.588**	-.183	-.140
EB4	-.128	**.523**	.138	.071
EB3	.048	**.503**	.087	-.151
BPB4	.104	.405	.150	.031
EB6	-.135	.393	.280	.231
IPB6	.276	.360	.257	-.127
MARK3	-.048	.343	.029	.057
HERD 1	-.119	.017	**.774**	-.115
HERD 2	.042	-.225	**.749**	.043
HERD 3	.075	.125	**.687**	-.154
IPB5	.236	-.016	**.679**	.035
IPB4	-.041	.074	.461	.172
HERD 4	-.161	.021	.067	**.588**
MARK1	.205	-.166	.015	**.571**

	Component			
	1	2	3	4
MARK 4	.424	-.086	-.219	.463
HERD5	.296	.084	.014	-.442
IPB1	.233	.300	-.211	.409
MARK2	-.113	.284	.366	.390

Note: Items that loaded above the 0.5 threshold are in bold

All items that had loadings less than 0.50 in Table 29 were removed in a successive iteration of the EFA for only 16 items, as shown in Table 30. The four components had eigenvalues greater than 1, and cumulatively explained 52.991% of the variance.

Table 30

EFA for Investors' Behavior (4): Reliability, and Pattern Matrix with Loadings, and Cross-Loadings

	Component			
	1	2	3	4
Number of Items (loadings > 0.5)	5	4	5	2
Cronbach's Alpha	.755	.749	.639	*.265*
Cumulative % of Variance Explained	17.630%	34.265%	45.422%	52.991%
IPB7	**.783**	-.005	.145	-.089
IPB8	**.773**	.027	.001	.123
EB2	**.721**	-.053	-.117	.167
EB1	**.624**	.198	.006	.092
BPB3	**.623**	-.035	-.047	-.265
HERD1	-.163	**.807**	.035	-.004
HERD3	.086	**.758**	.097	-.160
HERD2	-.034	**.756**	-.112	.232
IPB5	.282	**.667**	-.005	-.047
EB5	-.057	.088	**.739**	.061
BPB2	.178	-.232	**.673**	-.061
BPB1	-.044	-.123	**.640**	.232
EB4	-.058	.191	**.603**	-.067
EB3	.006	.085	**.526**	-.009
MARK1	.165	-.066	-.041	**.754**
HERD4	-.088	.079	.154	**.625**

Note: Items that loaded above the 0.5 threshold are in bold

Three components had strong reliability with Cronbach's alpha over 0.60, but Component 4 was not a reliable construct (Table 30). Therefore, MARK1 (It is important to make informed investment decisions based on information regarding the Saudi stock market and the Saudi economy) and HERD4 (Chatting with the people I know at financial institutions is

Table 31 (continued)

an important part of doing financial business for me) were removed, and the EFA was run again on 12 items (Table 31).

Table 31

EFA for Investors' Behavior (5): Reliability, and Pattern Matrix with Loadings, and Cross-Loadings

	Component	
	Overconfidence	Emotional Biases
Number of Items (loadings > 0.5)	6	6
Cronbach's Alpha	.764	.662
Cumulative % of Variance Explained	24.140%	44.099%
IPB7	**.774**	.091
IPB8	**.751**	.006
EB2	**.743**	-.071
EB1	**.673**	.203
MARK4	**.565**	-.192
BPB3	**.546**	-.023
HERD1	-.170	**.759**
HERD3	.060	**.747**
HERD2	-.007	**.593**
EB5	.050	**.564**
EB4	.038	**.550**
EB6	.040	**.523**

Note: Items that loaded above the 0.5 threshold are in bold

(table continues)

The analysis produced 2 components with Eigenvalues greater than 1 that explained 44.099% (Table 31). Component 1 represented overconfidence, and component 2 represented emotional biases. Actually, component 1 confirms the findings of Thaler and Barberis (2005) that overconfident behaviors are usually induced by both self-attribution bias (IPB7 & IPB8) and hindsight bias (BPB3) (p. 12). Table 31 shows the pattern matrix that contains the loadings after rotation where both components had eigenvalues over 1, and in combination explained 44.099% of the variance.

The Calculated Kaiser-Mayer-Olkin (KMO) verified the sampling adequacy for the analysis, KMO = 0.682, which is a mediocre value (Hair et al., 2010, p.104). The Bartlett's test of sphericity χ^2 (66) = 395.402, $p < 0.001$, indicated that correlations between items were

sufficiently large for PCA. Both components had Cronbach's alphas over the 0.60 threshold for exploratory research (Hair et al., 2010, p.125), which indicated strong reliability. All items loaded above the minimum threshold of 0.5, showing convergence, and all items had cross loadings less than 0.50, indicating the discriminant validity of the scale.

4.3 Sequential Equation Modeling (SEM) of Information Behavior

The proposed model of individual investors' information behavior was based on Wilson's (1997) general model of information behavior, and it was assumed that the information behavior of the individual investors in the SSM during the process of decision making is affected by a predefined set of intervening variables. The intervening variables included behavioral biases, information source accessibility, information source quality, financial self-efficacy, and subjective financial knowledge. The exploratory factor analysis was used to study the model assumptions, and assess the reliability and validity of the proposed constructs. However, EFA is not a statistical method for theory testing, rather it is an exploratory method that produces results that cannot be generalized beyond the sample (Costello & Osborne, 2011, p.7).

Therefore, the partial least squares structural equation modeling (PLS-SEM) was used to examine the proposed model of information behavior of the individual investors in the Saudi stock market, and test the significance of the relationships among the constructs.

Although, SEM is a multivariate statistical method that is similar to multiple regression methods, PLS-SEM is more powerful and has many advantages compared to other approaches. The advantages of PLS-SEM include working efficiently with smaller sample sizes, handling any

type of data, using single item constructs, and making no assumptions about data distributions. Specifically, PLS-SEM maximizes the explained variance between the constructs (R^2), but it does not explain the relationships (covariance) among the items in each construct. To do so, PLS-SEM uses the ordinary least squares (OLS) multiple regression, which makes it a perfect tool for theory testing (Hair et al., 2010, pp.760-762).

The PLS-SEM path modeling depicts the relationship between the constructs, which are the dependent variables, and the indicators, which are the measured independent variables. The SEM-PLS path model consists of the structural model (inner model), which represents the relationships between the constructs based on the structural theory, and the measurement model, which represents the relationship between constructs and their indicators based on the measurement theory (Hair et al., 2014, pp. 11-14).

4.3.1 Conducting the PLS-SEM.

For the purpose of this study, the structural model was based on the general information behavior model by Wilson (1997), which suggested that the individual investors in the SSM who had information needs would use their problem-focused coping strategies to fill their knowledge gap. Therefore, to reduce their investment decision making uncertainty, the investors would start the process of information seeking that is affected by intervening variables including information accessibility, information quality, socioeconomic status, subjective financial knowledge, and behavioral biases. Accordingly, the structural model (inner model) consisted of five constructs: Information behavior, information access, information quality, subjective knowledge, and investors' behavior.

The SEM-PLS analysis and path modeling were conducted using the statistical software package WarpPLS SEM software (version 5.0), which was a perfect fit for this study, because the PLS regression method does not require normally distributed data; the software performs and generates many statistical tests that are needed for theory testing. This study used a reflective measurement model (outer model) to represent the relationship between the latent constructs and their indicators. The reflective measurement model was chosen because the reflective measurement was consistent with the study objectives, and the indicators were highly correlated and interchangeable.

The process started with exporting the indicators' raw data from SPSS to Microsoft Excel, and removing all text columns except the headers and the indicators' values. After uploading the file to WarpPLS, the software checked the file for missing data and standardized the data in preparation of building the path model. The software has a friendly graphical user interface (GUI), which was very helpful in specifying both the structural model, and the measurement model. Next, the path coefficients were estimated by choosing a PLS regression algorithm known as Warp3, as well as the P values for coefficients, which are used for testing significance levels. The P values were calculated using a robust nonparametric method known as Stable3, which has been proven as the resampling method that generates the most precise P values compared to the other resampling methods like bootstrapping and jackknifing (Kock, 2015b, p.27).

4.3.1.1 The First PLS-SEM Model

The first model was constructed according to the results of the EFA, where each reliable component represented a construct in the SEM. Table 32 shows the nine constructs and their respective Cronbach's alphas generated during the EFA.

Table 32

PLS-SEM Model 1: Constructs, EFA Reliability, and Indicators

Construct	Abbreviation	Cronbach's Alpha	Indicators
Access: Formal Financial Information Sources	AFFIS	.880	IA4, IA5, IA3, IA7, IA1, IA9, IA6, IA8, IA10, IA2
Access: Informal Financial Information Sources	AIFIS	.707	IA14, IA13, IA12, IA11, IA15
Quality: Formal Financial Information Sources	QFFIS	.894	IQ4, IQ6, IQ5, IQ2, IQ7, IQ1, IQ3, IQ9, IQ8
Quality: Informal Financial Information Sources	QIFIS	.774	IQ13, IQ14, IQ12, IQ11, IQ15
Information Behavior	IB	.908	IS8, IS9, IS16, IS5, IS6, IS10, IS7, IS4, IS2, IS3, IS1
Acquisition Skepticism	SKEPT	.831	IS13, IS14, IS12, IS11, IS15
Subjective Financial Knowledge	KNOW	.815	SK1, SK2, SK3, SK4, , SK6, SK5
Overconfidence	OC	.764	IPB7, IPB8, EB2, EB1, MARK4, BPB3
Emotional Biases	EB	.662	HERD1, HERD3, HERD2, EB5, EB4, EB6

The PLS-SEM confirmed the components structure established in EFA, and provided additional measures to examine the general model fit and the constructs' reliability and validity. In total, the model had nine constructs and 63 indicators (Figure 8).

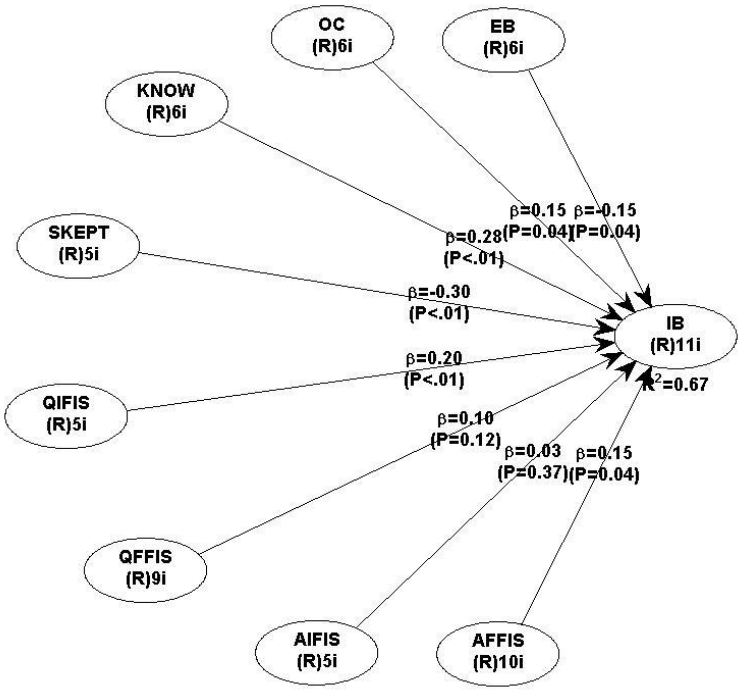


Figure 8. Information behavior model of individual investors – EFA based.

The general model fit is presented in Table 33, and was used to evaluate the structural model. The coefficient of determination (R^2) value of the model was 0.666, and it was statistically significant (P value <0.001). This confirmed that the model had a good fit with the original data. However, Table 34 shows that the path coefficients of AIFIS, and QFFIS had P values of 0.367 and 0.12 respectively, which indicated that neither are statistically significant at the 0.05 alpha level.

Table 33

PLS-SEM Model 1: Structural Model Fit & Quality Indices

Measure	General Rule for Acceptable fit

Average path coefficient (APC)=0.168, P=0.012	P < 0.05
Average R-squared (ARS)=0.666, P<0.001	P < 0.05
Average adjusted R-squared (AARS)=0.643, P<0.001	P < 0.05
Average block VIF (AVIF)=1.806	acceptable if <= 5, ideally <= 3.3
Average full collinearity VIF (AFVIF)=2.157	small >= 0.1, medium >= 0.25, large >= 0.36
Tenenhaus GoF (GoF)=0.581	acceptable if >= 0.7, ideally = 1
Sympson's paradox ratio (SPR)=1.000	acceptable if >= 0.9, ideally = 1
R-squared contribution ratio (RSCR)=1.000	acceptable if >= 0.7
Statistical suppression ratio (SSR)=1.000	acceptable if >= 0.7

Evidence of reliability and convergent validity was determined when all constructs had composite reliability and Cronbach's alphas over the minimum threshold of 0.60, indicating strong reliability (Table 34). However, examining the AVE values of the constructs (Table 34) did not conclude convergent validity for all the constructs. The AVE values of AFFIS, AIFIS, OC, and EB constructs were lower than the minimum threshold of 0.50, while the remaining constructs showed adequate convergence with AVE values over 0.50.

The Fornell-Larcker method was used to evaluate the discriminant validity of the reflective measurement model. For every construct, the squared root of the AVE values (Table 34) were greater than each construct's highest correlation with other constructs. The exception was AIFIS, where its square root of the AVE was 0.681, which is less than AIFIS's correlation with QIFIS (0.697). Ghiselli, Campbell, and Zedeck (1981) suggest that discriminant validity can still be confirmed if the high correlation with other constructs is higher than the square root of the AVE but less than the value of Cronbach's alpha. Therefore, AIFIS has an acceptable level of discriminant validity because its Cronbach's alpha (0.770) is higher than its correlation with QIFIS (0.697).

Table 34

PLS-SEM Model 1: Path Coefficients, Reliabilities, AVE Values, & Correlations of Constructs for the General Model of Information Behavior of Individual Investors

	Path Coefficients	P Values	Composite reliability	Cronbach's Alpha	AVE	IB	AFFIS	AIFIS	QFFIS	QIFIS	SKEPT	KNOW	OC	EB
IB	-	-	0.925	0.908	0.536	**0.732**								
AFFIS	0.147	0.044	0.903	0.880	0.483	0.538	**0.695**							
AIFIS	0.03	*0.367*	0.809	0.704	0.464	0.179	0.176	**0.681**						
QFFIS	0.102	*0.12*	0.917	0.897	0.551	0.454	0.668	0.285	**0.742**					
QIFIS	0.199	0.01	0.846	0.770	0.529	0.274	0.281	*0.697*	0.453	**0.727**				
SKEPT	-0.297	<0.001	0.881	0.830	0.597	-0.508	-0.165	0.167	-0.145	0.15	**0.773**			
KNOW	0.277	<0.001	0.87	0.817	0.534	0.63	0.48	-0.076	0.26	-0.037	-0.408	**0.731**		
OC	0.149	0.042	0.837	0.764	0.465	0.573	0.387	0.165	0.404	0.288	-0.318	0.433	**0.682**	
EB	-0.147	0.044	0.796	0.693	0.4	-0.291	-0.235	0.365	0.079	0.362	0.378	-0.446	-0.072	**0.633**

Note: Square roots of average variances extracted (AVEs) shown on diagonal in bold.
KEY: **AFFIS** = Access: Formal Financial Information Sources, **AIFIS** = Access: Informal Financial Information Sources, **QFFIS** = Quality: Formal Financial Information Sources, **QIFIS** = Quality: Informal Financial Information Sources, **IB** = Information Behavior, **SKEPT** = Acquisition Skepticism, **KNOW** = Subjective Financial Knowledge, **OC** = Overconfidence, **EB** = Emotional Biases.

The normalized pattern loadings and cross-loadings matrix (Table 35) shows that all indicators loaded significantly (P value <0.001) on their respective constructs with factor loadings above the required 0.50 level, except for IQ15 (Advice from friends and family) and MARK4 (You examine the market fundamentals of underlying stocks before making investment decisions). Also, all factor cross-loading were less than 0.50 except for IA5 (Financial reports issued by international investment firms) and MARK4 (You examine the market fundamentals of underlying stocks before making investment decisions).

Table 35

PLS-SEM Model 1: Normalized pattern loadings and cross-loading

	IB	AFFIS	AIFIS	QFFIS	QIFIS	SKEPT	KNOW	OC	EB
IS8	**0.947**	0.031	-0.191	-0.034	0.144	0.012	-0.206	-0.011	-0.039
IS9	**0.967**	-0.09	-0.172	0.033	0.065	0.078	-0.081	-0.047	0.081
IS7	**0.87**	0.244	0.023	-0.289	0.093	-0.19	-0.223	-0.029	0.063
IS16	**0.945**	-0.074	0.179	-0.155	-0.005	0.041	0.174	-0.06	-0.096
IS5	**0.897**	-0.097	0.156	0.202	-0.19	0.117	0.192	-0.16	-0.096
IS1	**0.609**	-0.221	0.277	0.448	-0.449	0.184	-0.234	0.062	0.092
IS2	*0.225*	-0.047	-0.074	0.133	0.022	0.278	0.806	0.438	-0.068
IS3	**0.931**	0.088	0.106	0.015	0.009	-0.26	-0.139	-0.045	0.161
IS4	**0.854**	0.003	0.162	0.087	-0.068	-0.223	0.42	-0.076	-0.005
IS6	**0.957**	0.045	0.057	0.014	-0.05	0.024	-0.183	0.194	0.063
IS10	**0.957**	-0.021	-0.184	-0.041	0.061	0.031	-0.182	-0.055	-0.079
IA1	0.702	*0.654*	-0.162	-0.073	-0.103	0.175	-0.055	-0.049	0.025
IA2	0.419	**0.721**	0.148	-0.143	-0.335	0.35	-0.058	0.148	-0.032
IA3	-0.18	**0.923**	0.088	0.079	0.098	-0.038	-0.178	0.184	-0.156
IA4	0.132	**0.915**	-0.195	0.196	-0.092	-0.055	0.058	-0.229	0.05
IA5	-0.059	**0.673**	0.179	*0.563*	-0.315	0.017	0.124	-0.182	-0.214
IA6	0.021	**0.809**	-0.24	0.174	0.221	-0.132	0.113	-0.218	0.361
IA7	-0.1	**0.951**	-0.018	-0.109	-0.096	-0.04	-0.057	0.058	0.236
IA8	-0.285	**0.866**	0.027	-0.274	0.24	-0.088	0.055	0.097	-0.124
IA9	-0.229	**0.927**	-0.038	-0.082	0.127	-0.027	-0.112	0.207	0.085
IA10	-0.161	**0.849**	0.255	-0.242	0.127	-0.04	0.133	-0.069	-0.3
IA11	0.135	0.019	**0.921**	0.212	-0.158	0.127	0.146	-0.067	-0.147
IA12	-0.115	-0.254	**0.755**	0.327	-0.01	0.342	0.333	0.097	-0.087
IA13	-0.078	0.391	**0.757**	-0.257	-0.018	-0.109	-0.401	0.17	-0.021
IA14	0.142	-0.107	**0.894**	-0.182	0.32	-0.062	-0.044	-0.058	-0.158
IA15	-0.065	-0.129	*0.685*	-0.066	-0.191	-0.366	0.043	-0.238	0.525
IQ1	0.261	-0.164	-0.07	**0.918**	0.013	0.102	0.133	-0.14	0.092
IQ2	0.048	-0.287	-0.132	**0.929**	0.09	0.064	0.148	-0.009	-0.027
IQ3	-0.037	-0.154	0.073	**0.928**	0.169	-0.064	-0.161	0.146	-0.168
IQ4	-0.053	0.147	0.032	**0.948**	-0.172	-0.041	-0.191	0.077	-0.045
IQ5	0.088	0.016	0.092	**0.912**	-0.23	-0.002	-0.242	0.047	-0.196
IQ6	0.059	-0.07	-0.132	**0.948**	0.018	-0.009	0.103	-0.171	0.186
IQ7	0.15	0.103	-0.049	**0.935**	-0.163	-0.02	-0.081	-0.08	0.225
IQ8	-0.412	0.123	0.219	**0.711**	0.322	-0.081	0.324	0.052	-0.211
IQ9	-0.375	0.64	0.122	*0.616*	0.044	0.02	0.033	0.183	0.136
IQ11	-0.043	-0.082	-0.229	0.219	**0.924**	0.081	0.174	0.002	0.003
IQ12	-0.117	-0.311	-0.044	0.319	**0.8**	0.208	0.282	0.071	-0.138
IQ13	-0.133	0.354	0.116	-0.283	**0.807**	-0.046	-0.288	0.133	-0.095
IQ14	0.205	0.081	0.003	-0.216	**0.943**	-0.013	-0.094	-0.055	-0.047
IQ15	0.192	-0.144	0.295	-0.026	*0.434*	-0.46	-0.102	-0.327	0.581
IS11	-0.086	0.12	-0.003	0.027	-0.114	**0.958**	-0.074	0.118	-0.167
IS12	0.053	-0.144	-0.094	0.052	0.02	**0.95**	-0.001	-0.033	-0.248

(table continues)

Table 35 (continued)

	IB	AFFIS	AIFIS	QFFIS	QIFIS	SKEPT	KNOW	OC	EB
IS13	0.184	-0.052	-0.067	0.06	-0.073	**0.972**	0.027	-0.042	0.057
IS14	0.089	-0.081	0.096	-0.089	0.111	**0.96**	0.113	-0.059	0.137
IS15	-0.404	0.253	0.147	-0.111	0.112	**0.783**	-0.089	0.045	0.32
SK1	0.147	-0.071	-0.213	0.216	0.079	0.041	**0.918**	-0.107	0.137
SK2	0.025	-0.034	0.064	0.006	-0.071	-0.075	**0.979**	-0.157	-0.002
SK3	0.082	0.019	0.083	-0.012	-0.102	0.249	**0.91**	0.223	-0.192
SK4	-0.08	0.236	0.254	-0.136	-0.19	-0.305	**0.793**	-0.3	0.086
SK5	0.05	-0.19	-0.102	0.019	0.382	0.28	*0.556*	0.636	-0.111
SK6	-0.279	-0.011	-0.08	-0.173	0.053	-0.067	**0.936**	0.052	-0.017
IPB7	-0.037	-0.192	-0.163	-0.129	0.301	0.053	0.295	**0.852**	0.108
IPB8	-0.147	-0.226	-0.112	0.151	-0.079	-0.093	0.086	**0.931**	0.052
EB1	0.294	0.205	-0.103	0.076	0.057	0.247	-0.279	**0.833**	0.137
EB2	-0.133	0.199	0.113	-0.031	-0.186	-0.066	-0.134	**0.93**	-0.085
BPB3	-0.52	-0.017	0.033	-0.049	0.235	-0.239	0.016	**0.76**	-0.187
MARK4	*0.764*	0.138	0.313	-0.007	-0.39	0.174	-0.102	*0.323*	-0.04
HERD1	0.137	-0.176	-0.067	-0.145	0.05	-0.169	-0.247	-0.068	**0.91**
HERD2	-0.054	-0.115	-0.137	0.144	0.407	-0.377	-0.339	-0.057	**0.72**
HERD3	-0.233	0.335	-0.015	-0.425	0.295	-0.272	-0.149	0.151	*0.669*
EB4	0.179	-0.062	0.103	0.329	-0.352	0.409	0.332	-0.111	*0.657*
EB5	0.097	0.083	0.087	0.048	-0.336	0.393	0.283	0.022	**0.791**
EB6	-0.072	-0.289	0.034	0.465	-0.189	0.165	0.255	-0.011	**0.752**

Note: Loadings and cross-loadings shown are after oblique rotation and Kaiser normalization.

In conclusion, the first PLS-SEM had a strong reliability, but had some violations to the assumptions of good fit such as statistically insignificant path coefficients, some indicators had loadings over the minimum threshold of 0.50, and violations of discriminant validity. Therefore, a second SEM-PLS model had to be constructed to better represent the theoretical framework of the information behavior model of individual investors in the SSM and to show acceptable levels of reliability and validity.

4.3.1.2 The Second PLS-SEM Model

Evaluating the measurement model of the first PLS-SEM model, which was based on the EFA results, showed that it had a poor fit, because not all the path coefficients were significant at the 0.05 alpha level and validity could not be confirmed. Accordingly, Kline (2011) recommends respecifying the measurement model in order to clearly represent the theory and the research questions in the SEM structure (p.92), and adds “respecification should be guided more by rational considerations than purely statistical ones” (p.94).

Therefore, the second PLS-SEM model was respecified to include constructs with fewer indicators in order to provide a better fit. For instance, the Information Behavior construct in the first PLS-SEM model included items related to information seeking, acquisition, and searching, which are all considered as behaviors under the larger umbrella of information behavior. However, the second SEM-PLS model divided the Information Behavior construct into two constructs, which were the Information Acquisition & Information Searching (IAIS) construct, and the Information Seeking (SEEK) construct.

Furthermore, the second PLS-SEM model included three single-item constructs to control for income, gender, and education level. Also, there was a new construct called Experience (EXP) to examine the effect of age, marital status, work experience, and trading experience on the information behavior of individual investors in the SSM. The Subjective Financial Knowledge was respecified by removing SK5 (I have heard of most of the new investments that are around) because it had a high cross-loading, and one item, IS2 (You are knowledgeable about the Saudi stock market), was added instead.

One of the objectives of this study was to examine the effect of interpersonal communication on the information behavior of individual investors; therefore, a new construct called Personal Advice (ADVICE) was created to represent that kind of information source and its quality. Additionally, a construct that measured Risk Tolerance was added to examine the effect of the individual investors' risk appetite on their information behavior. The last step of the respecification phase included removing indicators that failed to have substantial factor loadings above 0.50 or had high cross-loadings such as IA5 (Financial reports issued by international investment firms (UPS economic research, HSBC economic outlook), IQ15 (Advice from friends and family), and MARK4 (You examine the market fundamentals of underlying

stocks before making investment decisions). Table 36 shows the constructs that were used and their indicators.

Table 36

PLS-SEM Model 2: Constructs, EFA Reliability, and Indicators

Construct	Abbreviation	Indicators
Formal Information Access	FIA	IA1, IA3, IA4, IA5, IA6, IA7, IA8, IA9
Informal Information Access	IIA	IA11, IA12, IA13, IA14
Formal Information Quality	FIQ	IAQ1, IQ3, IQ4, IQ5, IQ6, IQ7, IQ8, IQ9
Informal Information Quality	IIQ	IQ11, IQ12, IQ13, IQ14
Information Acquisition & Information Search	IAIS	IS3, IS4, IS5, IS6, IS7, IS8, IS9, IS10, IS16
Acquisition Skepticism	SKEPT	IS11, IS12, IS13, IS14, IS15
Subjective Financial Knowledge	KNOW	SK1, SK2, SK3, SK4, SK6, IS2
Cognitive Biases	COGB	IPB2, IPB3, IPB7, IPB8, EB1, EB2 BPB3
Emotional Biases	EMO	EB4, EB5, EB6
Information Seeking	SEEK	IS1
Experience	EXP	AGE, MS, trad_ex, work_ex
Herding Behavior	HERD	HERD1, HERD2, HERD3
Risk Tolerance	RISK	riskAp
Financial Self-Efficacy	EFF	SK7
Income	Income	income
Gender	GENDER	GENDER
Education Level	EDU	edu
Personal Advice	Advice	IA15, IQ15

The PLS-SEM analysis was conducted using WarpPLS (version 5.0). The structural model (inner model) had 18 latent constructs, where 8 of those constructs were endogenous latent constructs (Figure 9). The endogenous constructs were Formal Information Access, Informal Information Access, Information Acquisition & Information Search, Herding Behavior, Information Seeking, Financial Self-Efficacy, Risk Tolerance, and Personal Advice. Endogenous constructs are dependent variables in one equation of the PLS-SEM, but can also be exogenous variables in other equations. The assessment of the structural model's ability to predict the hypothesized effects began after confirming the reliability and validity of the latent constructs, as recommended by Hair et al. (2014).

