How Do Bangladeshi Investors Take Decisions? An Ethnographic Decision Tree Model of Stock Selection

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Abstract

The study explores the decision making process of Bangladeshi stock market investors. We interview 31 investors currently holding stock portfolio in the Dhaka Stock Exchange (DSE) to understand their choices and decision making process. Based on the findings, we develop an Ethnographic Decision Tree Model (EDTM) of Stock Selection. We find that a stock usually comes to an investor's attention through news/ rumors or suggestions received from family/ friends/ broker or on the basis of past experience. Information use often depends on trust and the necessity to act on it immediately. In an active search process, 'filter' criteria are used to reduce the choice set of stocks for further evaluation. The nature of evaluation depends on whether investors look to invest for the long or the short term. Finally, stock selection depends on whether investors perceive the stock to be undervalued and whether the stock fits her/ his investment strategy. We also find that collective intelligence affects an individual's investment decision and trustworthiness of the information source is a key factor in determining her/ his investment behavior.

Keywords: Bangladesh Stock Market, Investor Information Collection Process, Investor Decision Making Process, EDTM of Stock Selection, Collective Intelligence

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1. Introduction

Market efficiency has received significant attention from scholars since Eugene Fama (1970) introduced the Efficient Market Hypothesis and is an important feature which determines how effective the stock market is in promoting economic development (Hassan et al., 2000). Several studies suggest that the Capital Market of Bangladesh is inefficient (e.g. Hassan et al., 2000; Mobarek et al., 2008). According to these studies, lack of proper regulatory framework and monitoring, and lack of investor knowledge and rationality are the leading causes for the inefficiencies of the Dhaka Stock Exchange (DSE) and the Chittagong Stock Exchange (CSE). One of the reasons behind the 2010-11 stock market crash is argued to be a preceding huge surge of demand for stocks by a large group of new investors, most of whom without having enough knowledge about the stock market invested most or all of their savings in the market (Saha, 2012).

Indeed, a popular perception regarding Bangladeshi stock market investors is that a large portion of them invest in the market without really understanding what they are getting into and take unreasonable amount of risk. This perception can be understood by the following comments made by several past and present regulators/ policy makers of the country at different times. Mirza Azizul Islam, former finance advisor to the caretaker government, e.g., said, "I have information that once again many people are selling off their land or borrowing money to invest in the share market. This is absolutely not the right thing to do." Farooq Ahmed Siddiqui, former chairman of Bangladesh Securities and Exchange Commission (BSEC) suggested, "It is not wise for those who do not understand the stock market to invest in it." Sheikh Hasina, the Prime Minister of Bangladesh, commented, “Do not buy any and every bit of information. One ends up making an investment, then losing everything and then crying that the fault is of the government, the fault is of the finance minister. That should not happen." (bdnews24.com, 2017)

Given the debacles that the Bangladesh stock market has faced over the years, it sure is interesting to probe into the investment decision making process of the investors and investigate, among other things, whether the popular perception is correct or not. Although a number of innovative studies have been undertaken in order to clarify our understanding of the investor information processing and decision-making behavior (e.g. Clarkson & Meltzer, 1960; Slovic et al., 1972; Bouwman et al., 1987, Nagy & Obenberger, 1994; Loibl & Hira, 2009), such studies are rare if not nonexistent in the context of Bangladesh capital market. Majority of the studies on Bangladesh stock markets

focus on market efficiency and regulations on information disclosure requirement (Hassan et al., 2000; Mobarek et al., 2008). In a relatively recent study on investors in the Dhaka Stock Exchange (DSE), Mamun et al. (2015) seek to find out whether DSE investors are rational or irrational and claim to have found a complete absence of the assumption of either rationality or irrationality in a number of critical issues. None of these studies explicitly analyze information collection and decision making process of the investors. In this paper, we attempt to fill this void by exploring the decision making behavior of Bangladeshi stock market investors. In contrast to the studies conducted on Bangladesh stock market, the focus of this paper is on the 'why' and the 'how' as opposed to the 'what' in order to have a deeper understanding of the decision-making process of the investors.

Efficiency level of the stock market is a critical factor in determining the ability of the firm sector of an economy to generate funds to finance capital investments, which in turn plays a pivotal role in achieving sustainable economic development. Understanding the decision making process of the stock market investors is the first step in understanding how efficient the stock market is. Our research is important because this is the first methodical and direct effort – to the best of our knowledge – of understanding the details and the nuances associated with information collection and decision making process of stock market investors of Bangladesh.

Our primary objective is to have an understanding of why and how stock market investors in Bangladesh choose which stocks to invest in. In doing so, we also explore the process the investors follow in searching for information and making decisions with a view to identifying possible patterns and biases. We interview investors holding portfolios in the DSE and on the basis of the interview findings, we develop an Ethnographic Decision Tree Model (EDTM) that captures this stock selection process of Bangladeshi investors. Interestingly, our analysis suggests, somewhat contrary to the popular perception, that Bangladeshi investors as a whole, follow a rather logical decision making process when selecting stocks to invest in. We find that a stock usually comes to an investor's attention through news/ rumors or suggestions received from family/ friends/ broker or on the basis of past experience. Information use often depends on trust and the necessity to act on it immediately. In an active search process, 'filter' criteria are used to reduce the choice set of stocks for further evaluation. The nature of evaluation depends on whether investors look to invest for the long or the short term. Finally, stock selection depends on whether investors perceive the stock to be undervalued and whether the stock fits her/ his investment strategy. We also find that

collective intelligence affects an individual's investment decision and trustworthiness of the information source is a key factor in determining her/ his investment behavior.

The rest of the paper is organized as follows. Section 2 discusses the literature on decision making process and factors affecting investment decisions; section 3 explains the research methods; section 4 summarizes the data; section 5 presents the EDTM for stock Selection which is the novel contribution of this paper; section 6 discusses some of the important findings and their implications while section 7 concludes the paper.

2. Literature Review

In this segment of the paper, we perform a literature review focusing on two broad areas relevant for our purpose – papers that attempt to identify factors affecting investment decisions and papers that study decision making process and biases. The literature review has helped us develop the list of questions we use to interview Bangladeshi investors. We have also compared and contrasted the various findings summarized in the literature review in order to analyze the investors' decision making process.

