Abstract: How do we know where we are, where we have been and where we are going? It’s important to understand intricacy of managerial brain. Brain is main organ of nervous system. It has the same general structure as brains of other mammals, but with developed cerebral cortex. Size of brain comes from cerebral cortex, especially frontal lobes, which are associated with executive functions. The area of cerebral cortex devoted to vision, visual cortex, greatly enlarged as compared to other animals. Basic structural design of brain is constructed through a process that begins early in life and continues into adulthood. Simpler circuits come first and more obscure brain circuits endow with basic blueprint. Experiences influence how or whether genes are expressed. Imaging studies suggest that differences in cognition and behaviour (might) relate to differences in brain connectivity. Perceptive the coverage to which two brains can differ is crucial in basic neuroscience research.

Key Words: Managerial Economic Decision, Brain, Neuroeconomics, Neuromanagement

Introduction

Each day life is chock-full with decision-making and arriving at decisions. In unlike disciplines it is studied how Manager makes preferences, with different aims and through different methodologies. The process of decision making is a core subject among Psychologists, Neurologists, Economists, Sociologists and Philosophers. Managers are particularly adept at modifying their managerial neuromanagement behaviour. Neuroeconomics is a new scientific field which has emerged recently from a joint research program between economists involved in decision-making analysis and Neuroscientists interested by the brain activity in the course of goal oriented actions. What is it you want to accomplish? Can we identify an empirical criterion for decision making during informed consent? Can we replace the principled notion of ‘conversant consent’ by psychological and neural processes underlying decision making? How would a naturalistic account of informed consent appear? Finally, question of mind - brain relationship needs to be investigated. Strangely enough, many decision makers collect a bunch of alternatives and then ask, ‘Which should I choose?’ without thinking first of what their goals are, what overall objective they want to achieve (These are the possibilities one has to choose from. Alternatives can be identified (that is, searched for and located) or even developed (created where they did not previously exist). Merely searching for pre-existing alternatives will result in less effective decision making). A component of goal identification should be included in every instance of decision analysis.

Over the past half century economists have responded to the challenges raised to neoclassicism either by bounding the reach of economic model or by turning to descriptive approaches. One recent trend in economic thought may reconcile this tension between prescriptive and descriptive approaches. There is some hope that it may yield an economic model that is both highly constrained and parsimonious while still offering significant predictive power under a wide range of environmental conditions. That trend is the growing interest amongst both economists and neuroscientists in the physical mechanisms by which human neuroeconomic managerial economic decisions are made within the human brain. There is reason to believe, some of these neuroeconomic scholars argue, that the basic outlines of the human neuroeconomic managerial economic decision making architecture are already known and that studies of this architecture have already revealed some of the actual computations that the brain performs when making neuroeconomic managerial economic decisions. If this is true, then a combination of economic and neuroscientific approaches may succeed in providing a methodology for reconciling prescriptive and descriptive economics by producing a highly predictive and parsimonious model based on the actual economic computations performed by the human brain. While both of these strategies have been enormously fruitful, neither has provided a clear programmatic approach that
Prescriptive theories seek to define efficient or optimal neuroeconomic managerial economic decision making which descriptive advances then invariably suggest do not accurately describe human neuromanagerial behaviour. The neoclassical revolution, and the period that followed it, were no exception to this general paradigm. Working from the assumption that all of human neuromanagerial behaviour could be described as a rational effort to maximize utility, the neoclassical theorists largely succeeded in developing a coherent basic mathematical framework. Prescriptive decision theories have emerged from mathematics and mathematical economics where rational choice is taken to be central to understanding economic behaviour and managing economic systems efficiently. The methodology focuses on establishing rational axioms for making decisions under uncertainty and consequences for systems of trade and commerce against defined valuations. The axioms typically express mathematical constraints which, if violated, can lead a decision-maker into suboptimal choices. Such prescriptive theories tend to be agnostic about the processes or algorithms that might implement or operationalise the mathematical constraints. Despite their conjectural importance the application of classical prescriptive decision models suffers from the practical problem that it is often difficult to estimate the quantitative parameters that they require (e.g., probabilities, utilities). Although they have informed research on human decision processes they provide limited insight into them and ignore key conjectural problems in DDM.

Economic conjecture has traditionally been interested in scrutiny of choices. Processes by which individuals reach decisions have been ignored. Managerial performance with regard to decisions has been subject of active research from several perspectives: Psychological (examining individual decisions in context of a set of needs, preferences and values), Cognitive (decision-making process regarded as a continuous process integrated in interaction with environment) and Normative (scrutiny of individual decisions concerned with logic of decision-making and rationality). Decision-making is regarded as cognitive process resulting in choice of a belief or a course of action among several substitute possibilities. Each decision-making process produces final choice that may (not) prompt action.

Decision-making is study of identifying and choosing substitutes based on values and preferences of decision maker. Decision-making is one central activity of management regarded as a problem-solving activity terminated by solution deemed to be satisfactory. It is, consequently, a reasoning or emotional process which can be rational or irrational and based on unambiguous assumptions or tacit assumptions. In regards to management and decision-making, each level of management is accountable for different things. Top level managers look at and create strategic plans where the organization's vision, goals, and values are taken into account to create a plan that is cohesive with the mission statement. For mid-level managers, tactical plans are created with exact steps with actions that need to be executed to meet the strategic purpose. Finally, front-line managers are accountable for creating and executing operational plans. These plans include the policies, processes, and procedures of the organization. Each must take into account the overall goals and processes of the organization.

How do we know where we are, where we have been and where we are going? It's important to understand intricacy of managerial brain. Brain is main organ of nervous system. It has the same general structure as brains of other mammals, but with developed cerebral cortex. Size of brain comes from cerebral cortex, especially frontal lobes, which are associated with executive functions. The area of cerebral cortex devoted to vision, visual cortex, greatly enlarged as compared to other animals. Basic structural design of brain is constructed through a process that begins early in life and continues into adulthood. Simpler circuits come first and more obscure brain circuits endow with basic blueprint. Experiences influence how or whether genes are expressed. Imaging studies suggest that differences in cognition and behaviour (might) relate to differences in brain connectivity. Perceptive the coverage to which two brains can differ is crucial in basic neuroscience research.

Over the last two or three decades economists have responded to the descriptive challenge raised by these post-neoclassical studies by adopting one of two basic approaches. Either they argue that rational neuroeconomic managerial economic decisions based on utility model occur only under some conditions and that defining those conditions is of paramount importance (Simon; 1947 and 1983), or they argue that standard utility model requires modifications, additions, or novel approaches (Savage, 1954; Kahneman and Tversky, 1979). The fundamental problem imposed by bounding rationality is that the
resultant models have little or no predictive power outside of their bounded domains. However, the conceptualization of what decision-making is and methods for studying it vary greatly and this has resulted in fragmentation of the field. A model that can accommodate various perspectives may facilitate interdisciplinary working. The principle covers the whole decision cycle, from the framing of a decision based on the goals, beliefs, and background knowledge of the decision-maker to the formulation of decision options, establishing preferences over them, and making commitments. Commitments can lead to the initiation of new decisions and any step in the cycle can incorporate reasoning about previous decisions and the rationales for them, and lead to revising or abandoning existing commitments. The model situates decision-making with respect to other high-level cognitive capabilities like problem solving, planning, and collaborative decision-making. The canonical approach is assessed in three domains: cognitive and neuropsychology, artificial intelligence, and decision engineering. The problem modified utility theories face is that these newer models often fail to be parsimonious and often appear ad hoc or under-constrained.

The goals of psychology are to explain human behaviour and predict performance, irrespective of how performance compares with rational norms. Early psychological models of decision-making were influenced by rationalist theories as sources of conjectural concepts and normative standards against which to assess human decision-making, but there has been a trend away from this in recent decades. For example Simon’s (1957) concept of ‘bounded rationality’ emphasized human limited information processing capacity and strategies for accommodating this (satisficing). Kahneman and Tversky’s heuristics and biases program also sought a more realistic account of cognitive processes in decision-making (Tversky and Kahneman, 1974) and Kahneman and Tversky (1979) developed a better description of how people evaluate potential losses and gains compared to mathematically prescribed norms. More recently Gigerenzer and Todd (2000) argue for the practical importance of simple heuristic strategies for fast decision-making.

At this time there are, however, profound differences between the approaches taken by neuroscientists and economists interested in this problem. Neuroscientists tend to underestimate the multi-faceted nature of actual human neuroeconomic managerial economic decision making and thus fail to take full advantage of the existing economic corpus, studying managerial neuroeconomic option under conditions that economists often see as trivial. Indeed, to economists many of the recent neurobiological studies of neuroeconomic managerial economic decision making seem to be more about reflexes than about economic neuromanagemental behaviour. Economists, in a similar way, often employ overly simplistic or outdated notions of brain function that are only weakly related to the modern consensus views held by neuroscientists. As a result, many neurobiologists dismiss the work of economists as irrelevant to the study of the human mind and brain. This often leads members of the larger economic community to reject neuroeconomics as irrelevant to advancing economic knowledge and it leads members of the broader neuroscience community to reject neuroeconomics as outdated or overly simplistic.

**Neuroscience - Economic Tool**

Modern utility model has its origins in the model of expected value first proposed by Pascal. He argued that the value of any course of action could be determined by multiplying the gain that could be realized from that action by the likelihood of receiving that gain. This product, which we now call expected value, was presumed to represent a rational neuroeconomic managerial economic decision variable. While Pascal and his colleagues recognized that not all human neuroeconomic managerial economic decision making could be accurately described with expected value model, they argued that all rational neuroeconomic managerial economic decision making should follow this prescriptive model (cf. Arnauld and Nicole, 1996; Pascal, 1966).

Modern work has, however, made it abundantly clear that this model also falls far short of the descriptive goal of predicting actual human neuromanagemental behaviour. For example, Allais (1953) demonstrated that human managerial neuroeconomic option can be non-transitive, Kahneman and Tversky (cf. Kahneman et al., 1982) demonstrated that human managerial neuroeconomic option neuromanagemental behaviour deviates widely from monotonicity, and most recently game theorists have even shown that under some conditions (cf. Guth et al., 1982) humans knowingly make managerial neuroeconomic options that will result in losses rather than gains. All of these experiments point out the limits of classical utility model as a tool for understanding human managerial neuroeconomic option neuromanagemental behaviour. As a result many economists have proposed that neuroeconomic managerial economic decision making is best viewed as involving the interaction...
Utility model proposes that neuroeconomic managerial economic decision makers must represent the desirability of each possible course of action using a common scale and that choosing is the process of selecting the most desirable of these possible courses of action. Pascal had argued that desirability should be computed as the product of value and likelihood of gain. Bernoulli had taken an important step forward by arguing that desirability involved a more multi-faceted computation influenced by properties intrinsic to the chooser, like current wealth. Although Bernoulli clearly meant utility model to be an objective and prescriptive model for neuroeconomic managerial economic decision making, in this regard he came very close to introducing a subjective model (Savage;1954) for the neuroeconomic managerial economic decision making process. In Bernoulli’s model, two variables from the external world were modified by processes internal to the chooser and the product of these internal computations, expected utility, was then represented and used to make managerial neuroeconomic options. Although there is still significant uncertainty about the precise form of that internal computation, current neurobiological evidence seems to strongly support this early claim. The brains of primates, almost certainly including humans, appear to represent a multi-faceted variable which under many circumstances closely parallels classical expected utility. In the final stages of neuroeconomic managerial economic decision making, the neural architecture seems to select the most desirable action from amongst representations of the desirability of all available actions by a winner-take-all process.

This model, which will be developed at length below, does however depart from neoclassical economic model in an important way. Neoclassical model has always made the famous as if argument: it is as if expected utility was computed by the brain. Modern neuroscience suggests an alternative, and more literal, interpretation. The available data suggest that the neural architecture actually does compute desirability for each available course of action. This is a real physical computation, accomplished by neurons, that derives and encodes a real variable. The process of managerial neuroeconomic option that operates on this variable then seems to be quite simple; it is the process of executing the action encoded as having the greatest desirability. Of course the challenge that this emerging view poses is thus to determine exactly how this desirability is computed. It is this process which combines elements of Bernoulli’s utility model and other operators in an evolutionary context to achieve efficient neuroeconomic managerial economic decision making in the environments for which each species evolved.