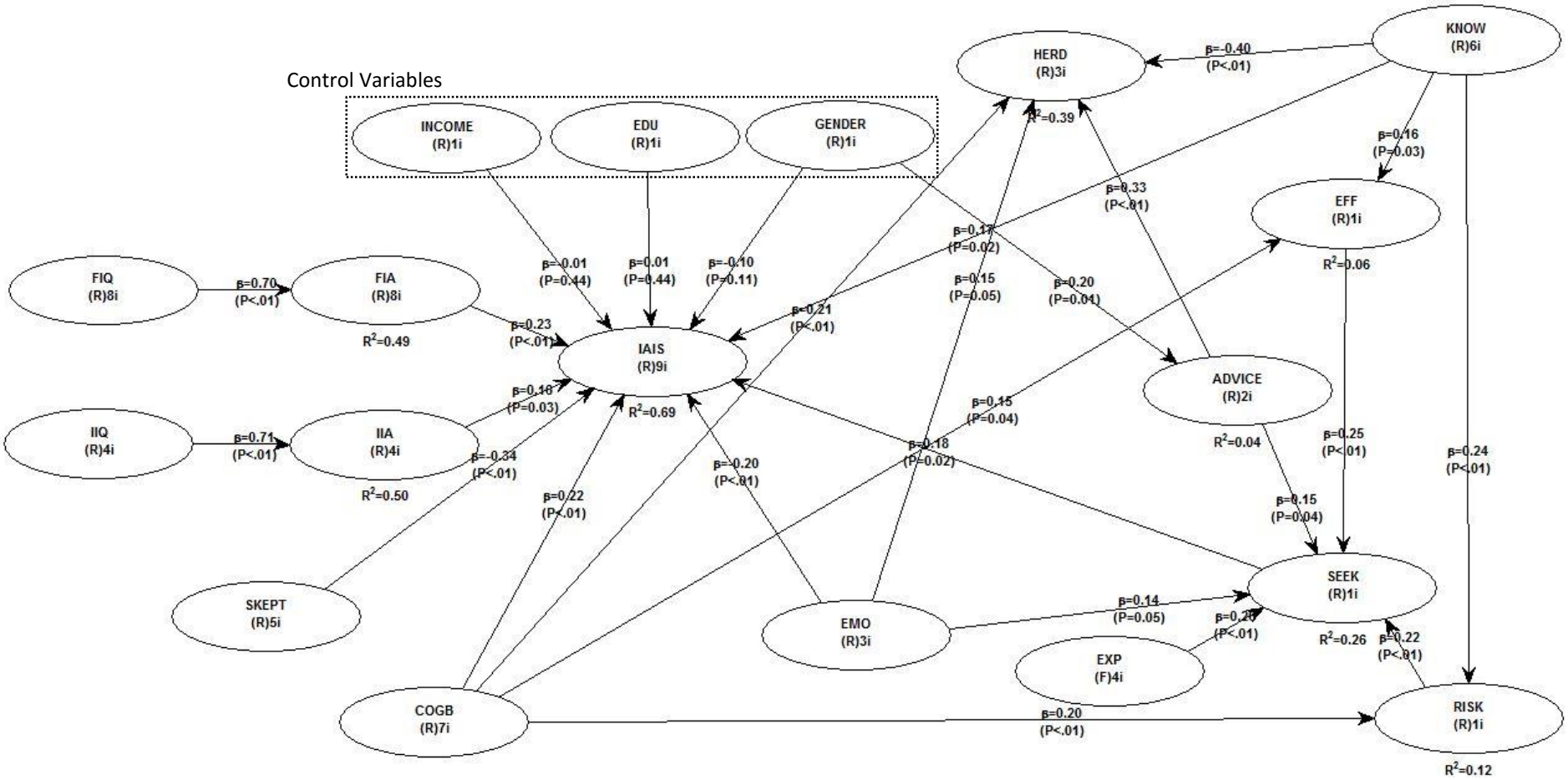


Figure 9. The information behavior model of individual investors.

KEY: **FIA**: Formal Information Access, **IIA**: Informal Information Access, **FIQ**: Formal Information Quality, **IIQ**: Informal Information Quality, IAIS: Information Acquisition & Information Search, **SKEPT**: Acquisition Skepticism, **KNOW**: Subjective Financial Knowledge, **COGB**: Cognitive Biases, **EMO**: Emotional Biases, **SEEK**: Information Seeking, **EXP**: Experience, **HERD**: Herding Behavior, **ADVICE**: Personal Advice, **RISK**: Risk Tolerance, **EFF**: Financial Self-Efficacy, Income: Income, **GENDER**: Gender, **EDU**: Education Level

4.3.1.2.1 The Assessment of the Reflective Measurement Model

The first step in evaluating the reflective measurement model was to examine the internal consistency reliability that is represented by the values of composite reliability and Cronbach's alpha. Hair et al. (2014) suggest that reliability values between 0.60 and 0.70 are acceptable only in exploratory research, and values between 0.70 and 0.90 are satisfactory, while values over 0.95 are not desirable (p.102). In this study, the composite reliability values of latent constructs ranged between 0.80 and 0.933 indicating strong reliability. The Cronbach's alphas of constructs ranged from 0.632 to 0.918, confirming the reliability of the latent constructs (Table 37).

Furthermore, to assess the convergent validity of the indicators on the construct level, it is recommended that the average variance extracted (AVE) values, where values greater than or equal to 0.50 are desirable to indicate that on average the reflective latent construct explains half of the variance in its indicators (Hair et al., 2014, p. 103). The AVE values of the latent constructs in this study, shown in Table 37, indicated that all constructs had AVE values over the 0.50 threshold except Cognitive Biases, and the single-item latent constructs. It is not appropriate to use the AVE to evaluate the single-item latent constructs because their loadings are fixed at 1. Cognitive Biases had an AVE value of 0.416. Therefore, convergent validity of the model could not be confirmed.

Next, to evaluate the discriminant validity of the latent constructs, and confirm the uniqueness of every construct by using the conservative Fornell-Larcker method that requires that the square root of AVE values should be greater than the respective latent construct's highest correlation with other latent constructs in the reflective measurement model. Table 37

shows that all the square root AVE values were greater than any correlations with other latent constructs in the model. Therefore, discriminate validity of the model was confirmed.

The final step was to evaluate the indicators' reliability, where all factor loadings should be 0.70 or higher and statistically significant. However, indicator loadings as low as 0.50 are accepted for newly developed scales in social science studies, because removing those scales would affect the content validity of the scales (Hair et al., 2014, pp.102-103). In this study, 63 indicators loaded on their respective latent constructs with values higher than 0.70, while six indicators had weaker loadings between 0.679 and 0.551 (Table 38). Those indicators were IA1 (Financial statements of publically listed companies), IQ1 (Financial statements of publically listed companies), IS11 (I never seem to find the right information for me), SK4 (Compared to most other people, I know less about investing), IPB2 (You forecast the future performance of a stock based on the current stock prices), and IPB8 (You believe the successful trading is attributed to your skills rather than luck.) The decision to keep those indicators was based on the content validity of the indicators, and their rule in explaining the information behavior of individual investors in the SSM.

Table 37

PLS-SEM Model 2: Reliabilities, AVE Values, and Correlations of Constructs for the Respecified General Model of Information Behavior of Individual Investors

	CR	CA	AVE	FIA	IIA	IAIS	FIQ	IIQ	COGB	HERD	SEEK	SKEPT	KNOW	EMO	EFF	EXP	RISK	GENDER	EDU	INCOME	ADVICE
FIA	0.897	0.868	0.521	**0.722**																	
IIA	0.825	0.717	0.541	0.229**	**0.736**																
IAIS	0.933	0.918	0.607	0.499***	0.229**	**0.779**															
FIQ	0.908	0.884	0.553	0.695***	0.331***	0.427***	**0.744**														
IIQ	0.865	0.793	0.617	0.313***	0.698***	0.281**	0.457***	**0.785**													
COGB	0.83	0.759	***0.416***	0.333***	0.249**	0.474***	0.36***	0.348***	**0.645**												
HERD	0.859	0.753	0.671	-0.268**	0.224**	-0.278**	-0.01	0.281**	-0.013	**0.819**											
SEEK	1	1	1	0.19*	0.196**	0.272**	0.28**	0.18*	0.202*	-0.052	**1**										
SKEPT	0.881	0.83	0.597	-0.163	0.157	-0.516***	-0.135	0.157	-0.249**	0.246**	-0.09	**0.773**									
KNOW	0.894	0.857	0.587	0.466***	-0.019	0.601***	0.261**	-0.008	0.384***	-0.494***	0.1	-0.407***	**0.766**								
EMO	0.803	0.632	0.577	-0.01	0.246**	-0.156	0.18*	0.216*	0.057	0.27**	0.164	0.382***	-0.175*	**0.76**							
EFF	1	1	1	0.144	0.029	0.122	0.08	-0.005	0.073	-0.097	0.162	-0.002	0.113	0.074	**1**						
EXP	0.8	0.663	0.512	-0.069	-0.127	-0.095	-0.115	-0.196*	-0.071	-0.224*	0.004	0.061	0.066	0.018	-0.112	**0.715**					
RISK	1	1	1	0.162	0.054	0.116	0.08	0.04	0.13	-0.116	0.246**	0.053	0.222*	0.089	0.205*	-0.015	**1**				
GENDER	1	1	1	-0.032	0.107	-0.089	0.007	0.066	0.01	0.19*	0.101	-0.034	-0.185*	0.082	-0.03	-0.09	-0.113	**1**			
EDU	1	1	1	0.105	0	0.16	0.031	-0.108	0.009	-0.159	0.097	-0.145	0.168	-0.245**	0.091	0.104	-0.006	-0.083	**1**		
INCOME	1	1	1	0.111	-0.192*	0.142	0.134	-0.225*	-0.058	-0.319***	0.163	-0.151	0.247**	-0.052	0.038	0.416***	-0.07	-0.063	0.195*	**1**	
ADVICE	0.906	0.792	0.828	-0.127	0.338***	-0.041	0.072	0.266**	-0.033	0.474***	0.129	0.077	-0.255**	0.234**	-0.066	-0.12	-0.047	0.195*	-0.04	-0.11	**0.91**

Note: Square roots of average variances extracted (AVEs) shown on diagonal.

*** p < .05, ** p < .01, *** p < .001**

KEY: **CR**: Composite Reliability, **CA**: Cronbach's Alpha, **FIA**: Formal Information Access, **IIA**: Informal Information Access, **FIQ**: Formal Information Quality, **IIQ**: Informal Information Quality, **IAIS**: Information Acquisition & Information Search, **SKEPT**: Acquisition Skepticism, **KNOW**: Subjective Financial Knowledge, **COGB**: Cognitive Biases, **EMO**: Emotional Biases, **SEEK**: Information Seeking, **EXP**: Experience, **HERD**: Herding Behavior, **RISK**: Risk Tolerance, EFF: Financial Self-Efficacy, Income: Income, **GENDER**: Gender, **EDU**: Education Level

Table 38

PLS-SEM Model 2: Normalized Pattern Loadings and Cross-Loadings Matrix

	FIA	IIA	IAIS	FIQ	IIQ	COGB	HERD	SEEK	SKEPT	KNOW	EMO	EFF	EXP	RISK	GENDER	EDU	INCOME	ADVICE
IA1	***0.679***	-0.022	0.375	-0.215	-0.033	-0.052	0.017	0.32	0.044	0.13	0.097	0.077	-0.032	-0.296	-0.277	0.064	-0.127	-0.161
IA3	**0.825**	0.222	-0.172	0.085	-0.044	0.157	0.228	0.107	0.044	-0.033	-0.257	-0.022	-0.06	-0.019	-0.162	0.109	0.007	-0.176
IA4	**0.914**	-0.198	0.073	0.054	0.01	-0.17	-0.13	-0.028	-0.098	-0.027	0.037	-0.027	0.037	0.177	-0.048	-0.087	0.035	0.123
IA5	**0.731**	0.248	-0.18	0.21	-0.193	-0.038	-0.054	0.043	-0.046	0.037	-0.128	0.006	-0.136	0.205	-0.044	-0.099	0.437	-0.016
IA6	**0.839**	-0.177	0.01	0.031	0.227	-0.211	0.129	0.038	-0.18	0.044	0.154	0.118	0.165	-0.005	-0.034	-0.201	-0.061	0.077
IA7	**0.775**	-0.006	-0.014	-0.009	-0.073	-0.064	0.136	0.09	-0.02	0.042	0.113	0.092	0.281	-0.094	0.217	0.128	-0.398	-0.173
IA8	**0.735**	-0.023	-0.064	-0.206	0.156	0.19	-0.314	-0.349	0.062	-0.068	0.009	-0.019	-0.177	0.02	0.135	0.091	0.133	0.218
IA9	**0.884**	-0.009	0.029	0.053	-0.072	0.187	0.011	-0.14	0.21	-0.102	-0.048	-0.236	-0.141	-0.025	0.102	-0.035	0.055	0.083
IA11	-0.125	**0.865**	0.067	0.117	0.047	-0.088	-0.189	-0.069	-0.187	-0.022	0.266	0.083	0.107	0.045	0.013	0.144	0.016	-0.142
IA12	-0.282	**0.811**	-0.101	0.234	0.067	-0.026	-0.059	-0.015	0.045	0.186	0.118	0.13	0.151	0.137	0.113	-0.151	-0.067	-0.2
IA13	0.437	**0.71**	-0.102	-0.24	-0.138	0.119	0.184	0.131	-0.042	-0.256	-0.152	-0.129	0.061	-0.055	-0.16	0.031	-0.058	0.096
IA14	-0.061	**0.776**	0.169	-0.109	0.037	-0.02	0.045	-0.068	0.19	0.11	-0.231	-0.083	-0.357	-0.14	0.045	-0.009	0.13	0.264
IS3	0.053	-0.064	**0.832**	0.022	0.175	-0.071	0.049	0.232	-0.155	0.082	0.024	0.127	0.151	-0.278	0.223	-0.019	0.001	0.105
IS4	0.023	0.173	**0.778**	0.083	-0.118	-0.005	0.07	-0.034	-0.076	***0.502***	-0.023	0.001	0.062	-0.23	0.128	-0.057	-0.007	-0.047
IS5	-0.122	0.209	**0.796**	0.255	-0.278	-0.113	-0.039	-0.079	0.118	0.186	0.013	-0.059	0.16	-0.013	0.077	-0.016	-0.229	-0.097
IS6	0.191	0.189	**0.804**	-0.139	-0.089	0.182	0.167	0.177	-0.027	-0.104	-0.045	-0.063	0.031	-0.019	-0.162	-0.259	0.222	-0.026
IS7	0.244	0.002	**0.881**	-0.27	0.081	-0.059	-0.046	0.07	-0.138	-0.14	0.049	-0.108	0.019	-0.052	0.082	-0.087	-0.037	0.051
IS8	-0.013	-0.14	**0.914**	0.023	0.078	0.065	-0.081	-0.157	0.047	-0.206	0.049	0.031	-0.194	-0.031	-0.051	0.044	0.104	0.001
IS9	-0.126	-0.155	**0.933**	0.065	0.065	-0.022	0.076	0.064	0.039	-0.063	0.059	0.024	-0.145	0.095	-0.168	0.017	0.016	-0.048
IS10	-0.038	-0.199	**0.896**	-0.03	0.11	0.008	-0.023	-0.052	0.034	-0.211	-0.05	-0.004	-0.062	0.214	-0.002	0.152	0.135	-0.019
IS16	-0.144	0.099	**0.903**	-0.013	-0.035	0.022	-0.079	-0.062	0.067	0.149	-0.097	0.084	0.109	0.145	-0.044	0.128	-0.189	0.108
IQ1	0.031	0	-0.022	***0.564***	0.122	-0.095	-0.041	0.34	-0.165	0.152	0.262	0.097	0.223	-0.352	-0.408	-0.04	-0.26	-0.038
IQ3	-0.047	-0.041	-0.065	**0.755**	0.298	0.126	-0.16	0.125	-0.178	-0.177	0.153	-0.188	0.155	-0.159	-0.101	0.274	-0.137	-0.02
IQ4	0.005	0.048	0.051	**0.912**	-0.183	0.059	0.032	-0.202	0.018	-0.173	-0.097	-0.024	-0.032	0.157	-0.016	-0.024	0.133	0.013
IQ5	-0.089	0.127	0.114	**0.739**	-0.185	0.095	0.042	-0.24	0.056	-0.203	-0.167	0.018	-0.18	0.229	0.053	-0.041	0.387	-0.057
IQ6	0	-0.18	-0.001	**0.913**	0.086	-0.195	0.102	0.134	-0.041	0.112	0.064	0.078	0.073	-0.025	-0.035	-0.153	0.02	0.067
IQ7	0.076	-0.036	0.014	**0.681**	-0.081	-0.133	0.084	0.317	-0.106	0.046	0.145	0.18	0.254	-0.262	-0.014	0.022	-0.421	-0.135
IQ8	-0.138	0.072	-0.102	**0.654**	0.158	0.069	-0.129	-0.265	0.143	0.229	-0.189	0.02	-0.29	0.219	0. 358	-0.059	0.204	0.083
IQ9	0.218	-0.04	-0.053	**0.799**	-0.108	0.065	0.03	-0.122	0.298	0.125	-0.114	-0.247	-0.176	0.105	0.171	0.073	-0.08	0.13
IQ11	-0.107	-0.159	-0.06	0.085	**0.899**	-0.026	-0.122	-0.041	-0.191	-0.031	0.228	0.067	0.072	0.144	0.017	0.015	0.039	-0.067
IQ12	-0.258	0.042	-0.174	0.108	**0.863**	0.023	-0.12	0.087	-0.09	0.131	0.131	0.153	0.108	0.038	0.079	-0.08	0.041	-0.171
IQ13	0.395	0.2	-0.088	-0.203	**0.706**	0.068	0.254	0.079	0.078	-0.171	-0.285	-0.156	0.001	-0.067	-0.171	0.043	-0.043	0.049
IQ14	0.07	-0.036	0.397	-0.046	**0.704**	-0.063	0.063	-0.135	0.303	0.054	-0.192	-0.127	-0.239	-0.182	0.051	0.036	-0.064	0.26
IPB7	-0.131	-0.201	0.012	-0.145	0.274	**0.788**	-0.036	0.239	-0.04	0.257	0.045	-0.008	0.123	-0.04	-0.028	-0.132	-0.247	0.005
IPB8	-0.231	-0.109	-0.019	0.266	-0.122	***0.681***	0.211	0.202	0.004	0.249	-0.185	-0.03	0.298	-0.157	0.148	-0.029	-0.206	-0.155
EB2	0.212	0.062	0.005	-0.046	-0.23	**0.79**	-0.041	-0.064	0.11	-0.067	-0.092	-0.203	-0.31	-0.102	0.097	0.04	0.285	0.027
BPB3	-0.015	0.072	-0.267	0.048	0.031	**0.72**	-0.405	-0.143	-0.276	-0.247	-0.033	-0.085	-0.058	0.109	-0.043	-0.154	-0.103	0.143
IPB2	0.141	0.203	-0.015	-0.419	-0.003	***0.551***	0.192	-0.026	-0.143	-0.159	0.348	0.08	0.045	0.045	-0.37	0.281	0.162	0.047
IPB3	-0.059	0.099	-0.084	-0.05	0.197	**0.706**	-0.12	-0.164	0.124	0.115	0.081	***0.541***	-0.077	0.16	0.142	0.073	0.083	0.085
EB1	0.114	-0.028	0.407	0.273	-0.026	**0.703**	0.195	-0.194	0.222	-0.281	-0.003	-0.064	-0.016	0.149	-0.059	0.004	0.074	-0.105
HERD1	-0.109	-0.125	0.074	-0.05	-0.162	0.027	**0.9**	0.141	0.15	-0.036	0.004	0.053	-0.079	0.01	-0.041	-0.063	0.069	0.255
HERD2	-0.135	0.051	0.01	0.271	0.021	-0.087	**0.863**	-0.064	0.011	0.089	-0.069	-0.079	-0.228	-0.146	-0.042	0.078	0.1	-0.197
HERD3	0.236	0.069	-0.081	-0.217	0.135	0.059	**0.827**	-0.073	-0.155	-0.052	0.064	0.027	0.299	0.132	0.081	-0.016	-0.164	-0.052
IS1	0	0	0	0	0	0	0	**1**	0	0	0	0	0	0	0	0	0	0
IS11	0.186	-0.105	-0.044	-0.176	0.102	0.217	-0.407	-0.205	***0.623***	-0.311	0.229	-0.061	-0.076	0.038	0.008	0.074	0.285	0.146
IS12	-0.193	-0.069	0.007	0.074	0.03	-0.003	-0.03	-0.052	**0.881**	0.016	-0.145	-0.03	-0.249	0.135	-0.007	0.155	0.185	-0.103
IS13	-0.078	0.017	0.084	0.111	-0.106	-0.103	0.213	0.169	**0.879**	0.156	-0.09	0.11	0.068	-0.073	-0.063	-0.007	-0.145	-0.159
IS14	-0.051	0.109	0.148	0.013	-0.051	-0.138	0.14	0.064	**0.871**	0.217	-0.04	-0.214	0.086	-0.095	0.018	-0.169	-0.128	0.047
IS15	0.225	0.085	-0.304	-0.062	0.06	0.049	0.095	0.003	**0.743**	-0.132	0.09	0.245	0.26	-0.002	0.089	-0.103	-0.287	0.155
SK1	-0.032	-0.209	0.082	0.112	0.189	-0.068	0.129	0.02	-0.011	**0.908**	0.098	0.142	0.1	-0.036	0.064	0.059	0.04	-0.065
SK2	-0.057	0.027	-0.013	-0.039	0.005	-0.123	0.055	0.049	-0.043	**0.975**	-0.005	-0.032	0.045	-0.004	0.066	0.107	0.049	-0.007
SK3	0.036	0.042	-0.018	-0.048	-0.07	0.207	-0.225	0.04	0.145	**0.807**	-0.069	-0.146	-0.327	0.246	-0.143	-0.034	0.065	0.055
SK6	-0.092	0.033	-0.16	-0.006	-0.071	-0.068	0.057	0.063	-0.038	**0.865**	-0.052	0.041	0.136	-0.24	-0.099	-0.083	-0.3	-0.103
SK4	0.23	0.138	0.021	-0.171	-0.133	-0.164	-0.214	-0.352	-0.223	***0.68***	0.185	-0.06	-0.106	0.052	0.079	0.029	0.164	0.295
IS2	-0.037	0.028	0.095	0.127	0.026	0.286	0.126	0.141	0.191	**0.865**	-0.177	0.009	0.082	0.039	0.013	-0.115	0.012	-0.129
EB6	-0.073	-0.232	-0.139	0.08	0.213	0.015	-0.108	0.162	-0.084	-0.046	**0.779**	-0.048	0.061	0.041	0.153	-0.33	0.142	0.236
EB5	0.163	0.004	-0.014	-0.256	0.015	0.058	-0.039	0.04	-0.003	-0.015	**0.912**	-0.002	0.02	-0.158	-0.008	0.176	-0.103	-0.041
EB4	-0.153	0.169	0.122	0.265	-0.179	-0.085	0.131	-0.172	0.067	0.054	**0.841**	0.039	-0.071	0.17	-0.104	0.024	0.024	-0.124
SK7	0	0	0	0	0	0	0	0	0	0	0	**1**	0	0	0	0	0	0
AGE	-0.076	0.024	-0.152	-0.059	0.029	0.054	-0.097	0.032	-0.146	-0.052	-0.048	0.194	**0.933**	-0.069	-0.046	-0.026	0.104	0.022
MS	-0.157	-0.109	-0.019	0.208	0.138	-0.218	-0.085	0.024	-0.037	-0.238	-0.166	0.078	**0.791**	0.178	0.176	0.121	-0.15	0.166
trad_ex	0.176	-0.066	-0.191	-0.174	0.083	0.11	-0.049	0.03	0.019	0.257	0.096	-0.431	**0.725**	0.222	0.113	0.16	0.01	0.024
work_ex	0.055	0.058	0.244	0.047	-0.13	-0.008	0.153	-0.056	0.144	0.029	0.072	-0.004	**0.902**	-0.124	-0.091	-0.108	-0.036	-0.106
riskAp	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	0	0	0
GENDER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	0	0

	FIA	IIA	IAIS	FIQ	IIQ	COGB	HERD	SEEK	SKEPT	KNOW	EMO	EFF	EXP	RISK	GENDER	EDU	INCOME	ADVICE
edu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	0
incom	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0
IA15	-0.02	0.159	-0.098	-0.039	-0.192	-0.016	0.082	0.001	0.01	0.065	0.003	-0.012	-0.066	0.063	0.08	0.057	0.042	**0.946**
IQ15	0.019	-0.151	0.093	0.037	0.182	0.015	-0.078	-0.001	-0.009	-0.062	-0.002	0.011	0.063	-0.059	-0.076	-0.054	-0.04	**0.951**

Note: Loadings and cross-loadings shown are after oblique rotation and Kaiser normalization.

4.3.1.2.2 The Assessment of the Structural Model

The AVIF was used to assess the level of collinearity in the model, where VIF values higher than 5 are considered a sign of severe multicollinearity (Hair et al., 2014, p. 125). The Informal Information Quality (IIQ) construct had the highest VIF value in the structural model (2.694), while other constructs had VIF values less than the maximum threshold of 5 (Hair et al., 2014, p. 125). The average block VIF (AVIF) for the structural model was 1.177, as shown in Table 39.

Table 39

PLS-SEM Model 2: Structural Model Fit & Quality Indices

Measure	General Rule for Acceptable fit
Average path coefficient (APC)=0.235, P=0.001	P<0.05
Average R-squared (ARS)=0.317, P<0.001	P<0.05
Average adjusted R-squared (AARS)=0.302, P<0.001	P<0.05
Average block VIF (AVIF)=1.177	acceptable if <= 5, ideally <= 3.3
Average full collinearity VIF (AFVIF)=1.812	small >= 0.1, medium >= 0.25, large >= 0.36
Tenenhaus GoF (GoF)=0.479	acceptable if >= 0.7, ideally = 1
Sympson's paradox ratio (SPR)=0.923	acceptable if >= 0.9, ideally = 1
R-squared contribution ratio (RSCR)=0.979	acceptable if >= 0.7
Statistical suppression ratio (SSR)=1.000	acceptable if >= 0.7

The coefficient of determination (R^2) represents the total effects of the exogenous latent constructs on the latent endogenous construct (i.e., the percentage of explained variance in the endogenous latent constructs explained by the exogenous latent constructs) where higher values indicate better predictability. R^2 values of 0.25, 0.50, and 0.75 are respectively considered weak, moderate, or substantial. However, those thresholds are just indicative, and can differ according to the discipline and the study stage (Hair et al., 2014, p.175). The R^2 values of exogenous latent constructs in this study are shown in Table 40.

Table 40

PLS-SEM Model 2: R-squared Values and Path Coefficients of the Structural Model

	R^2	FIA	IIA	IAIS	FIQ	IIQ	COGB	HERD	SEEK	SKEPT	KNOW	EMO	EFF	EXP	RISK	GENDER	EDU	INCOME	ADVICE
FIA	0.494				0.703***														
IIA	0.498					0.705***													
IAIS	0.688	0.227**	0.162*				0.218**		0.178*	-0.337***	0.171*	-0.202**				-0.105	0.014	-0.013	
FIQ																			
IIQ																			
COGB																			
HERD	0.385						0.21**				-0.405***	0.145*							0.334***
SEEK	0.259											0.143*	0.249**	0.264***	0.221**				0.147*
SKEPT																			
KNOW																			
EMO																			
EFF	0.061						0.155**				0.163***								
EXP																			
RISK	0.117						0.201*				0.241**								
GENDER																			
EDU																			
INCOME																			
ADVICE	0.038															0.195*			

Note: * p < .05, ** p < .01, *** p < .001

KEY: **R^2**: Explained variance , **FIA**: Formal Information Access, **IIA**: Informal Information Access, **FIQ**: Formal Information Quality, **IIQ**: Informal Information Quality, **IAIS**: Information Acquisition & Information Search, **SKEPT**: Acquisition Skepticism, **KNOW**: Subjective Financial Knowledge, **COGB**: Cognitive Biases, **EMO**: Emotional Biases, **SEEK**: Information Seeking, **EXP**: Experience, **HERD**: Herding Behavior, **RISK**: Risk Tolerance, **EFF**: Financial Self-Efficacy, **Income**: Income, **GENDER**: Gender, **EDU**: Education Level

The structural model path coefficients represent the suggested relationships among latent constructs. The magnitude and statistical significance of the path coefficients were examined. Table 40 shows that all path coefficients were statistically significant at 0.05 alpha level, where higher coefficients (βs) indicate larger association. There were only three constructs that were not statistically significant. However, Income, Gender, and Education Level, which are single-item latent constructs, were included in the model to control for their effect on the Information Acquisition and Information Search construct. Kock (2010) indicates the statistical significance of the effects of control constructs is not required (p.4). To conclude, all three tests of the model utility suggested that the structural model had a good fit. Additionally, there are other measures of model fit in Table 37, and all measures met or exceeded the minimum requirements of acceptance.

