CHAPTER 1

1. INTRODUCTION

An executive takes multiple decisions every day, some routine and some involving complex dimensions with its consequences ranging from immediate to long term. The decision environment is constricted with limited, sometimes even incomplete inputs and diverse constraints. Yet, the decision maker is expected to ensure workability and success of the choice. In strategic or financial decision making, there is higher risk and complexity in the decision context. This furthers the stakes for the decision maker. Owing to these high risks or stakes, along with long-term bearing and influence that it has, decision making has emerged as an important research agenda.

An individual or retail stock investor is exposed to multiple situations during the day where he/she is expected to decide on events with high monetary stakes. The risks are even higher for an institutional investor involving larger amount of money and extending to multiple stakeholders. Hence, it is imperative that financial decision maker should be able to evaluate complete information flows and take a comprehensive decision. Most of the times, he/she may be obligated to take an uninformed decision with partial information in limited time. His/her experiential wisdom and instincts play a role here. Investment decision making is supported by a confluence of rationality and intuitive appeal. The genesis of traditional and modern finance models lies in the rational approach. However, owing to multiple contextual constraints, investor may move away from pure rationality in decision making. Studying this process of diverging from rationality, role of contextual variables, behavioural mediation and alike has become an interesting field of enquiry for researchers under the emerging domain of behavioural finance.

Thaler (1980) articulates that in certain well-defined circumstances, decision makers’ behaviour is inconsistent with economic rational theory; where they under-weigh the opportunity costs, fail to ignore sunk costs, choose not to choose. This present study is an attempt to investigate investor decision making from behavioural perspective.

The subsequent section discusses the concept of general decision making followed by the
significance of information processing models. Next, behavioural foundations of investor decision making under the purview of bounded rationality are explored. Evidences highlighting the role of behavioural factors like aggregate market anomalies and individual decisions are investigated. In the last part of this section, need of the study is identified and research agenda is discussed.

1.1. Decision Making: Background

Generally, decision making is the cognitive process of choosing an alternative from the available choices. Decision makers weigh the options, assess the merits and demerits of each alternative, perform cost-benefit analysis prior to selecting an option. Here, ability to forecast the future accurately (or with minimum deviation) is an important criterion for ensuring event success. A decision maker operates in dynamic business environment with poorly-outlined goals, fluid and conflicting goals, poorly-defined work, uncertain and ambiguous data, pro-active and reactive actions within time constraint (Klein and Klinger, 1991). The is further accentuated by interplay of emotions (Matzler et al., 2007) which need to be controlled for rational analysis.

Mostly, decision makers are value optimizers in evaluating the competing alternatives. They weigh the options by qualitatively evaluating each alternative for estimating their worth. Researchers have studied the process of decision making from different perspectives. Swami (2013) collates the viewpoints and presents them as under:

- From a psychological perspective, an individual’s need, his/her preferred choice and value he/she desires to achieve is assessed in decision making.

- From a cognitive perspective, decision making is a continuous dynamic process with iterative changes in the decision contexts and environment.

- From a normative perspective, a decision maker is concerned with examining the options rationally, be an optimizer and select the alternative accordingly.

- Others opine that decision making is synonymous with problem-solving related activities seeking satisfactory and non-optimal outcome.

An emerging field of enquiry, Neuro-economics, attempts to provide a scientific description
behind the theory of decision making incorporating human emotions, human behaviour, assessing subjective value function and studying neurological interpretations. It attempts to provide unified explanation of human behaviour by studying it from three levels - Economics, Psychology and Neuroscience. Neuro-economics reviews the neural implementations of the computational processes in a brain that are involved in decision evaluation phase and suggests general acceptable integrated theory of decision making. The discipline describes sensation-action mechanism before a decision is made from neuro-biological perspective. It proposes biologically sound theory, the hows and whys of human decision making and its application across natural and social science (Rangel et al., 2008).

Neuro-economics is a multi-disciplinary field which combines economics, psychology and neuroscience in explaining theory of decision making. Economics brings together choice architypes, models with qualitative variables and experimental procedures for measuring these subjective variables. Psychology helps to study behavioural tendencies of decision makers under controlled environments and extends the observations into theories of learning and decision making. Neuroscience provides neural correlates of different events of decision making and thereby improves awareness about brain.