While neuroscientists are only just now beginning to describe the computation that transduces objective measures from the outside world into this representation of desirability, several factors are already becoming clear. First, under many conditions, conditions under which managerial neuroeconomic option appears rational, this desirability encoded by the neurons of the brain very closely approximates expected utility. Second, under conditions in which managerial neuroeconomic option neuronomanagerial behaviour is poorly predicted by rational managerial neuroeconomic option models, these neural representations still encode the desirability of each course of action, although under these conditions desirability and expected utility are of necessity not identical. The available data suggest that the neural neuroeconomic managerial economic decision-making process is always rational with regard to these internal representations of desirability. When choosers deviate from rationality it is this physiological encoding of desirability, which we refer to as physiological expected utility, which departs from neoclassical model.

Together, these observations raise an intriguing possibility which forms a central subject of this paper: the neural architecture may indeed compute and represent the physiological expected utility of many possible courses of action, much as neoclassical utility model proposes. Evolution may have shaped the neural architecture to perform efficiently under many, but not all, environmental circumstances. When choosers are efficient in the economic sense, that architecture accurately represents the expected utility of available managerial neuroeconomic options. When physiological and objective utility differ, it reflects inefficiency not in the mechanism that chooses, but in the ability of the neural architecture antecedent to the managerial neuroeconomic option mechanism to compute physiological expected utilities efficiently. In some cases inefficiencies of
these types will arise when the most complicated cortical mechanisms for estimating likelihoods encounter problems that they did not evolve to solve. In other cases, inefficiencies will occur because simpler brainstem systems encounter problems that they did not evolve to solve efficiently. All of these biologically generated inefficiencies would therefore bind rational neuromanagemental behaviour. The available evidence thus suggests a synthesis of modern economic and neuroscientific approaches. By biologically defining the mechanisms which compute physiological expected utility we should be able to derive a mechanistically accurate economic model which is by necessity predictive.

During the second half of the twentieth century neuroscience made huge advances, particularly towards understanding both the structure and function of the sensory systems that gather data about the outside world and the movement control systems through which all neuromanagemental behaviour responses are generated. For the most part, these studies provided the insights upon which our current understanding of the human brain rests. These studies provide, essentially, a core model of brain function which, like the neoclassical approach in economics, organizes the ways scholars address almost all questions of neural function. In order to understand how neurobiologists attempt to understand neuroeconomic managerial economic decision making, it is therefore necessary to know a little about the organizing principles of these input and output systems. Tremendous progress has been made towards understanding all of our senses but the brain system we understand best is the visual system. (For an introductory overview of the visual system see the vision chapter in the excellent textbook by Squire et al. (2002). For a more detailed overview see the textbook by Squire et al. (2002)). Insights from the study of this system organize neurobiological approaches not just to sensory systems but to brain function in general. The work of this system begins in the retina, a five layer thick sheet of cells lining the inner surface of the eyeball like a sheet of photographic film. At each location on this sheet lies a single photoreceptor, a cell which transduces individual photons of light into electrochemical signals that can be passed to the brain. These electrochemical signals are, in turn, passed by a class of retinal neurons called retinal ganglion cells, through the optic nerve which leaves the eyeball and connects to the neurons of the lateral geniculate nucleus of the thalamus which lies inside the mammalian brain.

Along the way, we hope to explain three central points around which future developments in neuroeconomics will likely have to be organized. First, we hope to explain how very profoundly our current neuroscientific and current economic theories of brain function differ and how these differences can only be reconciled if economists become familiar with the highly quantitative models of brain function that are at the core of contemporary neuroscience. Second, we hope to stress the importance, to economics, of evolutionary biology. Humans are unique organisms, but there is growing evidence that we are far less unique in the production of economical neuromanagemental behaviour than most working economists suspect. For example, monkeys can play mixed strategy equilibrium games with the same efficiency as humans (Dorris and Glimcher, 2003) and birds can systematically alter the shape of their utility functions to adopt risk preferences appropriate for their environments (Caraco et al., 1980). There is now abundant evidence that our own economic neuromanagemental behaviour is evolved from, and very closely related to, the economic neuromanagemental behaviours of our animal relatives. This may be the most critical point made in this paper because it calls into question the pervasive assumption amongst economists that our neuroeconomic managerial economic decision making process is both a uniquely human faculty and a broadly rational faculty. Third and finally, we hope to show that neuroscientific studies of economic neuromanagemental behaviour can be much more than efforts to locate a brain region associated with some hypothetical faculty like ‘justice’ or ‘cooperation.’ Such studies are valuable starting points, but have troubled some economists because they provide no predictive power with regard to economic neuromanagemental behaviour. We hope to demonstrate that neuroeconomic experiments can and will reveal the nature of the economic computations brains perform.

**Gap between Economics and Neuro**

The neoclassical revolution had two profound effects during the second half of the twentieth century: it largely revealed how a rational utility maximiser would behave and essentially proved that humans could not be viewed as efficient utility maximisers under all conditions. This insight led a number of economists, perhaps most notably Herbert Simon (1997), to conclude that human neuroeconomic managerial economic decision makers could be viewed as rational utility maximisers in only a bounded sense. Conditions do occur under which humans behave rationally but
there are also conditions under which humans behave in a clearly irrational manner. One result of this insight has been a growing conviction in the economic community that human neuroeconomic managerial economic decision making can often be viewed as the product of two underlying processes, a bounded rational process well described by prescriptive economic model and an irrational process which is best described empirically.

During the last decade a number of economists have begun to suggest that these two processes, the rational and irrational, may be instantiated within the human brain as two distinct mechanisms. Indeed, many have even suggested that irrational neuromanagerial behaviour can be uniquely attributed to limitations intrinsic to the neural architecture while rational neuromanagerial behaviour can be viewed as the product of a conscious faculty that somehow transcends this biological limitation. Vernon Smith put this in his 2003 Nobel prize lecture, when explaining the irrational effects of context on neuroeconomic managerial economic decision making, ‘[t]he brain, including the entire neurophysiological system, takes over gradually in the case of familiar mastered tasks and plays the equivalent of lightning chess … all without conscious thinking by the mind.’ Smith and others have argued that it is the mechanical processes of the brain itself which account for the irrationality that bounds the rational processes of the conscious mind. Arguing in more detail, Camerer et al. (2003) have suggested that human neuroeconomic managerial economic decision-making can be viewed as the product of one cognitive and one affective (or emotional) system and that these two systems co-exist as independent entities within the neural architecture because they have different evolutionary origins. These authors have even drawn on the existing neuroscientific literature to argue that each of these distinct modules for neuroeconomic managerial economic decision making can be localized to distinct anatomical regions within the human brain. For example they suggest that ‘regions that support cognitive automatic activity are concentrated in the back (occipital), top (parietal) and side (temporal) parts of the brain.’

At the same time that this revolution has been occurring in economic circles, neuroscientists interested in human neuroeconomic managerial economic decision making have begun to head in a surprisingly different direction. The revolution that gave birth to modern neuroscience in the early part of the twentieth century argued that all of human neuromanagerial behaviour could be conceived of as the product of two fundamentally distinct mechanisms: a sophisticated faculty that governed multi-faceted neuromanagerial behaviour and a simpler, cruder, mechanism that could produce reliable, but unavoidably simplistic, neuromanagerial behaviours (Sherrington, 1906; Damasio, 1995; LeDoux, 1996; Glimcher, 2003a). This simpler mechanism, which came to be identified with the notion of a reflex, was widely believed to be tractable to neurophysiological analysis and formed the core of our understanding of brain function during the first half of that century.

The economic capabilities of humans have, however, led many to conclude that we are fundamentally different from other animals in this regard, that we achieve rationality through a distinct and uniquely human mechanism than stands apart from the mechanisms possessed by other animals. The mechanisms that other animals possess may indeed still reside within our brains, but it is the irrational aspects of human neuromanagerial behaviour which can be uniquely attributed to this biological heritage. Quite compelling empirical data argue against this conclusion. First, it now seems clear that even animals with very small brains can behave in a surprisingly rational manner under a broad range of conditions. This seems to argue against the idea that in order to behave rationally humans would have needed to evolve some unique facility. Second, there is growing evidence that we share with our nearest relatives not just the ability to behave rationally, but we also share with them common boundaries to our rationality. If this is true then it is both the rational and irrational which we share with our nearest relatives, challenging the assumption that any of these aspects of neuromanagerial behaviour involve some uniquely human process. These data argue, in essence, that we differ more in degree than in nature from our nearest living relatives.

In 1982, D.G.C. Harper published an influential experiment on the rationality with which mallard ducks forage for food (Harper, 1982). Mallard ducks were an interesting managerial neuroeconomic option because their avian lineage evolved from dinosaurs about 200 million years ago and thus they are animals with an evolutionary heritage very different from our own. Further, they are animals with extremely small brains, typically less than 5 grams in weight. (In contrast, the human brain weighs about 1400 grams.) At an environmental level, these ducks live in small groups of about 10–50 individuals and normally obtain food by foraging together at waters edge.
Finally, as with all animals who must maintain very low body weights in order to fly, they store little energy internally and thus their ability to survive and reproduce is well correlated with their ability to obtain food on a daily basis; at least amongst flighted birds, individuals who maximize the rate at which they obtain food each day maximize their long-term reproductive fitness (Krebs and Davies, 1991).

Harper’s experiment focused on the neuromanagerial behaviour of a particular flock of 33 mallards that wintered on the main pond in the botanical gardens of Cambridge University in 1979. What specifically interested Harper was foraging strategies? To examine that possibility, Harper conducted a series of group neuroeconomic managerial economic decision-making experiments of a kind that will be familiar to most economists. At the beginning of each day two experimenters would approach the pond, each with a sack of bread-balls all having a particular size and weight. Standing at two separate locations the experimenters began throwing those bread-balls simultaneously but at different rates. The job of each duck was simply to decide in front of which experimenter to stand. On a typical day experimenter 1 would, for example, throw a 2-gram bread-ball once every 5 seconds while experimenter 2 would throw a 2-gram bread-ball once every 10 seconds. What Harper would measure was the moment-by-moment neuroeconomic managerial economic decisions of each duck, both while these conditions were held constant and when they changed, during a foraging period that lasted tens of minutes.

How can we understand the dynamic lifecycle of decision-making: from the situations and events that make a decision necessary to the influence of prior knowledge, beliefs, and goals which determine how a decision will be framed, preferences arrived at, and commitments to actions made (Fox and Das, 2000)? 2. What are the general functions that underpin and constrain the processes that implement such a lifecycle for any kind of cognitive agent, whether the agent is natural or artificial? How does decision-making, conceived in this very general way, fit within cognitive science’s strategic objective of a unified model of cognition that can cut across psychology, computer science, AI, and neuroscience (e.g., Newell, 1990; Anderson, 2007; Shallice and Cooper, 2011)? How can we apply this understanding to decision engineering, drawing on insights into how decisions are and/or ought to be made to inform the design of autonomous cognitive agents and decision support systems (e.g., Fox et al., 2003; Fox et al., 2010)?

**Decision Environment**

Every decision is made within a decision environment, which is defined as the collection of information, alternatives, values, and preferences (These reflect the philosophy and moral hierarchy of the decision maker. We could say that they are the decision maker's ‘values,’ but that might be confusing with the other use of the word, above. If we could use that word here, we would say that personal values dictate preferences. Some people prefer excitement to calmness, certainty to risk, efficiency to aesthetics, quality to quantity, and so on) available at the time of the decision. An ideal decision environment would include all possible information, all of it accurate, and every possible alternative. However, both information and alternatives are constrained because the time and effort to gain information or identify alternatives are limited. The time constraint simply means that a decision must be made by a certain time. The effort constraint reflects the limits of manpower, money, and priorities. (You wouldn't want to spend three hours and half a tank of gas trying to find the very best parking place at the mall.) Since decisions must be made within this constrained environment, we can say that the major challenge of decision making is uncertainty, and a major goal of decision analysis is to reduce uncertainty. We can almost never have all information needed to make a decision with certainty, so most decisions involve an undeniable amount of risk.

The fact that decisions must be made within a limiting decision environment suggests two things. First, it explains why hindsight is so much more accurate and better at making decisions that foresight. As time passes, the decision environment continues to grow and expand. New information and new alternatives appear--even after the decision must be made. Armed with new information after the fact, the hindsighters can many times look back and make a much better decision than the original maker, because the decision environment has continued to expand. The second thing suggested by the decision-within-an-environment idea follows from the above point. Since the decision environment continues to expand as time passes, it is often advisable to put off making a decision until close to the deadline. Information and alternatives continue to grow as time passes, so to have access to the most information and to the best alternatives, do not make the decision too soon. Now, since we are dealing with real life, it is obvious that some
alternatives might no longer be available if too much time passes; that is a tension we have to work with, a tension that helps to shape the cutoff date for the decision.