The second SEM-PLS model had some issues regarding the convergent validity of the Cognitive Biases construct (0.416), which was lower than the minimum requirement to confirm convergent validity of that latent construct. Kline (2011) suggests that poor convergent validity indicates that the latent construct may has fewer factors than needed to explain the variance (p.241). Another issue with the reflective measurement model was the lower than suggested factor loadings, along with the presence of cross-loadings that were greater than 0.50. The presence of those issues would have affected the interpretation of the results. As a result, a new PLS-SEM analysis was conducted to generate a new model with a better fit.

4.3.1.3 The Optimal PLS-SEM Model

After many iterations, the optimal PLS-SEM model was designed based on the structure of the second model, but with many modifications to produce the best fit model that

conformed to the theoretical framework. All indicators with low loadings or high cross-loadings were removed from the reflective measurement model to comply with the 0.70 minimum threshold of outer factor loadings. Moreover, the Cognitive Biases latent constructs were respecified by including only the biases that had been theoretically proven to correlate, which were overconfidence, hindsight, and self-attribution. The Informal Information Access, and The Informal Information Quality were removed, because their effects were not present in the sample.

Two more latent constructs were created to represent Outcome Confidence (TRUST) and Information Frustration (FRUST). Outcome Confidence, and Information Frustration were used to measure the outcomes of Information Acquisition and Information Search (IAIS), and to determine the effect of the information behavior of individual investors on bridging their knowledge gap and satisfying their information needs. In total, the model had 18 latent reflective constructs and 50 indicators, which brought the responses-to-predicted variables ratio to 2.56:1 (Figure 10) .The latent reflective constructs of the optimal information behavior of individual investors are listed in Table 41.

Table 41

Optimal PLS-SEM Model: Constructs, and Indicators

Construct	Abbreviation	Indicators
Formal Information Access	FIA	IA3, IA4, IA5, IA6, IA7, IA8, IA9
Formal Information Quality	FIQ	IQ3, IQ4, IQ6, IQ9
Information Acquisition & Information Search	IAIS	IS3, IS7, IS8, IS9, IS10, IS16
Acquisition Skepticism	SKEPT	IS13, IS14, IS15
Subjective Financial Knowledge	KNOW	SK1, SK2, SK3, SK6, IS2
Cognitive Biases	COGB	IPB7, IPB8, EB1, EB2 BPB3
Emotional Biases	EMO	EB5, EB6
Information Seeking	SEEK	IS1
Experience	EXP	AGE, MS, trad_ex, work_ex
Herding Behavior	HERD	HERD1, HERD2, HERD3
Risk Tolerance	RISK	riskAp
Financial Self-Efficacy	EFF	SK7

(table continues)

Table 41 (continued)

Construct	Abbreviation	Indicators
Income	Income	income
Gender	GENDER	GENDER
Education Level	EDU	edu
Personal Advice	Advice	IA15, IQ15
Information Frustration	FRUST	IS11, IS12
Outcome Confidence	TRUST	IS4

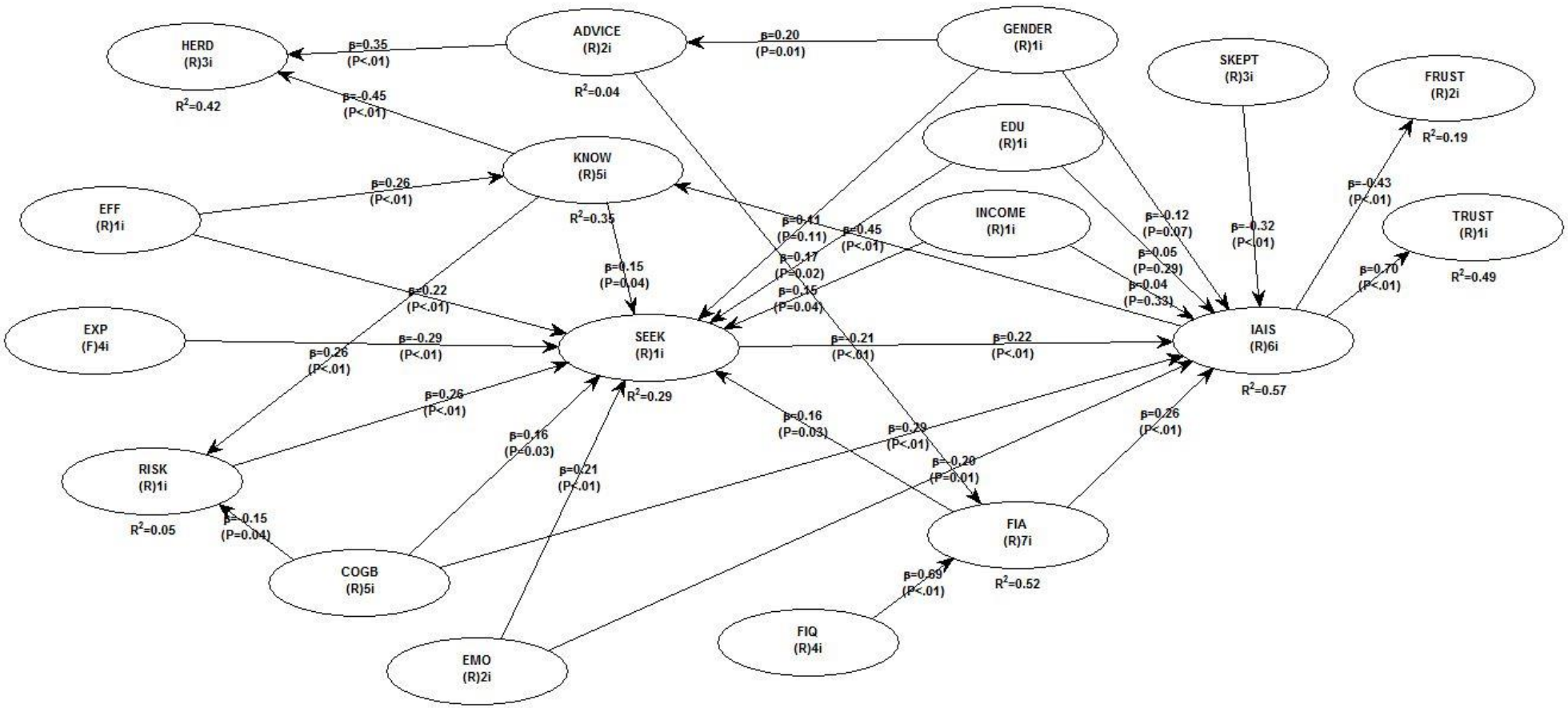


Figure 10. The optimal information behavior model of individual investors in the Saudi stock market.

KEY: **FIA**: Formal Information Access, **FIQ**: Formal Information Quality, **IAIS**: Information Acquisition & Information Search, **SKEPT**: Acquisition Skepticism, **KNOW**: Subjective Financial Knowledge, **COGB**: Cognitive Biases, **EMO**: Emotional Biases, **SEEK**: Information Seeking, **EXP**: Experience, **HERD**: Herding Behavior, **ADVICE**: Personal Advice, **FRUST**: Information Frustration, **TRUST**: Outcome Confidence, **RISK**: Risk Tolerance, **EFF**: Financial Self-Efficacy, **Income**: Income, **GENDER**: Gender, **EDU**: Education Level

4.3.1.3.1 The Assessment of the Reflective Measurement Model

The first step in evaluating the reflective measurement model was to examine the internal consistency reliability that is represented by the values of composite reliability and Cronbach's alpha. Hair et al. (2014) suggest that reliability values between 0.60 and 0.70 are acceptable only in exploratory research, and values between 0.70 and 0.90 are satisfactory, while values over 0.95 are not desirable (p.102). In this study, the composite reliability values of latent constructs were between 0.800 and 0.922, and the Cronbach's alphas of constructs ranged from 0.537 to 0.897 confirming the internal consistency reliability of the latent reflective constructs (Table 42). Although the Cronbach alpha value of Emotional Biases was lower than threshold of 0.60, the composite reliability value was 0.812, which confirmed the reliability of the construct. The composite reliability is considered a better reliability measure due to its calculation method that considers the different loadings of the indicators, which provides a better assessment for internal consistency (Henseler et al., 2009, p.299).

Afterward, the convergent validity of indicators on the construct level was established by using the average variance extracted (AVE) values, where values greater than or equal to 0.50 are desirable to explain half the variance (Hair et al., 2014, p. 103). The AVE values of the latent constructs in this study, shown in Table 42, indicated that all reflective latent constructs had AVE values over 0.51 with the exception of the single-item latent constructs, because it is not appropriate to use the AVE to evaluate them; therefore, their AVEs are fixed at 1. From this, the convergent validity of the reflective latent constructs was confirmed.

Table 42

Optimal PLS-SEM Model: Reliabilities, AVEs, & Full collinearity VIF Values, of the Latent Reflective Constructs

	Composite reliability	Cronbach's alpha	AVE
FIA	0.894	0.861	0.547
IAIS	0.922	0.897	0.663
FIQ	0.872	0.803	0.63
COGB	0.837	0.755	0.51
HERD	0.859	0.753	0.671
SEEK	1	1	1
SKEPT	0.884	0.802	0.717
KNOW	0.894	0.85	0.629
EMO	0.812	***0.537***	0.684
EFF	1	1	1
EXP	0.8	0.663	0.512
RISK	1	1	1
GENDER	1	1	1
EDU	1	1	1
INCOME	1	1	1
ADVICE	0.906	0.792	0.828
TRUST	1	1	1
FRUST	0.885	0.741	0.794

KEY: **FIA**: Formal Information Access, **FIQ**: Formal Information Quality, **IAIS**: Information Acquisition & Information Search, **SKEPT**: Acquisition Skepticism, **KNOW**: Subjective Financial Knowledge, **COGB**: Cognitive Biases, **EMO**: Emotional Biases, **SEEK**: Information Seeking, **EXP**: Experience, **HERD**: Herding Behavior, **ADVICE**: Personal Advice, FRUST: Information Frustration, **TRUST**: Outcome Confidence, **RISK**: Risk Tolerance, **EFF**: Financial Self-Efficacy, **Income**: Income, **GENDER**: Gender, **EDU**: Education Level

Next, to evaluate the discriminant validity of the latent constructs and confirm the uniqueness of every construct the conservative Fornell-Larcker method was used. The method requires that the square root of AVE values should be greater than the respective latent construct's highest correlation with other latent constructs in the reflective measurement model. Table 43 shows that all the square root of AVE values were greater than any correlations with other latent constructs in the model. Therefore, the discriminate validity of the model was confirmed.

Table 43

Optimal PLS-SEM Model: Correlations among Latent Variables with Square Roots of AVE Values

	FIA	IAIS	FIQ	COGB	HERD	SEEK	SKEPT	KNOW	EMO	EFF	EXP	RISK	GENDER	EDU	INCOME	ADVICE	TRUST	FRUST
FIA	**0.739**																	
IAIS	0.414***	**0.814**																
FIQ	0.675***	0.343***	**0.794**															
COGB	0.314***	0.443***	0.353***	**0.714**														
HERD	-0.243**	-0.25**	0.023	-0.045	**0.819**													
SEEK	0.169	0.271**	0.25**	0.177*	-0.052	**1**												
SKEPT	-0.138	-0.473***	-0.069	-0.267*	0.334***	-0.048	**0.847**											
KNOW	0.422***	0.539***	0.223*	0.418***	-0.473***	0.127	-0.367***	**0.793**										
EMO	-0.033	-0.176**	0.12	-0.004	0.249**	0.189**	0.367***	-0.212**	**0.827**									
EFF	0.124	0.142	0.013	0	-0.097	0.162	0.004	0.122	0.029	**1**								
EXP	-0.064	-0.125	-0.099	-0.069	-0.224*	0.004	0.049	0.063	0.059	-0.112	**0.715**							
RISK	0.167	0.126	0.069	0.088	-0.116	0.246**	0.042	0.233**	0.037	0.205**	-0.015	**1**						
GENDER	-0.004	-0.091	0.012	0.039	0.19**	0.101	0.002	-0.195*	0.135	-0.03	-0.09	-0.113	**1**					
EDU	0.085	0.177*	0.05	-0.018	-0.159	0.097	-0.184**	0.163	-0.245**	0.091	0.104	-0.006	-0.083	**1**				
INCOME	0.099	0.12	0.123	-0.046	-0.319***	0.163	-0.225*	0.231**	-0.036	0.038	0.416***	-0.07	-0.063	0.195**	**1**			
ADVICE	-0.104	-0.02	0.104	-0.068	0.474***	0.129	0.134	-0.275**	0.249**	-0.066	-0.12	-0.047	0.195**	-0.04	-0.11	**0.91**		
TRUST	0.423***	0.692***	0.333***	0.391***	-0.298***	0.159	-0.426***	0.626***	-0.17	0.06	-0.023	-0.013	-0.029	0.131	0.16	-0.101	**1**	
FRUST	-0.106	-0.409***	-0.121	-0.257**	0.051	-0.131	0.583***	-0.301***	0.223**	-0.017	0.067	0.053	-0.073	-0.055	-0.001	-0.019	-0.452***	**0.891**

Note: Square roots of average variances extracted (AVEs) shown on diagonal.
* p < .05, ** p < .01, *** p < .001
KEY: **FIA**: Formal Information Access, **FIQ**: Formal Information Quality, **IAIS**: Information Acquisition & Information Search, **SKEPT**: Acquisition Skepticism, **KNOW**: Subjective Financial Knowledge, **COGB**: Cognitive Biases, **EMO**: Emotional Biases, **SEEK**: Information Seeking, **EXP**: Experience, **HERD**: Herding Behavior, **ADVICE**: Personal Advice, **FRUST**: Information Frustration, **TRUST**: Outcome Confidence, **RISK**: Risk Tolerance, **EFF**: Financial Self-Efficacy, **Income**: Income, **GENDER**: Gender, **EDU**: Education Level

Finally, the normalized pattern matrix of loadings and cross-loadings (Table 44) was used to evaluate every indicator's reliability, where all indicators should load on the respective latent construct with at least 0.70, and the loadings should be statistically significant at the 0.05 alpha level (Hair et al., 2014, pp.102-103). In this study, all indicators significantly loaded on their respective latent constructs with values over the 0.70 threshold, except for the indicators of the single-item latent constructs. The single-item latent constructs were Information Seeking (SEEK), Financial Self-Efficacy (EFF), Risk Tolerance (RISK), Outcome Confidence (TRUST), Income (income), GENDER (Gender), and Educational Level (edu).

To conclude, the reflective measurement model of the optimal information behavior of individual investors in the SSM had met the required levels of accepted fit for face validity, internal consistency reliability, convergent validity, and discriminant validity.

Table 44

Optimal PLS-SEM Model: Normalized Pattern Loadings and Cross-Loadings of the Indicators of the Latent Reflective Constructs

	FIA	IAIS	FIQ	COGB	HERD	SEEK	SKEPT	KNOW	EMO	EFF	EXP	RISK	GENDER	EDU	INCOME	ADVICE	TRUST	FRUST
IA3	**0.825**	-0.097	0.042	0.141	0.224	0.224	0.062	-0.111	-0.263	-0.01	-0.016	-0.073	-0.192	0.123	-0.091	-0.142	0.116	0.061
IA4	**0.925**	0.072	0.005	-0.192	-0.172	0	-0.023	0.016	0.025	-0.023	0.01	0.136	-0.08	-0.107	0.093	0.032	-0.039	-0.151
IA5	**0.845**	-0.146	0.062	-0.138	-0.009	0.188	-0.167	0.078	-0.101	-0.005	-0.092	0.125	-0.063	-0.116	0.325	-0.012	0.059	0.104
IA6	**0.803**	-0.063	0.155	-0.226	0.178	0.028	-0.171	0.03	0.165	0.149	0.15	0.009	-0.086	-0.252	-0.093	0.04	0.246	0.009
IA7	**0.791**	-0.077	-0.071	-0.046	0.145	0.063	-0.038	0.044	0.142	0.102	0.249	-0.066	0.182	0.171	-0.36	-0.188	0.09	0.004
IA8	**0.775**	0.099	-0.241	0.197	-0.252	-0.308	0.038	-0.038	0.096	-0.038	-0.169	-0.026	0.077	0.12	0.092	0.203	-0.141	0.039
IA9	**0.775**	0.192	0.115	0.222	-0.083	-0.142	0.277	-0.01	-0.098	-0.178	-0.145	-0.085	0.12	-0.01	0.096	0.069	-0.307	-0.058
IS7	0.177	**0.817**	-0.189	0.02	-0.149	-0.025	0.217	-0.172	0.064	-0.153	-0.027	0.006	0.1	-0.062	0.044	0.07	0.181	-0.289
IS8	-0.009	**0.908**	0.058	0.096	-0.08	-0.19	0.085	-0.145	0.075	0.029	-0.218	-0.05	-0.066	0.037	0.155	-0.054	-0.01	-0.054
IS9	-0.093	**0.926**	0.088	-0.023	0.105	0.048	-0.01	0.11	0.055	0.014	-0.085	0.021	-0.125	-0.043	0.027	-0.101	-0.247	-0.001
IS10	0.01	**0.94**	-0.008	-0.017	0.074	0.02	-0.129	-0.032	-0.113	-0.022	0.046	0.099	0.014	0.054	0.063	-0.078	-0.193	0.132
IS16	-0.128	**0.784**	-0.025	-0.033	-0.067	-0.034	0.01	0.099	-0.102	0.039	0.159	0.177	-0.074	0.112	-0.25	0.145	0.413	0.105
IS3	0.05	**0.749**	0.072	-0.066	0.115	0.239	-0.209	0.203	0.008	0.126	0.233	-0.31	0.212	-0.111	-0.136	0.091	-0.021	0.143
IQ4	-0.009	0.076	**0.878**	0.067	-0.066	-0.178	0.159	-0.11	-0.112	0.055	-0.068	0.105	-0.005	-0.019	0.214	-0.031	-0.157	-0.208
IQ6	-0.016	-0.05	**0.849**	-0.214	0.15	0.159	-0.2	0.192	0.029	0.154	0.084	-0.069	-0.033	-0.226	-0.016	0.011	0.044	0.122
IQ9	0.139	-0.049	**0.849**	0.058	-0.069	-0.151	0.278	0.092	-0.031	-0.192	-0.23	0.11	0.137	0.115	-0.008	0.063	-0.002	-0.032
IQ3	-0.084	0.003	**0.823**	0.118	-0.036	0.157	-0.189	-0.16	0.13	-0.091	0.173	-0.139	-0.067	0.191	-0.239	-0.026	0.145	0.141
EB1	0.036	0.405	0.326	**0.715**	0.216	-0.198	0.146	-0.2	0.026	0.053	0	0.151	-0.061	0.017	0.076	-0.118	-0.017	0.143
EB2	0.215	-0.175	-0.203	**0.73**	-0.06	-0.074	0.067	-0.181	0.031	-0.123	-0.317	-0.007	-0.002	0.146	0.333	0.023	0.229	-0.014
IPB7	-0.125	0.123	-0.092	**0.811**	0.023	0.2	-0.039	0.317	0.094	0.08	0.155	-0.033	-0.022	-0.138	-0.292	0.034	-0.103	0.058
IPB8	-0.122	-0.118	0.019	**0.794**	0.261	0.195	-0.096	0.222	-0.123	0.055	0.305	-0.147	0.081	0.026	-0.114	-0.149	0.038	0.008
BPB3	-0.066	-0.055	0.123	**0.747**	-0.418	-0.185	-0.058	-0.185	-0.023	-0.013	-0.061	0.103	-0.021	-0.109	-0.1	0.199	-0.26	-0.166
HERD1	-0.159	-0.014	-0.098	-0.021	**0.917**	0.128	0.113	-0.034	-0.024	0.055	-0.106	0.037	-0.027	-0.068	0.163	0.21	-0.021	-0.032
HERD2	-0.031	-0.019	0.166	-0.107	**0.882**	-0.026	-0.17	0.082	0.02	-0.087	-0.191	-0.155	-0.084	0.073	0.036	-0.175	0.098	0.152
HERD3	0.186	0.035	-0.097	0.142	**0.84**	-0.092	0.087	-0.063	0.001	0.047	0.32	0.143	0.122	-0.019	-0.196	0.002	-0.092	-0.144
IS1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
IS13	-0.038	0.077	0.016	-0.079	0.172	0.152	**0.871**	0.174	-0.087	0.112	0.004	-0.083	-0.091	0.047	-0.025	-0.19	-0.102	0.245
IS14	-0.077	0.174	0.038	-0.016	-0.086	-0.054	**0.921**	0.106	-0.059	-0.204	-0.037	-0.027	0.064	-0.067	0.074	0.065	-0.121	-0.11
IS15	0.139	-0.304	-0.066	0.101	-0.063	-0.083	**0.775**	-0.313	0.165	0.152	0.044	0.119	0.009	0.04	-0.071	0.108	0.261	-0.105
SK1	-0.009	0.022	0.134	-0.151	0.163	-0.014	-0.111	**0.911**	0.07	0.127	0.103	-0.001	0.072	-0.005	0.052	-0.061	0.2	0.084
SK2	0.003	0.018	-0.054	-0.161	-0.001	-0.017	-0.022	**0.961**	0.027	-0.078	0.016	-0.012	0.078	0.122	0.071	0.052	-0.06	-0.084
SK3	0.053	-0.089	-0.084	0.103	-0.148	0.059	-0.214	**0.775**	-0.035	-0.108	-0.232	0.238	-0.127	-0.066	-0.048	0.097	0.177	0.336
SK6	-0.028	0.096	-0.05	-0.018	-0.09	-0.074	0.177	**0.764**	0.036	0.008	0.039	-0.229	-0.044	0.003	-0.112	-0.051	-0.443	-0.3
IS2	-0.007	-0.098	0.064	0.32	0.086	0.087	0.139	**0.845**	-0.141	0.044	0.041	0.101	0.008	-0.088	0.058	-0.019	0.289	0.086
EB6	-0.241	-0.093	0.281	-0.069	-0.056	0.029	-0.096	-0.065	**0.842**	0.006	0.027	0.121	0.071	-0.257	0.073	0.064	0.163	0.02
EB5	0.2	0.077	-0.233	0.057	0.046	-0.024	0.08	0.054	**0.894**	-0.005	-0.022	-0.1	-0.059	0.213	-0.06	-0.053	-0.136	-0.017
SK7	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
AGE	-0.05	-0.063	-0.05	-0.003	-0.063	0.044	-0.152	-0.014	0.014	0.175	**0.954**	-0.111	-0.054	-0.021	0.03	0.021	-0.059	-0.012
MS	-0.147	-0.001	0.236	-0.216	-0.111	0.129	0.104	-0.236	-0.324	0.046	**0.758**	0.098	0.188	0.022	-0.141	0.152	-0.026	-0.103
trad_ex	0.172	-0.084	-0.19	0.194	0.028	-0.016	-0.128	0.308	0.026	-0.351	**0.701**	0.229	0.155	0.129	0.023	0.082	-0.168	0.183
work_ex	0.025	0.111	0.04	0	0.104	-0.1	0.173	-0.044	0.134	0.003	**0.915**	-0.07	-0.13	-0.063	0.027	-0.145	0.168	-0.041
riskAp	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
GENDER	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
edu	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
incom	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
IA15	-0.053	-0.18	-0.032	-0.079	0.083	0.032	-0.113	0.024	0.041	0.008	-0.034	0.069	0.067	0.069	-0.026	**0.938**	0.166	0.106
IQ15	0.05	0.169	0.03	0.074	-0.078	-0.03	0.106	-0.022	-0.039	-0.008	0.032	-0.065	-0.063	-0.065	0.024	**0.946**	-0.156	-0.1
IS4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
IS11	0.123	-0.077	-0.066	0.114	-0.199	-0.103	-0.046	-0.222	0.187	0.002	0.073	0.009	0	-0.041	0.052	0.122	0.166	**0.879**

	FIA	IAIS	FIQ	COGB	HERD	SEEK	SKEPT	KNOW	EMO	EFF	EXP	RISK	GENDER	EDU	INCOME	ADVICE	TRUST	FRUST
IS12	-0.121	0.075	0.064	-0.112	0.194	0.101	0.045	0.217	-0.183	-0.002	-0.071	-0.008	0	0.04	-0.051	-0.12	-0.162	**0.885**

Note: Loadings and cross-loadings shown are after oblique rotation and Kaiser normalization. Loadings are in bold.

KEY: **FIA**: Formal Information Access, **FIQ**: Formal Information Quality, **IAIS**: Information Acquisition & Information Search, **SKEPT**: Acquisition Skepticism, **KNOW**: Subjective Financial Knowledge, **COGB**: Cognitive Biases, **EMO**: Emotional Biases, **SEEK**: Information Seeking, **EXP**: Experience, **HERD**: Herding Behavior, **ADVICE**: Personal Advice, **FRUST**: Information Frustration, **TRUST**: Outcome Confidence, **RISK**: Risk Tolerance, **EFF**: Financial Self-Efficacy, **Income**: Income, **GENDER**: Gender, **EDU**: Education Level

4.3.1.3.2 The Assessment of the Structural Model

The structural model fit was evaluated after confirming the validity and reliability of the reflective measurement model as suggested by Hair et al. (2014, p. 97). The process had three steps, which were collinearity assessment, coefficient of determination (R^2) assessment, and path coefficients evaluation.

Collinearity is the level of correlation between two exogenous reflective latent constructs, while multicollinearity is the correlation among more than two latent reflective constructs where high levels of multicollinearity suggest that the latent factors are measuring the same attribute (Hair et al., 2010, p. 165). The full variance inflation factor (VIF) was used to determine the level multicollinearity in the reflective latent constructs where VIF values below the suggested threshold of 3.3 (Cenfetelli, & Bassellier, 2009, p.701) indicate the existence of no multicollinearity, and no presence of common method bias in the model. The existence of common method bias suggests that the variance explained is attributed to the measurement method used rather than the constructs (Podsakoff, MacKenzie, & Podsakoff, 2003, p. 879).

Kock (2015a) defines the common method bias in the framework of the PLS-SEM as "a phenomenon that is caused by the measurement method used in an SEM study, and not by the network of causes and effects in the model being studied" (p.2). In the optimal SEM-PLS model, all latent reflective constructs had VIF values between 1.137 and 2.591, which indicated that there were no multicollinearity issues detected and no common bias method existed (Table 42). Furthermore, the average block VIF (AVIF) for the structural model was 1.131, confirming the previous findings, as shown in Table 45.

The coefficient of determination (R^2) represents the total effects of the exogenous latent constructs on the latent endogenous construct (i.e., the percentage of explained variance in the endogenous latent constructs explained by the exogenous latent constructs) where higher values indicate better predictability (Kock, 2015, p.48). R^2 values of 0.25, 0.50, and 0.75 are respectively considered weak, moderate, or substantial. However, those thresholds are just indicative, and can differ according to the discipline and the study's stage (Hair et al., 2014, p.175). The R^2 values of exogenous latent constructs in this study are shown in Table 45.

