

Conceptual Issues in Crafting Neuroeconomic - Managerial Decisions

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Abstract : *Decision-making is a region of intense study in neuroscience, and cognitive neuroscience, In real, World decision processes, management decisions emerge from complexly interlinked, This paper explores how brain absorbs information, recognises and frames problematic situations, and chooses appropriate responses, Brain structures suggest that brain considers various sources of information before making decision, Brain imaging technologies have stimulated neuro (managerial) studies of internal order of mind and its links with bandwidth of human decisions, How is (managerial) decision making processes carried out in brain? What are the limits of understanding thinking as a form of computing? How does previous experience alter behavior? Do we interpret research findings when neuro (managerial) logical results conflict? Imaging is an important aspect of dynamic capabilities and there is an increasing amount of evidence of how evolutionary patterns are shaped. There are yet unsolved problems in (managerial) cognition, although some of these problems have evidence supporting a hypothesized solution, and the field is rapidly evolving, What are the general implications of neuro (managerial) management? What happens in brain or is activated when Managers make decisions or are in the process of making decisions? Is study of decision-making via neuromanagement processes relevant for Managers? Many Managers seek information than required thereby causing delay because of time required to process information. This impairs effectiveness of decision. In this state, neuromanagement seeks to explain decision-making, ability to process multiple alternatives and choose optimal course of action. It studies how management behaviour shape understanding of brain and guide models of management. What are the coherent brain dynamics underlying prediction, control and decision making? Theoretical explanations posit that human brain accomplishes*

this through neural computations. Deciphering such transactions require understanding of neuro processes that implement value - dependent decision making. This leads to formulation of a 'neuro - management decision making paradox'. The goal is a speculation of how brain implements decisions that is tied to behaviour. There are unsolved research issues; how does Manager decide in a state of vacillation, Risk and Probability? How does Manager decide in state of VUCA (Uncertainty, Vulnerability, Complexity and Ambiguity)? How do we make decisions? How do human brains compute and represent abstract ideas? What counts as explanation of how brain works (what are function, algorithm and implementation)? This paper attempts at addressing current pace of advances in methods (fMRI, BOLD, EEG, ECG, etc), where we are going and what we ought to research next. This Paper attempts to explore phenomena through individual action, decision -making and reasoning processes. Objective is to put forward a model for neuro - management decision, in which interaction between variables of neuro - management decision processes are addressed through series of measurements of brain activity at time of decisions. Attempt is to describe a regular model for decision making process with intent of linking neuro - psycho and management levels of analysis capable of predicting observed behaviour. This provides conceptual framework for understanding and conducting Neuro (managerial) management research at intersection of neuro (managerial) science, management and psychology, offer solution through measurements of brain activity at time of decisions, linking and spanning neuro(managerial) biological and psychological and management levels of analysis.

Key Words: *Cognitive Neuroscience, Brain Imaging, Coherent Brain Dynamics, VUCA, fMRI, BOLD, EEG, ECG*

Introduction

What are minds for? Human brain is the most complex thing that we know of within our own World. Perhaps it is the most complex thing in the universe! Why have we as a species been blessed with such a gift? What is it for? How much of our managerality is determined by our brain? It's a question that's perplexed philosophers for centuries and scientists for decades, This is the old character versus nurture debate, Despite all the recent advances in the cognitive and neurosciences, there's still much about the human brain that we do not know, We are still quite a ways off from understanding how the brain produces phenomenal experience or qualia, It's what makes us the unique, self-reflective creatures that we are, Decision-making is a region of intense study in neuroscience, and cognitive neuroscience, In real, World decision processes, management decisions emerge from complexly interlinked, There is a need to explore how brain absorbs information, recognises and frames problematic situations, and chooses appropriate responses.