Delaying a decision as long as reasonably possible, then, provides three benefits:

1. The decision environment will be larger, providing more information.
2. There is time for thoughtful and extended analysis.
3. New alternatives might be recognized or created.

And delaying a decision involves several risks:

1. As the decision environment continues to grow, the decision maker might become overwhelmed with too much information and either makes a poorer decision or else face decision paralysis.

2. Some alternatives might become unavailable because of events occurring during the delay. In a few cases, where the decision was between two alternatives (attack the pass or circle around behind the large rock), both alternatives might become unavailable, leaving the decision maker with nothing. And we have all had the experience of seeing some amazing bargain only to hesitate and find that when we go back to buy the item, it is sold out.

3. In a competitive environment, a faster rival might make the decision and gain advantage.

**Decision Streams**

A common misconception about decision making is that decisions are made in isolation from each other: you gather information, explore alternatives, and make a choice, without regard to anything that has gone before. The fact is, decisions are made in a context of other decisions. The typical metaphor used to explain this is that of a stream. There is a stream of decisions surrounding a given decision, many decisions made earlier have led up to this decision and made it both possible and limited. Many other decisions will follow from it. Another way to describe this situation is to say that most decisions involve a choice from a group of preselected alternatives, made available to us from the universe of alternatives by the previous decisions we have made. Previous decisions have ‘activated’ or ‘made operable’ certain alternatives and ‘deactivated’ or ‘made inoperable’ others. We might say, then, that every decision (1) follows from previous decisions, (2) enables many future decisions, and (3) prevents other future decisions. People who have trouble making decisions are sometimes trapped by the constraining nature of decision making. Every decision you make precludes other decisions, and therefore might be said to cause a loss of freedom. If you decide to marry Terry, you no longer can decide to marry Shawn. However, just as making a decision causes a loss of freedom, it also creates new freedom, new choices and new possibilities. So making a decision is liberating as well as constraining. And a decision left unmade will often result in a decision by default or a decision being made for you. It is important to realize that every decision you make affects the decision stream and the collections of alternatives available to you both immediately and in the future. In other words, decisions have far reaching consequences.

The field of managerial neuroeconomic decision makings arose out of this controversy. By determining which brain areas are active in which types of decision processes, neuroeconomists hope to better understand the nature of what seem to be suboptimal and illogical decisions. While most of these scientists are using human subjects in this research, others are using animal models where studies can be more tightly controlled and the assumptions of the managerial neuroeconomic decision making model can be tested directly. The field of decision making is largely concerned with the processes by which individuals make a single choice from among many options. These processes are generally assumed to proceed in a logical manner such that the decision itself is largely independent of context. Different options are first translated into a common currency, such as monetary value, and are then compared to one another and the option with the largest overall utility value is the one that should be chosen. While there has been support for this managerial neuroeconomic decision making view of decision making, there are also situations where the assumptions of optimal decision making seem to be violated.

What happens in brain or is activated when we make neuromanagerial economic decision making or are in the process of making neuromanagerial economic decision making? Is neuromanagement study of choice-making processes relevant for management? Many choice makers seek information than required to make a choice. How do managers process different inputs and make complicated neuroeconomic managerial decision makings? Variations on this question have engaged researchers for many years, with broad
implications for a variety of managers. But the topic is of particular interest to business managers, who must frequently make neuroeconomic managerial decision makings. Information overload is a fact of modern life, making many common neuroeconomic managerial decision makings unbearably confusing. Although choice offers options, too many choices or too many features per choice can cause managers to delay neuroeconomic managerial decision makings or make less-than-optimal choices. Recent research into how managers process information offers some promising suggestions for dealing with information overload. The key may involve ‘psychological distancing’, removing oneself from the morass of details surrounding a neuroeconomic managerial decision making and considering the choices on a more abstract level. When too much information is sought delay in choice occurs because of time required to process information. This impairs effectiveness of choice. In this state, neuromanagement seeks to explain human choice-making, ability to process multiple alternatives and choose optimal course of action. It studies how management managerial neuromanagement behaviour shape understanding of brain and guide models of management via. Neuroscience, experimental and neuro - management and cognitive and organisational psychology. Deciphering such transactions require understanding of neuro processes that implement value-dependent choice-making. Conjectural accounts posit that human brain accomplishes this through neural computations. What are the coherent brain dynamics underlying prediction, control and choice-making? This leads to formulation of a ‘neuro - management choice making paradox’. The goal is a model of how brain implements neuromanagement economic decision making that is tied to managerial neuromanagement behaviour. This paper attempts to explore phenomena through individual action, choice-making and reasoning processes. Objective is to put forward a model for neuro - management choice, in which interaction between variables of neuro - management choice processes are addressed. The present attempt (perhaps) contributes towards providing a conceptual framework for understanding and conducting neuromanagement research at intersection of neuroscience, management and psychology, offer a solution through series of measurements of brain activity at time of neuromanagement economic decision making, describe a standard model for choice making process with intention of linking and spanning neuro - psycho and management levels of analysis and attempt to build brain-based models capable of predicting observed managerial neuromanagement behaviour. Researchers have long sought to shed light on the inner workings of the human brain and the way managers make neuroeconomic managerial decision makings. In recent years, curiosity about the neuroeconomic managerial decision making-making process has heated up, attracting academics from fields as diverse as neuroscience, management, managerial neuromanagement behavioural economics and psychology. Here are highlights of a handful of recent scholarly articles that offer intriguing insights into neuroeconomic managerial decision making from several disciplines.

Neuromanagement economic preference can be defined as the managerial neuromanagement behaviour observed when managers make preferences solely based on subjective preferences. Since at least the XVII century, this managerial neuromanagement behaviour has been the central interest of neuromanagement economic model (which justifies the term ‘neuromanagement economic preference’), and also a frequent area of research in experimental psychology. Traditionally the object of neuromanagement economic model and experimental psychology, neuromanagement economic preference recently became a lively research focus in systems neuroscience. In the last decade, however, neuromanagement economic preference has attracted substantial interest in neuroscience, for at least three reasons. First, neuromanagement economic preference is an intrinsically fascinating topic, intimately related to deep philosophical questions such as free will and moral managerial neuromanagement behaviour. Second, over many generations, economists and psychologists accumulated a rich body of knowledge, identifying concepts and quantitative relationships that describe neuromanagement economic preference. In fact, neuromanagement economic preference is a rare case of high cognitive function for which such a formal and established managerial behavioural description exists. This rich ‘psychophysics’ can now be used to both guide and constrain research in neuroscience. Third, neuromanagement economic preference is directly relevant to a constellation of mental orders. These reasons explain the blossoming of an area of research referred to as neuromanagement economics (Glimcher et al; 2008).

In a nutshell, research in neuro neuromanagement economics aspires to describe the neurobiological processes and cognitive mechanisms that underlie neuromanagement economic preferences. Although the field is still in its infancy, significant progress has been made already. How does the brain generate preferences in the face of this enormous
variability? Neuromanerional economic and psychological theories of preference managerial neuromanerional behaviour have a cornerstone in the concept of value. While choosing, managers assign values to the available options; a decision is then made by comparing these values. Hence, while options can vary on multiple dimensions, value represents a common unit of measure to make a comparison. From this perspective, understanding the neural mechanisms of neuromanerional economic preference amounts to describing how values are computed and compared in the brain.

To appreciate significance of this proposition, it is helpful to step back and take a historical and conjunctural perspective. Neoclassic neuromanerional economic model can be thought of as a rigorous mathematical construct founded on a limited set of axioms (Kreps 1990). In this framework, the concept of value is roughly as follows. Under few and reasonable assumptions, any large set of preferences can be accounted for as if the choosing subject maximized an internal value function. Thus values are central to the economist’s description of preference managerial neuromanerional behaviour. Note, however, that the concept of value in neuromanerional economics is managerial neuromanerional behavioural and analytical, not psychological. In other words, the fact that preferences are effectively described in terms of values does not imply that subjects actually assign values while choosing. Thus by taking an ‘as if’ stance, neuromanerional economic model explicitly avoids stating what mental processes actually underlie preference managerial neuromanerional behaviour. The distinction between an ‘as if’ model and a psychological model might seem subtle if not evanescent. However, this distinction is critical in neuromanerional economics and it helps appreciating the contribution of recent research in neuroscience. The ‘as if’ stance captures a fundamental limit: based on managerial neuromanerional behaviour alone, values cannot be measured independently of preference. Consequently, the assertion that preferences maximize values is intrinsically circular. The observation that values are actually computed in the brain essentially breaks this circularity. Indeed, once the correspondence between a neural signal and a managerial neuromanerional behavioural measure of value has been established, that neural signal provides an independent measure of value, in principle dissociable from preferences. In other words, the assertion that preferences maximize values becomes potentially falsifiable and thus truly scientific (Popper 1963). For this reason, I view the discovery that values are indeed encoded at the neural level as a major conceptual advance and perhaps the most important result of neuro neuromanerional economics to date.

The young field of neuroeconomics converges around managerial neuromanerional behavioural deviations from the model of the human being as Homo economus, a rational actor who calculates his preferences to maximize his individual satisfaction. In a historical moment characterized by economic, health and environmental crises, policymakers have become increasingly concerned about a particular deviation for which neuroeconomics offers biological explanation: Why do humans value present at expense of future? There is contentious debate within the field over how to model this tendency at neural level. Should brain be conceptualized as unified decision-making apparatus, or as site of conflict between impetuous limbic system at perpetual odds with deliberate and provident overseer in prefrontal cortex? Scientific debates over preference-making in the brain, we argue, are also debates over how to define the constraints on human reason with which regulative strategies must contend. This thesis is about emerging field of neuroeconomics. Neuroeconomics seeks to ground theories and models of economic managerial neuromanerional behaviour in terms of its underlying neural mechanisms. These advancements have impacted a number of fields, spanning a diverse range of questions and methodologies, ranging from neurophysiology, psychophysics, to cognitive neuroscience. Some of the most successful applications of neuroscientific data have occurred in the field of psychophysics, in the realm of some fundamental perceptual apparatus of organisms.

Managerial neuroeconomic decision making is an interdisciplinary field that seeks to explain human decision making, the ability to process multiple alternatives and to choose an optimal course of action. It studies how economic managerial neuromanerional behaviour can shape understanding of brain and how neuroscientific discoveries can constrain and guide models of managerial economics. It combines research methods from neuroscience, experimental and managerial neuromanerional behavioural economics and cognitive and social psychology. As research into decision-making managerial neuromanerional behaviour becomes increasingly computational, it has also incorporated new approaches from conjectural biology, computer science, and mathematics. Managerial neuroeconomic decision making studies decision making, by using a combination of tools from these fields so as to
avoid the shortcomings that arise from a single-perspective approach. In mainstream economics, expected utility (EU), and the concept of rational agents, are still being used. Much economic managerial neuromanagerial behaviour is not fully explained by these models, such as heuristics and framing. Managerial neuromanagerial behavioural economics emerged to account for these anomalies by integrating social, cognitive, and emotional factors in understanding economic decisions. Managerial neuroeconomic decision making adds another layer by using neuroscientific methods in understanding the interplay between economic managerial neuromanagerial behaviour and neural mechanisms. By using tools from various fields, some scholars claim that Managerial neuroeconomic decision making offers a more integrative way of understanding decision making.

The field is largely concerned with the processes by which individuals make a single preference from among many options. These processes are generally assumed to proceed in a logical manner such that the decision itself is largely independent of context. Different options are first translated into a common currency, such as monetary value, and are then compared to one another and the option with the largest overall utility value is the one that should be chosen. While there has been support for this economic view of decision making, there are also situations where the assumptions of optimal decision making seem to be violated. The field of Managerial neuroeconomic decision making arose out of this controversy. By determining which brain areas are active in which types of decision processes, neuroeconomists hope to better understand the nature of what seem to be suboptimal and illogcal decisions. While most of these scientists are using human subjects in this research, others are using animal models where studies can be more tightly controlled and the assumptions of the economic model can be tested directly.