2.1 Factors Affecting Investment Decisions

The literature on utility theory focuses on the development and refinement of "macro" models that explain aggregate market behavior (Nagy & Obenberger, 1994) and does not typically address individual investor's decision processes. Classical theory of portfolio choice has strong assumptions e.g. no transaction cost, awareness of all assets available and knowledge of their risks and returns etc. If all the investors face the same distribution of returns and have the same information set, in equilibrium, they select the same set of risky assets. Difference in risk attitude affects the allocation of wealth between safe and risky assets but not the assets selected. But empirical studies have shown significant heterogeneity in household portfolio holdings, inconsistent with the uniformity expected by the theory (Guiso & Jappelli, 2004).

A number of empirical studies have tried to elicit factors that explain the difference in investment behavior among individuals. In order to develop a client specified valuation model Baker and Haslam (1974) investigate factors that cause investors to vary in their perception of desirability of a particular stock and whether the factors systematically connect to their socioeconomic and

behavioral characteristics. They identify two distinct types of investor: i) those who prefer dividends and ii) those who prefer capital appreciation. The first group's decision variables are related to the amount of dividend and financial stability whereas the second group is more reliant on future expectations. Investors are not homogenous. Rather, certain types of stock are more attractive to certain types of investor.

Nagy & Obenberger (1994) like Baker & Halsam (1974) use a questionnaire approach. They report that classic wealth maximization criteria e.g. expected earnings, diversification need, minimizing risk etc. are important to investors, even though investors use diverse criteria when selecting stocks. Contemporary concerns such as local or international operations, environmental track record etc. are only given a cursory consideration. Financial Advice from brokers, family members etc. are, in most cases, not given much consideration. A large portion of the respondents reported that they do not use any type of valuation models when evaluating stocks.

Lewellen et al. (1977) undertook a more rigorous approach to understand the factors affecting investment decision by using both questionnaire and transaction data of the respondents. They looked at four broad elements of investment activity: i) basic portfolio objectives, ii) information collection and decision mechanics, iii) instrument selection and portfolio composition and iv) return perceptions and market attitudes. They report strong indication of systematic changes in investment objectives and risk preference across age brackets and, to a milder extent, income classes. Gender, family size, education etc. are also reported as causes of systematic difference in investment activity in some cases. These are reflected in differences in investment tactics, portfolio composition and environmental attitudes.

Cohn et al. (1975) provide evidences for decreasing relative risk aversion i.e. as wealth increases, a greater proportion of total assets is invested in risky assets. Riley Jr. & Chow (1992) also examine the factors affecting relative risk aversion of investors. They find that risk aversion decreases with age, education, wealth and income. They also find that risk aversion increases significantly after the age 65, decreases as one passes the poverty level and significantly decreases as individual's wealth rises to the top 10% of the population.

Al-Tamimi (2006) follows a similar approach to Nagy & Obenberger (1994) to study the factors affecting investors in the UAE market. The most influencing factors, in order of importance, are: expected corporate earnings, potential for getting rich fast, stock marketability, past performance

of the firm's stock, government holdings and the creation of the organized financial markets. On the other hand, the five factors found to be the least influencing factors on the UAE investor behavior in order of importance are: expected losses in other local investments, minimizing risk, expected losses in international financial markets, family member opinions, gut feeling on the economy.

Kabra et al. (2010) look at the factors influencing Indian investors. Using factor analysis, they identify 6 key factors: security, opinion, awareness, hedging, duration and benefits. They find while the factor "benefits" dominates younger age group (22 - 40), "hedging" influences the decision of the older age groups the most, which suggests that young investors generally demonstrate relatively more risk taking behavior. They also find that men are primarily affected by the factor "awareness" whereas women are more influenced by "benefits" and "hedging". The authors suggest that men exhibit more risk taking behavior and eager to know about different schemes available in market whereas women are relatively more risk averse.

2.2 Decision Making Process and Biases

Normative theories of decision making under uncertainty are almost always variants of expected utility rule put forward by Von Neumann & Morgenstern (1944). But rational choice theory does not provide an adequate foundation for descriptive theory of decision making. The deviations of actual behavior from the normative model are too widespread to be ignored, too systematic to be dismissed as random error, and too fundamental to be accommodated by relaxing the normative system (Tversky & Kahneman, 1986). With the expansion of traditional cost-benefit analysis of decision making, researchers find decision making heuristics insightful to explain consumer decision making behavior (Lee & Marlowe, 2003).

Past researches, usually in the field of consumer choice, have studied different decision-making heuristic models e.g. linear compensatory, additive difference, conjunctive, disjunctive, elimination by aspect, lexicographic etc. These strategies can be grouped in two ways. One is by type of comparison: alternative by alternative/ inter-dimensional evaluation strategy (consumers evaluate one alternative at a time) and attribute by attribute/ intra-dimensional evaluation strategy (attribute by attribute comparisons across alternatives). Secondly, these can be grouped by compensatory nature of decision making i.e. whether the consumer uses "compensatory strategy" that allows trade-off between different attributes of an alternative or "non-compensatory strategy"

where consumers do not compensate one attribute with another (focuses on one or a subset of dimensions and eliminate all the alternatives that do not meet consumer's desired level on those dimensions) (Payne, 1976; Lee & Marlowe, 2003).

Payne (1976) finds that a decision maker's information processing leading to preferential choice varies as a function of task complexity. Lee & Geistfeld (1998) propose two types of model. "Ideal Choice Model" represents "true preference" which is well developed, stable and not distorted by cost elements of the decision-making process. On the other hand, "Descriptive Model" describes how and why consumers think and act. In an environment with no search cost, descriptive choice models will likely coincide with ideal choice models. Task/ Decision Complexity is identified as an important element causing descriptive model to differ from ideal choice model. Factors affecting decision complexity include the number of alternatives in a choice set, the number of attributes for each alternative, the relationships among attributes, and the amount of time available for making a decision. Payne (1976) finds that consumers faced with two alternatives use a decision strategy which employs the same amount of information search for each alternative. This suggests the use of compensatory decision models in this scenario. But when consumers face more complex task with 6 or 12 alternatives, they exhibit variable information search across alternatives which suggests the use of non-compensatory decision models. The findings validate the author's hypothesis that increase in complexity of a decision situation will result in decision makers using choice heuristics to reduce cognitive strain. Payne et al. (1988) report that under moderate time pressure, subjects accelerate their processing and, to a lesser extent, focus on a subset of the available information. Under severe time pressure, people accelerate their processing, focus on a subset of the information, and change their decision strategies. There is slightly more attribute-based processing and more variance in the proportion of time spent on various attributes as time pressure increases.