Modern day business development and its global form have ushered in changes in the life of individuals and the business environment. Most behavioral decision research takes place in carefully controlled laboratory settings, and examination of relationships between performance and specific real-world decision outcomes is rare. Although previous studies investigated the relationship between general cognitive abilities and decision making, few have characterized specific cognitive abilities underlying decision making competence. Deciphering brain - environment transactions requires mechanistic understandings of project biological processes that implement value-dependent project decision-making. There is a crucial difference between 'thinking about thinking' and actually enhancing brain and mental processes by developing latent potential of each individual. Theoretical accounts posit that human brain accomplishes this through a series of neural computations, in which expected future reward of different project decision options are compared with one another and then option with highest expected value is selected. If human brain is often compared with computer, one aspect is crucially missing. Humans define goals for information processing in computers, whereas goals for biological brains are determined by need for survival in uncertain and competitive environments. How to handle brains behind

businesses in age of dramatic change and growing uncertainty? What then are the coherent brain dynamics underlying prediction, control and project decision-making?

Decisions are inevitable part of individual activities with daily life being a sequence of decisions. Distinctively, researchers are interested in assumptions, beliefs, habits and tactics to make decisions. Any iteration of economics as a human endeavour would need some explanation of substrates, mechanisms and variable effects of emotional influence upon cognitive functions operative in decision-making processes relevant and relative to ecological resources. Brain considers sources of information before decision. Nonetheless, how does it do this? Why does process sometimes go awry, causing impulsive, indecisive and confused decisions that lead to potentially dangerous behaviours? Neuroeconomic decision making offers tools for modeling behaviour. With different disciplines approaching through characteristically different techniques and substantial advances, question of how we design and how we have to craft judgments / decisions has engaged researchers for decades. This research investigates neural bases of decision predictability and value, parameters in Economics 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 offer exciting potential for construction of near - accurate models of decision - making.

Decision research has been influenced by homo behaviour economics metaphor with emphasis on normative models and deviations from predictions of those models. In contrast, principal metaphor of cognitive psychology conceptualizes humans as 'information processors'. Cross-fertilization between the two areas is important. A wide range of models and metaphors has been proposed to explain and describe 'decision making in ingenious ways. This encourages cross-fertilization between cognitive psychology and decision research by providing an overview of current perspectives that continues to highlight benefits of synergistic approach: cognitive modelling of multi-attribute decision making. Expansion of neuromanagement parallels development of cognitive science. Neuromanagement management has bridged contrasting fields of management and psychology. Management, psychology, and neuromanagement science converge into a single, unified discipline with ultimate aim of providing single, general theory of human behaviour. This is the field in which consilience operates. Researchers and psychologists offer conceptual tools for understanding and modeling behaviour.

Neuromanagerial researchers offer tools for the study of mechanism. The goal is to understand processes that connect sensation and action by revealing neuromanagerial mechanisms by which decisions are made.

How are decisions carried out in brain? Question is how manager make decisions. Brain considers sources of information before decision. In particular, the processes by which individuals reach decisions have been ignored. Problems confronting decision makers often embody conflicting values. Manager often fail to design 'rational' decisions. When faced with obscure decision, individuals engage in strategic simplifications of decision problems. How do parts of the brain that govern decision-making coordinate their activity when making a decision? This paper explores certain neuro-underpinnings in managerial decision modeling. Brain structures suggest that brain considers various sources of information before making decision, Brain imaging technologies have stimulated neuro (managerial) studies of internal order of mind and its links with bandwidth of human decisions, how is (managerial) decision making processes carried out in brain? What are the limits of understanding thinking as a form of computing? How does previous experience alter behavior? Do we interpret research findings when neuro (managerial) logical results conflict?