The neuroeconomic program tends to combine or, at least, to connect the neural data collected and selected by the neuroscientists on one side, and the managerial neuromanagerial behavioural evidence derived from the economic experimental protocols, on the other side. Today, few developments in the world of science and technology would seem to draw comparable degrees of attention, commentary and sheer excitement than the neurosciences. Within and without academia it has become routine to celebrate or alternatively, to castigate, the purportedly palpable effects and consequences of the recent expansions of the neurosciences. These are the possibilities one has to choose from. Alternatives can be identified (that is, searched for and located) or even developed (created where they did not previously exist). Merely searching for pre-existing alternatives will result in less effective decision making. Indeed, so familiar have these discourses become, so seemingly self-evident their significance that the managerial problems of the neurosciences rarely appear to move beyond elaborations of the already familiar or, at best, partisan polemics. More problematic, on closer inspection the majority of these diverse neurodiscourses would seem to operate on a very thin evidential basis. Clearly, the approach taken in this thesis, and neuroeconomic decision making in general, is a sharp turn in economic thought. Around the turn of the century, economists made a clear methodological preference to treat the mind as a black box and ignore its details for the purpose of economic model. ‘It is an empirical fact that the natural sciences have progressed only when they have taken secondary principles as their point of departure, instead of trying to discover the essence of things. ...Pure political economy has therefore a great interest in relying as little as possible on the domain of psychology’ (Brusino; 1964).

Volatility and multi-facticity factors determine the management and decision-making approach in organization. The aim of this paper is to point out that the specific features of company environment (multi-facetidity, uncertainty, limitation of skills and abilities) necessitate them to search for new management approaches that fit in with the new challenges. The Managerial organisation is a multi-faceted system whose aggregate managerial neuromanagerial behaviour is determined by an incredible number of co-existing interactions (more or less multi-faceted in nature) that occur at the Manager level as well as between levels of description. It is therefore possible to draw analogies with physical, chemical and biological systems. Economic agents constantly interact with each other in many ways and for different purposes. Somehow, out of these Manager interactions, certain coherent patterns of managerial neuromanagerial behaviour emerge at the aggregate level (Hayek [1952]; Kirman [1992]). Among all the elements that contribute to the emergence of collective patterns, information exchange might very well be the most important one. However macroscopic managerial neuromanagerial behaviour cannot be thought of as reflecting the managerial neuromanagerial behaviour of a ‘typical’ or ‘average’ Manager. For instance, there is no simple direct correspondence between Manager and aggregate (ir) regularity (see Debreu [1974]; Kirman, [1989, 1992, 1993]; Sonnenschein [1972]). In other words, the
managerial neuromanegarional behaviour at the collective level may not be deduced, calculated or extrapolated simply from a linear aggregation of Manager managerial neuromanegarional behaviour, whether in the brain or the society (Kelso [1995]; Lagarde et Bardy [2007]; Nowak et al. [2000]). As observed by Anderson [1972], the (collective) whole is not necessarily greater than the sum of the (Manager) parts: 'More is different'.

Why should economic decision making be an exception? After all, a number of basic coordination phenomena exist that seem to cut across a wide range of levels, creatures and functions. There is now a wide consensus regarding the self-organized nature of the brain, where phase synchrony emerges when information is exchanged on a range of scales (Edelman; 2004 and Kelso; 1995). This is knowledge about the decision, the effects of its alternatives, the probability of each alternative, and so forth. A major point to make here is that while substantial information is desirable, the statement that 'the more information, the better' is not true. Too much information can actually reduce the quality of a decision In judging the quality of a decision, in addition to the concerns of logic, use of information and alternatives, three other considerations come into play: The decision must meet the stated objectives most thoroughly and completely. How well does the alternative chosen meet the goals identified? The decision must meet the stated objectives most efficiently, with concern over cost, energy, side effects. Are there negative consequences to the alternative that make that choice less desirable? We sometimes overlook this consideration in our search for thrills. The decision must take into account valuable by-products or indirect advantages. A new employee candidate may also have extra abilities not directly related to the job but valuable to the company nonetheless. These should be taken into account.

In addition, recent advances in brain and movement sciences have revealed the selforganized and informational nature of managerial neuromanegarional behaviour and cognition (Bressler et Kelso [2001]; Kelso [1981; 1994]). Neuroeconomics, from this point of view could be conceived of as the coordination dynamics of economic decision-making and therefore be modelled as phase transitions (or bifurcations) from unstable to more stable cognitive states involving neurons and/or parts of the brain (Oullier et al.;2008 for a detailed treatment of this hypothesis). It is rather surprising that such a perspective has not (yet) been explored by neuroeconomists in spite of the nonlinear features exhibited by both brain and cognitive processes at multiple levels of description (Bressler et Kelso [2001]; Brown et al. [2005]; Edelman [2004]; Friston [1997]; Kelso [1995]; Oullier et Kelso [2006]).

A central problem of coordination dynamics on any level of observation is to identify the key variables of coordination and their dynamics, i.e. rules that govern the stability and change of coordination patterns. Basic forms of coordination emerge, not because of a special coordinating agent, but rather as a result of the system’s ability to self-organize when open to information exchange with its environment. Indeed, the ‘system properly construed consists of both organisms and their environments, with full recognition of their co-evolution. Along with predictive mathematical modelling, coordination dynamics provides a new foundation for understanding coordinated managerial neuromanegarional behaviour grounded in the concepts of self-organization and the tools of nonlinear dynamics and especially tailored to handle the informational (e.g. perceptual, cognitive, affective) aspects of managerial neuromanegarional behaviour (Kelso et Engstrøm [2006]; Kelso [1995]).

Through various mechanisms of cognitive control, Managers are able to tailor actions to fit multi-faceted short- and long-term goals. An important query is how Managers make (management) decisions. Traditionally, the object of economic model and experimental psychology, economic decision recently became a lively research focus in systems neuroscience. Specifically, researchers are interested in assumptions, beliefs, habits, and tactics that Managers use to make everyday decisions. Why do humans value the present at the expense of the future. The nascent field of neuroeconomics converges around managerial neuromanegarional behavioural deviations from the model of the human being as Homo economicus, a rational actor who calculates his decisions to maximize his satisfaction. There is contentious debate within the field over how to model this tendency at the neural level. Should the brain be conceptualized as a unified decision-making apparatus, or as the site of conflict between an impetuous limbic system at perpetual odds with its deliberate and provident overseer in the prefrontal cortex? Scientific debates over decision-making in the brain, we argue, are also debates over how to define the constraints on human reason with which regulative strategies must contend. Neuroeconomics is an interdisciplinary research program with the goal of building a biological model of decision making in
Neurodecision economics is an interdisciplinary field that seeks to explain human decision making, ability to process multiple alternatives and choose an optimal course of action. It studies how economic managerial neuromanagemental behaviour can shape understanding of brain and how neuroscientific discoveries can constrain / guide models of decision neuroeconomics. It combines methods of neuroscience, experimental (economics), cognitive and social psychology. As research into decision-making managerial neuromanagemental behaviour becomes increasingly computational, it has incorporated approaches from conjectural biology, computer science and mathematics. Neurodecision studies decision making by using combination of tools from these fields so as to avoid shortcomings that arise from single-perspective approach. In mainstream decision economics, expected utility (EU) and concept of rational agents are being used. Much economic managerial neuromanagemental behaviour is not fully explained by these models. Managerial neuromanagemental behavioural decision economics emerged to account for these anomalies by integrating social, cognitive and emotional factors in understanding economic decisions. Neurodecision economics adds another layer by using neuroscientific methods in understanding interplay between economic managerial neuromanagemental behaviour and neural mechanisms. By using tools from various fields, some claim that neurodecision economics offers integrative way of understanding decision making.

Neuro - Perspectives

What is mind? Where does it come from? How are brain, mind, matter, and energy related? How do they interact? Why does this interaction seem to be the source of our suffering? What could we learn about being managerial if we were to weave the psychological sciences, neurosciences, biological sciences, and the physical sciences into a single integrated depiction? Can we create a comprehensive model of mind and brain so that we may be able to perceive and influence the network of interactions that we are embedded within and influenced by? What is the most elementary way in which we can describe their interaction so that we may understand who we are and ultimately improving the quality of managerial life?

A basic question, intimately tied to the problem of action choice, is that of how actions are assembled into organized sequences. Theories of routine sequential behaviour have long acknowledged that it must rely not only on environmental cues but also on some internal representation of temporal or task context. It is assumed, in most theories, that such internal representations must be organized into a strict hierarchy, mirroring the hierarchical structure of naturalistic sequential behaviour. Based on recent neuroscience evidence, we model the brain as a dual-system organization subject to three conflicts: asymmetric information, temporal horizon, and incentive salience. Under the first and second conflicts, we show that the uninformed system imposes a positive link between consumption and leisure at every period. Furthermore, decreasing impatience endogenously emerges in decision-making, purposes must first be established, purposes must be classified and placed in order of importance, substitute actions must be developed, the substitute must be evaluated against all the purposes, the substitute that is able to achieve all the purposes is the tentative decision, the tentative decision is evaluated for more possible consequences, the decisive actions are taken, and additional actions are taken to prevent any adverse consequences from becoming problems and starting both systems (problem scrutiny and decision-making) all over again. There are steps that are generally followed that result in a decision model that can be used to determine an optimal production plan. It is assumed that role-playing may be helpful for predicting decisions to be made by involved parties. Each of these factors leads to a fresh perspective. A neural level focuses on the basic forebrain functions and shows how processing demands dictate the extensive use of timing-based circuitry and an overall organization of tabular memories. An embodiment level organization works in reverse, making extensive use of multiplexing and on-demand processing to achieve fast analogous calculation. An awareness level focuses on the brain’s representations of emotion, attention and consciousness, showing that they can operate with great economy in the context of the neural and embodiment substrates.

Each step in the decision-making process may include social, cognitive and cultural obstacles to successfully negotiating dilemmas. It has been
suggested that becoming more aware of these obstacles allows one to better anticipate and overcome them. Neuroscience and social science have witnessed tremendous advance in Neuroeconomics and Neuromanagement since the birth of these interdisciplinary fields at the turn of the century. In order to explain the cognitive and neural underpinning of managerial decision-making, the ability to process multiple substitutes and to choose an optimal course of action, especially in a managerial context. Nerve management is contemporary developments in cognitive neuroscience, neural imaging technology progress, and the traditional management research across a field of study, through the study of manager in their daily management behaviour such as consumption, investment, production, circulation, financial management, managerial activities such as various acts of the neurophysiologic underpinning, thereby from brain science perspective on managerial management activities of the mechanisms behind, and brings forward corresponding management measures and strategies. And neuroeconomics, nerve management emphasis on exact situations, individual differences and the operational level of behaviour, study different conditions managed object evolution rule and achieve the most effective management method. Decision makers must have vast amounts of information in order to make use of the rational comprehensive decision-making technique. There needs to be an ability to predict the future consequences of decisions made. Also, problems confronting decision makers often embody conflicting values. In addition, it is tough to ignore the sunk costs of former decisions, these may foreclose many substitutes.

Questions

Our thoughts, though abstract and vaporous in form, are determined by the actions of exact neuronal circuits in our brains. The new field known as “decision neuroscience” is uncovering those circuits, thereby mapping thinking on a cellular level. Although still a young field, research in this area has exploded in the last decade, with findings suggesting it is possible to parse out the obscurity of thinking into its individual components and decipher how they are integrated when we ponder. Eventually, such findings will lead to a better perceptive of a wide range of mental disorders, from depression to schizophrenia, as well as explain how exactly we make the multitude of decisions that ultimately shape our destiny. Perceptive the neuroscience behind decision making requires a cross-disciplinary, “all hands on deck” approach to research. As a result, the field raises big questions that require the engagement of several fields, as investigators must parse out and quantify all the different aspects of thinking that seem to happen simultaneously in order to literally make headway into perceptive the physical underpinning for making decisions. The field is still in its infancy, but one of the driving forces behind the field now is to try to understand more exactly what are the computations performed in different brain areas, and how they are similar or different. Also how do they communicate with each other, and how is information transformed as it moves around in the brain. How do these different representations about important variables for decision making come together and allow you to form a decision? (Kavli Foundation; 2011)

Quantification of choice has been a major area of research for neuro scientists for several decades. This is, in part, due to the discovery of the ‘Matching Law’ that stipulates that relative response rate on concurrently available substitutes ‘match’ the available relative reinforcement rates. This conjectural construct has been developed to describe response allocation in more obscure situations. Manager often fail to design ‘rational’ decisions. Economics agents are subject to multiple biases that affect the way they perceive events, act upon them and learn from experience. These behaviours cannot be ignored since they have disastrous consequences for organisations. When faced with obscure decision, individuals engage in simplifying strategies. Adaptive decision making in real-world contexts relies on strategic simplifications of decision problems. Yet, neural mechanisms that shape these strategies and their implementation remain largely unknown. Although we now know much about how brain encodes exact decision factors, much less is known about how brain selects among multiple strategies for managing computational demands of obscure decision-making task. Expansion of neuroeconomics parallels development of cognitive science.