Table 45

Optimal PLS-SEM Model: R^2, and VIF Values, of the Latent Reflective Constructs

	R-squared	Adjusted R-squared	Full collinearity VIFs
FIA	0.52	0.513	2.421
IAIS	0.573	0.544	2.591
FIQ			2.352
COGB			1.587
HERD	0.423	0.413	1.95
SEEK	0.29	0.23	1.361
SKEPT			2.219
KNOW	0.349	0.339	2.532
EMO			1.409
EFF			1.137
EXP			1.407
RISK	0.046	0.031	1.292
GENDER			1.166
EDU			1.172
INCOME			1.601
ADVICE	0.038	0.031	1.445
TRUST	0.486	0.482	2.71
FRUST	0.185	0.179	1.885

KEY: **FIA**: Formal Information Access, **FIQ**: Formal Information Quality, **IAIS**: Information Acquisition & Information Search, **SKEPT**: Acquisition Skepticism, **KNOW**: Subjective Financial Knowledge, **COGB**: Cognitive Biases, **EMO**: Emotional Biases, **SEEK**: Information Seeking, **EXP**: Experience, **HERD**: Herding Behavior, **ADVICE**: Personal Advice, **FRUST**: Information Frustration, **TRUST**: Outcome Confidence, **RISK**: Risk Tolerance, **EFF**: Financial Self-Efficacy, **Income**: Income, **GENDER**: Gender, **EDU**: Education Level

The structural model path coefficients represent the suggested relationships among latent constructs, and should be evaluated for sign, magnitude, and statistical significance (Henseler, Ringle, & Sinkovics, 2009, p.303). The magnitude and statistical significance of the path coefficients were examined. Table 46 showed that all path coefficients were statistically

significant, where higher path coefficients (βs) indicate larger effects on variance, because the coefficients refer to the standardized variables. For example, the statistically significant path coefficient of 0.256 means that a 1 standard deviation variation in the Financial Information Access (FIA) leads to a 0.256 standard deviation variation in Information Acquisition and Information Searching (IAIS).

However, some of the path coefficients of Gender, Income, and Educational Level were not statistically significant, which was anticipated because those single-item latent constructs were included in the model to control for their effect on the Information Acquisition and Information Search, and Information Seeking constructs. Kock (2010) indicates the statistical significance of the effects of control constructs is not required (p.4).

Table 46

Optimal PLS-SEM Model: Path Coefficients of the Structural Model

	FIA	IAIS	FIQ	COGB	HERD	SEEK	SKEPT	KNOW	EMO	EFF	EXP	RISK	GENDER	EDU	INCOME	ADVICE	TRUST	FRUST
FIA			0.691***													-0.211**		
IAIS	0.256**			0.289***		0.222**	-0.322***		-0.197*				***-0.125***	***0.048***	***0.038***			
FIQ																		
COGB																		
HERD								-0.453***								0.35***		
SEEK	0.163*			0.156*				0.147*	0.214**	0.215**	-0.289***	0.264***	0.108	0.174*	0.151*			
SKEPT																		
KNOW		0.451***								0.256**								
EMO																		
EFF																		
EXP																		
RISK				-0.15*				0.262***										
GENDER																		
EDU																		
INCOME																		
ADVICE													0.195					
TRUST		0.697***																
FRUST		-0.43***																

Note: * p < .05, ** p < .01, *** p < .001

KEY: **FIA**: Formal Information Access, **FIQ**: Formal Information Quality, **IAIS**: Information Acquisition & Information Search, **SKEPT**: Acquisition Skepticism, **KNOW**: Subjective Financial Knowledge, **COGB**: Cognitive Biases, **EMO**: Emotional Biases, **SEEK**: Information Seeking, **EXP**: Experience, **HERD**: Herding Behavior, **ADVICE**: Personal Advice, **FRUST**: Information Frustration, **TRUST**: Outcome Confidence, **RISK**: Risk Tolerance, **EFF**: Financial Self-Efficacy, **Income**: Income, **GENDER**: Gender, **EDU**: Education Level

To conclude, the structural model of the optimal information behavior of individual investors in the SSM was considered to have a good fit based on the tests of the model utility discussed in this section, along with the other measures of model fit (Table 47) where all measures met or exceeded the requirements of acceptance. After confirming the PLS-SEM model fit, the WarpPLS software was used to generate the summated variables, which combines the variables of each construct into a single scale in order to reduce the measurement error (Hair et al., 2010, p. 124). The summated variables were used to further analyze the impact of SES on the information behavior of the individual investors in the SSM.

Table 47

Optimal PLS-SEM Model: Structural Model Fit & Quality Indices

Measure	General Rule for Acceptable fit
Average path coefficient (APC)=0.259, P<0.001	P<0.05
Average R-squared (ARS)=0.323, P<0.001	P<0.05
Average adjusted R-squared (AARS)=0.307, P<0.001	P<0.05
Average block VIF (AVIF)=1.131	acceptable if <= 5, ideally <= 3.3
Average full collinearity VIF (AFVIF)=1.791	acceptable if <= 5, ideally <= 3.3
Tenenhaus GoF (GoF)=0.505	small >= 0.1, medium >= 0.25, large >= 0.36
Sympson's paradox ratio (SPR)=0.931	acceptable if >= 0.7, ideally = 1
R-squared contribution ratio (RSCR)=0.969	acceptable if >= 0.9, ideally = 1
Statistical suppression ratio (SSR)=0.931	acceptable if >= 0.7

4.4 The Socioeconomic Status of Individual Investors

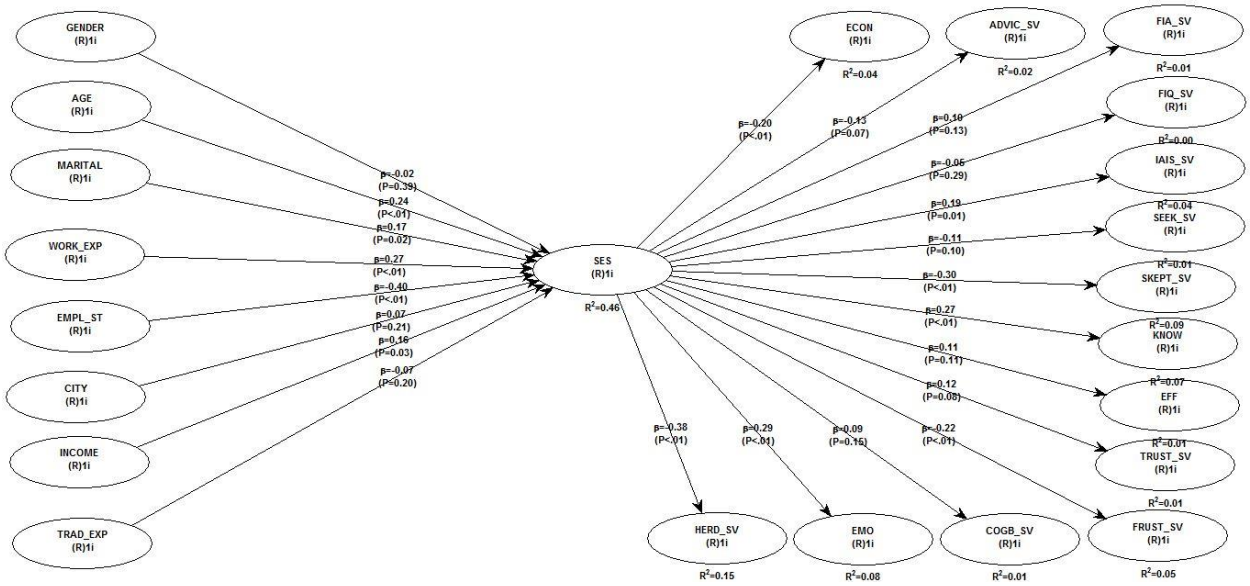
The SES of individual investors in the Saudi stock market was estimated by using Hollingshead's (1974) model. However, the marital status was not one of the factors used to determine the SES of individual investor due to the nature of the research methodology, where it was impossible to recognize any significant relationships from the data collected. Therefore, the main factors of estimation were the occupation and the education level of the participants.

This study classified the participants' input based on the ISCO-88 classification (Appendix E). Then, the each participant's occupation classification value was multiplied by a weight of five. Similarly, the educational level was classified into seven categories and was multiplied by a weight of three. Next, the occupational score and the educational level scores were added to produce an SES value for every participant, where the maximum score was 66, the minimum score was 12, and the average score was 51.59.

Hollingshead (1974) said that dividing the SES scores into a meaningful groups is a difficult task, and created a social strata that consists of five layers. Major business and professional (66-55), Medium business, minor professional, technical (54-40), Skilled craftsmen, clerical, sales workers (39-30), Machine operators, semiskilled workers (29-20), and Unskilled laborers, menial service workers (19-8) (p.46). However, to make the analysis more intuitive in this study, SES scores were categorized into three groups: high, middle, and low. The high SES category had 59 participants with scores ranging between 58 and 66, the middle SES category had 52 participants with scores ranging between 44 and 57, and the low SES category had 17 participants with scores below 44.

Evaluating the impact of the SES on the information behavior required adding the SES score to the variables of the PLS-SEM optimal information behavior model. Next, the PLS-SEM analysis was run again to examine the effect of the SES on the summated variables (SV) that were generated in during the SEM analysis in the previous section. Figure 11 shows the first PLS-SEM attempt to analyze the SES impact on the information behavior of individual investors. All the constructs on the left side of Figure 11 are single-item control variables (they are not summated variables), and the constructs on the right are the exogenous summated variables.

The control factors were chosen to give the best representation of the SES in Saudi Arabia due to the unique societal structure of the country.



KEY: **SES**: Socioeconomic Status, **ECON**: indicates if the participant is an economist or a banker**, FIA_SV**: Formal Information Access, **FIQ_SV**: Formal Information Quality, **IAIS_SV**: Information Acquisition & Information Search, **SKEPT_SV**: Acquisition Skepticism, **KNOW_SV**: Subjective Financial Knowledge, **COGB_SV**: Cognitive Biases, **EMO_SV**: Emotional Biases, **SEEK_SV**: Information Seeking, **HERD_SV**: Herding Behavior, **ADVICE_SV**: Personal Advice, **FRUST_SV**: Information Frustration, **TRUST_SV**: Outcome Confidence, **RISK_SV**: Risk Tolerance, **EFF_SV**: Financial Self-Efficacy, **Income**: Income, **GENDER**: Gender, **AGE**: Age, **EMPL_ST:** Employment Status, **CITY**: City of Residence, **TRAD_EXP**: Trading Experience, **Work_EXP**: Work Experience, **Marital:** Marital Status

Figure 11. The SES impact on the information behavior of individual investors.

Some of the path coefficients of the latent constructs were not statistically significant (P values > 0.05), as shown in Figure 11. Therefore, a second PLS-SEM model had to be created where all latent exogenous constructs with non-significant path coefficients were removed with the exception of the control variables. The results of the second analysis are in Figure 12.

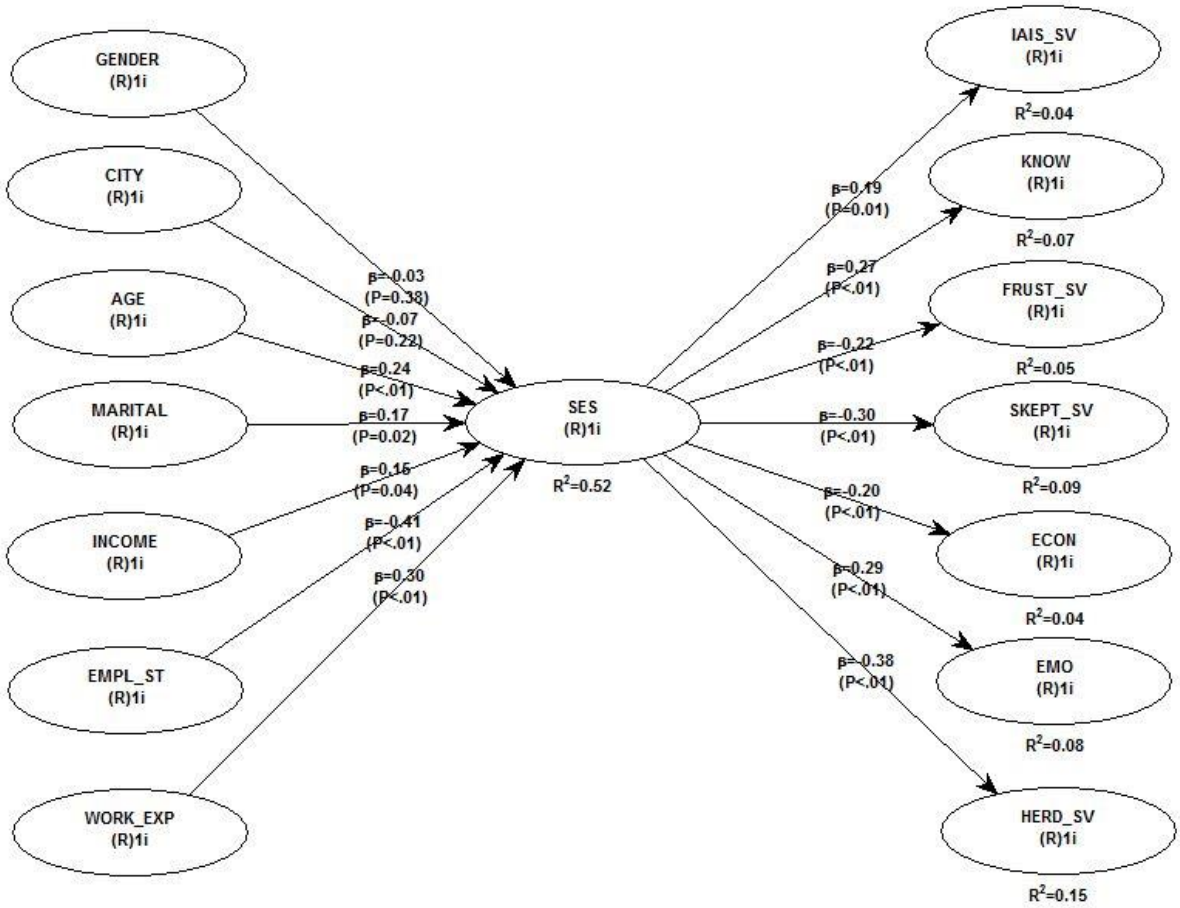


Figure 12. The optimal model of SES impact on the information behavior of individual investors.

KEY: **SES**: Socioeconomic Status, **ECON**: indicates if the participant is an economist or a banker**, IAIS_SV**: Information Acquisition & Information Search, **SKEPT_SV**: Acquisition Skepticism, **KNOW_SV**: Subjective Financial Knowledge, **EMO_SV**: Emotional Biases, **HERD_SV**: Herding Behavior, **FRUST_SV**: Information Frustration, Income: Income, **GENDER**: Gender, **AGE**: Age, **EMPL_ST:** Employment Status, **CITY**: City of Residence, **Work_EXP**: Work Experience, **Marital:** Marital Status

The WarpPLS (Version 5.0) software reports one-tailed P values for path coefficients to establish the direction of the relation (negative or positive. Figure 12 shows the SES impact of the SES on the information behavior of individual investors in the SSM, where all path coefficients are statistically significant, which helped in explaining the variations in the effect

among the constructs (Table 48). The general model fit and quality measures are reported in Table 49.

Table 48

The Optimal Model of SES: Path Coefficients of the Structural Model

	SES	IAIS_SV	FRUST_S	AGE	WORK_EX	CITY	MARITAL	GENDER	HERD_SV	EMPL_ST	KNOW	SKEPT_S	ECON	EMO	INCOME
SES				0.245**	0.297***	-0.069	0.173*	-0.027		0.405***					0.151*
IAIS_SV	0.188**														
FRUST_S	-0.221**														
AGE															
WORK_EX															
CITY															
MARITAL															
GENDER															
HERD_SV	-0.382***														
EMPL_ST															
KNOW	0.267***														
SKEPT_S	-0.303***														
ECON	-0.204**														
EMO	0.287***														
INCOME															

Note: * p < .05, ** p < .01, *** p < .001

KEY: **SES**: Socioeconomic Status, **ECON**: indicates if the participant is an economist or a banker, **IAIS_SV**: Information Acquisition & Information Search, **SKEPT_SV**: Acquisition Skepticism**, KNOW_SV**: Subjective Financial Knowledge, **EMO_SV**: Emotional Biases, **HERD_SV**: Herding Behavior, **FRUST_SV**: Information Frustration, **Income**: Income, **GENDER**: Gender, **AGE**: Age, **EMPL_ST**: Employment Status, **CITY**: City of Residence, **Work_EXP**: Work Experience, **Marital**: Marital Status

Table 49

The Optimal Model of SES: Structural model fit & quality indices

Measure	General Rule for Acceptable fit
Average path coefficient (APC)=0.230, P=0.002	P<0.05
Average R-squared (ARS)=0.130, P=0.033	P<0.05
Average adjusted R-squared (AARS)=0.120, P=0.041	P<0.05
Average block VIF (AVIF)=1.470	acceptable if <= 5, ideally <= 3.3
Average full collinearity VIF (AFVIF)=1.720	acceptable if <= 5, ideally <= 3.3
Tenenhaus GoF (GoF)=0.360	small >= 0.1, medium >= 0.25, large >= 0.36
Sympson's paradox ratio (SPR)=1.000	acceptable if >= 0.7, ideally = 1
R-squared contribution ratio (RSCR)=1.000	acceptable if >= 0.9, ideally = 1
Statistical suppression ratio (SSR)=1.000	acceptable if >= 0.7

Multicollinearity among the exogenous reflective latent constructs was measured using the variance inflation factor (VIF) where VIF values below the suggested threshold of 3.3 (Cenfetelli, & Bassellier, 2009, p.701) indicate the existence of no multicollinearity, and no presence common method bias in the model. In the optimal model of the SES impact on the information behavior of individual investors, all latent reflective constructs had VIF values between 1.105 and 2.46, which indicated that there were no multicollinearity issues detected and no common bias method existed (Table 50). The correlations among the latent reflective constructs is shown in Table 51.

Table 50

The Optimal Model of SES: R^2, and VIFs Values of the Endogenous Latent Reflective Constructs

	R-squared	Full collinearity VIFs
SES	0.522	1.77
IAIS_SV	0.035	1.801
FRUST_S	0.049	1.787
AGE		2.46
WORK_EX		2.318
CITY		1.105
MARITAL		1.256
GENDER		1.183
HERD_SV	0.146	1.74
EMPL_ST		1.601
KNOW	0.071	2.097
SKEPT_S	0.092	2.305
ECON	0.042	1.443
EMO_SV	0.082	1.342
INCOME		1.592

KEY: SES: Socioeconomic Status, **ECON**: indicates if the participant is an economist or a banker, **IAIS_SV**: Information Acquisition & Information Search, **SKEPT_SV**: Acquisition Skepticism, **KNOW_SV**: Subjective Financial Knowledge, **EMO_SV**: Emotional Biases, **HERD_SV**: Herding Behavior, **FRUST_SV**: Information Frustration, **Income**: Income, **GENDER**: Gender, **AGE**: Age, ***EMPL_ST***: Employment Status, **CITY**: City of Residence, **Work_EXP**: Work Experience, **Marital**: Marital Status

Using the summated variables in the optimal model of the SES impact on the information behavior of individual investors helped in minimizing the measurement error in the model, which was reflected on the model's fit to the data in this study. Although the coefficient of determination (R^2) for the exogenous latent constructs was relatively weak (Table 50), the

objective of this model was to map the effect of the social structure in Saudi Arabia on the behavior of individuals in Saudi Arabia and more specifically, their information behavior.

Table 51

The Optimal Model of SES: Correlations Among Latent Variables of the Optimal Model of the SES Impact

	SES	IAIS_SV	FRUST_S	AGE	WORK_EX	CITY	MARITAL	GENDER	HERD_SV	EMPL_ST	KNOW	SKEPT_S	ECON	EMO	INCOME
SES	1														
IAIS_SV	0.076	1													
FRUST_S	-0.096	-0.409***	1												
AGE	0.159	-0.135	0.023	1											
WORK_EX	0.29***	-0.031	0.077	0.684***	1										
CITY	-0.021	-0.119	0.091	-0.017	-0.004	1									
MARITAL	0.191*	-0.166	0.038	0.298***	0.202**	-0.088	1								
GENDER	-0.187*	-0.091	-0.073	-0.091	-0.155	-0.116	0.06	1							
HERD_SV	-0.262**	-0.25**	0.051	-0.248**	-0.153	-0.082	-0.017	0.19**	1						
EMPL_ST	0.492***	-0.085	0.085	0.002	-0.108	-0.026	-0.035	0.151	0.013	1					
KNOW	0.201**	0.539***	-0.301***	0.033	0.097	-0.071	-0.16	-0.195**	-0.473***	0.091	1				
SKEPT_S	-0.14	-0.473***	0.583***	-0.043	0.12	0.078	0.09	0.002	0.334***	-0.035	-0.367***	1			
ECON	-0.204**	-0.244**	0.09	0.033	0.007	0.078	0.016	0.005	0.357***	-0.191*	-0.455***	0.263**	1		
EMO	0.093	-0.176*	0.223**	0.016	0.13	-0.128	-0.022	0.135	0.249**	0.08	-0.212*	0.367***	0.08	1	
INCOME	0.188**	0.12	-0.001	0.41***	0.341***	-0.093	0.15	-0.063	-0.319***	0.208*	0.231**	-0.225**	-0.105	-0.036	1

Note: * p < .05, ** p < .01, *** p < .001

KEY: SES: Socioeconomic Status, **ECON**: indicates if the participant is an economist or a banker, **IAIS_SV**: Information Acquisition & Information Search, **SKEPT_SV**: Acquisition Skepticism, **KNOW_SV**: Subjective Financial Knowledge, **EMO_SV**: Emotional Biases, **HERD_SV**: Herding Behavior, **FRUST_SV**: Information Frustration, **Income**: Income, **GENDER**: Gender, **AGE**: Age, **EMPL_ST**: Employment Status, **CITY**: City of Residence, **Work_EXP**: Work Experience, **Marital**: Marital Status

CHAPTER 5

DISCUSSION, AND CONCLUSION

5.1 Discussion

Individual investors in the Saudi stock market can personally manage their investment portfolios to avoid the costs associated with professional financial advisory services and discretionary portfolio management services. In a non-advisory context, making informed decisions under uncertainty is both a complicated and a critical task, because analyzing the performance of the Saudi stock market and determining the relationship between the economy and their investment portfolios requires getting the right information at the right time.

The purpose of this quantitative survey study was to examine the information behavior of individual investors in Saudi Arabia within a non-advisory context of their investment decision-making process. To do so, the study examined the impact of intervening variables, not only on the information behavior, but also on the specific sub-sets of the information behavior. This includes information seeking, information searching and acquisition, and information using. The following sections will present the findings of the study in light of the research questions, and link them to the theories discussed in Chapter Two.

5.1.1 Research Questions 1 and 2

The first research question was: What are the information behaviors of individual investors in the Saudi stock market and what motivates these behaviors? To what extent do they impact the information behavior of the investors? The second research question was:

What is the effect of the information source characteristics and the information value on the individual investors' information behavior in the Saudi stock market? The results of the PLS-SEM model of the optimal information behavior of individual investors in the SSM discussed in Chapter Four was used to address both question research questions.

5.1.1.1 Information Seeking Behavior

The path coefficients of the structural model of the optimal information behavior of individual investors in the SSM showed that, while controlling for gender, education, and income, the Experience factor had the greatest negative effect on the variance of the information seeking behavior of individual investors in the SSM with a path coefficient of -0.289 ($p < 0.001$).

The next strongest effect was the level of Risk Tolerance ($\beta = 0.264$, $p < 0.001$), which indicated that as the investors' risk appetite increases, their information seeking will increase as well. The other factors that influenced the information seeking behavior were as follows: Financial Self-Efficacy ($\beta = 0.215$, $p < 0.01$), Emotional Biases ($\beta = 0.214$, $p < 0.01$), Education Level ($\beta = 0.174$, $p < 0.05$), Formal Information Access ($\beta = 0.163$, $p < 0.05$), Cognitive Biases ($\beta = 0.156$, $p < 0.05$), and Subjective Financial Knowledge ($\beta = 0.147$, $p < 0.05$). Together, the factors explained 29% of the variance in the information seeking behavior.

The Experience construct contained four indicators: age, marital status, work experience, and trading experience. Therefore, the experience factor established a profile of the person-in-context as described by Wilson (1997), who suggests that the level of stress induces the information seeking behavior, but investors with high levels of experience may not

seek information due to their established knowledge structure. Noticeably, income and experience had a strong positive relationship with a Pearson correlation coefficient of r = 0.416 and a significance value of less than 0.001.

When the participants were asked about their financial self-efficacy (I believe that the way I manage my money will affect my future), 75% of the responses either strongly agreed or agreed with the statement. As predicted by Wilson (1997), financial self-efficacy was one of the activating mechanisms for information seeking, and the results of this study confirmed that financial self-efficacy had a strong positive effect (β= 0.215) on the information seeking behavior of individual investors in the SSM.

The Emotional Biases construct represented the regret aversion bias. The significant effect of regret aversion bias on increasing the information seeking behavior confirmed the theory of counterfactual seeking, which suggests that information seekers tend to seek information about forgone opportunities to evaluate their decisions, and to achieve higher satisfaction (Summerville, 2011, p.28). The findings of this study confirmed that regret aversion and the information seeking behavior were positively related with a Pearson correlation coefficient of r = 0.189 and a significance value of less than 0.01. Emotional biases and education level had a strong negative relation with a Pearson correlation coefficient of r = -0.245 and a significance value of less than 0.001, which explains the positive effect of education on information seeking behavior.

Consistent with the established relationship between overconfidence, self-attribution, and hindsight in previous research (Thaler & Barberis, 2005, p. 12), this study found that the Cognitive Biases factor (COGB), which includes overconfidence, self-attribution, and hindsight,

is positively related to the information seeking behavior (SEEK) of individual investors with a Pearson correlation coefficient of r = 0.177 and a significance value of less than 0.05. Furthermore, cognitive biases (COGB) had a positive effect (β= 0.156, p < 0.05) on the information seeking behavior of individual investors.

The self-attribution bias reinforces investors' overconfidence, and the hindsight bias makes them feel that the previous movement in the markets were unsurprising (Jagongo, Mutswenje, 2014, p.96). Therefore, individual investors who have high levels of overconfidence take higher risks, which is reflected in the volume and volatility of the trades (Gervais and Odean, 2001, p. 19). Accordingly, the individual investors increase their information seeking to support their overconfidence in stock valuations, (Daniel, Hirshleifer, & Subrahmanyam, 1998, p.1841), as well as their increased risk appetite. The Information Seeking Behavior and the Risk Tolerance constructs were positively related with a Pearson correlation coefficient of r = 0.246 and a significance value of less than 0.01.

5.1.1.2 Information Acquisition and Information Searching (IAIS)

IAIS and Information Seeking Behaviors (SEEK) were positively related with a Pearson correlation coefficient of r = 0.271 and a significance value of less than 0.01. This is consistent with Wilson's (1999) nested model of information behavior (p.263) in which the information seeking and the information search behaviors are sub-sets of the information behavior. Accordingly, the Information Seeking Behavior (SEEK) had a positive effect on the variance of IAIS (β= 0.222, p < 0.01), was shown in Table 43.

Figure 13. Nested model of Information behavior (Wilson, 1999).

The path coefficients of the structural model of the optimal information behavior of individual investors in the SSM showed that, while controlling for gender, education, and income, the Acquisition Skepticism factor (SKEPT) had the strongest negative effect on the variance of the IAIS behavior of individual investors in the SSM ($\beta = -0.322$, $p < 0.001$). Similarly, Emotional Biases (regret aversion) had a negative effect ($\beta = -0.197$, $p < 0.05$).

To examine the Acquisition Skepticism factor (SKEPT) the participants were asked about their satisfaction level with the results of their information search in satisfying their information need using the following statements: “I often have doubts about the sources of information I use”, “I frequently agonize over which sources of information to consider”, and “I often wonder if I’ve chosen the right source of information”. Therefore, the stress and coping theories, as suggested by Wilson (1997), provides a way to explain the individual investors’ behavior when they fail to find sufficient information sources or when they purposively avoid information that will make them regret their investment decisions.

The negative effects of the acquisition skepticism (β= -0.322, p < 0.001), and emotional biases (β= -0.197, p < 0.05) on IAIS can be observed when individual investors do not find information sources that satisfy their information needs and reduce their uncertainty. As a result, the higher levels of unpredictability will lead the individual investors to adopt an emotion-focused coping mechanism rather than problem-focused coping mechanism (Wilson, 1997, p. 554). Accordingly, IAIS and Acquisition Skepticism were negatively related with a Pearson correlation coefficient of r = -0.473 and a significance value of less than 0.001. Also, IAIS and regret aversion (EMO) were negatively related with a Pearson correlation coefficient of r = -0.176 and a significance value of less than 0.01. Another interesting finding was that IAIS and herding behavior were negatively related with a Pearson correlation coefficient of r = -0.25 and a significance value of less than 0.01, which indicates the positive effect of information acquisition on reducing investors' tendancy to engage in negative behaviors such as herding.