Neurological, social science and psychological researchers have identified three broad categories of decision making styles, also referred to as, information processing styles. These are discussed in the following sub-section.

1.2. Information Processing Styles or Decision Styles

Information processing style is the preferred way of processing available information in a decision task. Initially, two predominant styles identified were rational and intuitive (Simon, 1957), where the former refers to rational use of information and explicit analytics, and the latter is a blend of expertise and experience.

Conventional wisdom almost exclusively relies on analysis, cognition and judgement to be rational approach, outperforming, at most times the intuitive style. Interestingly, recent enquiries provide multiple instances where decision maker’s preference systematically moves away from the rational style in favour of a more intuitive approach. Now, intuitive style is no longer
perceived as an inferior or a primitive form, instead it has been endowed with the potential to supplement rational cognition in domains which impede explicit analysis (Burke and Miller, 1999; Khatri and Ng, 2000).

Contemporary theorists also suggest dual processing style with intuition and cognition working separately, yet in an iterative parallel fashion. The relative extent of engagement of these complementary systems is governed by contextual factors where dominance of either reflects individual’s decision style.

Subsequent section discusses these three reflections regarding individual’s preference to process information – cognitive, intuitive and ambidextrous (or dual).

1.2.1. Cognitive Preference

Broadly, cognitive style thinking has been defined as a set of processes that organizes mental thinking pattern across situations. It systemizes operational and tactical strategies in a complex sequential decision-making process (Messick, 1978; Löfström, 2005). Simon (1957) held that analytical decision-making is a sequential process involving problem identification, developing and analyzing decision alternatives and then selecting the best option. Owing to the procedural detailing, cognitive thinking has been typified as slow, deliberative, computational, based on rules and processes (Hammond, 1996; Epstein, 1990, 2008; Hogarth, 2005) with emphasis on deliberative analysis for selecting an alternative.

Löfström (2005) collates multiple dimensions of cognitive centered decision-making models; such as:

- **perceptual functioning** – or perceptual learning. It relates to simple sensory modalities to complex categorizations of spatial and temporal patterns in the problem context and inter-relationships between different variables,

- **impulsivity-reflectivity** – It refers to the rate at which decisions are taken in an uncertain, random and dynamic environment. It relates to the internal-external stimuli building the social experience,
• **convergent-divergent** – are two contrary styles. While convergent thinking follows set of logical steps to choose an option, or usually a stereotype option; divergent thinking involves creative, spontaneous, non-linear style to explore multiple possible solutions and unexpected connections,

• **holist-serialist** – perceiving the situation on a system’s perspective or on the basis of individual datasets,

• **random-sequential** – Random processing includes studying lack of pattern or predictability in a decision context or decision frames on logic of consequences in a progressive pattern,

• **assimilator-explorer** – approach addresses decision maker’s preference for familiarity (assimilation) or originality (exploration) in the situation

• **adaptor-innovator** – adaptor is characterized by meticulousness, reliability, efficiency in a methodical way; while, innovator is characterized by tangential thinking and approaching tasks from unsuspected dimensions.

Cognition includes one or many of these dimensions as an approach to problem solving. Hence, the researcher concludes that cognitive abilities are brain-based mental computational skills for simple or complex task. It includes mechanism related to learning, memory, attention to detail, motor skills, visual and spatial processing, executive functions and problem solving (Michelon 2006). The dimensions of preference for cognitive thinking, as discussed in the preceding paragraphs, are individual’s preference for perception, organization, retrieval, conceptualization, representation of information dataset and more importantly, understanding relationships between variables. Miller (1987) views cognitive style as higher-order meta strategies that influence individual approach/ response to a situation.