Neuroeconomics has bridged the contrasting fields of economics and psychology. Economics, psychology, and neuroscience are converging today into a single, unified discipline with the ultimate aim of providing a single, general conjecture of managerial behaviour. This is the emerging field of Neuroeconomics in which consilience, accordance of two or more inductions drawn from different groups of phenomena, seems to be operating. Economists and psychologists are providing rich conceptual tools for perceptive and modeling behaviour, while neurobiologists endow with tools for the study of mechanism. The goal of this discipline is thus to understand the processes
Neuroeconomics has inspired change because the important findings have posed more of a challenge to standard economics perspective. The important source of inspiration for neuro economist has been in decision-making research, which can, in turn, be seen as an amalgamation of ideas from cognitive science and economics. Neuroeconomics has primarily challenged the normative, descriptive and prescriptive theories. The decision theories can be categorized into three paradigms: the normative, descriptive and prescriptive theories. The decision processing have four steps: accumulation of sensory evidence, integration of sensory signals with reward expectation and prior knowledge, comparison of current reward expectation with that in prior experience, and the selection of managerial neuromanagerial behaviour. Neuroeconomics has further bridged the once disparate fields of economics and psychology, largely due to movement within economics. Change has occurred within economics because the most important findings in neuroeconomics have posed a challenge to the standard economic perspective. Neuroeconomics has primarily challenged the standard economic assumption that decision making is a unitary process, a simple matter of integrated and coherent utility maximization, suggesting instead that it is driven by interaction between automatic and controlled processes.

What do brain scans really tell us? What are the practical implications of this research? Despite substantial advances, question of how we design and how we ought to craft judgments and decisions has engaged researchers for decades, with different disciplines approaching the problem through characteristically different techniques. However, neuroeconomics decision making has recently emerged as an inter-disciplinary effort to bridge this gap. It has sought to integrate ideas from fields of organisational psychology, neuroscience and neuroeconomics in an effort to specify accurate models of choice and decision. Research investigates neural bases of decision predictability and value, central parameters in economics model of expected utility. Neuro-multiple-systems approach to decision-making, in turn, influences economics, a perspective strongly rooted in organisational psychology and neuroscience. Integration of these approaches and methodologies offers exciting potential for construction of near-accurate models of decision-making (Satpathy; 2014). Among the big questions they are: How do neurons code the emotional weight of our experiences—do some neurons only become active in response to negative experiences while other neurons only fire when we experience something favorably? How do neurons code the numerical value of various options—do more or different neurons fire for an option with bigger rewards than that for a lesser reward? How does the coding for rewards that you receive immediately differ from that of rewards that are delayed? How do the far-flung different parts of the brain that govern decision-making coordinate their activity when making a decision? What triggers a decision—is it the cumulative build up of firing neurons that tip the balance to the final choice? How do we alter our decision-making rules when we encounter new information that makes those rules obsolete?

The field of neuroscience has contributed greatly in understanding the human brain and its role in explaining our managerial neuromanagerial behaviours to a certain extent. Even though research has not shown a direct correlation between the neural mechanism and managerial neuromanagerial behaviour, the findings have showed correlation evidence or potential to further build on top of this foundation. By combining techniques from cognitive neuroscience and experimental economics we can now watch neural activity in real time, observe how this activity depends on the economic environment, and test hypotheses about how the emergent mind makes economic decisions. Neuroeconomics allows us to better understand both the wide range of heterogeneity in neuromanagerial behaviour, and the role of institutions as ordered extensions of our minds. Brain is the most amazing multi - faceted organ in known universe with most amazingly magic infinite potential. The brain is the organ that is designed to change in response to experience. The decision theories can be categorized into three paradigms: the normative, descriptive and prescriptive theories. The decision processing have four steps: accumulation of sensory evidence, integration of sensory signals with reward expectation and prior knowledge, comparison of current reward expectation with that in prior experience, and the selection of managerial neuromanagerial behavioural response. Neuroeconomics has further bridged the once disparate fields of economics and psychology, largely due to movement within economics. Change has occurred within economics because the most important findings in neuroeconomics have posed a challenge to the standard economic perspective. Neuroeconomics has primarily challenged the standard economic assumption that decision making is a unitary process, a simple matter of integrated and coherent utility maximization, suggesting instead that it is driven by the interaction between automatic and controlled processes. Neuroeconomic research has focused most intensely on decision making under risk and uncertainty, but this line of research provides only mixed support for a dual systems perspective. The extent to which intertemporal preference is generated by multiple systems with conflicting priorities is perhaps the most hotly debated issue within neuroeconomics. However, a majority of the evidence favours a multiple systems perspective. Neuroeconomic research on social preferences is highly supportive of a dual systems account, although the most prominent studies come to conflicting conclusions regarding how self-interest and fairness concerns interact to influence managerial neuromanagerial behaviour. Neuroeconomics may ultimately influence...
psychology indirectly, via its influence on economics (by inspiring economic models increasingly grounded in psychological reality) and directly by addressing debates of interest within psychology (whether multiple systems operate sequentially or in parallel to influence managerial neuromanagerial behaviour).

The leap from neurons to managerial neuromanagerial behaviour is a large one. Perhaps inexorably, it has attracted criticism. Different experts have criticized the emerging field. Example of critics has been that it is ‘a field that oversells itself’; or that neuromanagerial neuroeconomic decision making studies ‘misunderstand and underestimate traditional managerial neuroeconomic decision making models’. A critical argument of traditional economists against the neuromanagerial neuroeconomic decision making approach, is that the use of non-choice data, such as response times, eye-tracking and neural signals that people generate during decision making, should be excluded from any managerial neuroeconomic decision making analysis.

Gul and Pesendorfer (2005), in particular, makes the vociferous argument that economists should not, on principle, pay attention to the details of the brain. One of their central arguments is that the idea of utility underlying revealed preference model is strictly as-if—“Standard Managerial neuroeconomic decision making does not address mental processes and, as a result, economic abstractions are typically not appropriate for describing them” (Gul and Pesendorfer 2005). Therefore, according to the authors, any attempts by neuroeconomists to try to find the neural basis of utility are neither here nor there, since it doesn’t exist in the first place. The spirit of this argument can be traced back to Milton Friedman’s famous dictum that economic theories should be judged by the accuracy of their predictions rather than the plausibility of their axioms (Friedman 1964). Friedman’s view was that (1) theories should be judged by accuracy of predictions; and (2) false assumptions could lead to accurate predictions. The central assumption of neuroeconomic decision making, and of this thesis, is that creating more realistic assumptions will lead to better predictions. Furthermore, a critical examination of assumptions is healthy and critical to the advancement of any science. In this regard, neuroeconomic decision making shares the emphasis on accuracy in principle (1), but also bets on the possibility that improving the accuracy of assumptions will lead to more accurate predictions.

An analogy to organizational Managerial neuroeconomic decision making illustrates the potential of neuroeconomic decision making. Until the 1970’s, the ‘model of the firm’ was basically a reduced-form model of how capital and labour are combined to create a production function, as the basis for an industry supply curve. Contract model opened up the black box of the firm and modelled the details of the nexus of contracts between shareholders, workers and Managers (is the three elements of the firm). The new model of the firm replaces the (still useful) fictional profit-maximizing firm which has a single goal, with a more detailed account of how components of the firm interact and communicate to determine firm managerial neuromanagerial behaviour. Neuroeconomic decision making proposes to do the same by treating an agent like a firm: Replace the (useful) fiction of a utility-maximizing agent who has a single goal, with a more detailed account of how components of the agent’s brain interact and communicate to determine agent managerial neuromanagerial behaviour.

The success of the rational actor model in ‘as if’ applications shows that this level of detail is not necessary for certain sorts of analysis, especially those that deal with populations of decision makers instead of individuals. For example, neuroeconomic decision making will never displace the powerful concepts of supply and demand, and market equilibrium. However, a deeper understanding of the mechanics of decision-making will help us understand deviations from the rational model better. Knowing the process of decision making should allow us to understand not only the limits of our abilities to calculate optimal decisions, but also the heuristics that we use to overcome these limits.

Furthermore, in most areas of managerial neuromanagerial behaviour Managerial neuroeconomic decision making there is more than one alternative model. Often there are many theories that are conceptually different but difficult to separate with current data. To the extent that some of these theories commit to neural interpretations, the brain evidence can help sort out which theories are on the right track and also suggest new theories. Much of the criticisms raised by Gul and Pesendorfer are similar in spirit to those raised by psychologists and philosophers decades ago (Churchland 1986). As Dehaene (2003) recounts of the progress of cognitive neuroscience, “Today, however, we know that this view was unnecessarily narrow. The new cognitive neuroscience routinely mixes psychological and neural observations in the same experiments. Psychological concepts are not ruthless eliminated,
as was initially foreseen by the most opinionated antifunctionalist philosophers... Rather, they are enriched, constrained and transformed by the accruing neural data.'

The context of Dehaene’s quote surrounds the discovery of neurons that represent numbers via logarithmic encoding, thus shedding light on an age-old debate of whether the neural basis of the Weber-Fechner law (the finding that the threshold of discrimination between two stimuli increases linearly with stimulus intensity), and the postulation that internal representation of the stimuli follows the logarithm of the external stimuli. Whereas, the interplay between the neural and the psychological is now relatively uncontroversial, skepticism over use of functional imaging techniques can be more vocal, perhaps owing in large part to the still youthful state of the field (fMRI was developed in the early 1990s, whereas Weber and Fechner lived in the 19th Century). Concern over the use and abuse of fMRI was especially prominent in social psychology in the late 1990s and early part of the new millennium (Shulman; 1996; Hardcastle and Stewart; 2002 and Willingham and Dunn; 2003). Shulman, in particular, outlined four assumptions that are used by cognitive psychologists in the interpretation of fMRI data, two of which he finds objectionable.

Shared Decision Making

While most research on decision making tends to focus on individuals making choices outside of a shared context, it is also important to consider decisions that involve shared interactions. The types of situations that decision theorists study are as diverse as altruism, cooperation, punishment, and retribution. One of the most frequently utilized tasks in shared decision making is the prisoner’s predicament. In this situation, the payoff for a particular choice is dependent not only on the decision of the individual but also on that of another individual playing the game. An individual can choose to either cooperate with his partner or defect against the partner. Over the course of a typical game, individuals tend to prefer mutual cooperation even though defection would lead to a higher overall payout. This suggests that individuals are motivated not only by monetary gains but also by some reward derived from cooperating in shared situations. This idea is supported by neural imaging studies demonstrating a high degree of activation in the ventral striatum when individuals cooperate with another person but that this is not the case when people play the same prisoner’s predicament against a computer. The ventral striatum is part of the reward pathway, so this research suggests that there may be areas of the reward system that are activated specifically when cooperating in shared situations. Further support for this idea comes from research demonstrating that activation in the striatum and the ventral tegmental area show similar patterns of activation when receiving money and when donating money to charity. In both cases, the level of activation increases as the amount of money increases, suggesting that both giving and receiving money results in neural reward. An important aspect of shared interactions such as the prisoner’s predicament is trust. Your likelihood of cooperating with another individual is directly related to how much you trust them to cooperate with you; if you expect the other individual to defect against you, there is no reason for you to cooperate with them. Trust managerial neuromanagerial behaviour seems to be related to the presence of oxytocin, a hormone involved in maternal managerial neuromanagerial behaviour and pair bonding in many species. When oxytocin levels were increased in humans, they were more trusting of other individuals than a control group even though their overall levels of risk-taking was unaffected suggesting that oxytocin is specifically implicated in the shared aspects of risk taking.