Bouwman et al. (1987) study the investment screening process of financial analysts. The authors try to generalize the findings and draw attention to 3 major aspects of the investor behavior: information search strategies, the vehicles used to guide information search and task-specific knowledge. The "information search strategies" of the experts vary along two dimensions: i) the extent to which specific information is searched and ii) ease with which the search is interrupted due to change in objective. In the first dimension, an investor has either a "directed" approach where they look for specific information or a "sequential" approach where the information pieces

are examined one by one. The analysts mostly employ the directed strategy as it is less time intensive and it enables them to view only the information which they believe are important for decision making. Some of them employ sequential search strategy only in order to check whether they have missed any key piece of information. In the second dimension, an investor pursues either an "active" strategy in which analyst quickly changes her/ his objective or "methodical" strategy in which analyst completes the current goal before starting a new one. According to the study, the analysts vary considerably in this dimension. Those pursuing active strategy reach to a final decision faster than others. The authors identify 3 vehicles that determine the direction of analysts' search: "checklist**"** of important indicators**,** developing a "theme" of a company's nature and future prospects and "conditional checklist". All the analysts use checklists though its elements vary from analyst to analyst. Authors indicate that the variance in checklist maybe because of the lack of attention the checklist approach receives in financial training. The analysts hence build their own checklists from their experience. Conditional checklists contain those factors about which the analysts want to know more than what is available in the report. In such cases, they are willing to interrupt their current task to get the complete information. "Task-specific knowledge" is also an important determinant of analysts' information search. An analyst usually resorts to "financial templates" which are memory structures based on her/ his accumulated experience. Financial templates are complex structures that contain a variety of knowledge: industry specific standards of what is acceptable, "pictures" of typical company behavior, typical problems for a particular type of company or industry, and ready-made evaluations of the attractiveness of an investment.

Daniel et al. (2002) review evidences of psychological biases that affect investors. Since human information processing capacity is finite due to limited cognitive resources such as time, memory and attention, there is a need for imperfect decision-making procedure; the authors call it "heuristic simplification". This has been identified as a source of psychological bias along with self-deception and emotion-based judgment. Heuristic simplification helps explain many different documented biases, such as salience and availability effects (heavy focus on information that stands out or is often mentioned, at the expense of information that blends in with the background), framing effects (wherein the description of a situation affects judgments and choices), money illusion (wherein nominal prices affect perceptions), and mental accounting (tracking gains and losses relative to arbitrary reference points).

They cover a number of investor biases which have been covered in the extant literature. Firstly, investors often do not invest in different asset or security categories. They invest only in stocks that are "on their radar screens". Many investors entirely neglect major asset classes (e.g. commodities, stocks, bonds, real estate), and omit many individual securities within each class. Investors are strongly biased toward investing in stocks based in their own home countries. Investors with more social ties are likelier to participate in the stock market. Employees tend to invest in their own firms' stocks and perceive these stocks as low risk. A focus on salient features, familiarity or 'mere exposure' effects, (e.g. a perception that what is familiar is more attractive and less risky) and ambiguity aversion are cited as possible causes for such behaviors.

Secondly, investors exhibit loss averse behavior. Individuals are concerned about gains and losses as measured relative to an arbitrary reference point. These psychological effects help explain the disposition effect i.e. investors are more prone to realizing gains than losses. Odean (1998) shows that the individual investors trading through a large discount brokerage firm are more likely to sell their winners than their losers.

Thirdly, investors use past performance as an indicator of future performance in mutual fund and stock purchase decisions. Sirri & Tufano (1998) provide evidence that flows into mutual funds are concentrated among those funds which have had extraordinarily high performance in the past. This evidence suggests that investors are naively extrapolating past mutual fund success, when empirical evidence suggests that there is little or no persistence in performance. The fact that the flows are concentrated among the top performing mutual funds in each category is potentially consistent with limited attention/ salience effects.

Fourthly, investors trade very aggressively. It has been argued that the volume of trade in speculative markets is too large, and overconfidence of traders has been advanced as an explanation. Evidence suggests that more active investors earn lower returns as a result of incurring higher transaction costs. Barber & Odean (1999) find that investors who have experienced the greatest past success in trading are the likeliest ones to switch to online trading and will trade the most in the future. This evidence is consistent with self-attribution bias, meaning that the investors have likely attributed their past success to skill rather than to luck. Also, there is some evidence that access to internet trading appears to encourage more active trading.

3. Research Methods

3.1 Data Collection Method

The main purpose of this study is the exploration of the decision-making process of Bangladeshi stock market investors. While questionnaires are relatively easy to administer and can be used to collect information of a large sample, it suffers a major drawback for which this method is not selected for the study. A questionnaire allows a respondent to answer only within a restricted set of responses, which often cannot fully capture her/ his thoughts and emotions. Interviews and focus groups are better suited to provide the depth of information that would be more useful. Interviews can be used as a primary data gathering method to collect information from individuals about their own practices, beliefs, or opinions. They can be used to gather information on past or present behaviors or experiences (Harrell & Bradley, 2009). In order to fully understand the nuances of individual decision making, a qualitative approach has been deemed fit. Interview has been chosen as the method of inquiry. We interview a total of 31 investors, 5 of whom are institutional investors while the remaining 26 are non-institutional investors, regarding various aspects of their investment decision-making process. We use separate interview guides for institutional and non-institutional investors. Interview guide used for institutional investors includes questions regarding their organizations' decision process as to how they choose and manage their clients' portfolios whereas non-institutional investors have been asked questions solely pertaining to how they choose and manage their own investment portfolios.

Though Qualitative studies in Finance are rare, these are not totally non-existent. Clarkson & Meltzer (1960) and Bouwman et al. (1987), e.g., employ "Protocol Analysis", a method where the decision maker is asked to verbalize each step of her/ his decision-making process. The researchers then analyze this data to construct a model of the decision making process.