### 1.2.2. Intuitive Preference

Researchers argue that rational or cognitive processing is not always possible in decision contexts owing to lack of information, resources, behavioural biases and variations (Gilovich et al., 2002; Kornev and Thissen, 2000; Dijksterhuis et al., 2006; Dijksterhuis 2004b). As stated earlier,
contextual limitations like dynamic business environment with poorly-outlined, fluid, conflicting goals, poorly-defined work, uncertain and ambiguous data, pro-active and reactive actions within time constraint further accentuates the complexity for the decision maker. In such contexts, intuitive ability of the decision maker helps eliminate the precincts of analytical reasoning. Matzler et al., (2007) argue that in many complex decision contexts, no amount of data can substitute the benefit of experiential wisdom that supports gut feeling, inner voice or intuition. The concept of Intuition has been studied and interpreted by various researchers over the years. Jung (1933) suggested intuition as some psychological stimuli communicated unconsciously. This system is characterized by tacit, implicit with associationist (connectionist) cognitive activities (van Riel et al., 2003). Intuitive decision making is expressed as feeling of instant awareness or deduction achieved by the decision maker with very little (Westcott and Ranzoni, 1963) or insufficient information (Shirley and Langan-Fox, 1996), and without any awareness of deliberation and analytical thinking (Hogarth, 2001).

Multiple researches have recognized the importance of intuitive or emotional responses in decision making (Loewenstein et al., 2001; Damasio et al., 1994). Studies provide evidence that intuitive decisions can be as reliable, robust and accurate as cognitive decision making (Klein, 2003; Dijkstra, 2004; Witteman and Van den Bercken, 2007). Further, researchers conclude that when assessments cannot be performed analytically, or when evaluations require intense pattern recognition, or when time constrains estimation, like in a complex multi-objective dynamic decision environment, working cohesively, and relying on instincts is more beneficial thinking style (Wittemen et al., 2009; Wilson, 2002).

1.2.3. Ambidextrous or Dual Processing

Preference for analysis is understood as analytical-automotive, while preference for intuition is understood intuitive-automotive responses in the decision contexts. Either of the two styles may be automatically triggered based on the decision maker’s preference, decision context or psychological factors.

In this section, we discuss the third school which proposes dual-process or ambidextrous model for information processing. Evans (2008) classified dual-processing models into (a) models where
clear distinction between intuitive and analytical processing is drawn and initial preference is based on certain variables, (b) models where both intuitive and analytical processing initiates in parallel, and (c) default-interventionist models where either analytical-automotive and intuitive-automotive processed are initiated first and further deliberate processes are enthused only to support, facilitate or correct automatic-intuitive processes (Hogarth, 2001; Evans, 2007; Kahneman and Frederick, 2002). This approach is aligned to cognitive continuum theory (Hammond et al., 1987). Unidimensional representation in cognitive continuum posits relative use of intuition and cognition which limits independent variations in the intensity of the two decision styles, prompting a two-dimensional conceptualization of usage of intuition and cognition, as represented in figure 1.1. Four quadrants in the Cartesian rational-experiential system represent four separate thinking styles. These are explained as under:

1. First, a primarily rational style (high on rational system and low on experiential system) is characterized by the predominant use of the rational information processing system. This style is stepwise, calculative, critical and explicit. It is synonymous with rule-based decision support systems.

![Figure 1.1: The Cognitive Style Matrix](source: van Riel, A. C., Ouwersloot, J., and Lemmink, J. G. A. M. (2003). Antecedents of effective decision making: A cognitive approach.)
2. Second, a style characterized by a mix of relatively effortless analytical thinking and the use of experiential cognition (low on rational system and low on experiential system) of a limited scope can be observed. Common sense, and heuristic or routine decision-making are practical examples of this style. It is appropriately characterized by the term ‘habit frozen into memory’.

3. Furthermore, a predominantly intuitive style is distinguished (low on rational system and high on experiential system), characterized by the almost exclusive and ‘intensive’ use of the experiential information processing system. This style is inherently uncritical, since the validity of insights is taken for granted.

4. Finally, a combination or integration of effortful rational thinking and the intensive use of experiential cognition (high on rational system and high on experiential system) characterizes a fourth style. The term active sense making preliminarily refers to this style.

The style is simultaneously critical, and creative.

The information processing model by Miller (1987) has three dimensions of cognitive behavior, namely, perception (pattern recognition and paying attention), thought (classification, analogical reasoning and judgment) and permanent memory (representation, organization and retrieval). Further, he segregates cognitive styles on the basis of whether the related activity originates from right side (intuitive style) or left side (cognitive style) of the brain.