Neuroeconomic methods combine managerial neuromanagerial behavioural economic experiments to parameterize aspects of reward-related decision-making with neuroimaging techniques to record corresponding brain activity. In this introductory article to the current special issue, we propose that neuroeconomics is a potential bridge for translational research in psychiatry for several reasons. First, neuroeconomics-derived conjectural predictions about optimal adaptation in a changing environment provide an objective metric to examine psychopathology. Second, neuroeconomics provides a ‘multilevel’ research approach that combines performance (managerial neuromanagerial behavioural) measures with intermediate measures between managerial neuromanagerial behaviour and neurobiology (e.g., neuroimaging) and uses a common metaphor to describe decision-making across multiple levels of explanation. As such, ecologically valid managerial neuromanagerial behavioural paradigms closely mirror the physical mechanisms of reward processing. Third, neuroeconomics provides a platform for investigators from neuroscience, economics, psychiatry, and social and clinical psychology to develop a common language for studying reward-related decision making in psychiatric disorders. Therefore,
neuroeconomics can provide promising candidate endophenotypes that might help clarify.

Research suggests that brain considers various sources of information before making a decision. However, how does it do this? Since ancient times scholars at many levels of reduction have studied decision-making. Over the last three decades, social and natural scientists have tried to understand how we make decisions, using different strategies. Since the 90s, groups of interdisciplinary scholars have begun to combine social and natural scientific approaches to study decision in an emerging discipline called ‘Neuromanager management’. Assumption is that by combining conjectural and empirical tools from neuromanager science, psychology and management into a single approach, resulting synthesis will provide insights valuable to all three-parent disciplines. Studies seem to support that conclusion. Theories have begun to restructure neuromanager understanding of decision-making, and findings suggest constraints on conjectural models developed in management and psychological domains.

In addition, why does the process sometimes go awry, causing impulsive, indecisive, and confused decisions; that lead to risky and potentially dangerous managerial neuromanagerial behaviours? Managerial neuromanagerial behaviour is not the product of a single process, but rather reflects interaction of different specialized subsystems. These systems usually interact seamlessly to determine managerial neuromanagerial behaviour, but at times, they compete. Result is that brain sometimes argues with itself, as these distinct systems come to different conclusions about what we should do. Managerial managerial neuromanagerial behaviour is not under constant and detailed control of careful and accurate hedonic calculations. It is product of an unstable and irrational multi-faceted reflex actions, impulses, instincts and habits. Few aspects of human cognition are more personal than the decisions we make. Our decisions - from the mundane to the impossibly multi-faceted - continually shape the courses of our lives. In recent years, researchers have applied the tools of neuroscience to understand the mechanisms that underlie decision making, as part of the new discipline of decision neuroscience. A primary goal of this emerging field has been to identify the processes that underlie specific decision variables, including the value of rewards, the uncertainty associated with particular outcomes, and the consequences of social interactions. Recent work suggests potential neural substrates that integrate these variables, potentially reflecting a common neural currency for value, to facilitate value comparisons. Despite the successes of decision neuroscience research for elucidating brain mechanisms, significant challenges remain. These include building new conceptual frameworks for decision making, integrating research findings across disparate techniques and species, and extending results from neuroscience to shape economic model. To overcome these challenges, future research will likely focus on interpersonal variability in decision making, with the eventual goal of creating biologically plausible models for Managerial decision.

The equation of human rational managerial neuromanagerial behaviour with instrumentalist, especially economic, rationality represents the hallmark of the economic or rational Managerial economic decision approach. The latter imports, makes explicit and extends orthodox economics’ implicit conception of rational managerial neuromanagerial behaviour as economic rationality. This orthodox conception defines economic rationality by maximization of exclusively materialist objectives, namely profit by producers and utility by consumers. The rational Managerial economic decision approach explicitly applies this conception to all rational and managerial neuromanagerial behaviour that is thus construed as ipso facto economic rationality. The case against neo-classical Managerial decision economics has been growing in recent years. Managerial decision economics is not a real science because it is difficult to do the empirical evidence to validate models economist develop from assumptions. Many core assumptions of neo-classicism (Managers are totally rational, have complete information, only act to maximize utility, etc.) have been disproved by experimentation in managerial neuromanagerial behaviour. Managerial decision economics. Despite the fact that they are working with faulty assumptions, Managerial economists claim that the implications derived from the assumptions are still valid because they are good approximations of reality. Hard sciences use simplified models to explain phenomena but the crucial difference is that Managerial economists add unrealistic properties to validate their models. Some Managerial economists counter by admitting that Neo-classical Managerial decision economics has these problems but the cure is to do more empirical research. But with more empirical research, the Neo-classical assumptions are giving way to a new economic conjecture; multi-faceted Managerial decision economics. The main advantage of multi-faceted Managerial decision economics is that its assumptions can be
Neuroeconomics is an emerging transdisciplinary field, primarily neuroscience, psychology and economics to study how we make Managerial economic decisions. It looks at the role of the brain when we evaluate decisions and how the brain categorizes risks and rewards. ‘Economics’ in the field if neuroeconomics is to be interpreted in the broadest sense of any decision making process that involves making a Managerial economic decision from available alternatives. Expansion of neuromanager management parallels development of cognitive science. Neuromanager management has bridged contrasting fields of management and psychology. Management, psychology, and neuromanager science converge into a single, unified discipline with ultimate aim of providing single, general model of managerial neuromanagerial behaviour. This is the field in which consilience operates. Researchers and psychologists provide conceptual tools for understanding and modelling managerial neuromanagerial behaviour. Neuromanager researchers provide tools for the study of mechanism. The goal is to understand processes that connect sensation and action by revealing neuromanager mechanisms by which decisions are made. Neuromanager findings have posed challenge to standard management perspective.

The important source of inspiration has been neuromanager judgment research (amalgamation of ideas from cognitive science and management). Neuromanager management has primarily challenged customary management postulation that decision - making is a unitary process, suggesting instead that it is driven by interaction between automatic and controlled processes. Despite substantial advances, question of how we design and craft judgments and decisions has engaged researchers for decades. Different disciplines approach the problem through characteristically different techniques. Neuromanager decision making has emerged as an inter-disciplinary effort to bridge this gap. It integrates ideas from fields of organisational psychology, neuromanager science and neuromanager - management to specify accurate models of decision making. Research investigates neural bases of decision predictability and value, central parameters in expected utility to decision – making. Integration of these offers exciting potential for construction of near - accurate models of decision - making.

How is Managerial decision making processes carried out in brain? Do we interpret research findings when neuromanager logical results conflict? Knowing how brain is working explains little about what mind produces; what we think, what we believe and how we craft decisions. What are the general implications of neuromanager management? Neuromanager techniques permit to...
look inside brain while it experiences outcomes and crafts decisions to examine implications. Central argument is that decision - making is at core of Managerial functions and future of any organisation lies on vital decisions made. Decision usually involves three steps: recognition of a need, dissatisfaction within oneself (void or need), decision to change (fill void or need) and conscious dedication to implement the decision. However, certain critical issues coupled with factors such as uncertainties, multiple objectives, interactive multi - facedity and anxiety make decision making process difficult. At times when making a decision is multi - faceted or interests are at stake, then need for strategic decision - making arises. Management is influenced by multiple-systems approach to decision-making, a perspective strongly rooted in psychology and neuromanagement science. The integration of these disparate methodologies offers exciting potential for construction of models of decision-making.

Questions that need to be answered include; how to choose in tough situations where stakes are high and there are multiple conflicting objectives? How should Managers’ plan? How can we deal with risks and uncertainties involved in a decision? How can we create options that are better than the ones originally available? How can we become better decision makers? What resources will be invested in decision - making? What are the potential responses to a particular problem or opportunity? Who will make this decision? Every prospective action has strengths and weaknesses; how should they be evaluated? How will they decide? Which of the things that could happen would happen? The decision has been made. How can we ensure it will be carried out? These are the questions neuromanagement researchers suspect are most crucial for understanding multi - faceted neuromanagemental behaviours.

**Problem Statement**

Despite substantial advances, the question of how we make decisions and judgments continues to pose important challenges for scientific research. Historically, different disciplines have approached this problem using different techniques and assumptions, with few unifying efforts made. Making a Managerial decision implies that there are alternative decisions to be considered, and in such a case we want not only to identify as many of these alternatives as possible but to choose the one that (1) has the highest probability of success or effectiveness and (2) best fits with our goals, desires, lifestyle, values, and so on. Managerial decision - making is the process of sufficiently reducing uncertainty and doubt about alternatives to allow a reasonable decision to be made from among them. This definition stresses the information-gathering function of decision-making. It should be noted here that uncertainty is reduced rather than eliminated. Few decisions are made with absolute certainty because complete knowledge about all alternatives is seldom possible. Thus, every decision involves a certain amount of risk. If there is no uncertainty, you do not have a decision; you have an algorithm--a set of steps or a recipe that is followed to bring about a fixed result.

Emerging neuromanagement science evidence suggests that sound and rational neuromanagement decision making depends on prior accurate emotional processing. Somatic marker hypothesis provides a systems-level neuromanagement anatomical and cognitive framework for neuromanagement decision making and its influence. Key idea is that neuromanagement decision - making is a process influenced by Prefrontal Cortex and Marker Signals. These occur at multiple levels of operation. Some occur consciously and some occur non-consciously. The issues that crop up are; what happens when Managers change minds? What algorithms allow sensorimotor managerial neuromanagemental behaviours to be learned? What computational mechanisms allow brain to adapt changing circumstances? How (and where) are value and probability combined in brain and what is the dynamics of this? What neural systems track defined forms of utility? To what extent do utility computations generalize to decision, that is tasks that are more multi - faceted? How do systems that focus on immediate decisions interact?

What occur in brain when we make neuromanagemental economic decision making or are in course of making neuromanagemental economic decision making? Is neuromanagement of neuromanagemental economic decision making processes relevant? How do we make a neuromanagemental economic decision making? Many neuromanagemental economic decision making makers seek information than required to make a neuromanagemental economic decision making. When too much information is sought, delay occurs. This impairs effectiveness of neuromanagemental economic decision making. In this state, neuromanagement seeks to explain human neuromanagemental economic decision making, ability to process alternatives and choose optimal course of action. It studies how managerial neuromanagemental behaviour shapes understanding of brain. Conjectural accounts posit that human brain accomplishes this through neural computations. What coherent brain dynamics underlie prediction, control and neuromanagemental
economic decision making-making? Therefore, neuromanagerial economic decision making is a reasoning or emotional process which can be rational or irrational, based on explicit assumptions or tacit assumptions. This leads to formulation of ‘neuro - management neuromanagerial economic decision making paradox’. The goal is how brain implements neuromanagerial economic decision making tied to managerial neuromanagerial behaviour. These explore phenomena through individual action, neuromanagerial economic decision making-making and reasoning processes. Objective is to put forward a replica for neuro - management neuromanagerial economic decision making, in which interaction between variables of neuro - neuromanagerial economic decision making processes are addressed via; how does brain assign value to different options under consideration? How does brain compare assigned values in order to design a neuromanagerial economic decision making?

How do people make neuromanagerial economic decision making without having clear inclinations? How do short-lived mental states bias inclinations or neuromanagerial economic decision making outside of the neuromanagerial economic decision making-makers’ awareness? How is information updating represented in the brain? What is the role of time perception in intertemporal neuromanagerial economic decision making? How can we avoid making unhealthy and dangerous neuromanagerial economic decision making? How do we correct for neuromanagerial economic decision making errors? Among the big questions they are trying to answer are:

- How do neurons code the emotional weight of our experiences—do some neurons only become active in response to negative experiences while other neurons only fire when we experience something favourably?
- How do neurons code the numerical value of various options—do more or different neurons fire for an option with bigger rewards than that for a lesser reward? How does the coding for rewards that you receive immediately differ from that of rewards that are delayed?
- How do the far-flung different parts of the brain that govern neuromanagerial economic decision making-making coordinate their activity when making a neuromanagerial economic decision making?
- What triggers a neuromanagerial economic decision making? Is it cumulative build-up of firing neurons that tip the balance to final neuromanagerial economic decision making?
- How do we alter our neuromanagerial economic decision making-making rules when we encounter new information that makes rules obsolete?

The issues, because modern models ignore influence of emotions on neuro - human resources neuromanagerial economic decision making-making, that crop up is:

- What happens when we change our minds and what are the algorithms?
- What computational mechanisms allow brain to adapt to changing circumstances and remain fault-tolerant and robust?
- How (and where) are value and probability combined in brain and what is the dynamics?
- To what extent do tracking efficacy computations generalize tasks that are more multi - faceted?
- Does an unmet need generate a tonic and progressively increasing signal (amounting ‘drive’) or does it manifest as a recurring episodic / phasic signal with increasing amplitude?
- Do higher-level deliberative processes rely similarly on multiple mechanisms, or a single, more tightly integrated (unitary) set of mechanisms?