3.2 Data Analysis Method

In order to make sense of the qualitative data, we resort to an Ethnographic Decision Tree Model (EDTM). EDTM assesses behavioral choices made in certain situations and constructs formal models to represent decision choices (Hazra, 2014). An important assumption in EDTM is that groups are likely to abide by a common set of decision rules even though variations may exist at the individual level decision making (Johnson & Williams, 1993; Beck, 2005). Gladwin (1989),

in a seminal work, outlines in detail the steps required to be followed by studies using EDTM. The method involves formulation of decision criteria using data obtained from a sample of decision makers and construction of "a decision tree, table, flow chart, or set of 'if-then rules' or expert systems" (Gladwin, 1989, p. 8). EDTM has been used in various academic fields such as health, psychology, agriculture, sociology, Information Systems etc. to make sense of a variety of decision making processes (see e.g., Johnson & Williams, 1993; Fairweather, 1999; Beck, 2000; Gladwin, Gladwin & Peacock, 2001; Oh & Park, 2004; Ryan & Bernard, 2006).[1] We have not come across any study that uses EDTM to analyze the decision making process of stock selection. This study is unique from that perspective also.

4. Data

Semi-structured interviews have been conducted on 31 investors who hold portfolio in the Dhaka Stock Exchange (DSE). The interviewees were selected on the basis of personal connections and their willingness to give time (purposive sampling). They have been asked open ended questions based on the interview guides regarding their motivation to enter the market, information search and portfolio construction strategies, self-assessment of their knowledge, portfolio performance assessment, overall attitude towards investment in the stock market etc. The average interview time is about 49 minutes. All interviews have been recorded and transcribed.

4.1 Demographic and Information Use Characteristics

Table 1 reports the demographic and information use characteristics of the interviewees. The group of investors interviewed mostly consist of people belonging to the age group 31 – 40 (42%). The next largest age group is 21 – 30 (35.5%). Vast majority of the respondents are men (90%). More than half of the respondents are married (64.5%). All but one interviewee are University graduates, and more than half of all respondents hold Master's degree.

Most of the respondents in this group are private service holders (39%) and investment professionals (23%). The group also includes banker, university teacher, businessmen and retired engineer. In terms of monthly income, more than half the interviewees fall either in the group "Between Tk. 20,000 and 50,000" or "Between Tk. 100,000 and 300,000". The income group

[1] As cited by Hazra (2014).

"Between Tk. 100,000 and 300,000" covers about 40% of the respondents when monthly family income is considered.

Table 1: Demographic and Information Use Characteristics

Investor Information	Percentage
Age	
21 to 30	35.5
31 to 40	41.9
41 to 50	9.7
50+	12.9
Gender	
Male	90.3
Female	9.7
Marital Status	
Married	64.5
Single	35.5
Highest Level of Education	
Higher Secondary School	3.2
Bachelor's	41.9
Master's	51.6
PhD	3.2
Profession	
Service	38.7
Accountant	3.2
Banker	3.2
Investment Professional	22.6
Student	9.7
Lecturer/Professor	9.7
Businessman	9.7
Retired Engineer	3.2
Monthly Income	
Below Tk. 20,000	7.4
Between Tk. 20,000 to 50,000	33.3
Between Tk. 50,000 to 80,000	14.8
Between Tk. 80,000 to 1,00,000	11.1
Between Tk. 1,00,000 to 3,00,000	33.3
Monthly Family Income	
Between Tk. 20,000 to 50,000	8.3
Between Tk. 50,000 to 80,000	8.3
Between Tk. 80,000 to 1,00,000	8.3
Between Tk. 1,00,000 to 3,00,000	41.7
Over Tk. 3,00,000	33.3
Years in the Stock Market	
<1 year	6.5
1 to 5	32.3
5 to 10	29.0
10 to 15	22.6
20+	9.7
Stock Market Holding as % of Total Financial Asset	
0 to 10%	8.7
11 to 20%	8.7
21 to 30%	4.3
51 to 60%	21.7
71 to 80%	13.0
81 to 90%	8.7
91 to 100%	34.8
Percentage of Information/Concept Used	
21 to 30%	12.9
41 to 60%	29.0
61 to 80%	35.5
81 to 100%	22.6

Substantial variation exists among investors in terms of length of involvement in the stock market, total financial assets and the amount of investments in the stock market. Total time involved in the stock market ranges from 4 months to 31 years. 32% of the respondents have been investing in the stock market for 1 to 5 years. We also look at the portion of one's financial assets invested in the stock market. This portion ranges from 10% to 100% of total assets. 35% of the respondents have more than 90% of their total financial assets in the stock market.

Additionally, investors were asked to fill up a questionnaire in order to accurately record their demographic and financial characteristics, awareness and use of information and concepts employed in investment decision making. To check the latter, investors were asked to rate 41 different types information and concepts (taken from the DSE website and Textbooks) in terms of familiarity and use on a 4-point scale (0=Never heard of it, 1=Heard of it but do not use it, 2=Heard of it and often use it and 3=Use it frequently). These contain market information (e.g. change in price, volume of trade etc.), accounting information (revenues, EPS, dividends etc.), concepts (e.g. Efficient Market Hypothesis) and macroeconomic indicators (e.g. fiscal policy, interest rate etc.). Based on the responses, the top 5 information used are: i) change in stock price, ii) day's value, iii) day's price range, iv) revenue, and v) Price to Earnings (P/E) Ratio. On the other hand, the bottom 5 information/concepts used are: i) Efficient Market Hypothesis, ii) Hedging, Speculation and Arbitrage, iii) S&P500, NASDAQ, Dow Jones Industrial Average (DJIA), iv) Risk Adjusted Returns (e.g. Sharpe Ratio), v) Beta and Expected Return (CAPM Model). It is important to note that the top 5 are available in the DSE website whereas the bottom 5 are not.

In order to have an overview of the percentage of the information/ concepts understood and used in constructing portfolio by an investor, total points across 41 categories for each investor were calculated and converted into percentage of total possible score.

$$\%\ of\ information\ use = \frac{\text{Sum of scores of 41 information and concepts based on its use by an investor} * 100}{\text{Total Possible Score } (41 * 3 = 123)}$$

Mean and median of the percentage use is 63% and 62% respectively. 14 investors score above this average. The top 3 investors in terms of this measure use 97%, 93% and 90% of the concepts, respectively. Two of the top three are finance professionals and all hold Master's degree. All of them are highly knowledgeable in the field of Finance and hence are expected to know more than an average investor. The investors with the lowest scores use 28%, 28% and 34% of the concepts

respectively. Two have them have Master's degree and one of them holds a Doctorate degree. Two of these three investors are women. In their interviews, these two investors reported that they are more reliant on advices from their friends, colleagues and advisors. This might be the reason behind their lower use and understanding of different information and concepts.