Studies on dual process models provide sharp division between deliberative and intuitive processes, with both working in a parallel, complementary and congruent manner (Epstein, 1998; Sinclair and Ashkanasy, 2005). This integrated model of decision making iterates between the analytical and intuitive ends harmoniously and the dominance of either approach determined by specific factors like context and disposition (Burke and Miller 1999).

The present research is based on the ambidextrous decision-making style which encompasses two co-existent interactive information processing ways – Cognitive and Intuitive. As discussed earlier, the difference in the two styles is outlined by the quantum of information processed (low for cognitive and high for intuitive) and the kind of processing (serial for cognitive and parallel for intuitive) (Betsch and Iannello, 2010). Further, it has also been stated that when the decision
task warrants intuitive assessment, tacit or experiential system dictates. This system prompts automatize use of heuristics.

A stock market investor usually takes multiple trading decisions, usually, within numerous constrictions. There is limited, incomplete information about the financial changes, limited time for processing the available information and limitations pertaining to information processing capabilities. Further, the operating environment for a stock market investor is described as dynamic (where doing nothing is also seen as an action), stochastic and not deterministic, with multiple agents, partial visibility (of the entire system), high computation issues, where an investor takes decision under uncertainty following the principle of expected utility maximization. Under the circumstances, the relative use of intuitive faculty in conjunction with analysis would certainly help is achieving higher decision effectiveness.

Recent researches under the domain of investor decision making have highlighted multiple behavioural constructs, broadly categorized under behavioural finance studies. In the subsequent section, concept of behavioural finance is explored.

1.3. Behavioural Finance

Traditional and modern theories in finance are based on rational environment and rational agents operating in efficient markets. The basis of these models is that analytical approach and scientific validation leads to rational decisions following a logic of consequences (March, 1994). The models hypothesize closed system boundaries with interaction between rational elements within the system. These models study these rational interplays and propose theories for financial decision making. However, rationality of agents is criticized on three aspects. Firstly, the investor does not have real time access to changing information flows. Secondly, the investor may not be able to adjust the posterior probabilities in the light of new events; leading to incoherent data and unreliable analysis. And thirdly, the investor does not have sufficient time for detailed and complete analysis of each alternative. Rationality, therefore, is only theoretical in nature with un-pragmatic assumptions and poor validity of outcomes.

Hence, it would not be incorrect to state that an investor does not operate completely on rationality rather functions under stricter constraints of bounded rationality (Simon, 1957). Conceptually,
bounded rationality postulates that decision makers do not possess infinite cognitive abilities; rather they have limited conceptual and computational skills with imperfect memories. Further, insufficient time for deliberation and limited access to real-time dynamic information database are other limitations. In the stock market, an investor operates under these stricter constrictions of bounded rationality and therefore relies on his/her intuitive ability to take high quality decisions relatively quickly. Additionally, there are multiple behavioural mediators and contextual variables which inhibit holistic rational information processing.

![Figure 1.2: Rationality Vs Bounded Rationality – The Psychological Mediation](image)

To sum up, the emerging research under the purview of behavioural finance has questioned the validity of these rational models. This new wave of research supports its arguments by empirically substantiating the role of qualitative variables in financial models. Behavioural finance eliminates these limitations by proposing models/theories with not-so-fully rational elements owing to personal preferences or mistaken beliefs (Ritter, 2003). These proposed models study interplay of non-financial or qualitative variables, the effect of which, is evident both at aggregate market level in the form of market anomalies and at individual investor level in the form of imperfect trading decisions/investment choices. Figure 1.2 conceptualizes this interaction between behavioral foundations of decision making at an individual level and rational agents of traditional finance models resulting in aggregate market phenomena. It also depicts that divergence from Markowitz efficient market theory can be explained by studying behavioural underpinnings in
the stock market either through a top-down (aggregate-investor) or bottom-up (investor-aggregate) approach.

1.4. Need of the Study

Existing literature in the domain of behavioural finance have investigated moderating or mediating role of non-financial variables on the financial performance of stock market investors. These multidisciplinary studies have examined the effect of socio-cultural, socio-economic and demographic variables, apart from emotions and sentiments, on the investment assessment and choice behaviour. They demonstrate the influence of qualitative factors on cognitive faculty of the investors at different stages prior to decision.