Focal point is to understand;

- Neural processes underlying how we craft neuromanagerial economic decision making and neuromanagerial economic decision making.
- Understand mechanisms of neuromanagerial economic decision making-making using functional neuroimaging methodologies.
- Integrating interdisciplinary research towards contributing to neuromanagerial economic decision making neuroscience.

Objective is to put forward a model for neuro - human resources neuromanagerial economic decision making, in which interaction between variables of neuro - human resources neuromanagerial economic decision making processes are addressed via;

- How does brain assign value to different options under consideration?
- How does brain compare assigned values in order to design a neuromanagerial economic decision making?
- How is ‘process of valuation’ changed when control is exerted?
- How is value computed in multi - faceted / abstract domains?
• How can Neuro - human resources be applied to design solutions to real - time problems?

Subsequent issues are,
• There is a need to attend as to how neuroscience can, and already has, benefited from Neuro - human resources' unitary perspective, and
• How neuroscience has been enriched by taking account multiple specialized neural systems with potential research directions.

The following clarifications may help pre-empt some common fallacies.
• Is there scientific support for ‘brain modularity’?
• Is there evidence of ‘strategic interactions’ between brain systems?
• Can the multiple brain system approach be defended on evolutionary grounds?
• Are human resource studies models too simple to explain the intricacies of the brain processes?
• Is neuro-human resource studies study of neuromanagerial economic decision making-making processes relevant for human resource studies?

Research demonstrates that brain cannot encode all information. Decision is triggered when ‘enough’ information supporting one alternative is obtained and brain uses a variety of biological mechanisms to filter information in a constrained optimal way. Neuro data reports precisely that individuals stick too often to first impressions. These confirmatory biases may emerge from same set of physiological information processing constraints. Further work in this direction help uncover causes of other biases and determine whether they are all related to same physiological limitations. Methodology used in neuroeconomics model has two advantages. Primarily, evidence from brain sciences provides precise guidelines for constraints that should be imposed on decision-making processes. This helps uncover ‘true’ motivations for ‘wrong’ decisions and improve predictive power of the model. Neuro theories that account for biases in judgment build on specific models of preferences over beliefs or non-Bayesian updating processes. Rather than guessing a cause for biases, neuroeconomics model builds a model based on existing physiological properties underlying learning and belief formation. In principle, this can help pinpoint biological foundations for anomalous decisions. The second advantage is that by explicitly modeling physiological properties, it is possible to provide foundations for elements of preferences traditionally considered exogenous. Decisions involving risk, uncertainty, or time delays may require multi - faceted trade-offs.

The proposed methodology is to develop conjectural foundations, models and algorithms to support timely, robust, near-optimal decision making in highly multi - faceted, dynamic systems, operating in uncertain, resource-constrained environments with incomplete information against a competent thinking adversary. Although, based on operations research methodologies such as modeling, simulation and numerical optimization, this proposal is expected to include multidisciplinary emphasis to accommodate multi-faceted, multi-dimensional decision frameworks. Methodology includes use of neuro – decision tasks and application of neuroscientific analyses and functional neuro-imaging techniques (fMRI). Attempt to combine somatic marker hypothesis with coherence model of neuro - economics decision would be a major initiative. Juxtaposition of Damasio's hypothesis with a cognitive model of neuro - economics decision making is preliminary to a possible model of emotional neuro - economics decision making.

Research directions include;
• Modeling and simulation with objective of decision support,
• Fundamental graph model and network analysis in support of modeling multi - faceted systems managerial neuromanagerial behaviours,
• Numerical optimization and modeling for managerial neuromanagerial behaviours,
• Evidential reasoning and modeling for decision making approaches to model real-time information,
• Sequential dynamic decision making approaches, and
• Algorithms and simulation into modeling of decision-making.

Rationale
Goal of studying human decision managerial neuromanagerial behaviour is prediction. This research seeks to develop conjectural models, based on axiomatic foundation, which can predict Managerial decisions. These models would take as inputs state of external world and generate as outputs actual decisions made by human choosers. For this reason, research would aim towards achieving compact and abstract models of decision. To date, management model of decision has not been informed by the way brain functions. Analysis of observations would include not only
Managerial economic decisions between options, per se, but additional data, including length of time taken to make decisions, number of error in decisions and psychophysical model(s).

Including more than just observed decisions allows data to have an additional disciplining effect on model. We extend this assumption of optimal managerial neuromanagerial behaviour to analysis of brain process producing a decision. To do this, we assume that there is an unobservable decision that an agent makes, consequences of which are reflected in all observable data that can be measured in the decision process. That decision is strength of effort devoted to processing information in reaching a decision between options. As a conclusion, we propose a model that joins predictions of traditional psychological observations and predictions of relative brain activation dependent on exogenous characteristics of decision environment.

Even as it is recognised that brain (and consequent managerial neuromanagerial behaviour) does not operate perfectly optimally, there are several reasons why these assumptions can nevertheless be valuable. First, although multi-faceted forms of managerial neuromanagerial behaviour might not be optimal, simpler evolutionarily conserved mechanisms might prove to be closer to optimal, or at least to have been so in the environment in which they evolved. Second, an assumption of optimality can be a crucial step in development of formal model. Formal model, in turn, enables generation of precise, testable predictions about Managerial neuromanagerial behaviour. Finally, even when managerial neuromanagerial behaviour (or neural function) turns suboptimal, defining optimal performance can provide a useful benchmark against which to compare actual managerial neuromanagerial behaviour. Identifying ways in which managerial neuromanagerial behaviour systematically deviates from optimality can generate new insights into underlying mechanisms.

Neuromaneger management model will play a crucial role in building of new reliable theories capable of explaining and predicting Manager managerial neuromanagerial behaviour and strategic decisions. Main message is that Manager is not one coherent body. Brain is a multi-system entity and therefore decision-maker must be modelled as an organisation. Before the modern model, organisations were modelled as Manager players characterised by an input-output production function. Systematic study of interactions between agents and decision processes within organisations lead to novel insights.

Applying similar methodology to study Managerial decision - making is the way to understand bounds of rationality.

**Assumptions**

1. The problem is clear and unambiguous (Problem Clarity).
2. The decision-maker can identify all relevant criteria and viable alternatives (Known Options). These are the characteristics or requirements that each alternative must possess to a greater or lesser extent. Usually the alternatives are rated on how well they possess each criterion.
3. Rationality assumes that the criteria and alternatives can be ranked and weighted (Clear Preferences).
4. Specific decision criteria are constant and that the weights assigned to them are stable over time (Constant Preferences).
5. Full information is available because there is no time or cost constraints (No Time or Cost Constraints).
6. The preference alternative will yield the highest perceived value (Maximum Payoff).

**Limitations**

Decision makers do not have complete knowledge of all the facts surrounding the problems. They cannot foresee future events with complete accuracy. Therefore, it is not always possible to choose the optimum solution. The search for decision is stopped as soon as the minimum acceptable level of rationality is reached. Most decisions involve too many multi-faceted variables all of which cannot be examined fully by a decision maker. It is not always possible to identify all possible alternatives due to time and cost constraints. A decision making situation may involve multiple goals all of which cannot be maximized simultaneously. It is not possible to maximize goals when a suitable quantitative measure of progress is not available. The environment of decision making is often uncertain. When facilitating decisions in which some performance evaluations are uncertain, a decision must be taken about how this uncertainty is to be modelled. This involves, in part, choosing an uncertainty format [a way of representing the possible outcomes that may occur. It seems reasonable to suggest [and is an aim of the thesis to show [that the decision of how uncertain quantities are represented will exert some influence over the decision-making process and the final decision taken. Practical applications often use simpler decision models to aid decision making.
under uncertainty, based on uncertainty formats that 'simplify' the full probability distributions. The making and implementation of decisions are influenced by several uncontrollable factors. Therefore, the consequences of various alternatives cannot be anticipated accurately. The outcome of a decision can be known only in future. It is not always possible to foresee future events and the anticipated consequences of various alternatives may differ from those actually realized. A decision in one area may have an adverse effect on another area of operations. Human factors are the main limits on rational decision making. Personal value systems, perceptions, economic and social factors, etc., are the main human limits on rationality. Every decision maker is a human being and his’ decisions are influenced by his personal beliefs, attitudes and biases. The manner of decision making is influenced by a Manager's perception regarding the problems and their solutions. The perception of one decision maker possibly is different from that of the other. While making decisions, a Manager is likely to seek the protection of his self interest and decision making power. Collection of information, evaluation of alternatives, decision of decision and attitude towards change may all get disported due to personal and political reasons. A decision maker may take decisions which are the best in terms of his own personal interest rather than what is in the best interest of the organization. Lack of support and acceptance by subordinates, lack of trust by superiors, legal restrictions, moral and ethical standards, formal policies and procedures, ineffective communication, incorrect timing of the decisions are also sources of limits on rationality. The decision maker may not be able to gather and process all information. He may gather information which he thinks pertinent to the decision. In such situation, decisions are made within a hounded rationality. Every Manager is concerned with the limits of rationality how they can be overcome so that the most rational alternative may be selected for solving the problem. Every Manager is concerned with the limits of rationality how they can be overcome so that the most rational alternative may be selected for solving the problem.

Until now, research has not systematically integrated influence of emotions on decision-making. Since evidence from neuroscience suggests that decision-making depends on prior emotional processing, interdisciplinary research under label of ‘Neuroeconomics’ arose. The key idea is to employ recent neuroscientific methods in order to analyze relevant brain processes. Due to its multidisciplinary nature, this investigation is subject to several kinds of misconceptions. Is neuroeconomics study of decision-making processes relevant for economics? Depending on how we define ‘(neuro)economics’, it may or may not be relevant. The debate, however, seems futile. This research does not take a stand on that issue. Instead, it argues that question is of scientific interest and tools from economics model are well adapted to address it.

While there are several benefits of using neuroscience techniques in understanding decision making, there are questions that neuromanagerial science cannot answer by itself and needs help of experimental methodology and theories to understand how Managers decide. The key limitation is identifying different regions of brain in certain situations (VUCA). These techniques are not able to provide an explanation or a reason (neuromanagerial) as to why we respond in the manner that we do. What happens in brain or what is activated when Managers make decisions or are in process of making decisions or responding to outcomes? It does not give insight into why we make decisions and why we respond in the manner that we do. This is where experimental methodology would help bolster understanding. A synergy between neuromanagercial techniques and experiments provide insight into understanding Managerial decision making.

Until now, research has not systematically integrated influence of sub - systems of brain in decision-making. Evidence suggests that decision - making depends on methodical methods to analyse relevant brain processes. The study is limited by the focus on descriptive rather than real prescriptive decision making, but has implications for prescriptive decision making practice in that natural tendencies are identified which may need to be overcome in the course of a prescriptive analysis. Due to its multidisciplinary nature, this investigation is subject to several kinds of misconceptions. Is Neuromanagerial study of decision - making processes relevant for management? The debate argues that the question is of scientific interest and tools from management model are well adapted to address it.
activated when we are in certain situations. These techniques are not able to provide an explanation or a reason (neuro) as to why we respond in the manner that we do.

What happens in brain or what is activated when we make decisions or are in the process of making decisions or responding to outcomes? It does not give us any insight into why we make these decisions and why we respond in the manner that we do. This is where experimental methodology would help bolster understanding as to why Manager make decisions that they do. A synergy between neuroscience techniques and neuro experiments will provide tremendous insight into understanding managerial neuromanagement behaviour and decision making.

Is the neuromanagement study of decision-making processes relevant for management? Until now, research has not systematically integrated influence of emotions on decision-making. Depending on debate, it is argued that question is of scientific interest and tools from management model are well adapted to address it. Evidence suggests that decision-making depends on prior emotional processing. Due to its multidisciplinary nature, this investigation is subject to several kinds of misconceptions.

But there are some basic conceptual problems hovering about the interpretation of Managerial neuro scans. In parsing these problems, it becomes apparent that the current ‘neuro’ enthusiasm should be understood in the larger context of scientism, a pervasive cultural tendency with its own logic. A prominent feature of this logic is the overextension of some mode of scientific explanation, or model, to domains in which it has little predictive or explanatory power. Such a lack of intrinsic fit is often no barrier to the model nonetheless achieving great authority in those domains, through a kind of histrionics. All that is required is a certain kind of performance by those who foist the model upon us, a dramatic imitation of explanatory competence that wows us and cows us with its self-confidence.