5. Findings

5.1 An Ethnographic Decision Tree Model (EDTM) of Stock Selection

In order to summarize the findings and understand the factors affecting the stock selection decision of an investor participating in Bangladeshi Stock Market, an Ethnographic Decision Tree Model (EDTM) explaining an investor's process of selecting a particular stock is presented. In this section, we discuss the structure of this Decision Tree Model and support the elements with excerpts from the interviews.

The decision tree has three outcomes: "buy", "do not buy" and "consider it for later". From the interviews, three different ways by which stocks come to an investor's attention are identified. These are past experience, news/ suggestion/ rumors and active search for stocks to invest in. The stocks an investor chooses usually fall in one of these three categories.

Investors, especially those who are experienced, know about some stocks in details. These are not analyzed as frequently or thoroughly as a stock new to them. We find, somewhat similar to Sirri & Tufano (1998) and Al-Tamimi (2006), that many of the investors, based on a stock's reputation and past performance, have identified a set of stocks which are deemed 'safe'.

> ***"****I used to buy and sell stocks very recklessly before. Since the stock market crash, I invest in large and good companies whose financial conditions are known to me. For example, there is Beximco, Grameenphone, Square etc. I hold these stocks. This is because investment in these stocks is very safe. These companies do not get into trouble that easily. Even after the market crashed, these stocks had relatively high price. Though their price fell significantly, their condition was good.****"***

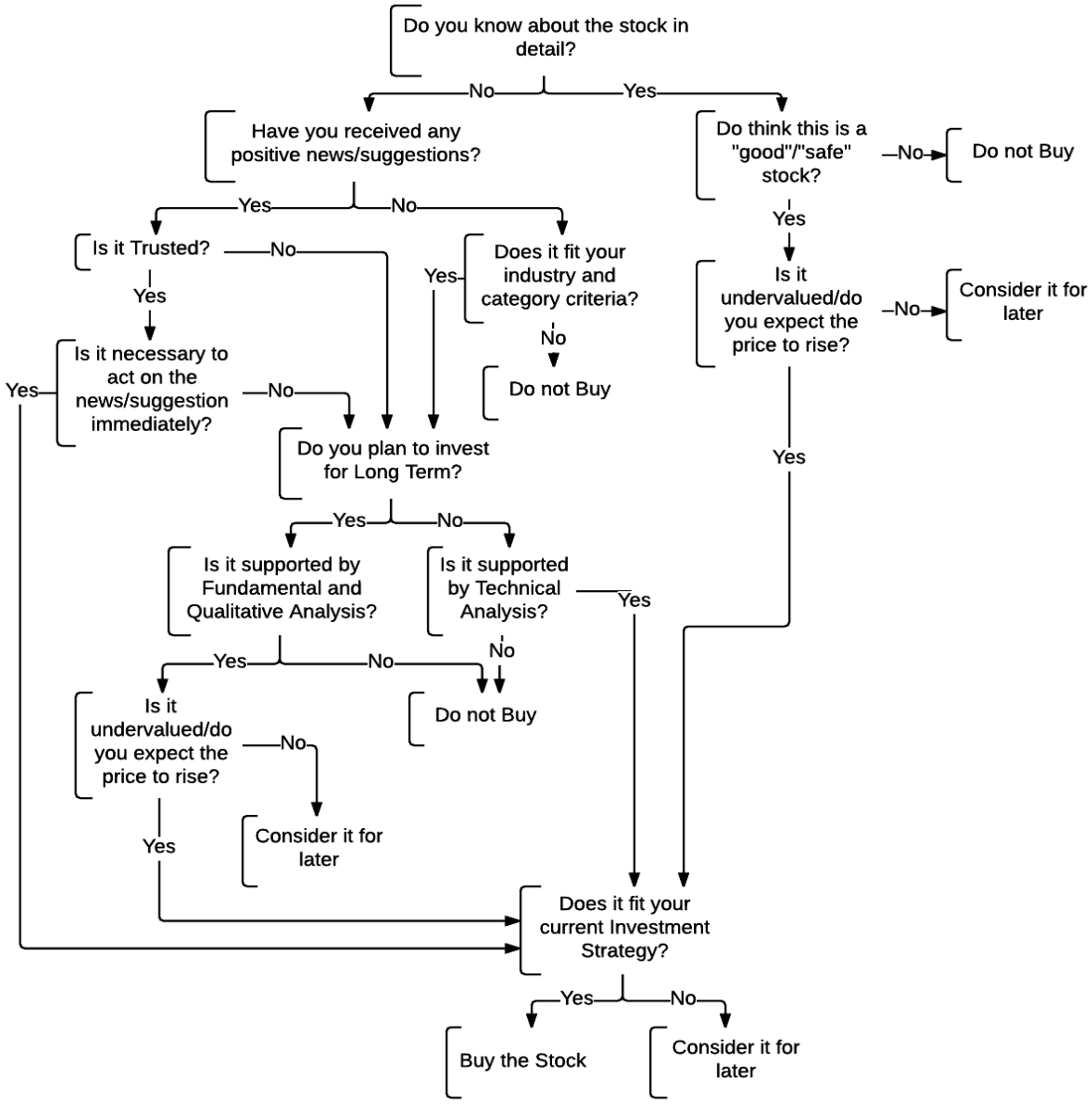

Figure 1: An Ethnographic Decision Tree Model (EDTM) of Stock Selection by Bangladeshi Investors

The interviews also show in contrast to the findings of Nagy & Obenberger (1994) that Bangladeshi investors often choose a stock based on news/ suggestions/ rumors they receive from their family/friends/acquaintances/broker. Final decisions are often taken based on information even before it is verified or validated by the investor as they put their trust on these sources and believe that immediate action is necessary to benefit from the investment. But in most cases, investors deem it necessary to study the stock before they act on the information.

"Those of us who trade have made a lot of friends. We collect the information from them. The information is not like those which can be found searching the internet. Information, e.g., that a company will start another operation is not available in the internet. Those who know the company's directors or staffs collect the information. Then they buy the share. After they purchase, they suggest us to buy it."

"I have an individual analysis of each stock. If I believe that the stock is comparatively cheap, I consult with some of my friends who are working in different organizations to get their opinion about it. If they give me some positive news and I see that the volume is rising, then it becomes easier for me to take the decision. I am then confident that I should buy this stock. This helps me a lot."