Other factors that had statistically significant positive effects on the variance of IAIS were Cognitive Biases (β= 0.289, p < 0.001) and Formal Information Access (β= 0.256, p < 0.01). The positive effect of Cognitive Biases on IAIS is similar to the overconfidence bias effect on Information Seeking Behavior (SEEK), where overconfident individual investors will trade more aggressively, and take higher risks, which drives them to acquire more information more frequently to update their beliefs when they feel that they have taken the right decision (Gervais and Odean, 2001, p. 3).

Together, all five factors explained 57.3% of the variance in Information Acquisition and Information Searching Behavior (Table 46). IAIS was related with Formal Information Quality (FIQ), Cognitive Biases, and Information Frustration (FRUST) with Pearson correlation

coefficients of $r = 0.343$ ($p < 0.001$), $r = 0.443$ ($p < 0.001$), and $r = -0.409$ ($p < 0.001$) respectively (Table 45). The similarities found in the relationships of the information seeking behavior and IAIS with the other factors in the model may be caused by the difficulty to define the concept of information (Wilson, 1981, p.1), which may lead some researchers to use both terms interchangeably.

Finally, the findings of this study confirm previous research that suggest successful investors have better information gathering capabilities than overconfident investors, but successful investors may not utilize their information efficiently. Therefore, some studies consider overconfident investors as one of the major stock market drivers (Gervais and Odean, 2001, p. 20).

5.1.1.3 Information Use

The path coefficients of the structural model of the optimal information behavior of individual investors in the SSM showed that, while controlling for gender, education, and income, the IAIS behavior had a strong positive effect ($\beta = 0.451$, $p < 0.001$) on the variance of the Subjective Financial Knowledge (KNOW), which means that the information acquired during the process had addressed the information needs of the individual investors in the SSM. IAIS and the Subjective Financial Knowledge are positively related with a Pearson correlation coefficient of $r = 0.539$ and a significance value of less than 0.001, which supports the fact that individuals' react in accordance to their subjective knowledge when searching for information to achieve their goals (Moorman et al., 2004).

Another significant positive impact of IAIS was on increasing the investors' Outcome Confidence (TRUST) ($\beta = 0.697$, $p < 0.001$) where IAIS and TRUST are positively correlated with a Pearson correlation coefficient of $r = 0.692$ and a significance value of less than 0.001. As individual investors increased their IAIS, their Information Frustration (FRUST) decreased ($\beta = -0.43$, $p < 0.001$). Therefore, searching for financial information enhances the subjective knowledge of individual investors in the SSM by bolstering confidence in their ability of successfully finding financial information that is relevant to their investment decisions.

5.1.1.4 Information Value and Information Source Characteristics Impact on Information Behavior

The path coefficients of the structural model of the optimal information behavior of individual investors in the SSM showed that, while controlling for gender, education, and income, seven formal information sources had a statistically significant positive effect on the Information Seeking Behavior ($\beta = 0.163$, $p < 0.05$), and on IAIS ($\beta = 0.163$, $p < 0.01$) of individual investors in Saudi Arabia. Those seven sources include websites of publically listed companies, financial reports issued by local investment firms, financial reports issued by international investment firms, economic reports issued by banks, official Statistical reports, online independent research, and research from online databases.

On the other hand, informal information sources represented in interpersonal communication with family and friends (ADVICE) did not have a direct impact on the Information Seeking Behavior and IAIS of individual investors, but it had a significant effect on individual investors access to formal information sources ($\beta = -0.211$, $p < 0.01$). Furthermore,

Table 43 shows that the increased utilization of Personal Advice increased the herding behavior ($\beta = 0.35$, $p < 0.001$). The effect of other informal information sources, such as newspapers, TV informal online forums, chat rooms and social media was not present in the sample.

The findings of this study showed strong positive correlation of Formal Information Sources with IAIS ($r = 0.414$, $p < 0.001$), Cognitive Biases ($r = 0.314$, $p < 0.001$), and Subjective Financial Knowledge ($r = 0.422$, $p < 0.001$).

The payoff realized by the information seeker upon receiving the information is known as the information value, which determines the demand price of information. This is defined as the highest price that an information seeker is willing to pay for an information good in order to maximize his expected payoff function (utility). Factors like time, importance, usefulness, income, location, and relevance affect that price (Marschak, 1959).

In this study the information value was reflected in two factors: Formal Information Quality (FIQ) and Outcome Confidence (TRUST). The access to formal information sources (FIA) was strongly related with the FIQ with a Pearson correlation coefficient of $r = 0.675$ and a significance value of less than 0.001. Moreover, the access to formal information sources (FIA) was strongly related with TRUST with a Pearson correlation coefficient of $r = 0.423$ and the significance value less than 0.001. Accessing formal information sources (FIA) was negatively correlated with the Herding Behavior (HERD) with a Pearson correlation coefficient of $r = -0.243$ and a significance value of less than 0.01. Finally, Formal Information Quality (FIQ) was significantly related with Cognitive Biases, Information Seeking Behavior, Subjective Financial Knowledge, and Outcome Confidence with Pearson correlation coefficients of $r = 0.353$ ($p < 0.001$), $r = 0.25$ ($p < 0.01$), $r = 0.223$ ($p < 0.05$), and $r = 0.333$ ($p < 0.001$), respectively (Table 45).

5.1.1.5 Herding Behavior

The path coefficients of the structural model of the optimal information behavior of individual investors in the SSM (Table 43) showed that, while controlling for gender, education, and income, two factors explained 42.3% of the variance in the Herding behavior of individual investors in the SSM (Table 46). The first factor was the Subjective Financial Knowledge, which had a negative effect on behavior ($\beta = -0.453$, $p < 0.001$), and had a negative correlation ($r = -0.473$, $p < 0.001$) indicating that as the subjective knowledge increased the less likely the individual investors would engage in herding behaviors. On the other hand, the second factor, Personal Advice from family and friends, induces herding behaviors ($\beta = 0.35$, $p < 0.001$), and had a positive correlation ($r = 0.474$, $p < 0.001$), as shown in Tables 43 and 45.

Studies have shown that investing is a popular topic in daily conversations and media channels (Shiller, 1990, p.64). The findings of this study confirms previous research, which suggests that interpersonal communication among individual investors influences their financial decisions, where trading behaviors spread as a result of information sharing. As a result, when a critical number of investors react in a certain way to changes in the market, other investors will take that as a sign of a possible positive outcome, and will copy those reactions (Hirshleifer, & Teoh, 2003, p.36).

5.1.2 Research Question 3

The third research question asked: What is the impact of the socioeconomic status of individual investors on their information behavior? The optimal model of the SES impact on the

information behavior of individual investors (Figure 12) was used to explore the effect of SES on the information behavior of individual investors in the SSM.

This study estimated the SES of individual investors by using Hollingshead's (1974) method, which utilizes many SES factors rather than just using the standard method of measuring SES. This was reflected on the model developed to measure the impacts and is reflected on the conclusions drawn in this discussion (Braveman et al., 2005). The variance of the SES of individual investors in Saudi Arabia, while controlling for gender and city of residence, was significantly affected by employment status ($\beta = 0.405$, $p < 0.001$), work experience ($\beta = 0.297$, $p < 0.001$), age ($\beta = 0.245$, $p < 0.01$), marital status ($\beta = 0.173$, $p < 0.05$), and income ($\beta = 0.151$, $p < 0.05$), as shown in Table 48. In total, those factors explained 52.2% of the variance in the SES of the individual investors in the SSM, which is an indication of the sufficient adequacy of this model for estimating and predicting the impact of SES on information behavior.

The SES of individual investors in the SSM had a strong positive impact on the variance of their Emotional Biases (regret aversion bias) ($\beta = 0.287$, $p < 0.001$), Subjective Financial Knowledge ($\beta = 0.267$. $p < 0.001$), and Information Acquisition and Information Searching behavior ($\beta = 0.188$, $p < 0.01$). Furthermore, the higher the SES of individual investors, the less they were affected by Acquisition Skepticism ($\beta = -0.303$, $p < 0.001$), less likely they were to engage in herding behaviors ($\beta = -0.382$, $p < 0.001$), and experiance information frustration ($\beta = -0.221$, $p < 0.01$). Moreover, the results indicate that economists and bankers have higher SES than non-bankers and non-economists in the sample ($\beta = -0.204$, $p < 0.01$).

5.2 Study Implications

The interdisciplinary nature of the field of information science required that the theoretical framework for the information behavior of individual investors' model be determined by integrating findings of research studies from many fields, such as information science, finance, behavioral finance, information economics, and psychology, in order to provide a wider view of the information behavior of individual investors in the Saudi stock market. The main structure of the theoretical interdisciplinary information behavior model was empirically grounded and was based on Wilson's (1997) general behavior model.

Therefore, the significant intervening variables identified in this study extend the set of intervening variables that were first suggested by Wilson in his model. Furthermore, the intervening variables identified in this study do not only influence the individual investors' information behavior at one point, but their effects are confirmed in many stages of the decision making process, which is in line with the suggestion of Wilson (1997) to study the impact of those intervening variables during different stages of the information behavior, such as information seeking, information acquisition, information searching, and information use (p.569).

The findings of the study indicate that the information behavior of individual investors in Saudi Arabia consists of interweaved processes, sub-processes, and factors that determine the behavior of individuals when they have information needs. That conclusion is in line with Godbold' (2005) suggestion that is:

> The order of information seeking tasks may be reversed or convoluted, and includes dead-ends, changes of direction, iteration, abandonment and beginning again. It therefore seems timely to develop a diagram which explicitly shows the myriad paths

> that can be taken through the different modes of information behaviour, from confusion to revelation and back again, until such time as the information excursion is deemed to be over. (p.5)

Therefore, I believe that the optimal information behavior model developed in this study is a successful first step in mapping the information behavior of individual investors in the Saudi stock market.

In Saudi Arabia, empirical research in information behavior is scarce, hence this study adds value to that area of research in the region, and has been the beginning of more extensive research because it provides an extensive background of the factors that influence the behavior of individual investors. Use of the findings of this study by policymakers, investment firms, and media channels will help in providing further protection for the individual investors, will result in providing better channels to communicate the right information at the right time, and will reduce the negative effects of bad behaviors such as the herding behavior on the stock prices. Finally, individual investors may benefit from the findings of this study by reviewing their investment strategies, carefully choosing their information sources, and using the formal financial information as a tool to react to price changes rather than ignoring the usefulness of the accounting information and pursuing personal advice from their cognitive authorities.

5.3 Study Limitations

The study targeted only individual investors and not other groups such as institutional investors, financial advisors, and fund managers. Furthermore, the questionnaire designed to examine the information behavior of individual investors did not ask the participants about their financial performance, which could have benefited the study in identifying the gap

between the subjective financial knowledge and the objective financial knowledge. The limited sample size was a result of many factors, such as the limited time frame of collecting the data, the extensive time needed to finish the questionnaire, and the level of difficulty of some questions related to the behavioral biases, where some participants indicted that it was hard for them. However, the partial least squares structural equation modeling helped in achieving high statistical power with the deliberately small sample size.

5.4 Future Work

In their review of the information needs and uses in library and information science, Julien and Duggan (2000) indicate that only about 10% of the studies focus on the information seeking behavior and information needs. As a result, I believe that there are many opportunities for future research in that area. The optimal model of information behavior can be developed in future research by extending the sample to other categories of participants in the Saudi stock market to measure the effects of the intervening on other aspects of the investment decision making process. Studies have shown that decisions people make are hard to predict, because their present and future choices are different from each other (Simon et al., 1987, p. 26), and information seekers do not follow perfect and optimal information seeking strategies (Godbold, 2006, p.5). Therefore, linking the model to market information by adding trading trends and stock prices' movement patterns can help in examining the information behavior of investors during crises. Accordingly, the model can incorporate the effect of the economic costs associated with accessing reliable formal sources of information as one of the

intervening variables that would affect the investors' decision on the sources of information used.

5.5 Conclusion

The main goal of this dissertation was to understand the information behavior of individual investors in the Saudi Stock market, and to understand the impact of the intervening factors on their behaviors. The research design required a broad literature review on multiple disciplines such as information science, finance, behavioral finance, information economics, and psychology to establish the theoretical framework of the information behavior model that was based on Wilson's (1997) general model of information behavior. The intervening variables influencing the information behavior of individual investors included indicators related to behavioral biases, information source characteristics, socioeconomic status, demographics and financial profile characteristics.

An online questionnaire instrument was employed to measure related aspects from the individual investors in the Saudi Stock market. Afterwards, data were analyzed using exploratory factor analysis (EFA), and the second generation multivariate technique of the structural equation modeling. The findings of the study were based on statistically significant results of the optimal information behavior model, which was developed after many iterations of analysis. The optimal information behavior model succeeded in absorbing many theories in order to move from decision-based models towards causal models.

The study shows that the experience factor has the greatest negative effect on the information seeking behavior of individual investors. The next strongest effect is the level of

risk tolerance followed by financial self-efficacy, emotional biases, education level, formal information access, regret aversion bias, and subjective financial knowledge. The information acquisition and information searching behavior, while controlling for gender, education, and income, is influenced by the acquisition skepticism, regret aversion bias, formal information access, overconfidence, and information seeking behavior. Furthermore, the findings of the study indicate that, while controlling for gender, education, and income, formal information sources have a statistically significant positive effect on the information seeking behavior, and on the information acquisition and information searching of individual investors in Saudi Arabia. Finally, the socioeconomic status of individual investors in Saudi Arabia is significantly influenced by the employment status, work experience, age, marital status, and income. Interestingly, gender and city of residence did not have statistically significant effects on the SES, which raises questions about some of the misconceptions about the Saudi social structure, such as gender inequality and using the city of residence as an indicator of wealth.

I believe that this dissertation is the first step of future research that will remove boundaries among different disciplines, and will add value not only to the research field, but also to the welfare of individual investors. Finally, I conclude with the inspiring idea of Wheeler (2011) who says:

> I would like to see is some reasonable attempt at a model that would combine decision-making issues with information product issues…an *information science economist*, by providing a crosswalk from economic information theory to a complex information commodity practice, just might usefully inform the real politics and the real economics of information, knowledge, and society. (p.47)

APPENDIX A

ENGLISH VERSION OF THE QUESTIONNAIRE

Q1

Questionnaire Introduction

Dear Participant

My name is Nabil Elwani and I am a doctoral candidate in the Interdisciplinary Information Science Ph.D. program in the College of Information at the University of North Texas (UNT). For my dissertation, I am examining the information behavior of individual investors in the Saudi stock market. Because you may be an individual investor, I am inviting you to participate in this research study by completing the attached surveys. The questionnaire is available in both Arabic and English. You will be asked to fill an online questionnaire that will take approximately 15-20 minutes to complete. This questionnaire will not collect any personal information from you, hence your identity will be protected. In addition to the questionnaire, there will be a separate contact form that you can complete if you are interested in participating in a follow-up interview. Your personal information will not be linked to your answers of the main questionnaire. If you choose to participate in this study, please answer all questions as honestly as possible and to the best of your knowledge. Participation is strictly voluntary and you may refuse to participate at any time during the process. Thank you for taking the time to assist me in my educational endeavors. If you require additional information or have questions, please contact me at the email listed below.

Sincerely,
Nabil Elwani

Q2

University of North Texas Institutional Review Board
Informed Consent Notice

Before agreeing to participate in this research study, it is important that you read and understand the following explanation of the purpose, benefits and risks of the study and how it will be conducted.

Title of Study: The Information Behavior of Individual Investors in Saudi Arabia

Student Investigator: Nabil Elwani, University of North Texas (UNT), Department of Library and Information Science (LIS).

Supervising Investigator: Dr. Shawne Miksa, Ph.D.

Purpose of the Study: You are being asked to participate in a research study, which involves exploring the effects of behavioral biases, socioeconomic status, and source characteristics on the information behavior of individual investors in the Saudi stock market within the non-advisory context.

Study Procedures: You will be asked to fill an online questionnaire that will take about 15-20 minutes of your time.

Foreseeable Risks: No foreseeable risks are involved in this study.

Benefits to the Subjects or Others: This study is not expected to be of any direct benefit to you, but we hope to learn more about the information behavior of individuals in Saudi Arabia to clarify the causal relationships among the information behavior processes and the intervening variables that may affect the investment decision making. The study is expected to assist the efforts of policymakers and the capital market authority (CMA) in finding better ways to protect the wellbeing of investors, and in establishing better information dissemination guidelines in the market. Finally, financial institutions may use the findings of this study to provide better services to their clients, which may improve their competitiveness and reputation in the market.

Compensation for Participants: None

Procedures for Maintaining Confidentiality of Research Records: Your part in this study is anonymous. That means that your answers to all questions are private. No one else can find out your answers. Scientific reports will not identify you or any other individual as being in this research project. Confidentiality will be maintained to the degree possible given the technology and practices used by the online survey company. Your participation in this online survey involves risks to confidentiality similar to a person's everyday use of the Internet.

Questions about the Study: If you have any questions about the study, you may contact Nabil Elwani at Tel: +1 (xxx) xxx-xxxx, or Dr. Shawne Miksa, Ph.D., office: +1 (xxx) xxx-xxxx

Review for the Protection of Participants: This research study has been reviewed and approved by the UNT Institutional Review Board (IRB). The UNT IRB can be contacted at (940) 565-4643 with any questions regarding the rights of research subjects.

Research Participants' Rights:

Your participation in the survey confirms that you have read all of the above and that you agree to all of the following:

- Nabil Elwani has explained the study to you and you have had an opportunity to contact him/her with any questions about the study. You have been informed of the possible benefits and the potential risks of the study.
- You understand that you do not have to take part in this study, and your refusal to participate or your decision to withdraw will involve no penalty or loss of rights or benefits. The study personnel may choose to stop your participation at any time.
- You understand why the study is being conducted and how it will be performed.

- You understand your rights as a research participant and you voluntarily consent to participate in this study.
- You understand you may print a copy of this form for your records.

Q3 Research Study Consent

❍ I am less than 18 years old and therefore cannot participate in this research study.

❍ I am at least 18 years old. I have or had an investment portfolio in the Saudi stock market. I have read the above information and my questions have been answered to my satisfaction. I hereby consent to participate in this research study.

❍ I am at least 18 years old and do not wish to participate in this research study.

Q4 How often do you use the following information sources in your investment decision?

	Always	Most of the time	Sometimes	Rarely	Never
Financial statements of publically listed companies	❍	❍	❍	❍	❍
Announcements of publically listed companies	❍	❍	❍	❍	❍
Websites of publically listed companies	❍	❍	❍	❍	❍
Financial reports issued by local investment firms (Jadwa economic research)	❍	❍	❍	❍	❍
Financial reports issued by international investment firms (UPS economic research, HSBC economic outlook)	❍	❍	❍	❍	❍
Economic reports issued by banks (NCB economic review)	❍	❍	❍	❍	❍
Official Statistical reports (CMA, SAMA)	❍	❍	❍	❍	❍
Online independent research (MorningStar, Yahoo! Finance)	❍	❍	❍	❍	❍
Research from online databases (Zawya)	❍	❍	❍	❍	❍
Books	❍	❍	❍	❍	❍
News papers	❍	❍	❍	❍	❍
TV	❍	❍	❍	❍	❍
Informal online forums and chat rooms	❍	❍	❍	❍	❍
Social media	❍	❍	❍	❍	❍
Advice from friends and family	❍	❍	❍	❍	❍

Q5 Other information sources (please specify)

Q6 How do you evaluate the quality and accuracy of financial information delivered through the following resources?

	Excellent	Good	Fair	Poor	Very Poor	Not applicable
Financial statements of publically listed companies	❍	❍	❍	❍	❍	❍
Announcements of publically listed companies	❍	❍	❍	❍	❍	❍
Websites of publically listed companies	❍	❍	❍	❍	❍	❍
Financial reports issued by local investment firms (Jadwa economic research)	❍	❍	❍	❍	❍	❍
Financial reports issued by international investment firms (UPS economic research, HSBC economic outlook)	❍	❍	❍	❍	❍	❍
Economic reports issued by banks (NCB economic review)	❍	❍	❍	❍	❍	❍
Official Statistical reports (CMA, SAMA)	❍	❍	❍	❍	❍	❍
Online independent research (MorningStar, Yahoo! Finance)	❍	❍	❍	❍	❍	❍
Research from online databases (Zawya)	❍	❍	❍	❍	❍	❍
Books	❍	❍	❍	❍	❍	❍
News papers	❍	❍	❍	❍	❍	❍
TV	❍	❍	❍	❍	❍	❍
Informal online forums and chat rooms	❍	❍	❍	❍	❍	❍
Social media	❍	❍	❍	❍	❍	❍
Advice from friends and family	❍	❍	❍	❍	❍	❍

Q7 Please indicate the degree to which you agree or disagree with the following statements:

	Strongly agree	Agree	Neither Agree nor Disagree	Disagree	Strongly disagree
You purposively seek information to help you in making a critical investment decision	❍	❍	❍	❍	❍
You are knowledgeable about the Saudi stock market	❍	❍	❍	❍	❍
I know where to find the information I need prior to making a decision	❍	❍	❍	❍	❍
I am confident in my ability to research important decisions	❍	❍	❍	❍	❍
I know the right questions to ask when looking for information	❍	❍	❍	❍	❍
I can focus easily on a few good sources of information when making a decision	❍	❍	❍	❍	❍
I know where to look to find the information I need	❍	❍	❍	❍	❍
I am confident in my ability to recognize sources of information worth considering	❍	❍	❍	❍	❍
I can tell which sources of information meet my expectations	❍	❍	❍	❍	❍
I trust my own judgment when deciding which source of information to consider	❍	❍	❍	❍	❍
I never seem to find the right information for me	❍	❍	❍	❍	❍
Too often the sources of information I use are not satisfying	❍	❍	❍	❍	❍
I often have doubts about the sources of information I use	❍	❍	❍	❍	❍
I frequently agonize over which sources of information to consider	❍	❍	❍	❍	❍
I often wonder if I've chosen the right source of information	❍	❍	❍	❍	❍
I have the skills required to obtain needed information before making important decisions	❍	❍	❍	❍	❍

Q8 Please indicate the degree to which you agree or disagree with the following statements:

	Strongly agree	Agree	Neither Agree nor Disagree	Disagree	Strongly disagree
I know pretty much about investing	❍	❍	❍	❍	❍
I do not feel very knowledgeable about investing	❍	❍	❍	❍	❍
Among my circle of friends, I'm one of the "experts" on investments	❍	❍	❍	❍	❍
Compared to most other people, I know less about investing	❍	❍	❍	❍	❍
I have heard of most of the new investments that are around	❍	❍	❍	❍	❍
When it comes to trading shares, I really don't know a lot	❍	❍	❍	❍	❍
I believe the way I manage my money will affect my future	❍	❍	❍	❍	❍

Q9 Please indicate the degree to which you agree or disagree with the following statements:

	Strongly agree	Agree	Neither Agree nor Disagree	Disagree	Strongly disagree
You invest in popular stocks with high earnings growth, and avoid stocks that have performed poorly in the recent past.	❍	❍	❍	❍	❍
You invest in stocks after predicting their future movements through analyzing the trends of some representative stocks.	❍	❍	❍	❍	❍
You believe that the historical stock prices in the Saudi stock market have been predictable and reasonable to expect.	❍	❍	❍	❍	❍
You invest more in a losing stock that you own after it has further gone down.	❍	❍	❍	❍	❍
You make new investment decisions based on your previous forecasted performance of the Saudi stock market.	❍	❍	❍	❍	❍
You forecast the future performance of a stock based on the current stock prices.	❍	❍	❍	❍	❍
You consider some of the stocks in your portfolio as low risk investments, while at the same time you consider some other stocks as high risk investments.	❍	❍	❍	❍	❍
You ignore the connection between low risk stocks and high risk stocks in your investment portfolio.	❍	❍	❍	❍	❍

Q10 Please indicate the degree to which you agree or disagree with the following statements:

	Strongly agree	Agree	Neither Agree nor Disagree	Disagree	Strongly disagree
You invest in stocks that appear more frequently in the news or advertisements.	❍	❍	❍	❍	❍
You prefer to buy local stocks than international stocks because the information of local stocks is more available.	❍	❍	❍	❍	❍
You are normally able to anticipate the end of good or poor market returns at the Saudi stock market.	❍	❍	❍	❍	❍
The success of your past investment decisions is due to your ability to forecast the performance of the Saudi stock market.	❍	❍	❍	❍	❍
You believe the successful trading is attributed to your skills rather than luck.	❍	❍	❍	❍	❍
You believe that your skills and knowledge of the Saudi stock market can help you to outperform the market.	❍	❍	❍	❍	❍
You hold some losing stocks in your portfolio because they will break-even someday.	❍	❍	❍	❍	❍
You sell some winning stocks in your portfolio because you are afraid to lose this profit.	❍	❍	❍	❍	❍
You make conservative and low risk investment decisions after realizing losses on risky stocks in the past.	❍	❍	❍	❍	❍
It is safer to invest in popular well-known stocks.	❍	❍	❍	❍	❍

Q11 Please indicate the degree to which you agree or disagree with the following statements:

	Strongly agree	Agree	Neither Agree nor Disagree	Disagree	Strongly disagree
You make investment decisions based on trading decisions of other investors (e.g., family, friends, colleagues, etc.).	❍	❍	❍	❍	❍
Your trading volume may be based on the trading volume of other investors (e.g., family, friends, colleagues, etc.).	❍	❍	❍	❍	❍
You usually react quickly to the changes of other investors' decisions and follow their reactions to the stock market.	❍	❍	❍	❍	❍
It is important to make informed investment decisions based on information regarding the Saudi stock market and the Saudi economy.	❍	❍	❍	❍	❍
You prefer to invest in stocks with government ownership.	❍	❍	❍	❍	❍
You prefer to invest in stocks that are Sharia compliant	❍	❍	❍	❍	❍
You examine the market fundamentals of underlying stocks before making investment decisions.	❍	❍	❍	❍	❍
Chatting with the people I know at financial institutions is an important part of doing financial business for me	❍	❍	❍	❍	❍
The less I talk to financial institution personnel the better	❍	❍	❍	❍	❍
I prefer to make most of my financial decisions in person	❍	❍	❍	❍	❍

Q12_1 Please select the range that best describes your answer to the following questions

Gender	❍ Male	❍ Female

Q13 Age

_____ Years

Q14 What is you marital status?

- ❍ Single
- ❍ Married
- ❍ Divorced
- ❍ Widowed

Q15 If you live in Saudi Arabia, which city?

- ❍ I don't live in Saudi Arabia
- ❍ Riyadh
- ❍ Jeddah
- ❍ Makkah
- ❍ Madinah
- ❍ Khobbar
- ❍ Dammam
- ❍ Hassa
- ❍ Qatif
- ❍ Khamis Mushait
- ❍ Muzailef
- ❍ Haffouf
- ❍ Almubaraz
- ❍ Taif
- ❍ Najran
- ❍ Hafr Albaten
- ❍ Jubail
- ❍ Deba'a
- ❍ Kharj
- ❍ Yanbu
- ❍ Tabuk
- ❍ Ara'ar
- ❍ Hawyah
- ❍ Oniza
- ❍ Sakaka
- ❍ Jizan
- ❍ Qurayat
- ❍ Dhahran
- ❍ Baha
- ❍ Zelfi
- ❍ Alrras

- ❍ Wadi Aldawswer
- ❍ Besha
- ❍ Saihat
- ❍ Sharrora
- ❍ Bahra
- ❍ Tarout
- ❍ Dawademy
- ❍ Sabia'a
- ❍ Beesh
- ❍ Ohoud Rofaida
- ❍ Fareesh
- ❍ Bareq
- ❍ Houta
- ❍ Alaflaj

Q16 If you live abroad, where?