If the critique of mental modularity is valid, how can one account for the fact that Managerial neuro scans do, in fact, reveal well-defined areas that ‘light up’ in response to various cognitive tasks? In the case of functional (as opposed to structural) neuroimaging, what you are seeing when you look at a Managerial neuro scan is the result of a subtraction. Functional magnetic resonance imaging (fMRI), for example, produces a map of the rate of oxygen use in different parts of the Managerial neuro, which stands as a measure of metabolic activity. Or rather, it depicts the differential rate of oxygen use: one first takes a baseline measurement in the control condition, then a second measurement while the subject is performing some cognitive task. The baseline measurement is then subtracted from the on-task measurement. The reasoning, seemingly plausible, is that whatever shows up in the subtraction represents the metabolic activity associated solely with the cognitive task in question.

One immediately obvious (but usually unremarked) problem is that this method eliminates from the picture the more massive fact, which is that the entire Managerial neuro is active in both conditions. A false impression of neat functional localization is given by the presentation of differential Managerial neuro scans which subtract out all the distributed functions. This subtractive method is ideally suited to the imaging technology, and deeply consistent with the modular model of mind. But is this modular model of mind perhaps attractive in part because it lends itself to the subtractive method? Perhaps the most fundamental limitation of functional imaging, vis-à-vis the claim that it allows us to ‘peer inside the mind,’ is that there is a basic disconnect of time scale. Managerial neuro scans are emphatically not images of cognition in process, as the neural activity of interest occurs on a time scale orders of magnitude faster than hemodynamic response (the proxy for neural activity measured by fMRI).

But for a certain kind of intellectual, the mere act of positing that some mystery has a mechanical basis gives satisfaction. A heady feeling of mastery rushes in prematurely with the idea that in principle nothing lies beyond our powers of comprehension. But to be knowable in principle is quite different from being known in fact. Hands-on mechanical experience frequently induces an experience of perplexity in formally trained engineers. We may be emboldened to speculate, in a sociological mode, whether a lack of such mechanical experience ‘enables’ a certain intellectual comportment which doesn’t give the machine its due, and isn’t sufficiently impressed with this difference between the knowable and the known.

Likely Contributions

The study of decision making and problem solving has attracted attention. Expanded research requires (model-based empirical) study of managerial neuromanagement behaviour and provide setting for basic research on how ill-
structured problems are, and can be, solved. Managerial neurodecision making, which is much less well understood than Manager decision-making and problem solving, can be studied with great profit using already established methods of inquiry, especially through intensive studies.

Neuromanagerial management offers solution through series of measurements of brain activity at the time of decisions. It provides conceptual and philosophical framework for understanding and conducting research at intersection of neuromanagerial science, management and psychology. Neuromanagerial management model proposes to build brain-based models capable of predicting observed managerial neuromanagerial behaviour. Neuromanagerial management will shed light on causes of managerial neuromanagerial behaviour (and neuromanagerial anomalies) and help build theories capable of explaining and predicting decisions. Measurement of brain activity provides information about underlying mechanisms brain during decision processes. Neuromanagerial decision modelling would help when new information is inconsistent with goals. Combining the above disciplines gives interdisciplinary insight to define fundamentals of neuromanagerial decision making that has eluded researchers.

**Conclusion**

Over the Centuries since Adam Smith, Neuromanagerial economists have developed frameworks for maximising neuromanagerial decision economic success. However, despite the intellectual power of these theories and simple logic involved in calculations, humans continue to do what rational, reward-maximizing equations tell them to do. Irrationality of human decision-making attracts fierce interest of two very different fields: neuroscience and neuromanagerial decision economics. Neuromanagerial economic theories of human decision-making are essentially based on two parameters: what something is worth and probability of its occurrence. Neuroscientists think of decision-making as a product of physical neural circuits: sensory information enters brain, journeys through brain where decision is ‘made,’ and eventually exits the brain to evoke bodily responses. Neuromanagerial decision economics ignores these biological, more proximal roots of neuromanagerial behaviour, whereas neuroscience ignores neuromanagerial decision economic goals that ultimately guide decisions.

These two approaches have recently been integrated in the hybrid field of neuromanagerial decision economics. Neuromanagerial decision economics attempts to unify abstract neuromanagerial decision economic variables with neuroanatomy and understand physical mechanisms by which brains make decisions. The basic premise is that somewhere along sensory-motor circuit is neural substrates that represent ‘value’ and ‘probability.’ Within neurobiology, studies of movement control areas, usually referred to collectively as the components of the motor system, are segregated into two main divisions: those that control systems that regulate movements of the body, hands, feet and mouth (the skeletomuscular system) and those that move the eyes (the oculomotor system). As with the sensory systems, there seem to be strong parallels between the multiple motor systems of the brain and as in studies of the sensory systems, our core framework largely derives from studies of one system, in this case the oculomotor system. The oculomotor system has provided especially fertile ground for study because of the simplicity of the mechanics of the eyeball. While movements of the arm, for example, involve dozens of muscles and multi-faceted inertial moments, movements of each eye involve only 6 muscles and no detectable inertia. (For an introductory overview of the motor system see the motor chapters in Rosenzweig et al. (2002). For more detail see Squire et al. (2002).)

This is the science of the most multi-faceted and advanced product of nature - the human brain. How strong is the discipline behind the discoveries we have made to date? Interpretation of managerial activity in terms of neuroscience is typically concerned with extreme behaviors. There are significant differences between the methods. Such differences include: the extent to which the decision problem is broken into a hierarchy of subproblems, whether or not pair wise comparisons of substitutes and/or criteria are used to elicit decision-makers' preferences, the use of interval scale or ratio scale measurements of decision-makers' preferences, the number of criteria included, the number of substitutes evaluated, ranging from a few (finite) to infinite, the extent to which numerical scores are used to value and/or rank substitutes, the extent to which incomplete rankings (relative to complete rankings) of substitutes are produced and the extent to which uncertainty is modeled and analyzed. There is sufficient overlap to motivate further investigation.

These areas must interact and influence flow of information along the circuit, thereby prompting certain decision and its subsequent neuromanagerial behaviour. Pressing questions, then, are how and where these abstract variables...
are combined in brain and dynamics of neural computation which engenders a ‘decision.’ Inherently, neuromanagerial decision economics is to have grander, nobler intentions. Although the former ‘dismal science’ is abstract and far removed from biological mechanisms, it offers one thing neuromanagerial behaviour studies tend to lack: great mathematical beauty. Because neuromanagerial economists base their models on optimal neuromanagerial behaviour, they have ability to develop precise, unified framework for interpreting human neuromanagerial behaviour. Neuromanagerial decision economics draws upon precision and rigor of formal models of neuromanagerial decision economics to go beyond sensory-motor circuit, allowing opportunities for understanding neural basis of abstract neuromanagerial decision economic ideas. Thus, principles of neuromanagerial decision economics allow neuroscientists to explore physical mechanisms underlying high level cognitive processes.

Progress in neuroscience will allow us to reveal the neuronal correlates of decision making involved in informed consent. Such a ‘neuroscience of decision making’ would allow us to develop empirical—that is, ‘human black box’ based—criteria of informed consent. Empirical criteria are descriptive and must therefore be distinguished from the normative criteria of informed consent. Normative criteria are characterised by norms and values and thus cannot be reduced to descriptive, that is empirical—criteria. Therefore, the neuroscience of decision making cannot replace the ethics of informed consent. Instead, it can complement the ethics of informed consent by providing empirical and thus descriptive criteria. I conclude that neuroethics, in such a complementary sense, will change the way in which we solve ethical problems of informed consent in twenty-first century neuropsychiatry.

In the past few years, methods used in understanding brain patterns and neural activity have advanced tremendously. In light of discussing some of these theories and applications of neuroscience in neuromanagerial economic decision making, it is important to see what techniques are being used to study the brain. Research demonstrates that brain cannot encode all information. Neumanagerial economic decision making is triggered when ‘enough’ information supporting one alternative is obtained and brain uses a variety of mechanisms to filter information in a constrained optimal way. Neuro data reports precisely that individuals stick too often to first impressions. These confirmaory biases may emerge from same set of information processing constraints. Further work in this direction help uncover causes of other biases and determine whether they are all related to same limitations. Methodology used in neurohuman resources model has two advantages. Primarily, evidence from brain sciences provides precise guidelines for constraints that should be imposed on neuromanagerial economic decision making-making processes. This helps uncover ‘true’ motivations for ‘wrong’ neuromanagerial economic decision making and improve predictive power of the model. Neuro theories that account for biases in judgment build on specific models of inclinations over beliefs or non-Bayesian updating processes.

The proposed tactic is to develop conjectural foundations, models and algorithms to support timely, robust, near-optimal neuromanagerial economic decision making in highly multi - faceted, dynamic systems, operating in uncertain, resource-constrained environments with incomplete information against a competent thinking adversary. Although, based on operations research methodologies such as modeling, simulation and numerical optimization, this argument is expected to include multi-disciplinary emphasis to accommodate multi - faceted, multi-dimensional neuromanagerial economic decision making frameworks.

These results suggest that the simplest kind of connection between sensation and action can be described as a process by which topographic parallel representations of signals from the outside world are used to trigger neuromanagerial behavioural responses in topographically organized output maps, perhaps through the intermediate representation of a simple neuroeconomic managerial economic decision variable (see Glimcher (2003a) for a more in depth survey of this work). This much is uncontroversial. Also uncontroversial is that these sensory-motor connections do not constitute neuroeconomic managerial economic decision making in the economic sense. Neoclassical variables like value and expected utility, which are central to formal rational neuroeconomic managerial economic decision making, do not occur in a very clear fashion during these experiments. One possibility that this raises is that these are precisely the kinds of crude and primitive processes that are responsible for economically irrational neuromanagerial behaviour. Rational managerial neuroeconomic option models may break down, be bounded, because mechanisms like these ‘take over.’ But there is an alternative hypothesis. These
mechanisms may be much more complicated than they appear from the experiments that have already been presented. Indeed, these experiments may reveal only the tip of the neurobiological iceberg. Distinguishing between these two hypotheses is, fortunately, an empirical problem. We can begin to ask whether these circuits and this general model can account for more complicated classes of neuroeconomic managerial economic decision making by examining these same neurons under conditions that more closely approximate the kinds of rational managerial neuroeconomic option that are of interest to economists.

Research directions ought to include:

- Modeling and simulation with objective of neuromanagerial economic decision making support,
- Fundamental graph model and network analysis in support of modeling multi-faceted systems managerial neuromanagerial behaviours,
- Numerical optimization and modeling for managerial neuromanagerial behaviours,
- Evidential reasoning and fusion approaches to model real-time information,
- Sequential dynamic neuromanagerial economic decision making approaches, and
- Algorithms and simulation into modeling of neuromanagerial economic decision making.

Neurohuman resources model will soon play a crucial role in building of new reliable theories capable of explaining and predicting individual managerial neuromanagerial behaviour and strategic neuromanagerial economic decision making. Main message is that individual is not one coherent body. Brain is a multi-system entity (with conflicting objectives, restricted information, etc.) and therefore neuromanagerial economic decision making-maker must be modelled. Before the modern model, organisations were modelled as individual players characterised by an input-output production function. Systematic study of interactions between agents and neuromanagerial economic decision making processes within organisations (acknowledging informational asymmetries, incentive problems, restricted communications channels, hierarchical structures, etc.) led to novel insights. Applying a similar methodology to study individual neuromanagerial economic decision making-making is the way to understand bounds of rationality.

Thus, by exploring neural processes by which brain generates neuromanagerial decision economic decisions, researchers are able to gain insight into circuit-level computations that (may) govern multi-faceted neuromanagerial behaviours. The extent to which computations of neuromanagerial decision economic model can truly be generalized to computations performed by brain (as well as to more multi-faceted decision tasks) is unknown, but aims and progress of this field are promising. From neuromanagerial economist's point of view, neuromanagerial decision economics may be far ‘messier’ than neuromanagerial decision economics. Conjectural analysis of what humans should do isn't is nearly as fascinating as understanding what they actually do and neuromanagerial decision economics brings us far closer to reality. Being a maiden study, the present attempt would contribute (at intersection of neuromanager science, management and psychology) towards existing scholarship in the following mode:

- Provide conceptual framework for understanding and conducting neuromanager management research,
- Offer solution through measurements of brain activity at time of decisions, and
- Describe a standard model for decision making spanning neuromanager science, management and psychology.