Investors often actively search for stocks they are going to invest in. As many of the non-institutional investors do not have the time or capacity to look at all the stocks traded in the market, they use some 'filter' criteria to narrow down the choice set. From the interviews, the most common such criteria were 'industry' and 'share category'. We find that investors prefer some industries over others based on their expectation of its future prospect, which is a finding similar to that of Al-Tamimi (2006) and Nagy & Obenberger (1994). Some of the investors also report strict avoidance of certain category of stocks e.g. Z category. Hence these were used in the Decision Tree Model. Further studies may generate other such criteria.

"When you look at the 300 stocks industry wise, it comes to 10 to 15 companies. Then I analyze the industry; and the movements of different industries. I look at what movements there are in the market and which industries have the possibility of future movements. Using some technical tools, I look at the position the industries are in currently and what might their position be in the future. If I find out that an industry has the possibility of movement in the future, then I scan particular stocks from that industry using my fundamental and technical knowledge."

"I look at the basic things like everyone. I check its condition, how much debt it has, whether it was in Z category at any time etc. I always check the category. I never buy Z category shares. This is a problem category. If there is any problem, the company goes into the Z category. It becomes difficult to sell it. It gets stuck then."

Our analysis reveals that investors usually use a combination of past experience, news/ suggestion/ rumors and active search to identify which stocks are eligible for investment. But they are usually inclined to one or two of these sources. For example, an investor in most cases may resort to active search whereas another depends mostly on suggestions. The interviews show that different investors have a varied level of trust and dependence on suggestions. Again, different investors may have different 'filter' criteria or different definitions of fundamental soundness of a company and consequently different definitions of a 'good' company.

The interviews show that the path of analysis of a stock is dependent on the plan of the investor. Investors intending to invest for the long term usually resort to fundamental analysis along with some other evaluations based on some qualitative criteria such as management strength, shareholding structure etc. The focus on technical analysis, on the other hand, is always associated with short-term investments but never long-term investments. Even those who use mostly fundamental analysis do not do such analysis when planning for short-term investment.

> ***"****First I used to look at the profitability of the company. If the company has past years' information, then I looked at the profit of those years. It may be so that the information tells me that they have earned good profit in the past i.e. the trend of the profit is good. They may also do well in the future. But a company with high profit might also have large capital. Then their Earnings per Share (EPS) will not be that high. But a company with good profit but small capital will have a higher EPS. So, I looked at this too. I also look at the reserves. The company may have profited in the last few years but did not give any dividend. They built up their reserves for the future. These are shareholders' money. So, I look at whether the company has good reserves.****"***
>
> ***"****If the Management is strong, then I will invest. An example is Olympic Industry. They sell biscuits now. But when they first started out, they were a bad company. They used to sell battery then. The product did not have much value and much demand; there ratios were not good, and their future was unclear. These three indicators are very poor, but the Management is very strong. They are honest. I will invest here. Business can be bad. But it is the Management that turns this around. Olympic was a battery company. The business was bad. Then they completely shifted their focus from battery to biscuit. The product may not have potential. Then change the product, change the*

industry. They shifted to food industry. Now they are doing very good in that industry. Battery is still there. They are currently selling battery, foods and they will also bring some new things into the market in the future. The company is performing better. This is because Management was very strong and had good business sense."

"For Z category stocks, I look at the 52 weeks range. I look at whether these are at 52 weeks' or 2 years' low. If I see that in last one month it fell by around 20% and the market has a tendency to rise, I buy the share. I do not even look at any other thing, neither income statement nor balance sheet. I just look at the price. Let's say that a stock's price is at 52 weeks' low. I then observe for a few days to see how the price behaves. The overall market is important too. When I see that the overall perception about the stock market is good and the market is steady, I buy the stock. It's a very short-term investment, maximum 3 to 4 weeks. If I get 5-10% return within 3-4 weeks, I sell the stock."

The 'Point of Entry' i.e. when to buy is always dictated by whether the stock is or perceived to be undervalued or whether the stock's price is expected to rise in the future by the investor. A stock selected after analysis may not meet the point of entry criterion always. But rather than totally avoiding the stock, investors may consider it at point when the criterion is met. On top of that, an investor's current investment strategy may not be consistent with the decision to purchase the stock (e.g. according to one's investment strategy, she/ he should not exceed a pre-defined level when investing in short-term stocks or if the market condition is not favorable for risk taking etc.).

"Now, before I buy anything, I always look at the fundamentals. Then I look at the technical analysis. I examine fundamentals to judge the quality of a stock. But I also look at technical analysis as it helps me to determine when to enter the market."

"It depends on a lot of things. For example, the market now has a positive trend. People are getting good return from the market; other things which influence the market are positive. In that case, I will invest about 60% in the short term. By short term I mean a month or 2-3 weeks, i.e., I will buy today and sell within a month. So, I will allocate 60% in short term and 20% each for medium and long term. It depends on the market condition."

We find that there are a couple of important factors which influence the decision making process and the outcome. These are discussed below.

5.2 Collective Intelligence

Although investors usually incline towards either experience, news/ rumors/ suggestions or active search to guide their decision-making process, it is not easy to group investors into these three categories as the decisions are mostly a combination of these factors. Our findings suggest that stock market investment decision is a result of "collective intelligence" rather than individual intelligence. Whether active or not, each of the investors is part of a group or a network that shares information with each other. Though the information given or received is not always acted upon, news, suggestions and rumors always travel through this network. This group usually contains friends and family members who invest, brokers, fellow investors who use the same Brokerage house, members of share market related Facebook groups etc. In many cases, an individual enters the stock market with the help of her/ his friend(s) or family member(s). We also find that in the initial stage, investors are more dependent on financial advice they receive from different sources. These advices received in the initial stage of investment together with the investor's education and experience play important role in shaping an investor's decision-making process. The nature of a group and its influence on the decision of its members are not always addressed in Finance and Economics literature, especially in Bangladeshi context.

Collective Intelligence certainly has its advantages. It allows an individual investor to access information that s/he has not directly searched for or analyzed. If utilized properly, this can reduce the drawbacks an individual suffers due to time and resource constraints. Institutional investors enjoy the fruits of division of labor as they employ dedicated analysts for each sector. This allows them to access and analyze more information than a non-institutional investor. Organization's structure assists them to pool information and plan their portfolio. Conscious recognition of this network and realization of its usefulness may enable investors to plan their investments more effectively. Nowadays a lot of investors and professionals are taking formal training in investment. This is likely to have a positive impact on the investment environment of Bangladesh as information shared by these qualified individuals may help to raise the quality of decision making of other investors.