Imaging is an important aspect of dynamic capabilities and there is an increasing amount of evidence of how evolutionary patterns are shaped, There are yet unsolved problems in (managerial) cognition, although some of these problems have evidence supporting a hypothesized solution, and the field is rapidly evolving, What are the general implications of neuro (managerial) management? There are unsolved research issues; how does Manager decide in a state of vacillation, Risk and Probability? How does a Manager decide in state of VUCA (Uncertainty, Vulnerability, Complexity and Ambiguity)? How do we make decisions? How does human brain compute and represent abstract ideas? What counts as explanation of how the brain works (what are function, algorithm and implementation)? This paper attempts at addressing current pace of advances in methods (fMRI, BOLD, EEG, ECG, etc), where we are going, and what we should research next. This provides conceptual framework for understanding and conducting Neuro (managerial) management research at intersection of neuro (managerial) science, management and psychology, offer solution through measurements of brain activity at time of decisions, linking and spanning neuro(managerial) biological, psychological and management levels of analysis, volatility, uncertainty, complexity and ambiguity of

general conditions and situations, The deeper meaning of each element of VUCA serves to enhance the strategic significance of VUCA foresight and insight as well as the behavior of groups and managers in organisations.

Managerial Activity: Managers make (economic) decision makings in complex situations. Neuromanagerial economic decision making needs a decision maker (Manager) responsible for economic decision making. This maker has number of alternatives and must choose the best alternative (or optimised combination). When this has been made, events may have occurred (maker has no control). Each (combination) of alternatives, followed by an event, leads to a result with some quantifiable significance. Cognitive neuroscience research suggests that diverse preference orderings and decisions possibly will surface depending on which brain circuits are activated. This perchance contradicts the microeconomic postulate that one complete preference ordering provides sufficient information to predict decision and behaviour.

Sen argues that emergence of complete preference ordering may be prevented by existence of conflicting motivations. Sen criticises existence of competing motivations (or 'reasons for decision') stating that unique preference ordering is not sufficient for describing human behaviour (unless, by chance, all motivations provide the same preference ordering). Nonetheless, Sen does not provide an explanation of how different motivations impact on decision (explanation can be found in recent neuroscience research). One key insight is *modularity* of human brain (not all brain circuits get activated when executing response to given circumstances). Same stimuli may generate different behavioural responses depending on which brain circuits are activated. If hypothesis is accurate, different brain circuits can guide to different decisions depending on which brain structures and circuits are activated. Consequently, there would be various (possibly conflicting) preference orderings. Furthermore, if a particular brain circuit could act relatively insulated, distinctive preference ordering would result (closed system).

Consistency properties are internal to the neuroeconomic Managerial decision function that describes behaviour. Samuelson's revealed preference formulation is scientifically more respectable (since) if an individual's behaviour is consistent, then it must be possible to explain behaviour without reference to anything other than behaviour. Sen (2002) identifies 'internal consistency' approach and 'self-interest pursuit' approach, respectively. Internal consistency model explains behaviour by finding regularities in

observed behaviour that enable to assess consistency without reference to anything other than (or external to) observed behaviour. In order to predict neuroeconomic Managerial decisions, researchers work out which preferences are consistent by checking whether agents' do or do not violate certain axioms of revealed preference. Added approach is 'self-interest pursuit' approach. It is assumed that self-interest, represented by complete preference ordering, dominates all motivations in coherent matrix. 'Rational' behaviour will consist in pursuit of self-interest. This provides basis for application of utility theory in coherent analysis which represents chooser's preferences and explains how preferences determine neuroeconomic Managerial decisions. Internal consistency is neither sufficient nor necessary condition of neuroeconomic Managerial decision. It is not sufficient because '[a] person who always chooses things he values least and hates most would have great consistency of behaviour, but he can scarcely count as a model of rationality. There may be actions that are rational but where axiomatic conditions of consistency of behaviour would not obtain. Internal (intrinsic) psychological structure of Manager may be affected by conflicting motivations, values or goals, each of them corresponding to a different ordering and interacting in a way that precludes emergence of internally consistent preference ordering. External (extrinsic) factors may influence neuroeconomic Managerial decision based on 'menu-dependence'. Changes may modify attitude towards other elements thereby changing preference ordering. These contravene axiomatic conditions of internal consistency which require that orderings must be independent from external conditions.