Q17 What is the highest level of education completed?
- ❍ Primary or less
- ❍ Intermediate
- ❍ High school graduate
- ❍ Diploma
- ❍ Bachelor's degree (BA, BS)
- ❍ Master's degree (MA, MS, MEng, MEd, MBA)
- ❍ Professional degree (MD, DDS, JD), or Doctorate degree (Ph.D., Ed.D).

Q18 Employment status
- ❍ Employed
- ❍ Retired
- ❍ Self-employed
- ❍ Out of work and looking for work
- ❍ Out of work but not currently looking for work
- ❍ A homemaker
- ❍ Other

Q19 How many years of work experience do you have?
_____ Years

Q20 What is your current occupation? If retired, what was your occupation?

Q21 Please select the range that best describes your monthly income in Saudi Riyals (SAR)
_____ Saudi Riyal 000's

Q22 As an investor, how many years have you been trading in the Saudi Stock Market?
_____ Years

Q23 What is the approximate number of stocks in your portfolio/s?
_____ Companies

Q24 Please select the range that best describes the approximate amount that you have invested in the Saudi stock market (in SAR)

- ❍ Less than 50,000
- ❍ 50,000 to 99,999
- ❍ 100,000 to 149,999
- ❍ 150,000 to 299,999
- ❍ 300,000 to 499,999
- ❍ 500,000 to 1,000,000
- ❍ Over 1,000,000

Q25 Have you ever attended any investment courses?

- ❍ Yes (Please Specify) _____
- ❍ No

Q26 For how long do you usually hold your stocks?

- ❍ Less than a month
- ❍ 1-3 months
- ❍ 4-6 months
- ❍ 7-9 months
- ❍ 10-12 months
- ❍ More than a year

Q27 Investment motivation (more than one answer can be selected)

- ❑ Growth
- ❑ Saving
- ❑ I love risk
- ❑ Retirement
- ❑ Other (Please Specify) _____

Q28 How often do you execute buy/sell orders?

- ❍ Every day
- ❍ Once a week
- ❍ Once a month
- ❍ Other (Please Specify) _____

Q29 How many trades per week do execute?

_____ Trades/Week

Q30 How do you give your buy/sell orders? (more than one answer can be selected)

- ❑ Phone, fax
- ❑ online
- ❑ Mobile Applications
- ❑ going personally to the bank
- ❑ Other (Please Specify) _____

Q31 Are you an economist, banker, or financier?

- ❍ Yes
- ❍ No

Q32 Compared to others, how do you rate your risk appetite?

- ❍ Very low risk taker
- ❍ Low risk taker
- ❍ Average risk taker
- ❍ High risk taker
- ❍ Very high risk taker

Q33 Do you invest in mutual funds? Discretionary portfolio funds?

- ❍ Yes
- ❍ No

Q34 How much of your investments are allocated in in mutual funds?

_____ %

Q35 Do you designate one of your investment portfolios for speculation and high risk investments?

- ❍ Yes
- ❍ No

Q36 Do you own more than one investment portfolio in the Saudi stock market?

- ❍ Yes (How many?) _____
- ❍ No

APPENDIX B

ARABIC VERSION OF THE QUESTIONNAIRE

Q1

أعزائي المشاركين

أنا مرشح لنيل درجة الدكتوراة من جامعة شمال تكساس (UNT) وسوف أقوم بدراسة السلوك المعلوماتي للمستثمرين الأفراد في سوق الأسهم السعودية .و لذلك فإنني أدعوكم للمشاركة في هذه الدراسة البحثية من خلال استكمال الإستبيان في الرابط أدناه .الأستبيان متوفر باللغتين العربية و الأنجليزية ، حيث يمكن اختيار اللغة المفضلة من أعلى الصفحة . سوف يستغرق ملء الإستبيان على الانترنت حوالي 20-15 دقيقة من وقتكم .للمعلومية فإن هذا الإستبيان لن يجمع أي معلومات شخصية عنكم و ذلك من أجل حماية الهوية الخاصة بكم .إذا تطلبت هذه الدراسة أي معلومات إضافية فسيكون هناك استمارة منفصلة لملء معلومات الإتصال إذا كنت ترغب في المشاركة في مقابلات عن طريق الهاتف، وبالتالي، فإن اسمك و هويتك لن يكونا مرتبطين بإجاباتكم على أسئلة الإستبيان الرئيسي .إذا اخترت المشاركة في هذه الدراسة، يرجى الإجابة على جميع الأسئلة بدِقة و صراحة ، علماً بأن المشاركة طوعية تماماً ويمكنكم التوقف عن المشاركة في أي وقت .أشكركم على أخذ الوقت لمساعدتي في جمع المعلومات التي ستساعدني على إنجاز البحث النهائي لنيل درجة الدكتوراة .إذا كنتم بحاجة إلى معلومات إضافية أو لديكم اي أسئلة، يرجى الاتصال بي على البريد الإلكتروني المذكور أدناه .

نبيل علواني

Q2

جامعة شمال تكساس مجلس المراجعة المؤسسية (**IRB**)
إشعار بالموافقة

قبل الموافقة بالمشاركة في هذه الدراسة البحثية، من الضروري قراءة و فهم الغاية و الفوائد و المخاطر من المشاركة في الدراسة.

عنوان الدراسة: السلوك المعلوماتي للمستثمرين الأفراد في سوق الأسهم السعودي.

الباحث الرئيسي: نبيل علواني، كلية المعلومات، جامعة شمال تكساس.

المشرف الدراسي: الدكتورة شاون دي ميكسا، كلية المعلومات، جامعة شمال تكساس.

الغرض من الدراسة: المشاركة في دراسة بحثية بهدف التعرف على تأثير النزعات السلوكية و الوضع الإجتماعي و الإقتصادي و خصائص مصادر المعلومات على السلوك المعلوماتي للمستثمرين الأفراد في سوق الأسهم السعودي و خصوصاً في السياق الغير إستشاري للعملية الإستثمارية .

إجراءات الدراسة: سوف يطلب منكم إكمال الإستبيان للتعرف على آرائكم و تصوراتكم فيما يتعلق بموضوع الدراسة ، علماً بأن تعبئة الإستبيان قد يحتاج ١٥ دقيقة من وقتكم.

المخاطر المتوقعة: لا يتوقع ان يكون هنالك أية مخاطر أو مسؤولية في حالة الرفض أو المشاركة قي هذه الدراسة البحثية.

فوائد الدراسة: لايتوقع ان يكون هناك اي فوائد مباشرة للمشاركين في هذه الدراسة البحثية. ولكن من المتوقع ان نتائج هذه الدراسة البحثية قد تساعد الباحثين و الممارسين على فهم السلوك المعلوماتي للمستثمرين الأفراد مما قد ينعكس إيجاباً على مستوى الخدمات المقدمة لهم في سوق الأسهم السعودي عن طريق المؤسسات المالية و خصوصا خلال عملية اتخاذ القرارات الإستثمارية. كما ان الدراسة قد تساعد المشرعين في سوق الأسهم السعودي على تقديم وسائل أفضل لحماية المستثمرين و تطوير أنظمة و قنوات أفضل لتبادل المعلومات.

حوافز المشاركة: لا يوجد أي تعويضات مالية للمشاركة.

اجراءات حماية الخصوصية: لن يتم تجميع أي معلومات تدل على هوية المشاركين في هذه الدراسة و كل إجابات المشاركين على الأسئلة ستكون مجهولة الهوية و ذلك لتقديم أعلى مستوى حماية ممكن لخصوصيات المشاركين. كما أن كل التقارير البحثية المنبثقة من نتائج هذه الدراسة البحثية لن يكون لها اي صلة بهوية المشاركين في البحث. سيتم الحفاظ على السرية وفقا لمعاييرالحماية التقنية المقدمة من قبل الشركة المقدمة للاستبيان عبرالانترنت (Qualtrics). مشاركتكم في هذا الإستبيان قد تنطوي على مخاطر مماثلة لإستخدامكم الشخصي للإنترنت لأغراض مختلفة.

أسئلة عن الدراسة: في حال وجود أي أسئلة او إستفسارات متعلقة بهذه الدراسة البحثية، الرجاء الإتصال بـ نبيل علواني من خلال البريد الإلكتروني اوالإتصال بالمشرفة على البحث الدكتورة شاون ميكسا من خلال البريد الإلكتروني.

المراجعة لحماية المشاركين: لقد تم مراجعة هذه الدراسة البحثية و الموافقة عليها من قبل مجلس المراجعة المؤسسية (IRB). يمكنكم الاتصال بمجلس المراجعة البحثية على الرقم ٠٠١-٩٤٠-٥٦٥-٣٤٦٤

حقوق المشاركين في البحث:
مشاركتكم في هذه الدراسة البحثية تؤكد أنكم قد قرأتم كل الفقرات السابقة وأنكم توافقون على كلِ ما يلي:

- تم إيضاح طبيعة الدراسة من قبل الباحث نبيل علواني، كما أن لديكم فرصة للإتصال به حول اي أسئلة او إستفسارات حول الدراسة.
- تم إبلاغكم بالفوائد المتوقعة و المخاطر المحتملة للدراسة.
- أنت غير ملزم بالمشاركة في هذه الدراسة ، رفضك للمشاركة او قرارك بالإنسحاب لا تنطوي عليه أي عقوبة او فقدان لأي حقوق او مزايا، ويمكنك التوقف عن المشاركة في أي وقت.
- أنت تفهم الغرض من هذه الدراسة البحثية و إجراءات تنفيذها.
- أنت تفهم حقوقك كمشارك بالدراسة، و توافق طوعاً على المشاركة في هذه الدراسة.
- أنت تفهم أنه يمكنك طلب نسخة من هذا الإقرار للإحتفاظ به في سجلاتك.

شاكر لكم طيب تعاونكم، و تقبلوا خالص تحياتي

Q3الموافقة على المشاركة

- ❍ عمري أقل من ١٨ سنة و لذلك لا استطيع المشاركة
- ❍ عمري أكبر من ١٨ سنة، و لدي محفظة تداول أو كان لدي محفظة تداول في سوق الأسهم السعودي و أوافق على المشاركة في هذه الدراسة البحثية
- ❍ عمري أكبر من ١٨ سنة، و لا أرغب في المشاركة في هذه الدراسة البحثية

Q4ما مدى إستخدامك لمصادر المعلومات التالية خلال إتخاذك للقرارت الإستثمارية الخاصة بك

	لا أستخدمها مطلقاً	نادراً	أحياناً	غالباً	أستخدمها دائماً
القوائم المالية للشركات المدرجة في سوق الأسهم السعودي	❍	❍	❍	❍	❍
إعلانات الشركات المدرجة في سوق الأسهم السعودي	❍	❍	❍	❍	❍
مواقع الإنترنت الخاصة بالشركات المدرجة في سوق الأسهم السعودي	❍	❍	❍	❍	❍
التقارير المالية الصادرة عن شركات الإستثمار المحلية) مثال :الأبحاث الصادرة عن شركة جدوى للإستثمار(	❍	❍	❍	❍	❍
التقارير المالية الصادرة من شركات الإستثمار العالمية) مثال :بحوث يو بي اس الإقتصادية ، توقعات اتش اس بي سي الاقتصادية(	❍	❍	❍	❍	❍
التقارير الإقتصادية الصادرة من البنوك) مثال :تقارير البنك الأهلي(	❍	❍	❍	❍	❍
التقارير الإحصائية الرسمية) هيئة السوق المالية، مؤسسة النقد(	❍	❍	❍	❍	❍
بحوث مستقلة على مواقع الإنترنت) مورنينج ستار ، ياهو فاينانس(	❍	❍	❍	❍	❍
بحوث من قواعد المعلومات على شبكة الإنترنت) مثال :زاوية(	❍	❍	❍	❍	❍
كتب	❍	❍	❍	❍	❍
الصحف المحلية	❍	❍	❍	❍	❍
التلفاز	❍	❍	❍	❍	❍
منتديات الإنترنت الغير رسمية) مثال :هوامير البورصة السعودية(	❍	❍	❍	❍	❍
وسائل الإتصال الاجتماعية) مثال :تويتر(	❍	❍	❍	❍	❍
توصيات الأصدقاء و أفراد العائلة	❍	❍	❍	❍	❍

Q5الرجاء ذكر اي مصادر أخرى للمعلومات التي قد تستخدمها خلال إتخاذك للقرارات الإستثمارية الخاصة بك

Q6ما تقييمك لجودة المعلومات المتوفرة عن طريق مصادر المعلومات التالية

	ممتازة	جيدة	متوسطة الجودة	سيئة	رديئة	لا أستخدمها
القوائم المالية للشركات المدرجة في سوق الأسهم السعودي	❍	❍	❍	❍	❍	❍
إعلانات الشركات المدرجة في سوق الأسهم السعودي	❍	❍	❍	❍	❍	❍
مواقع الإنترنت الخاصة بالشركات المدرجة في سوق الأسهم السعودي	❍	❍	❍	❍	❍	❍
التقارير المالية الصادرة عن شركات الإستثمار المحلية) مثال : الأبحاث الصادرة عن شركة جدوى للإستثمار(	❍	❍	❍	❍	❍	❍
التقارير المالية الصادرة من شركات الإستثمار العالمية) مثال :بحوث يو بي اس الإقتصادية ، توقعات اتش اس بي سي الاقتصادية(	❍	❍	❍	❍	❍	❍
التقارير الإقتصادية الصادرة من البنوك) مثال :تقارير البنك الأهلي(	❍	❍	❍	❍	❍	❍
التقارير الإحصائية الرسمية) هيئة السوق المالية، مؤسسة النقد(	❍	❍	❍	❍	❍	❍
بحوث مستقلة على مواقع الإنترنت) مورنينج ستار ، ياهو فاينانس(	❍	❍	❍	❍	❍	❍
بحوث من قواعد المعلومات على شبكة الإنترنت) مثال :زاوية(	❍	❍	❍	❍	❍	❍
كتب	❍	❍	❍	❍	❍	❍
الصحف المحلية	❍	❍	❍	❍	❍	❍
التلفاز	❍	❍	❍	❍	❍	❍
منتديات الإنترنت الغير رسمية) مثال :هوامير البورصة السعودية(	❍	❍	❍	❍	❍	❍
وسائل الإتصال الاجتماعية) مثال :تويتر(	❍	❍	❍	❍	❍	❍
توصيات الأصدقاء و أفراد العائلة	❍	❍	❍	❍	❍	❍

Q7الرجاء اختيار مدى موافقتك أو عدم موافقتك على العبارات التالية

	لا أوافق بتاتاً	لا أوافق	محايد	أوافق	أوافق بشدة
تبحث خصيصاً عن معلومات تساعدك على إتخاذ القرارات الإستثمارية المهمة	○	○	○	○	○
لديك دراية جيدة بسوق الأسهم السعودي	○	○	○	○	○
يمكنك الحصول على المعلومات التي تحتاجها قبل إتخاذ القرارات الإستثمارية	○	○	○	○	○
لديك مهارة البحث عن معلومات تساعدك في إتخاذ القرارات المهمة	○	○	○	○	○
أستطيع أن أسأل الأسئلة المناسبة عند بحثي عن المعلومات	○	○	○	○	○
بإمكاني التركيز فقط على المصادر المهمة للمعلومات عند إتخاذ القرارات الإستثمارية	○	○	○	○	○
أعرف أين أجد المعلومات التي أحتاجها	○	○	○	○	○
انا أثق في قدرتي على التعرف على مصادر المعلومات الثرية	○	○	○	○	○
يمكنني التعرف على مصادر المعلومات التي تلبي توقعاتي	○	○	○	○	○
انا على ثقة من تقييمي لمصادر المعلومات	○	○	○	○	○
لا يمكنني أبداً إيجاد المعلومات المناسبة	○	○	○	○	○
مصادر المعلومات التي استخدمها لا تلبي حاجتي	○	○	○	○	○
أحياناً يكون لدي بعض الشكوك في مصداقية مصادر المعلومات التي أستخدمها	○	○	○	○	○
غالباً ما تكون مهمة اختيار مصادر المعلومات مقلقة و صعبة بالنسبة لي	○	○	○	○	○
أتسائل في أغلب الأحيان إذا كنت قد إخترت مصدر المعلومات الصحيح	○	○	○	○	○
لدي المهارات المطلوبة لإيجاد المعلومات المطلوبة لإتخاذ القرار	○	○	○	○	○

Q8الرجاء اختيار مدى موافقتك أو عدم موافقتك على العبارات التالية

	لا أوافق بتاتاً	لا أوافق	محايد	أوافق	أوافق بشدة
أنا على دراية تامة بكل ما يتعلق بعملية الإستثمار	○	○	○	○	○
لا أشعر أن لدي خبرة كبيرة بالإستثمار	○	○	○	○	○
أنا" خبير "الاستثمار ضمن مجموعة أصدقائي	○	○	○	○	○
أنا لا أعلم الكثير عن الاستثمار مقارنة بالآخرين	○	○	○	○	○
لقد سمعت عن أغلب أنواع الإستثمارات الجديدة الموجودة حالياً	○	○	○	○	○
لا أعلم الكثير عن تداول الأسهم	○	○	○	○	○
أعتقد أن طريقة إدارتي لأموالي ستؤثر على مستقبلي	○	○	○	○	○

Q9الرجاء اختيار مدى موافقتك أو عدم موافقتك على العبارات التالية

	أوافق بشدة	أوافق	محايد	لا أوافق	لا أوافق بتاتاً
تفضل الاستثمار في الأسهم القيادية ذات الأرباح العالية و تتجنب الاستثمار في الأسهم ذات الأداء المنخفض مؤخراً	❍	❍	❍	❍	❍
تستثمر في الأسهم المتوقع تحركها في المستقبل من خلال تحليلك لحركة بعض الأسهم القيادية حالياً	❍	❍	❍	❍	❍
تعتقد أن أداء سوق الأسهم في الفترات الماضية منطقي و كان بالإمكان توقعه	❍	❍	❍	❍	❍
تزيد من قيمة إستثمارتك في الأسهم الخاسرة في محفظتك عند إنخفاض سعرها حالياً في السوق على إفتراض أنها سوف ترتفع في المستقبل	❍	❍	❍	❍	❍
تتخذ قرارات استثمارية جديدة بناءاً على تحليلك لأداء سوق الأسهم السعودي في الفترات الماضية	❍	❍	❍	❍	❍
تبني توقعات عن أداء الأسهم المستقبلي على الأسعار الحالية لتلك الأسهم	❍	❍	❍	❍	❍
تفترض ان محفظتك الإستثمارية مقسمة الى قسمين ،أحدهما يحوي الأسهم عالية المخاطر بينما يحتوي القسم الآخر على الأسهم قليلة المخاطر	❍	❍	❍	❍	❍
تتغاضى عن علاقة الأسهم قليلة المخاطر بالأسهم عالية المخاطر في محفظتك	❍	❍	❍	❍	❍

Q10الرجاء اختيار مدى موافقتك أو عدم موافقتك على العبارات التالية

	أوافق بشدة	أوافق	محايد	لا أوافق	لا أوافق بتاتاً
تستثمر في الأسهم التي يتم تغطيتها بشكل متكرر في وسائل الإعلام المختلفة	❍	❍	❍	❍	❍
تفضل الاستثمار في سوق الأسهم المحلي نظراً لتَوفر معلومات أكثر من المعلومات المتعلقة بأسواق الأسهم الأجنبية	❍	❍	❍	❍	❍
تستطيع في العادة توقع بدء و إنتهاء دورات العائدات الربحية الجيدة و الضعيفة في سوق الأسهم السعودي	❍	❍	❍	❍	❍
نجاح قراراتك الإستثمارية في الفترات الماضية يعود إلى قدرتك على توقع أداء السوق السعودي	❍	❍	❍	❍	❍
تعتقد أن الإستثمارات الناجحة التي تقوم بها تعود لمهارتك في تداول الأسهم و ليس بسبب الحظ	❍	❍	❍	❍	❍
تعتقد ان أداء محفظتك يمكن أن يتفوق على اداء السوق بسبب مهاراتك ومعرفتك بسوق الأسهم السعودي	❍	❍	❍	❍	❍
تحتفظ بالأسهم الخاسرة في محفظتك لثقتك بأنها سوف ترتد و تحقق مكاسب في المستقبل	❍	❍	❍	❍	❍
تقوم ببيع بعض الأسهم الرابحة في محفظتك خوفاً من أن تخسر هذا الربح في المستقبل	❍	❍	❍	❍	❍
تتحفظ و تقوم باستثمارات قليلة المخاطر عندما تجد أنك خسرت نتيجة لتداولك في أسهم عالية المخاطر في السابق	❍	❍	❍	❍	❍
من الأسلم الاستثمار في الأسهم الرائجة	❍	❍	❍	❍	❍

Q11الرجاء اختيار مدى موافقتك أو عدم موافقتك على العبارات التالية

	أوافق بشدة	أوافق	محايد	لا أوافق	لا أوافق بتاتاً
تقوم بقرارات استثمارية مماثلة للقرارات الاستثمارية التي يقوم بها مستثمرون آخرون) مثال :أفراد عائلتك ، أصدقائك ، زملائك في العمل(	❍	❍	❍	❍	❍
حجم تداولك للأسهم مماثل لحجم تداولات مستثمرون آخرون) مثال :أفراد عائلتك ، أصدقائك ، زملائك في العمل(	❍	❍	❍	❍	❍
تتفاعل و بطريقة مماثلة لردات فعل مستثمرون اخرون تجاه أي تغييرات في السوق) مثال :أفراد عائلتك ، أصدقائك ، زملائك في العمل(	❍	❍	❍	❍	❍
من الضروري إتخاذ قرارات إستثمارية مدروسة و مبنية على معلومات تخص السوق السعودي و الإقتصاد السعودي	❍	❍	❍	❍	❍
تُفَضّل الإستثمار في الشركات التي تمتلك المؤسسات الحكومية حصة فيها	❍	❍	❍	❍	❍
تُفَضّل الإستثمار في الشركات المتوافقة مع الشريعة الإسلامية	❍	❍	❍	❍	❍
تقوم بدراسة و تحليل اساسيات الأسهم السعودية قبل إتخاذ أي قرارات إستثمارية	❍	❍	❍	❍	❍
مناقشاتي مع الأشخاص الذين أعرفهم في شركات الإستثمار يمثل عامل مهم بالنسبة لي عند إتخاذ أي قرارات استثمارية	❍	❍	❍	❍	❍
تفضل أقل درجة ممكنة من المناقشة مع الخبراء الماليين في المؤسسات المالية التي تتعامل معها	❍	❍	❍	❍	❍
أقوم شخصياً بإتخاذ جميع قراراتي الاستثمارية دون اي تدخل او نصيحة من أحد	❍	❍	❍	❍	❍

Q12_1الرجاء اختيار الإجابة الامثل للأسئلة التالية، عما بأن اجابات الأسئلة لا يمكن ربطها بتاتاً بهويتك

❍ أنثى	❍ ذكر	الجنس

Q13العمر

_____سنة

Q14الحالة الإجتماعية

- ❍ أعزب/ عزباء
- ❍ متزوج / متزوجة
- ❍ مطلق / مطلقة
- ❍ أرمل / أرملة

Q15إذا كنت تسكن في السعودية، في أي مدينة؟

- ❍ لا أسكن حاليا ً في السعودية
- ❍ الرياض
- ❍ جدة
- ❍ مكة المكرمة
- ❍ المدينة المنورة
- ❍ الخبر
- ❍ الدمام
- ❍ الظهران
- ❍ القطيف
- ❍ خميس مشيط
- ❍ الطائف
- ❍ الهفوف
- ❍ ينبع
- ❍ المظيلف
- ❍ نجران
- ❍ حفر الباطن
- ❍ الجبيل
- ❍ ضباء
- ❍ الخرج
- ❍ المبرز
- ❍ تبوك
- ❍ عرعر
- ❍ الحوية
- ❍ عنيزة
- ❍ سكاكا
- ❍ جيزان
- ❍ القريات
- ❍ الأحساء
- ❍ الباحة
- ❍ الزلفي
- ❍ الرس
- ❍ وادي الدواسر
- ❍ بيشه
- ❍ سيهات
- ❍ شروره
- ❍ بحره
- ❍ تاروت
- ❍ الدوادمي
- ❍ صبياء
- ❍ بيش
- ❍ أحد رفيدة
- ❍ الفريش
- ❍ بارق

- ❍ الحوطة
- ❍ الأفلاج

Q16إذا كنت تقيم خارج السعودية ، أين؟

Q17ما أعلى درجة علمية حصلت عليها؟
- ❍ الإبتدائية أو أقل
- ❍ المتوسطة
- ❍ الثانوية
- ❍ دبلوم
- ❍ بكالوريوس
- ❍ ماجيستير
- ❍ دكتوراة

Q18الحالة الوظيفية
- ❍ موظف / موظفة
- ❍ متقاعد / متقاعدة
- ❍ رجل أعمال / سيدة أعمال
- ❍ لا اعمل ولكن أبحث عن عمل
- ❍ لا أعمل و لا أبحث عن عمل
- ❍ لدي مشروع منزلي
- ❍ أخر

Q19كم عدد سنوات خبرتك العملية؟
_____سنة

Q20 ما هي وظيفتك الحالية (أو وظيفتك قبل تقاعدك)؟

Q21الرجاء اختيار متوسط دخلك الشهري بالريال السعودي
_____ألف ريال سعودي

Q22ما مدة تداولك كمستثمر للأسهم في سوق الأسهم السعودي؟
_____سنة

Q23كم يبلغ تقريباً عدد الشركات التي تملك اسهمها في محافظك للتداول في سوق الأسهم السعودي؟
_____شركة

Q24الرجاء إختيار المدى المناسب لمبلغ إستثماراتك في سوق الأسهم السعودي بالريال السعودي تقريباً؟
- ❍ اقل من ٥٠,٠٠٠ ريال
- ❍ بين ٥٠,٠٠٠ - ٩٩٩,٩٩ ريال
- ❍ بين ١٠٠,٠٠٠ - ٩٩٩,١٤٩ ريال
- ❍ بين ١٥٠,٠٠٠ - ٩٩٩,٢٩٩ ريال
- ❍ بين ٣٠٠,٠٠٠ - ٩٩٩,٤٩٩ ريال
- ❍ بين ٥٠٠,٠٠٠ - ١,٠٠٠,٠٠٠ ريال
- ❍ اكثر من ١,٠٠٠,٠٠٠ ريال

Q25هل حضرت دورة استثمار تدريبية من قبل؟
- ❍ نعم) ماهي و أين؟( )
- ❍ لا

Q26كم مدة إبقائك للأسهم تقريباً قبل بيعها او تدويرها؟
- ❍ أقل من شهر
- ❍ بين شهر - ٣ اشهر
- ❍ بين٤ أشهر - ٦ أشهر
- ❍ بين ٧ أشهر - ٩ أشهر
- ❍ بين ١٠ أشهر - ١٢ شهر
- ❍ أكثر من سنة

Q27ما هدفك من الإستثمار في سوق الأسهم السعودي؟ (يمكن إختيار أكثر من إجابة)
- ❑ التنمية
- ❑ الإدخار
- ❑ أحب المغامرة
- ❑ توفير مبلغ للتقاعد
- ❑ آخر(الرجاء ذكره)

Q28ما مدى تداولك للأسهم؟
- ❍ يومياً
- ❍ مرة في الاسبوع
- ❍ مرة شهرياً
- ❍ آخر(الرجاء ذكره)

Q29تقريباً كم عدد عمليات التداول التي تقوم بها أسبوعياً؟
_____عملية في الأسبوع

Q30كيف تنفذ عمليات البيع و الشراء؟) يمكن إختيار أكثر من إجابة(
- ❑ عن طريق الإتصال الهاتفي و الفاكس
- ❑ عن طريق الإنترنت
- ❑ عن طريق تطبيقات الهاتف المحمول
- ❑ عن طريق صالات التداول
- ❑ آخر(الرجاء ذكره)

Q31هل أنت خبير إقتصادي ، موظف في القطاع البنكي ، أو خبير استثمار؟
- ❍ نعم
- ❍ لا

Q32كيف تقيم مدى تحملك لمخاطر الإستثمار؟
- ❍ مخاطرة منخفضة جداً
- ❍ مخاطرة منخفضة
- ❍ مخاطرة متوسطة
- ❍ مخاطرة عالية
- ❍ مخاطرة عالية جداً

Q33هل تستثمر في الصناديق الإستثمارية و العقارية؟ أو صناديق التحوط؟
- ❍ نعم
- ❍ لا

Q34ما هي نسبة ما تستثمره في الصناديق الإستثمارية الى ما تستثمره مباشرة في سوق الأسهم السعودية؟
_____ %

Q35هل تخصص إحدى المحافظ الإستثمارية لغرض المضاربة أو تداول الأسهم ذات المخاطر العالية؟
- ❍ نعم
- ❍ لا

Q36هل تملك أكثر من محفظة إستثمارية؟
- ❍ نعم (كم محفظة)
- ❍ لا

APPENDIX C

IRB APPROVAL LETTER

UNT

A green light to greatness.