5.3 Trust

The extent to which an investor depends on news/ rumors/ suggestions may depend on the trust s/he puts on her/ his sources. While investors report that they receive news from a wide variety of sources, they usually do not act upon the news before they verify it. However, among the various sources, there are some that they value and trust more than others. Investors often act upon information received from such sources almost immediately.

Things become complicated due to the existence of market manipulation. Bangladeshi investors are concerned about such activities. This may make it difficult for investors to put their trust on a particular source as they fear the news they receive may not be accurate. Investors have also expressed their distrust of published financial statements. Many of them believe the figures presented are often manipulated and do not provide a true picture of a company's financial health. Lack of trust on both public and private information often make it difficult for investors to define their preference for information and take effective decisions. This lack of trust results in investors being less reliant on published financial information and more reliant on qualitative criteria e.g. management quality, shareholding structure, past record of board members etc. Based on these criteria, investors form an opinion about a company which in turn influences the stock selection decision. Such findings suggest potential ineffectiveness of disclosure policies. This a significant barrier in investment assessment and hence a roadblock on the way to achieving market efficiency.

5.4 A Few Additional Findings

A few other findings are worth mentioning here. A subset of the interviewees who faced the stock market crash of 2010-11 report that they did not consider risks at all when they used to invest before the crash. The high return they saw other people receiving by participating in the market attracted them. Those who started investing a year or two before the crash saw their investments garnering tremendous returns, even if the investment decisions were not well thought out. They did not take the potential risks into account, did not set a specific target for return and became aware of the risks only after they experienced the crash. This corroborates findings presented in Saha (2012) and brings forward the importance of studying investment risk communication methods in Bangladesh.

One of the Institutional investors interviewed identified broker dependence as a major problem in the Bangladeshi Stock Market. He alludes to the existence of agency problem between the broker and the investor as the broker's incentive lies in volume of trading instead of the client's profit. But, for many investors in Bangladesh, a brokerage firm is the primary source of information. A naïve investor may not be aware of the fact that a broker may present information with a view to maximizing her/his own objective function rather than the client's. This is a problem that also requires attention.

6. Discussion

In constructing the EDTM, several sources of difference among investors have been identified. Namely, we have identified differences in the following areas: how the stock comes into investor's attention (i.e. whether the choices they evaluate are actively searched for or based on suggestions given by family/ friends/ broker or based on past experience), level of trust on the received news/ rumors/ suggestions, definition of a "good" company, choice set 'filter' criteria (e.g. industry nature, share category etc.), investment duration (long-term or short-term) and evaluation criteria (fundamental analysis/ technical analysis/ other qualitative criteria), definition of undervalued stock (process of determining value or formation of expectation about future price) and finally portfolio construction strategy.

Several of our findings are supported by the literature. Daniel et al. (2002), e.g., mention that while choosing investment instruments, many investors ignore other major asset classes (e.g. bonds, real estate etc.). Our findings show that 35% of the respondents have more than 90% and 79% of the respondents have more than 50% of their total financial assets in the stock market. Barber & Odean (2008) propose that agents faced with multiple alternatives primarily consider options which have attention attracting qualities. When alternatives are many and search costs high, attention may affect choice more profoundly than preference. This proposition is consistent with our finding that news, rumors and suggestions often hold more weight than other criteria in influencing investors' decisions. We find that investors use 'filter' mechanisms to simplify the task of stock selection when presented with many alternatives. This is consistent with the work of Payne (1976) where he provides evidence that decision makers use choice heuristics to reduce cognitive strain when faced with increased complexity in investment decision making. Bouwman et al. (1987) report that financial analysts develop and use "themes" based on company's nature and future prospects to

guide their analysis. Our findings present similar results as it shows that investors prefer some industries over others based on their expectations on the industries' future performance.

7. Conclusion

Most of the studies on Bangladesh stock markets address the issue of market efficiency without taking into account the nature of investors and their decision-making processes. This study looks to close that gap by exploring stock selection process of Bangladeshi investors. 31 investors who are currently holding portfolio in Dhaka Stock Exchange (DSE) have been interviewed regarding their choices and decision making processes. The contents of the interviews are analyzed to develop an Ethnographic Decision Tree Model (EDTM) of stock selection which helps us understand the different stages of decision making of a Bangladeshi stock market investor such as how a stock comes into an investor's attention, how choice set is handled when actively searching for stocks, how investment plans affect evaluation of a stock, how expectation of price and investment strategy affect final choices, etc. In addition, the study finds that collective intelligence and trust are two key factors that influence decision making of a Bangladeshi stock market investor.

This study is exploratory in nature. In EDTM, the researcher's interpretation of data also plays a big role. Hence, it is difficult to generalize the study's findings. One of the main contributions of this study is that it helps to identify factors specific to decision making in Bangladesh context. These findings can serve as a repository of hypotheses that can be studied further and tested to understand its validity. The method followed in this study is different from the traditional methods used in analyzing stock market decision making. It has served its purpose of generating insights which would have been difficult to obtain using other methods.

The findings of our paper have pertinent implications for business owners/ managers, investment bankers/ financial institutions/ non-bank financial institutions (NBFIs), individual investors, educators and students. Business owners/ managers trying to raise funds through the capital market can be benefitted by gaining a basic understanding of the choice behavior of the potential buyers of their shares, which may have important implications for their decision to issue shares and for the pricing of their IPOs (initial public offerings). Investment bankers/ financial institutions /NBFIs can benefit from gaining useful insights regarding more prudent management of their

clients' investment portfolios. Individual investors can be benefitted by acquiring an initial working knowledge as to how to go about choosing the stocks to invest in. Educators in Bangladesh teaching investment theory can use the findings for teaching purpose whereas Bangladeshi students of finance can be motivated by being able to connect the theories they learn in class with the realities of stock market decision making process of the Bangladeshi investors.

One of the limitations of the paper is that the EDTM does not include mechanism to determine allocation of funds among various forms of investment instrument in the presence of budget constraint. The interviews do not contain information on how investors determine the amount they invest in or the minimum volume they purchase for each stock. Further study is required in order to model this portion of the decision making.

The findings presented and the EDTM constructed in this paper can serve as the basis for future research on Bangladesh stock markets. The study does not depend on traditional risk-return based theoretical framework and therefore can provide a different understanding of investor behavior. As it solely focuses on Bangladesh Market, the findings capture the nuances of Bangladeshi investors. By pairing the model with economic theory, a more robust understanding of investor decision making can be studied in the future. This study also provides scope for future research on the process of information transmission within a group setting and the determinants of trust in terms of investment decision making. This research can be seen as a stepping stone to understanding a myriad of aspects regarding investment decision making in the context of Bangladesh.