Further, it has also been established that ambidexterity in decision makers enables iterative and synchronous processing of information at rational and intuitive ends, simultaneously. The previous section has discussed, in detail, the merit of cognitive (Messick, 1978; Löfström, 2005) and intuitive approach in managerial decision making (Dane and Pratt, 2007). It has been established that intuitive decision-making saves time and analytical effort, while relieving cognitive faculty for other managerial work (Davis and Davis, 2003). To put things in perspective, researchers argue that intuition improves forecasting accuracy of stock market investors (Harteis and Gruber, 2007). Yet, a comprehensive framework suggesting composite use of intuition and cognition is missing in behavioural finance literature. Also, these studies are not aligned to the rational paradigms of efficient market theories and suggest role of non-rational (but not irrational) qualitative factors. Hence, this study investigates the predictor role of intuitive ability and cognitive capability on the performance of stock market investors.

Moreover, studies investigating behavioural factors which act as possible antecedents of intuitive ability and cognitive capability are also not very definitive. Additionally, some of these studies are theoretical in nature and lack empirical validation. In this research, we attempt to examine the role of pertinent behavioural constructs, though, investigated in general decision-making literature, yet not been substantiated in investment decisions. This study aims to assess if such behavioural factors affect or develop investor’s intuitive ability and cognitive capability. Also,
this study explores nuances between intuitive and analytical decision making in the stock market context and provides an interesting, new look at the decision models.

To sum up the need of the study, the research questions formulated are:

- Can behavioural variables contribute to decision makers’ intuition and cognition, generally and to that of investor’s intuition and cognition, specifically?
- Does intuition and cognition improve the effectiveness of decision in an ambidextrous decision framework?

1.5. Organization of the Study

Chapter 1 – Introduction

In the introductory chapter, we have discussed the background the study, exploring investor’s orientation towards intuitive, cognitive and ambidextrous information processing in decision making. Additionally, boundaries of traditional finance theory have been narrated and emerging role of behavioural finance, specifically the role of psychological variables in financial decision making is examined.

Chapter 2 – Review of Literature

In chapter two, market indicators identifying anomalies in market behaviour have been discussed, followed by behavioural variables studies at the micro or investor level. The composition of risk and its multiple definitions are listed at the end of chapter two, followed by gaps in the existing behavioural finance literature.

Chapter 3 – Conceptual Framework

In chapter three, key constructs of the study based on the review are identified. It draws attention to the ambidextrous model of decision making and identifies behavioural factors influencing investor’s intuitive ability and cognitive capability. Proposed research framework is conceptualized and research hypotheses are explained.

Chapter 4 – Research Design and Methodology

Chapter four outlines research methodology adopted for the study including sample design, questionnaire design, details of the measurement scale used for the research constructs. The reliability score of the survey instrument and limitations of the research are also outlined.
Chapter 5 – Data Collection and Analysis
Chapter five presents the findings of descriptive and inferential statistical analysis of the data. The main effect of the predictor variables has been studied using multiple regression and moderation effect of select demographic variables has been investigated using both multiple regression and categorical split analysis for testing the hypothesis.

Chapter 6 – Results and Interpretations
This chapter summarizes the key interpretations based on the data analysis in the previous chapter. The key behavioural predictors of an investor’s intuitive ability and cognitive capability are outlined and their role in investor decision making framework narrated.

Chapter 7 – Conclusions
This chapter consolidates the findings, results and interpretations of the research in a form of a summary. Significant contributions of the study for the investor, for other decision makers, for organisations and to the management literature are described. The limitations of the study and future research direction are discussed.

1.6. Concluding Remarks
Rational agents of the rational models of financial or investment decision making have been criticized owing to their simplistic assumptions and poor validity of assumptions. The role of (not-so-rational) behavioural interplay in these models has been recognized and therefore, the need to identify qualitative constructs in decision making has been intensified. The study undertaken is an attempt to identify the behavioural factors which influence intuition and cognition of a decision maker, in general, and an investor, in specific. There is a need to outline these factors to improve the overall performance of the decision maker. In the next chapter, the review of existing studies in behavioural finance is presented to identify relevant behavioural variables in investment decision making.