THE OFFICE OF RESEARCH INTEGRITY AND COMPLIANCE

October 9, 2015

Dr. Shawne Miksa
Student Investigator: Nabil Elwani
Department of Library and Information Science
University of North Texas
RE: Human Subjects Application No. 15-342

Dear Dr. Miksa:

In accordance with 45 CFR Part 46 Section 46.101, your study titled The Information Behavior of Individual Investors in Saudi Arabia" has been determined to qualify for an exemption from further review by the UNT Institutional Review Board (IRB).

No changes may be made to your study's procedures or forms without prior written approval from the UNT IRB. Please contact Jordan Harmon, Research Compliance Analyst, ext. 4643, if you wish to make any such changes. Any changes to your procedures or forms after 3 years will require completion of a new IRB application.

We wish you success with your study.

Sincerely,

Chad Trulson, Ph.D.
Professor
Chair, Institutional Review Board

CT:jh

APPENDIX D

TERMS DEFINITIONS

Term	Definition
Activating mechanisms of information behavior	Attributes that would affect the person's information seeking motivation to proceed and satisfy the information need, which could be the need for new information, the need to confirm current information, the need to explain information, the need to confirm own beliefs and values, or the need to explain own beliefs and values (Wilson, 1997, p. 568).
Active search	By which "an individual actively seeks information" (Wilson, 1997, p. 562); the active searching for information is motivated by high levels of risk and uncertainty, and it takes place before making the decision of purchasing a product or service (Wilson, 1997, p.563).
Anchoring & Adjustment	People form initial estimates of their subjective probability distributions by anchoring these estimates to initial starting points, but "different starting points yield different estimates" (Tversky and Kahneman, 1974, p. 1128). Similarly, adjustment from an anchor value is "usually employed in numerical prediction when a relevant value is available" (Tversky and Kahneman, 1974, p. 1131).
Behavioral finance	Relaxes some, or all the assumptions traditionally accepted under the market efficiency hypothesis, the expected utility theory, and the expected rational behavior (Thaler & Barberis, 2005, p. 1). Behavioral finance accepts human irrationality; therefore, it utilizes cognitive psychology theories, and the limits to arbitrage theory to explain market inefficiencies, cognitive biases, and people's preferences (Thaler & Barberis, 2005, p. 12).
Belief perseverance biases (BPB)	Biases that result from the "tendency to cling to one's previously held or recently established beliefs irrationally or illogically. Investors continue to hold and justify the belief because of their bias toward belief in themselves or their own ideals or abilities" (Pompian, 2012, p. 27). BPB includes biases such as conservatism, confirmation, representativeness, illusion of control, hindsight, and cognitive dissonance.
Cognitive biases	"Stem from basic statistical, information processing, or memory errors; cognitive errors may be considered the result of faulty cognitive reasoning" (Pompian, 2012, p. 25).
Cognitive dissonance	Cognitive dissonance is "the existence of nonfitting relations among cognitions…cognition [is] any knowledge, opinion, or belief about the environment, about oneself, or about one's behavior. [It is] an antecedent condition which leads to activity oriented toward dissonance reduction" (Festinger, 1962, p. 3).
Context	McCreadie and Rice (1999) define context as "the larger picture in which the potential user operates and the larger picture in which an information system is developed and operates and in which potential information may become available"
Coping	Coping with stressful situations is the "cognitive and behavioral efforts to manage (master, reduce, or tolerate) a troubled person-environment relationship" (Folkman & Lazarus, p.152). The stress level guides the person's decision to either proceed and fill the gap and satisfy his or her information need by utilizing problem-focused coping strategies (i.e., information seeking) to change the circumstances of the situational need, or regulate his or her emotions and distress through emotion-focused coping (Folkman & Lazarus, p.152).

Efficient capital markets	"The markets in which “the current price of a security obviously ‘fully reflects’ all available information” (Fama, 1970, p. 387)
Emotional biases	Errors that result from “impulse or intuition and may be considered to result from reasoning influenced by feelings” (Pompian, 2012, p. 25). Emotional biases include biases such as loss aversion, overconfidence, self-control, status quo, endowment, regret aversion, and affinity.
Emotions	"People’s emotions and associated universal human unconscious needs, fantasies, and fears drive many of their decisions" (Baker & Nofsinger, 2010, p. 6).
Framing	"People’s perceptions of the choices they have are strongly influenced by how these choices are framed. In other words, people often make different choices when the question is framed in a different way, even though the objective facts remain constant. Psychologists refer to this behavior as frame dependence" (Baker & Nofsinger, 2010, p. 6)
Heuristics	"Often referred to as rules of thumb, are means of reducing the cognitive resources necessary to find a solution to a problem. They are mental shortcuts that simplify the complex methods ordinarily required to make judgments. Decision makers frequently confront a set of choices with vast uncertainty and limited ability to quantify the likelihood of the results" (Baker & Nofsinger, 2010, p. 6)
Hindsight bias	Happens when investors perceive historical stock prices as having been unsurprising and sensible to anticipate. Pompian (2012) argues that “people tend to remember their own predictions of the future as more accurate than they actually were because they are biased by the knowledge of what has actually happened” (p. 31).
Information	Buckland (1991) classifies uses of the term information into three categories (p.351). The first is information-as-process, where information is intangible and denotes the “act of informing”. The second principle use of the term “information” is information-as-knowledge, where information represents the intangible knowledge that results from the act of informing. However, Buckland (1991) indicates that in this sense, information could either increase or decrease uncertainty, because knowledge is personal, subjective, and conceptual. Accordingly, representing that knowledge requires defining the third principle use of the term information: information-as-thing. With this definition, information is considered to be a tangible object, such as data, documents, or artifacts; hence, information retrieval systems and expert systems can deal with it directly.
Information asymmetry	A situation in which one party in a transaction has more or superior information compared to another. This often happens in transactions where the seller knows more than the buyer, although the reverse can happen as well. Potentially, this could be a harmful situation because one party can take advantage of the other party's lack of knowledge.(investopedia)
Information Behavior	Wilson (2000) defines the information behavior as “the totality of human behavior in relation to sources and channels of information, including both active and passive information seeking, and information use. Thus, it includes face-to-face communication with others, as well as the passive reception of information as in, for example, watching TV advertisements, without any intention to act on the information given (p.49).

Information cost	is determined by the supply price of information, which is the lowest price that an information provider is willing to accept in order to cover the costs of production incurred to supply that information good (Marschak, 1959, pp. 80-81).
Information economics	Examines the decision making process under uncertainty and the nature of risk-taking at the microeconomic level (Braman, 2006, p.3).
Information goods	“A collection or a bundle of many heterogeneous goods and services that together comprise an activity” (Porat, 1977, p.2).
Information needs	Derr (1983) defines information need as “a relationship, which obtains between information and the information purposes of individuals. It is an objective condition rather than a psychological state” (p.276). Accordingly, the information seekers satisfy their needs “if and only if [they have] a legitimate or genuine purpose for the use of that information” (p. 277).
Information processing biases (IPB)	Describe “how people process information either illogically or irrationally in financial decision making (Pompian, 2012, p. 27). IPB includes biases such as anchoring and adjustment, mental accounting, framing, availability, self-attribution
Information searching behavior	According to Marchionini (1995), information search is the “behavioral manifestation of humans engaged in information seeking” (p. 5). Wilson (2000) indicates that the micro-level of that behavior in which the information seeker interact with the retrieval systems, and judges the relevance of the retrieved results is known as the information searching behavior (p. 49).
Information Seeking Behavior	Wilson (2000) defines the information seeking behavior as “the purposive seeking for information as a consequence of a need to satisfy some goal. In the course of seeking, the individual may interact with manual information systems (such as a newspaper or a library), or with computer based systems” (p. 49).
Information seeking uncertainty	“the dispersion of individuals' subjective probability (or belief) distributions over possible states of the world. Information…consists of events tending to change these probability distributions” (Hirshleifer, 1973, p.31).
Information use behavior	Wilson (2000) defines the information use behavior as all “physical and mental acts involved in incorporating the information found into the person's existing knowledge base” (p. 50).
Information value	The payoff realized by the information seeker upon receiving the information (Marschak, 1959, pp. 80-81).
Intervening Variables in information seeking behavior	"The barriers, particularly those at the level of the person, may act to prevent the initial emergence of a coping strategy, or may intervene between the acquisition of information and its use" (Wilson, 1997, p. 556)
Mental accounting	Is the “the set of cognitive operations used by individuals and households to organize, evaluate, and keep track of financial activities” (Thaler, 1999, p. 183).
Ongoing search	"After, actively searching for information, which results in establishing one’s basic framework of knowledge, ideas, beliefs, or values, ongoing search expands or updates one’s framework (Wilson, 1997, p. 562).
Passive attention	"The unintentional information acquisition without intentional seeking" (Wilson, 1997, p.562)

Passive search	"signifies those occasions when one type of search (or other behavior) results in the acquisition of information that happens to be relevant to the individual" (Wilson, 1997, p. 562).
Regret	Regret is "an emotional feeling associated with the ex post knowledge that a different past decision would have fared better than the one chosen" (Shefrin and Statman, 1985, p. 781).
Regret aversion	Pompian (2012) indicates that regret aversion bias is "an emotional bias in which people tend to avoid making decisions that will result in action out of fear that the decision will turn out poorly" (p. 41).
Representativeness	Is a heuristic by which people "classify new information based on past experiences and classifications " (Pompian, 2012, p. 29).
Self-attribution bias	Is "the tendency of individuals to ascribe their successes to innate aspects, such as talent or foresight, while more often blaming failures on outside influences, such as bad luck" (Pompian, 2012, p. 35).
Situation	A situation is "the particular set of circumstances from which a need for information arises, along with the awareness, however unclear, that information may be useful in addressing the situation" (McCreadie and Rice, 1999, p. 59).
Stock	A share of ownership, or equity, in a firm (Fabozzi, 2008a, p. 13)
Stock Market	Stock market is a market where stocks are bought and sold (Zuravicky, 2005, p. 6)
Stress	Stress is defined as "a relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and as endangering his or her well-being…Stress is a particular relationship between the person and the environment" (Folkman, 1984, p.840).
The availability heuristic	Is a useful tool to evaluate the probability that an event would happen based on how easily and quickly the event comes to mind (Tversky and Kahneman, 1974, p. 1127). Nevertheless, availability may lead to biases due to different levels of retrievability of instances (familiarity, salience, and recency), the effectiveness of search, imaginability (they don't come to mind, or hard to conceive), and the illusory correlation effect by which "the frequency is based on the strength or associative relationship between events…the effect is extremely resistant to contradictory data" (p. 1128).
Traditional Finance	Examines the consumption and investment decisions of individuals and firms in order to explain their process of decision-making. The main pillars of traditional finance are: the expected utility theory (EU), the portfolio selection theory, the capital asset pricing model (CAPM), the arbitrage pricing theory (APT), The Black–Scholes options pricing model, and the efficient market hypothesis.
Uncertainty	Kuhlthau (1993) defines uncertainty as "a cognitive state which commonly causes affective symptoms of anxiety and lack of confidence" (p. 347).

APPENDIX E

ISCO-88 CODING

Major Group 1 Legislators, senior officials and managers: " This major group includes occupations whose main tasks consist of determining and formulating government policies, as well as laws and public regulations, overseeing their implementation, representing governments and acting on their behalf, or planning, directing and coordinating the policies and activities of enterprises and organizations, or departments. Reference to skill level has not been made in defining the scope of this major group, which has been divided into three sub-major groups, eight minor groups and 33 unit groups, reflecting differences in tasks associated with different areas of authority and different types of enterprises and organizations".

11. Legislators and senior officials

111. Legislators

112. Senior government officials

113. Traditional chiefs and heads of villages

114. Senior officials of special-interest organizations

12. Corporate managers [1]

121. Directors and chief executives

122. Production and operations department managers

123. Other department managers

13. General managers [2]

131. General managers

Major Group 2 Professionals: "This major group includes occupations whose main tasks require a high level of professional knowledge and experience in the fields of physical and life sciences, or social sciences and humanities. The main tasks consist of increasing the existing stock of knowledge, applying scientific and artistic concepts and theories to the solution of problems, and teaching about the foregoing in a systematic manner. Most occupations in this major group require skills at the fourth ISCO skill level. This major group has been divided into four sub-major groups, 18 minor groups and 55 unit groups, reflecting differences in tasks associated with different fields of knowledge and specialization".

21. Physical, mathematical and engineering science professionals

211. Physicists, chemists and related professionals

212. Mathematicians, statisticians and related professionals

213. Computing professionals

214. Architects, engineers and related professionals

22. Life science and health professional

221. Life science professionals

222. Health professionals (except nursing)

223. Nursing and midwifery professionals

23. Teaching professionals

231. College, university and higher education teaching professionals

232. Secondary education teaching professionals

233. Primary and pre-primary education teaching professionals

234. Special education teaching professionals

235. Other teaching professionals

24. Other professionals

241. Business professionals

242. Legal professionals

243. Archivists, librarians and related information professionals

244. Social science and related professionals

245. Writers and creative or performing artists

246. Religious professionals

Major Group 3 Technicians and associate professionals: "This major group includes occupations whose main tasks require technical knowledge and experience in one or more fields of physical and life sciences, or social sciences and humanities. The main tasks consist of carrying out technical work connected with the application of concepts and operational methods in the above-mentioned fields, and in teaching at certain educational levels. Most occupations in this major group require skills at the third ISCO skill level. This major group has been divided into four sub-major groups, 21 minor groups and 73 unit groups, reflecting differences in tasks associated with different fields of knowledge and specialization".

31. Physical and engineering science associate professionals

311. Physical and engineering science technicians

312. Computer associate professionals

313. Optical and electronic equipment operators

314. Ship and aircraft controllers and technicians

315. Safety and quality inspectors

32. Life science and health associate professionals

321. Life science technicians and related associate professionals

322. Modern health associate professionals (except nursing)

323. Nursing and midwifery associate professionals

324. Traditional medicine practitioners and faith healers

33. Teaching associate professionals

331. Primary education teaching associate professionals

332. Pre-primary education teaching associate professionals

333. Special education teaching associate professionals

334. Other teaching associate professionals

34. Other associate professionals

341. Finance and sales associate professionals

342. Business services agents and trade brokers

343. Administrative associate professionals

344. Customs, tax and related government associate professionals

345. Police inspectors and detectives

346. Social work associate professionals

347. Artistic, entertainment and sports associate professionals

348. Religious associate professionals

Major Group 4 Clerks: "This major group includes occupations whose main tasks require the knowledge and experience necessary to organize, store, compute and retrieve information. The main tasks consist of performing secretarial duties, operating word processors and other office machines, recording and computing numerical data, and performing a number of customer-oriented clerical duties, mostly in connection with mail services, money-handling operations and appointments. Most occupations in this major group require skills at the second ISCO skill level. This major group has been divided into two sub-major groups, seven minor groups and 23 unit groups, reflecting differences in tasks associated with different areas of specialization".

41. Office clerks

411. Secretaries and keyboard-operating clerks

412. Numerical clerks

413. Material-recording and transport clerks

414. Library, mail and related clerks

419. Other office clerks

42. Customer service clerks

421. Cashiers, tellers and related clerks

422. Client information clerks

Major Group 5 Service workers and shop and market sales workers: "This major group includes occupations whose main tasks require the knowledge and experience necessary to provide personal and protective services, and to sell goods in shops or at markets. The main tasks consist of providing services related to travel, housekeeping, catering, personal care, protection of individuals and property, and to maintaining law and order, or selling goods in shops or at markets. Most occupations in this major group require skills at the second ISCO skill level. This major group has been divided into two sub-major groups, nine minor groups and 23 unit groups, reflecting differences in tasks associated with different areas of specialization".

51. Personal and protective services workers

511. Travel attendants and related workers

512. Housekeeping and restaurant services workers

513. Personal care and related workers

514. Other personal service workers

515. Astrologers, fortune-tellers and related workers

516. Protective services workers

52. Models, salespersons and demonstrators

521. Fashion and other models

522. Shop salespersons and demonstrators

523. Stall and market salespersons

Major Group 6 Skilled agricultural and fishery workers: "This major group includes occupations whose tasks require the knowledge and experience to produce farm, forestry and fishery products. The main tasks consist or growing crops, breeding or hunting animals, catching or cultivating fish, conserving and exploiting forests and, especially in the case of market-oriented agricultural and fishery workers, selling products to purchasers, marketing organizations or at markets. Most occupations in this major group require skills at the second ISCO skill level. This major group has been divided into two sub-major groups, six minor groups and 17 unit groups, reflecting differences in tasks associated with differences between market-oriented and subsistence agricultural and fishery workers".

61. Market-oriented skilled agricultural and fishery workers

611. Market gardeners and crop growers

612. Market-oriented animal producers and related workers

613. Market-oriented crop and animal producers

614. Forestry and related workers

615. Fishery workers, hunters and trappers

62. Subsistence agricultural and fishery workers

621. Subsistence agricultural and fishery workers

Major Group 7 Craft and related trade workers: "This major group includes occupations whose tasks require the knowledge and experience of skilled trades or handicrafts which, among other things, involves an understanding of materials and tools to be used, as well as of

all stages of the production process, including the characteristics and the intended use of the final product. The main tasks consist of extracting raw materials, constructing buildings and other structures and making various products as well as handicraft goods. Most occupations in this major group require skills at the second ISCO skill level. This major group has been divided into four sub-major groups, 16 minor groups and 70 unit groups, reflecting differences in tasks associated with different areas of specialization".

71. Extraction and building trade workers

711. Miners, shot firers, stonecutters, and carvers

712. Building frame and related trades workers

713. Building finishers and related trades workers

714. Painters, building structure cleaners and related trades workers

72. Metal, machinery and related trades workers

721. Metal molders, welders, sheet-metal workers, structural-metal preparers, and related trades workers

722. Blacksmiths, tool-makers and related trades workers

723. Machinery mechanics and fitters

724. Electrical and electronic equipment mechanics and fitters

73. Precision, handicraft, printing and related trades workers

731 Precision workers in metal and related materials

732. Potters, glass-makers and related trades workers

733. Handicraft workers in wood, textile, leather and related material

734. Printing and related trades workers

74. Other craft and related trades workers

741. Food processing and related trades workers

742. Wood treaters, cabinet-makers and related trades workers

743. Textile, garment and related trades workers

744. Pelt, leather and shoemaking trades workers

Major Group 8 Plant and machine operators and assemblers: "This major group includes occupations whose main tasks require the knowledge and experience necessary to operate and monitor large scale, and often highly automated, industrial machinery and equipment. The main tasks consist of operating and monitoring mining, processing and production machinery and equipment, as well as driving vehicles and driving and operating mobile plant, or assembling products from component parts. Most occupations in this major group require skills at the second ISCO skill level. This major group has been divided into three sub-major groups, 20 minor groups and 70 unit groups, reflecting differences in tasks associated with different areas of specialization".

81. Stationary plant and related operators

811. Mining and mineral-processing-plant operators

812. Metal-processing-plant operators

813. Glass, ceramics and related plant-operators

814. Wood-processing-and papermaking-plant operators

815. Chemical-processing-plant operators

816. Power-production and related plant operators

817. Automated-assembly-line and industrial-robot operators

82. Machine operators and assemblers

821. Metal-and mineral-products machine operators

822. Chemical-products machine operators

823. Rubber- and plastic-products machine operators

824. Wood-products machine operators

825. Printing-, binding-and paper-products machine operators

826. Textile-, fur-and leather-products machine operators

827. Food and related products machine operators

828. Assemblers

829. Other machine operators and assemblers

83. Drivers and mobile plant operators

831. Locomotive engine drivers and related workers

832. Motor vehicle drivers

833. Agricultural and other mobile plant operators

834. Ships_ deck crews and related workers

Major Group 9 Elementary occupations: "This major group covers occupations which require the knowledge and experience necessary to perform mostly simple and routine tasks, involving the use of hand-held tools and in some cases considerable physical effort, and, with

few exceptions, only limited personal initiative or judgment. The main tasks consist of selling goods in streets, door keeping and property watching, as well as cleaning, washing, pressing, and working as labourers in the fields of mining, agriculture and fishing, construction and manufacturing. Most occupations in this major group require skills at the first ISCO skill level. This major group has been divided into three sub-major groups, ten minor groups and 25 unit groups, reflecting differences in tasks associated with different areas of work".

91. Sales and services elementary occupations

911. Street vendors and related workers

912. Shoe cleaning and other street services elementary occupations

913. Domestic and related helpers, cleaners and launderers

914. Building caretakers, window and related cleaners

915. Messengers, porters, doorkeepers and related workers

916. Garbage collectors and related labourers

92. Agricultural, fishery and related labourers

921. Agricultural, fishery and related labourers

93. Labourers in mining, construction, manufacturing and transport

931. Mining and construction labourers

932. Manufacturing labourers

933. Transport labourers and freight handlers

Major Group 0 Armed forces: "Members of the armed forces are those personnel who are currently serving in the armed forces, including auxiliary services, whether on a voluntary or compulsory basis, and who are not free to accept civilian employment. Included are regular members of the army, navy, air force and other military services, as well as conscripts enrolled for military training or other service for a specified period, depending on national requirements. Excluded are persons in civilian employment of government establishments concerned with defense issues: police (other than military police); customs inspectors and members of border or other armed civilian services; persons who have been temporarily withdrawn from civilian life for a short period of military training or retraining, according to national requirements, and members of military reserves not currently on active service. Reference to a skill level has not been used in defining the scope of this major group".

REFERENCES

Abdelsalam, M. (1990). The use of corporate financial reports by investors in Saudi Arabia. *Advances in International Accounting, 3*, 25-39.

Aftab, O., Cheung, P., Kim, A., Thakkar, S., & Yeddanapudi, N. (2001). *Information theory and the digital age.* Unpublished manuscript. Retrieved from http://web.mit.edu/6.933/www/Fall2001/Shannon2.pdf

Agrawal, K. (2012). A conceptual framework of behavioral biases in finance. *The IUP Journal of Behavioral Finance, 9*(1), 7-18.

Akerlof, G. A. (1970). The market for" lemons": Quality uncertainty and the market mechanism. *The Quarterly Journal of Economics, 84*(3), 488-500.

Al-Abdulqader, K., Hannah, G., & Power, D. (2007). The appraisal of ordinary shares by saudi investors. *Research in International Business and Finance, 21*(1), 69-86.

Allen, B. (1997). Information needs: A person-in-situation approach. In P. Vakkari, R. Savolainen & B. Dervin (Eds.), *Information seeking in context: Proceedings of an international conference on research in information needs, seeking, and use in different contexts* (pp. 111-122). London: Taylor Graham Publishing.

Allen, B., & Kim, K. (2001). Person and context in information seeking: Interactions between cognitive and task variables. *The New Review of Information Behaviour Research, 2*(November), 1-16.

American Psychological Association: Socioeconomic status. (2015). Retrieved from http://www.apa.org/topics/socioeconomic-status/

Arestis, P., Demetriades, P. O., & Luintel, K. B. (2001). Financial development and economic growth: The role of stock markets. *Journal of Money, Credit and Banking, 33*(1), 16-41. doi:10.2307/2673870

Arrindell, W. A., & Van der Ende, J. (1985). An empirical test of the utility of the observations-to-variables ratio in factor and components analysis. *Applied Psychological Measurement,* 9(2), 165-178.

Arrow, K. J. (2009). Some developments in economic theory since 1940: An eyewitness account. *Annual Review of Economics, 1*(1), 1-16.

Babbie, E. (2012). *The practice of social research* (12th ed.). Belmont, California: Cengage Learning.

Baker, H. K., & Nofsinger, J. R. (2010). *Behavioral finance: Investors, corporations, and markets* (1st ed.). New Jersey: John Wiley & Sons.

Barber, B. M., & Odean, T. (2013). The behavior of individual investors. In G. M. Constantinides, M. Harris & R. M. Stulz (Eds.), *Handbook of the economics of finance: Corporate finance* (pp. 1533-1565). Amsterdam, The Netherlands: North Holland/Elsevier.

Bandura, A. (1971). *Social learning theory*. New York: General Learning Press.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*(2), 191-215.

Barber, B. M., & Odean, T. (2013). The behavior of individual investors. In G. M. Constantinides, M. Harris & R. M. Stulz (Eds.), *Handbook of the economics of finance: Corporate finance* (pp. 1533-1565). Amsterdam, The Netherlands: North Holland/Elsevier.

Barberis, N., & Huang, M. (2001). Mental accounting, loss aversion, and individual stock returns. *The Journal of Finance, 56*(4), 1247-1292.

Bates, M. (2005). Information and knowledge: An evolutionary framework for information science. *Information Research, 10*(4), 10-14.

Bates, M. (2009a). Information. In M. Bates, & M. Maack (Eds.), *Encyclopedia of library and information sciences* (3rd ed., pp. 2347-2360). New York: Taylor & Francis. doi:doi:10.1081/E-ELIS3-120045519

Bates, M. (2009b). Information behavior. In M. Bates, & M. Maack (Eds.), *Encyclopedia of library and information sciences* (3rd ed., pp. 2381-2391). New York: Taylor & Francis. doi:doi:10.1081/E-ELIS3-120043263

Bateson, G. (1972). *Steps to an ecology of mind: Collected essays in anthropology, psychiatry, evolution, and epistemology*. San Francisco, California: Chandler publications.

Batterjee, A. A. (2013). The relationship between SES and giftedness in saudi arabia. *Mankind Quarterly, 53*(3), 3-52.

Bayar, Y., Kaya, A., & Yildirim, M. (2014). Effects of stock market development on economic growth: Evidence from turkey. *International Journal of Financial Research, 5*(1), 93-100. doi:10.5430/ijfr.v5n1p93

Bearden, W. O., Hardesty, D. M., & Rose, R. L. (2001). Consumer self-confidence: Refinements in conceptualization and measurement. *Journal of Consumer Research, 28*(1), 121-134.

Beck, S. E., & Manuel, K. (2008). *Practical research methods for librarians and information professionals* (1st ed.). New York: Neal-Schuman Publishers.

Belkin, N. (1978). Information concepts for information science. *Journal of Documentation, 34*(1), 55-85. Belkin, N., & Robertson, S. (1976). Information science and the phenomenon of information. *Journal of the American Society for Information Science, 27*(4), 197-204.

Belkin, N., & Vickery, A. (1985). *Interaction in information systems: A review of research from document retrieval to knowledge-based systems*. London, UK: British Library.

Belleflamme, P. (2005). Versioning in the information economy: Theory and applications. *CESifo Economic Studies, 51*(2/3), 329-358.

Bencivenga, V. R., Smith, B. D., & Starr, R. M. (1996). Equity markets, transactions costs, and capital accumulation: An illustration. *The World Bank Economic Review, 10*(2), 241-265.

Black, F. (1972). Capital market equilibrium with restricted borrowing. *The Journal of Business, 45*(3), 444-455.

Black, F., & Scholes, M. (1973). The pricing of options and corporate liabilities. *The Journal of Political Economy, 81*(3), 637-654.

Bloomfield, R. J. (2006). *Behavioral finance.* (No. 38-06). Rochester, New York: Social Science Electronic Publishing. doi: http://dx.doi.org/10.2139/ssrn.941491

Bosworth, B., Hymans, S., & Modigliani, F. (1975). The stock market and the economy. *Brookings Papers on Economic Activity, 1975*(2), 257-300.

Boulding, K. E. (1956). *The image: Knowledge in life and society*. Ann Arbor: University of Michigan Press.

Braman, S. (2006). The micro- and macroeconomics of information. *Annual Review of Information Science and Technology, 40*(1), 3-52. doi:10.1002/aris.1440400108

Braveman, P. A., Cubbin, C., Egerter, S., Chideya, S., Marchi, K. S., Metzler, M., & Posner, S. (2005). Socioeconomic status in health research: One size does not fit all. *Jama, 294*(22), 2879-2888.