References

Al-Tamimi, H. A. H. (2006). Factors influencing individual investor behavior: an empirical study of the UAE financial markets. *The Business Review*, *5*(2), 225-233.

Baker, H. K., & Haslem, J. A. (1974). Toward the development of client-specified valuation models. *The Journal of Finance*, *29*(4), 1255-1263.

Barber, B. M., & Odean, T. (2008). All that glitters: The effect of attention and news on the buying behavior of individual and institutional investors. *Review of Financial Studies*, *21*(2), 785-818.

bdnews24.com. (2017, January 18). As Bangladesh stock market soars, experts advise caution to investors.

Beck, K.A. (2000). *A decision making model of child abuse reporting.* Dissertation Abstracts International Section A: Humanities and Social Sciences. (61(5-A))

Beck, K. A. (2005). Ethnographic Decision TreeModeling: A Research Method for Counseling Psychology. Journal of Counseling Psychology, 52(2), 243-249. doi: 10.1037/0022-0167.52.2.243

Bouwman, M. J., Frishkoff, P. A., & Frishkoff, P. (1987). How do financial analysts make decisions? A process model of the investment screening decision. *Accounting, Organizations and Society*, *12*(1), 1-29.

Clarkson, G. P., & Meltzer, A. H. (1960). Portfolio selection: A heuristic approach. *The Journal of Finance*, *15*(4), 465-480.

Cohn, R. A., Lewellen, W. G., Lease, R. C., & Schlarbaum, G. G. (1975). Individual investor risk aversion and investment portfolio composition. *The Journal of Finance*, *30*(2), 605-620.

Daniel, K., Hirshleifer, D., & Teoh, S. H. (2002). Investor psychology in capital markets: Evidence and policy implications. *Journal of monetary economics*, *49*(1), 139-209.

Fairweather, J. R. (1999). Understanding how farmers choose between organic and conventional production. Results from New Zealand and policy implications. *Agriculture and Human Values, 16,* 51 - 63.

Fama, E. F. (1970). Efficient capital markets: A review of theory and empirical work. *The journal of Finance*, *25*(2), 383-417.

Gladwin, C. H. (1989). *Ethnographic decision tree modeling* (Vol. 19). Sage.

Gladwin, C. H., Gladwin, H., & Peacock, W. G. (2001). Modeling hurricane evacuation decisions with ethnographic models. *International Journal of Mass Emergencies and Disasters, 19(2),* 117 - 143.

Guiso, L., Jappelli, T., Padula, M., & Pagano, M. (2004). Financial market integration and economic growth in the EU. *Economic Policy*, *19*(40), 524-577.

Harrell, M. C., & Bradley, M. A. (2009). *Data collection methods. Semi-structured interviews and focus groups*. RAND NATIONAL DEFENSE RESEARCH INST SANTA MONICA CA.

Hassan, M. K., Islam, A. M., & Basher, S. A. (2000). Market efficiency, time-varying volatility and equity returns in Bangladesh stock market. *Applied Financial Economics*, *6*.

Hazra, U. (2014). *Understanding acceptance decisions and identity associated with smartphones: A qualitative enquiry* (Unpublished Doctoral Dissertation). University of Cape Town, Cape Town, South Africa.

Johnson, J., & Williams, M. L. (1993). A preliminary ethnographic decision tree model of injection drug users' (IDUs) needle sharing. *Substance Use and Misuse, 28(10),* 998-1014.

Kabra, G., Mishra, P. K., & Dash, M. K. (2010). Factors influencing investment decision of generations in India: An econometric study.

Kane, A., Marcus, A., & Bodie, Z. (2007). *Essentials of investments*. McGraw-Hill.

Lee, J., & Geistfeld, L. V. (1998). Enhancing consumer choice: are we making appropriate recommendations? *Journal of Consumer Affairs*, *32*(2), 227-250.

Lee, J., & Marlowe, J. (2003). How consumers choose a financial institution: decision-making criteria and heuristics. *International Journal of Bank Marketing*, *21*(2), 53-71.

Lewellen, W. G., Lease, R. C., & Schlarbaum, G. G. (1977). Patterns of investment strategy and behavior among individual investors. *The Journal of Business*, *50*(3), 296-333.

Loibl, C., & Hira, T. K. (2009). Investor information search. *Journal of economic psychology*, *30*(1), 24-41.

Mamun, M. A., Syeed, M. A., & Yasmeen, F. (2015). Are investors rational, irrational or normal? *Journal of Economic & Financial Studies, 3*(4), 1-15.

Mobarek, A., Mollah, A. S., & Bhuyan, R. (2008). Market efficiency in emerging stock market: evidence from Bangladesh. *Journal of Emerging Market Finance*, *7*(1), 17-41.

Nagy, R. A., & Obenberger, R. W. (1994). Factors influencing individual investor behavior. *Financial Analysts Journal*, 63-68.

Oh, H.-S., & Park, H.-A. (2004). Decision tree model of the treatment-seeking behaviors among Korean cancer patients. *Cancer Nursing, 27(4),* 259-266.

Payne, J. W. (1976). Task complexity and contingent processing in decision making: An information search and protocol analysis. *Organizational behavior and human performance*, *16*(2), 366-387.

Payne, J. W., Bettman, J. R., & Johnson, E. J. (1988). Adaptive strategy selection in decision making. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *14*(3), 534.

Riley Jr, W. B., & Chow, K. V. (1992). Asset allocation and individual risk aversion. *Financial Analysts Journal*, 32-37.

Ryan, G.W. & Beranrd, R. H. (2006). Testing and ethnographic decision tree model on a national sample: Recycling beverage cans. *Human Organization, 65(1),* 103-114.

Saha, S. (2012). Stock market crash of Bangladesh in 2010-11: Reasons & roles of regulators.

Slovic, P., Fleissner, D., & Bauman, W. S. (1972). Analyzing the use of information in investment decision making: A methodological proposal. *The Journal of Business*, *45*(2), 283-301.

Tversky, A., & Kahneman, D. (1986). Rational choice and the framing of decisions. *Journal of business*, S251-S278.

Von Neumann, J., & Morgenstern, O. (1944). *Theory of games and economic behavior*. Princeton, NJ, US: Princeton University Press.