Bricker, J., Kennickell, A., Moore, K., Sabelhaus, J., Ackerman, S., Argento, R., Windle, R. (2012). *Changes in U.S. family finances from 2007 to 2010: Evidence from the survey of consumer finances.* ().Board of Governors of the Federal Reserve System. Retrieved from http://www.federalreserve.gov/pubs/bulletin/2012/pdf/scf12.pdf

Brookes, B. C. (1980). The foundations of information science part I: Philosophical aspects. *Journal of Information Science, 2*(3-4), 125-133.

Buckland, M. (1991). Information as thing. *Journal of the American Society for Information Science, 42*(5), 351-360.

Burke, C. (2007). History of information science. *Annual Review of Information Science and Technology, 41*(1), 3-53. doi:10.1002/aris.2007.1440410108

The Capital Market Authority, Semi Annual Statistical Bulletin. (2014). Retrieved from http://www.cma.org.sa/en/Publicationsreports/Pages/SemiAnnualReport.aspx

Capurro, R., & Hjørland, B. (2003). The concept of information. *Annual Review of Information Science and Technology, 37*(1), 343-411. doi:10.1002/aris.1440370109

Case, D. O. (2012). *Looking for information: A survey of research on information seeking, needs and behavior* (3rd ed.). Bingley, UK: Emerald Group Publishing.

Cenfetelli, R. T., & Bassellier, G. (2009). Interpretation of formative measurement in information systems research. *MIS Quarterly,* 689-707.

The Central Department of Statistics and Information. Retrieved from http://www.cdsi.gov.sa/english/index.php?option=com_content&view=article&id=56&Itemid=147

Chan, L. K. C., Jegadeesh, N., & Lakonishok, J. (1996). Momentum strategies. *The Journal of Finance, 51*(5), 1681-1713. Retrieved from http://www.jstor.org/stable/2329534

Chance, D., & Brooks, R. (2010). *Introduction to derivatives and risk management* (8th ed.). Mason, Ohio: Cengage Learning.

Chen, J. (2004). Generalized entropy theory of information and market patterns. *Corporate Finance Review, 9*(3), 21-32.

Coffee, J. C.,Jr. (1997). Brave new world?: The impact(s) of the Internet on modern securities regulation. *The Business Lawyer, 52*(4), 1195-1233.

Coltman, T., Devinney, T. M., Midgley, D. F., & Venaik, S. (2008). Formative versus reflective measurement models: Two applications of formative measurement. *Journal of Business Research, 61*(12), 1250-1262.

Cool, C. (2001). The concept of situation in information science. *Annual Review of Information Science and Technology, 35*, 5-42.

Copeland, T., Weston, F., Shastri, K., & Katz, J. (2005). *Financial theory and corporate policy* (4th ed.). New Jersey: Prentice Hall.

Cornelius, I. (1996). Information and interpretation. Paper presented at the *Royal School of Librarianship,* 11-21.

Costello, A. B., & Osborne, J. W. (2011). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *Practical Assessment, Research & Evaluation, 10*(7).

Courtright, C. (2007). Context in information behavior research. *Annual Review of Information Science and Technology, 41*(1), 273-306.

Creswell, J. W. (2013). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). Thousand Oaks, California: Sage.

Dailami, M., & Atkin, M. (1990). *Stock markets in developing countries: Key issues and a research agenda*. Washington, D.C.: World Bank Publications.

Daniel, K., Hirshleifer, D., & Subrahmanyam, A. (1998). Investor psychology and security market under-and overreactions. *The Journal of Finance, 53*(6), 1839-1885.

Danes, S. M., & Haberman, H. (2007). Teen financial knowledge, self-efficacy, and behavior: A gendered view. *Journal of Financial Counseling and Planning, 18*(2)

De Bondt, W. F., & Thaler, R. (1985). Does the stock market overreact? *The Journal of Finance, 40*(3), 793-805.

Delva, M. D., Kirby, J. R., Knapper, C. K., & Birtwhistle, R. V. (2002). Postal survey of approaches to learning among ontario physicians: Implications for continuing medical education. *BMJ (Clinical Research Ed.), 325*(7374), 1218.

Derr, R. L. (1983). A conceptual analysis of information need. *Information Processing & Management, 19*(5), 273-278.

Dervin, B. (1997). Given a context by any other name: Methodological tools for taming the unruly beast. In P. Vakkari, R. Savolainen & Dervin B. (Eds.), *Information seeking in context: Proceedings of an international conference on research in information needs, seeking, and use in different contexts* (pp. 13-38). London: Taylor Graham.

Dervin, B. (1977). Useful theory for librarianship: Communication, not information. *Drexel Library Quarterly, 13*(3), 16-32.

Devereux, M. B., & Smith, G. W. (1994). International risk sharing and economic growth. *International Economic Review, 35*(3), 535-550. doi:10.2307/2527072

Dretske, F. (1981). *Knowledge and the flow of information*. Cambridge, Massachusetts: MIT Press.

Dupuit, J. (1844). On the measurement of the utility of public works. *International Economic Papers, 2*(1952), 83-110.

Ellis, D. (1989). A behavioural model for information retrieval system design. *Journal of Information Science, 15*(4-5), 237-247.

Fabozzi, F. J. (2008a). Fundamentals of investing. In F. J. Fabozzi (Ed.), *Handbook of finance, financial markets and instruments* (pp. 9-16). New Jersey: John Wiley & Sons Inc.

Fabozzi, F. J. (2008b). Overview of financial instruments and financial markets. In F. J. Fabozzi (Ed.), *Handbook of finance, financial markets and instruments* (pp. 3-7). New Jersey: John Wiley & Sons Inc.

Fama, E. F. (1970). Efficient capital markets: A review of theory and empirical work. *The Journal of Finance, 25*(2), 383-417. doi:10.1111/j.1540-6261.1970.tb00518.x

Fama, E. F., & French, K. R. (2004). The capital asset pricing model: Theory and evidence. *Journal of Economic Perspectives, 18*, 25-46.

Festinger, L. (1962). *A theory of cognitive dissonance*. Stanford, California: Stanford University Press.

Field, A. (2009). *Discovering statistics using SPSS* (3rd ed.). Los Angeles: Sage publications.

Figlewski, S. (1981). The informational effects of restrictions on short sales: Some empirical evidence. *The Journal of Financial and Quantitative Analysis, 16*(4, Proceedings of 16th Annual Conference of the Western Finance Association, June 18-20, 1981, Jackson Hole, Wyoming), 463-476. Retrieved from http://www.jstor.org/stable/2330366

The financial crisis response. (2012). Washington, D.C.: U.S. Department of the Treasury. Retrieved from http://www.treasury.gov/resource-center/data-chart-center/Documents/20120413_FinancialCrisisResponse.pdf

Fisher, K. E., & Naumer, C. M. (2009). Information needs. In M. Bates, & M. Maack (Eds.), *Encyclopedia of library and information sciences* (3rd ed., pp. 2452-2458). New York: Taylor & Francis. doi:doi:10.1081/E-ELIS3-120043243

Folkman, S. (1984). Personal control and stress and coping processes: A theoretical analysis. *Journal of Personality and Social Psychology, 46*(4), 839-852.

Folkman, S., & Lazarus, R. S. (1985). If it changes it must be a process: Study of emotion and coping during three stages of a college examination. *Journal of Personality and Social Psychology, 48*(1), 150-170.

Fox, C. (1983). *Information and misinformation. an investigation of the notions of information, misinformation, informing, and misinforming*. Westport, Connecticut: Greenwood Press.

Fromlet, H. (2001). Behavioral finance-theory and practical application. *Business Economics, 36*(3), 63-69.

Gervais, S., & Odean, T. (2001). Learning to be overconfident. *Review of Financial Studies, 14*(1), 1-27.

Ghiselli, E. E., Campbell, J. P., & Zedeck, S. (1981). *Measurement theory for the behavioral sciences: Origin & evolution* WH Freeman & Company.

Godbold, N. (2005). Beyond information seeking: Towards a general model of information behaviour. *Information Research, 11*(4), 9.

Goldsmith, E., & Goldsmith, R. E. (1997). Gender differences in perceived and real knowledge of financial investments. *Psychological Reports, 80*(1), 236-238.

Green, A. (1990). What do we mean by user needs? *British Journal of Academic Librarianship, 5*(2), 65-78.

Grossman, S. J., & Stiglitz, J. E. (1980). On the impossibility of informationally efficient markets. *The American Economic Review, 70*(3), 393-408.

Grunig, J. E. (1989). Publics, audiences and market segments: Segmentation principles for campaigns. In C. Salmon (Ed.), *Information campaigns: Balancing social values and social change* (6th ed., pp. 199-228). Newbury Park, California: SAGE Publications, Inc.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis* (7th ed.). Upper Saddle River, NJ: Pearson Prentice Hall.

Hair Jr, J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2014). *A primer on partial least squares structural equation modeling (PLS-SEM)* (1st ed.). Los Angeles: Sage Publications.

Henefer, J., & Fulton, C. (2005). Krikelas's model of information seeking. In K. E. Fisher, S. Erdelez & L. McKechnie (Eds.), *Theories of information behavior* (3rd ed., pp. 225-229). Medford, New Jersey: Information Today Inc.

Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). The use of partial least squares path modeling in international marketing.

Hirshleifer, D., & Hong Teoh, S. (2003). Herd behaviour and cascading in capital markets: A review and synthesis. *European Financial Management, 9*(1), 25-66.

Hirshleifer, D., Hou, K., Teoh, S. H., & Zhang, Y. (2004). Do investors overvalue firms with bloated balance sheets? *Journal of Accounting and Economics, 38*, 297-331.

Hirshleifer, J. (1973). Where are we in the theory of information? *American Economic Review, 63*(2), 31-39.

Hirshleifer, J., & Riley, J. (1979). The analytics of uncertainty and information-an expository survey. *Journal of Economic Literature, 17*(4), 1375-1421. Retrieved from http://www.jstor.org/stable/2723720

Hirshleifer, J., & Riley, J. (1992). *The analytics of uncertainty and information, 1992*. Cambridge, UK: Cambridge University Press.

Hollingshead, A. B. (1975). Four factor index of social status. In P. Smith (Ed.), *The Yale journal of sociology* (pp. 21-51). New Haven, Connecticut: The Department of Sociology at Yale University. Retrieved from http://elsinore.cis.yale.edu/sociology/yjs/yjs_fall_2011.pdf#page=21

Holmström, B., & Tirole, J. (1993). Market liquidity and performance monitoring. *Journal of Political Economy, 101*(4), 678-709.

Huberman, G. (2001). Familiarity breeds investment. *Review of Financial Studies, 14*(3), 659-680.

Hvide, H. K. (2002). Pragmatic beliefs and overconfidence. *Journal of Economic Behavior & Organization, 48*(1), 15-28.

Investment incentives, saudi arabian general investment authority (SAGIA). (2015). Retrieved from https://www.sagia.gov.sa/Investment-climate/Some-Things-You-Need-To-Know-/Investment-Incentives.

ISCO-88: Major, sub-major, minor and unit group titles. (2004a). Retrieved from http://www.ilo.org/public/english/bureau/stat/isco/isco88/major.htm

ISCO-88: The international standard classification of occupation. (2004b). Retrieved from http://www.ilo.org/public/english/bureau/stat/isco/isco88/index.htm

Jagongo, A., & Mutswenje, V. S. (2014). A survey of the factors influencing investment decisions: The case of individual investors at the NSE.

Johnson, J. D. (2003). On contexts of information seeking. *Information Processing & Management, 39*(5), 735-760.

Johnson, R. R. B., & Christensen, L. B. (2010). *Educational research: Quantitative, qualitative, and mixed approaches* (2nd ed.). Thousand Oaks, California: Sage Publications.

Jones, C. (2015). Survey: Americans have big gaps in financial knowledge. *USA Today* Retrieved from http://www.usatoday.com/story/money/personalfinance/2015/05/02/americans-have-a-lot-to-learn-about-money/26250315/

Jones, R., & Mendelson, H. (2011). Information goods vs. industrial goods: Cost structure and competition. *Management Science, 57*(1), 164-176.

Julien, H., & Duggan, L. J. (2000). A longitudinal analysis of the information needs and uses literature. *Library & Information Science Research, 22*(3), 291-309.

Kahneman, D., & Tversky, A. (1977). *Prospect theory: An analysis of decision making under risk.* (No. ADA045771). Arlington, Virginia: Advanced Decision Technology Program, Defense Advanced Research Projects Agency.

Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica, 47*(2), 263-291.

Kim, J., Lee, H., & Min, I. (2013). The economics of curiosity. *The Korean Economic Review, 29*(1), 23-50.

Klein, G. (2009). *Streetlights and shadows: Searching for the keys to adaptive decision making*. Cambridge, Massachusetts: MIT Press.

Kline, P. (2000). *Handbook of psychological testing* (2nd ed.). New York: Routledge.

Kline, R. B. (2011). *Principles and practice of structural equation modeling* (3rd ed.) Guilford publications.

Kock, N. (2010). Using WarpPLS in e-collaboration studies: An overview of five main analysis steps. *International Journal of e-Collaboration (IJeC), 6*(4), 1-11.

Kock, N. (2015a). Common method bias in PLS-SEM: A full collinearity assessment approach. *International Journal of e-Collaboration (IJeC), 11*(4), 1-10.

Kock, N. (2015b). *WarpPLS 5.0 user manual*. Laredo, Texas.

Krikelas, J. (1983). Information-seeking behavior: Patterns and concepts. *Drexel Library Quarterly, 19*(2), 5-20.

Kuhlthau, C. C. (1999). Investigating patterns in information seeking: Concepts in contexts. In T. D. Wilson, & D. Allen (Eds.), *Exploring the contexts of information behaviour* (pp. 10-20). London, UK: Taylor Graham Publishing.

Kuhn, T. S. (1962). *The structure of scientific revolutions* (4th ed.). Ann Arbor: University of Chicago Press.

Kuhn, T. S. (1979). *The essential tension: Selected studies in scientific tradition and change*. Ann Arbor: University of Chicago Press.

Lakonishok, J., Shleifer, A., & Vishny, R. W. (1994). Contrarian investment, extrapolation, and risk. *The Journal of Finance, 49*(5), 1541-1578. Retrieved from http://www.jstor.org/stable/2329262

Leckie, G. J., Pettigrew, K. E., & Sylvain, C. (1996). Modeling the information seeking of professionals: A general model derived from research on engineers, health care professionals, and lawyers. *The Library Quarterly, 66*(2), 161-193.

Lenski, W. (2010). Information: A conceptual investigation. *Information, 1*(2), 74-118.

Levine, R. (1991). Stock markets, growth, and tax policy. *The Journal of Finance, 46*(4), 1445-1465.

Li, Y. M., Lee, J., & Cude, B. J. (2002). Intention to adopt online trading: Identifying the future online traders. *Journal of Financial Counseling and Planning, 13*(2), 49.

Lincoln, Y., & Guba, E. (1985). *Naturalistic inquiry.* Newbury Park, California: Sage Publications, Inc.

Lintner, J. (1965). The valuation of risk assets and the selection of risky investments in stock portfolios and capital budgets. *The Review of Economics and Statistics, 47*(1), 13-37.

Losee, R. M. (1997). A discipline independent definition of information. *Journal of the American Society for Information Science, 48*(3), 254-269.

Lovric, M., Kaymak, U., & Spronk, J. (2008). *A conceptual model of investor behavior.* (No. ERS-2008-030-F&A). The Netherlands: Erasmus Research Institute of Management. Retrieved from http://hdl.handle.net/1765/12468

Luenberger, D. G. (2006). *Information science*. Princeton, New York: Princeton University Press.

Lukenbill, W. B. (2012). *Research in information studies: A cultural and social approach*. Bloomington, Indiana: Xlibris.

Lundh, A. (2010). Studying information needs as question-negotiations in an educational context: A methodological comment. *Information Research: An International Electronic Journal, 15*(4). Retrieved from http://www.informationr.net/ir/15-4/colis722.html

Luong, L. P., & Ha, D. T. (2011). *Behavioral factors influencing individual investors' decision making and performance* (Masters).

Ma, L. (2012). Meanings of information: The assumptions and research consequences of three foundational LIS theories. *Journal of the American Society for Information Science and Technology, 63*(4), 716-723.

Machlup, F. (1962). *The production and distribution of knowledge in the United States*. Princeton, New York: Princeton University Press.

MacKay, D. M. (1969). *Information, mechanism and meaning*. Cambridge, Massachusetts: M.I.T. Press.

Madden, A. D. (2000). A definition of information. *Aslib Journal of Information Management, 52*(9), 343-349.

March, J. G. (1994). *Primer on decision making: How decisions happen*. New York: The Free Press.

Marchionini, G. (1995). *Information seeking in electronic environments*. Cambridge; New York: Cambridge University Press.

Markowitz, H. (1952). Portfolio selection. *The Journal of Finance, 7*(1), 77-91.

Marschak, J. (1959). Remarks on the economics of information. *Contributions to scientific research in management. Proceedings of the Scientific Program following the Dedication of the Western data Processing Center, Graduate School of Business Administration* (pp. 79-98). Berkeley, California: Western Data Processing Center, UCLA.

Maslow, A. H. (1943). A theory of human motivation. *Psychological Review, 50*(4), 370-396.

Mason, R. O. (1978). Measuring information output: A communication systems approach. *Information & Management, 1*(4), 219-234.

Matejka, F., & McKay, A. (2015). Rational inattention to discrete choices: A new foundation for the multinomial logit model. *American Economic Review, 105*(1), 272-298. doi:10.1257/aer.20130047

McCreadie, M., & Rice, R. E. (1999). Trends in analyzing access to information. part II. unique and integrating conceptualizations. *Information Processing & Management, 35*(1), 77-99. doi:http://dx.doi.org/10.1016/S0306-4573(98)00038-7

Meadow, C. T., & Yuan, W. (1997). Measuring the impact of information: Defining the concepts. *Information Processing & Management, 33*(6), 697-714.

Merton, R. C. (1973). Theory of rational option pricing. *The Bell Journal of Economics and Management Science, 4*(1), 141-183.

Moorman, C., Diehl, K., Brinberg, D., & Kidwell, B. (2004). Subjective knowledge, search locations, and consumer choice. *Journal of Consumer Research, 31*(3), 673-680.

Mossin, J. (1966). Equilibrium in a capital asset market. *Econometrica, 34*(4), 768-783.

Murray, K. B. (1991). A test of services marketing theory: Consumer information acquisition activities. *The Journal of Marketing, 55*(1), 10-25.

Nagy, R. A., & Obenberger, R. W. (1994). Factors influencing individual investor behavior. *Financial Analysts Journal, 50*(4), 63-68.

Nauta, D. (1972). *Meaning of information* (1st ed.). Berlin, Germany: Mouton de Gruyter.

Neumann, L. J., & Morgenstern, O. (1947). *Theory of games and economic behavior*. Princeton, New Jersey: Princeton University Press.

Nezafat, M., & Wang, Q. (2013). *Short-sale constraints, information acquisition, and asset prices.* (No. 2257093). Rochester, New York: Social Science Electronic Publishing. doi:http://dx.doi.org/10.2139/ssrn.2257093

Ngoc, L. T. B. (2014). Behavior pattern of individual investors in stock market. *International Journal of Business and Management, 9*(1), 1-16.

O'Connor, L. G. (2013). The information seeking and use behaviors of retired investors. *Journal of Librarianship and Information Science, 45*(1), 3-22.

Obstfeld, M. (1994). Risk-taking, global diversification, and growth. *The American Economic Review, 84*(5), 1310-1329.

Odean, T. (1998). Are investors reluctant to realize their losses? *The Journal of Finance, 53*(5), 1775-1798.

Perry, B. (2008). Credit crisis: Wall Street history. Retrieved from http://www.investopedia.com/university/credit-crisis/credit-crisis1.asp

Pickard, A. J. (2007). *Research methods in information*. London: Facet.

Pitman, J. (1997). *Probability*. New York: Springer.

Podsakoff, P. M., MacKenzie, S. B., Lee, J., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology, 88*(5), 879.

Pompian, M. M. (2012). *Behavioral finance and investor types*. Hoboken, New Jersey: Wiley.

Porat, M. U. (1977). *The information economy: Definition and measurement.* (No. 003-000-00512-7). Washington, D.C.: ERIC.

Qualtrics Labs, Inc. (2005). Qualtrics [electronic questionnaire]. Retrieved from

http://www.qualtrics.com/

Rahman, M. A., Chowdhury, S. S. H., & Sadique, M. S. (2015). Herding where retail investors dominate trading: The case of saudi arabia. *The Quarterly Review of Economics and Finance, 57*, 46-60.

Rapoport, A. (1953). What is information? *Synthese, 9*(3/5), 157-173. Retrieved from http://www.jstor.org/stable/20114156

Rea, L. M., & Parker, R. A. (2012). *Designing and conducting survey research: A comprehensive guide*. San Francisco, California: Jossey-Bass/Wiley.

Research and economic development: Informed consent: Informed consent for non-English speaking subjects. (2015). Retrieved from http://research.unt.edu/faculty-resources/research-integrity-compliance/irb/informed-consent

Richardson, S., Tuna, İ., & Wysocki, P. (2010). Accounting anomalies and fundamental analysis: A review of recent research advances. *Journal of Accounting and Economics, 50*(2–3), 410-454. doi:http://dx.doi.org/10.1016/j.jacceco.2010.09.008

Ritter, J. R. (2003). Behavioral finance. *Pacific-Basin Finance Journal, 11*(4), 429-437.

Ross, S. A. (1976). The arbitrage theory of capital asset pricing. *Journal of Economic Theory, 13*(3), 341-360.

Saint-Paul, G. (1992). Technological choice, financial markets and economic development. *European Economic Review, 36*(4), 763-781.

Settle, R. B., & Alreck, P. L. (1989). Reducing buyers' sense of risk. *Marketing Communications, 14*(1), 34-40.

Sewell, M. (2011). *History of the efficient market hypothesis.* (No. 11/04). London: UCL Department of Computer Science. doi:http://www.cs.ucl.ac.uk/fileadmin/UCL-CS/images/Research_Student_Information/RN_11_04.pdf

Shannon, C. E. (1948). A mathematical theory of communication. *Bell System Technical Journal, 27*(3), 379-423. doi:10.1002/j.1538-7305.1948.tb01338.x

Shannon, C. E., & Weaver, W. (1949). *The mathematical theory of communication*. Urbana, Illinois: University of Illinois Press.

Sharpe, W. F. (1964). Capital asset prices: A theory of market equilibrium under conditions of risk. *The Journal of Finance, 19*(3), 425-442.

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. J. (1990). Speculative prices and popular models. The Journal of Economic Perspectives, 4(2), 55-65.

Shiller, R. J. (2003). From efficient markets theory to behavioral finance. *Journal of Economic Perspectives, 17*(1), 83-104.

Shleifer, A., & Vishny, R. W. (1997). The limits of arbitrage. *The Journal of Finance, 52*(1), 35-55.

Simon, H. A., Dantzig, G. B., Hogarth, R., Plott, C. R., Raiffa, H., Schelling, T. C., . . . Winter, S. (1987). Decision making and problem solving. *Interfaces, 17*(5), 11-31.

Sonnenwald, D. H. (1999). Evolving perspectives of human information behavior: Contexts, situations, social networks and information horizons. In T. Wilson, & D. Allen (Eds.), *Exploring the contexts of information behavior: Proceedings of the Second International Conference in Information Needs*. London: Taylor Graham.

Spence, A. M. (1974). An economist's view of information. *Annual Review of Information Science and Technology, 9*, 57-78.

Spink, A. (2010). *Information behavior: An evolutionary instinct*. New York: Springer.

Spink, A., & Cole, C. (2006). Human information behavior: Integrating diverse approaches and information use. *Journal of the American Society for Information Science and Technology, 57*(1), 25-35. doi:10.1002/asi.20249

Spink, A., & Heinström, J. (2011). *New directions in information behaviour*. Bradford: Emerald Group Publishing Limited.

SPSS statistics (2015). (V 23 ed.) IBM.

Statman, M. (1995). Behavioral finance versus standard finance. In A. Wood (Ed.), *Behavioral finance and decision theory in investment management* (pp. 14-22). Charlottesville, Virginia: CFA Institute.

Statman, M. (1999). Behaviorial finance: Past battles and future engagements. *Financial Analysts Journal, 55*(6), 18-27.

Stigler, G. J. (1961). The economics of information. *Journal of Political Economy, 69*(3), 213-225.

Stiglitz, J. E. (2000). The contributions of the economics of information to twentieth century economics. *The Quarterly Journal of Economics, 115*(4), 1441-1478.

Stoll, H. R. (2003). Market microstructure. In G. M. Constantinides, M. Harris & R. M. Stulz (Eds.), *Handbook of the economics of finance: Corporate finance* (pp. 555-604). Amsterdam, The Netherlands: North Holland/Elsevier.

Summerville, A. (2011). Counterfactual seeking: The scenic overlook of the road not taken. *Personality & Social Psychology Bulletin, 37*(11), 1522-1533. doi:10.1177/0146167211413295 [doi]

Taylor, R. S. (1962). The process of asking questions. *American Documentation, 13*(4), 391-396.

Taylor, R. S. (1968). Question-negotiation and information seeking in libraries. *College & Research Libraries, 29*(3), 178-194.

Teweles, R. J., & Bradley, E. S. (1998). *The stock market* (7th ed.). New York: John Wiley & Sons.

Thaler, R. H. (1999). Mental accounting matters. *Journal of Behavioral Decision Making, 12*(3), 183-206.

Thaler, R., & Barberis, N. (2005). A survey of behavioral finance. In R. Thaler (Ed.), *Advances in behavioral finance* (pp. 1-74). Princeton, New York: Princeton University Press.

Treynor, J. L. (1961). Market value, time, and risk. *Unpublished Manuscript,* 95-209.

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

Vakkari, P. (1997). Information seeking in context: A challenging metatheory. In P. Vakkari, R. Savolainen & Dervin B. (Eds.), *Information seeking in context: Proceedings of an international conference on research in information needs, seeking, and use in different contexts* (pp. 451-464). London: Taylor Graham.

Varian, H. R., & Shapiro, C. (1999). *Information rules: A strategic guide to the network economy*. Cambridge, Massachusetts: Harvard Business School Press.

Von Baeyer, H. C. (2004). *Information :The new language of science*. Cambridge, Massachusetts: Harvard University Press.

Weintraub, R. (1993). Neoclassical economics. *The Concise Encyclopedia of Economics, 1*, March, 2015.

Wheeler, W. (2011). Economics of information: A brief introduction. *Progressive Librarian,* (36), 42-50.

Wiener, N. (1961). *Cybernetics or control and communication in the animal and the machine*. Cambridge, Massachusetts: MIT press.

Williamson, K., & Smith, D. K. (2010). Empowered or vulnerable? The role of information for Australian online Investors/Plus forts ou plus vulnérables? le rôle de l'information pour les investisseurs en ligne Australiens. *Canadian Journal of Information and Library Science, 34*(1), 39-81.

Wilson, P. (1973). Situational relevance. *Information Storage and Retrieval, 9*(8), 457-471.

Wilson, T. D. (1981). On user studies and information needs. *Journal of Documentation, 37*(1), 3-15.

Wilson, T. D. (1997). Information behaviour: An interdisciplinary perspective. *Information Processing & Management, 33*(4), 551-572.

Wilson, T. D. (1999). Models in information behaviour research. *Journal of Documentation, 55*(3), 249-270.

Wilson, T. D. (2000). Human information behavior. *Informing Science, 3*(2), 49-56.

Wilson, T. D. (2005). Evolution in information behavior modeling: Wilson's model. In K. E. Fisher, S. Erdelez & L. McKechnie (Eds.), *Theories of information behavior* (3rd ed., pp. 31-36). Medford, New Jersey: Information Today, Inc.

The world factbook, Saudi Arabia. (2014). Retrieved from https://www.cia.gov/library/publications/the-world-factbook/geos/sa.html

Zipf, G. K. (1949). *Human behavior and the principle of least effort.* Oxford, England: Addison-Wesley Press.