Interpretation of Managerial activity in terms of neuroscience is typically concerned with the neurophysiological underpinnings of Managerial neurodecision Managerial economic behaviours. One key insight is *modularity* of human brain (not all brain circuits get activated when executing response to given circumstances). Same stimuli may generate different behavioural responses depending on which brain circuits are activated. If hypothesis is accurate, different brain circuits can guide to different decisions depending on which brain structures and circuits are activated. Consequently, there would be various (possibly conflicting) preference orderings. Furthermore, if a particular brain circuit could act relatively insulated, distinctive preference ordering would result (closed system).

Real-life decision making involves assessment, by cognitive and emotional processes, of incentive value of various actions available in particular

situations. However, often situations require decisions between many complex and conflicting alternatives, with a high degree of uncertainty and ambiguity. The goal is to make better and 'rational' neuromanagement economic decision making. Theories and prescriptions require a cognitive understanding Managerial Economic Behavioural Decisions Systems (MEBDS). The question of appropriate prescriptions is directed towards conceptualisation of Managerial economic behaviour equipped with implications for understanding strategy. Some Managerial economic behaviour fails to achieve goals of firm. One way of looking at it is pre-existing framework of conceptualization and analysis can be resolved with the initial decision process. It also has to be recognised that once strategic decisions have been made and a suitable decision framework established, the Managerial work involved in such decisions takes on an increasingly routine aspect. Overall object will be to reach an acceptable balance so that decision is made in a timely manner and coordinated. Operational measure of balance / imbalance between neural systems is the extent of temporal discounting apparent in Manager's neurodecision behaviour. This ensures that conflict between goals is minimised. Neuroeconomic explanation has often concentrated on functional and dysfunctional neurodecision Managerial economic behaviour.

Human Brain Tectonics

Human resources rely on cautious mock-up of neuromanagement economic decision making modeling. Tactic consists in construction models to display relationship between cause and neuro incongruity. Freedom provided by introspection technique leads to a model selection problem. Neuro - management neuromanagement economic decision making-making, regarded as a mental process (cognitive process), result in selection of path of action among alternative circumstances. Each neuromanagement economic decision making-making process produces neuromanagement economic decision making. Process is regarded as incessant process integrated with situation. Investigation is concerned with rationale of neuromanagement economic decision making - making, reasonableness and invariant neuromanagement economic decision making. These reflect compensatory interface of neuromanagement economic decision making - related expanse.

Specific brain structure potentiates neuromanagement economic decision making - makings depending on strategy, traits and framework. Therefore, neuromanagement economic decision making is a reasoning or emotional process which can be rational or irrational, based

on explicit / tacit assumptions. This leads to formulation of a 'neuro - management neuromanagement economic decision making paradox'. Explorations on brain mechanisms juxtapose link between brain and behaviour, known as Cognitive Neuroscience, to study neuronal activities, connections between neurons, plasticity of brain and relationship between brain and behaviour. These inherit methods as how brain encodes, processes information, stores representation in mind to craft actions in reaction to stimuli. These embrace sensation and perception of information, interface linking information in dissimilar modalities, matrix of memory and dispensation of information. Deduction is based on postulation that individual cognitive functions are based on neural activities in brain.

Researchers argue that humans make neuromanagement economic decision making by obeying laws of judgment. Expected efficacy argument has dominated understanding by assuming that under circumstances, human beings make neuromanagement economic decision making and inclination by maximizing efficacy. Nevertheless, in observing behaviours, they do not link cerebral scrutiny to decide which inclination to formulate. This holds proper for uncertain and non-risky neuromanagement economic decision making. Neuroscience plays role to understand brain in reason of behaviours. Arguments include Prospect Theory, Somatic Marker argument and Magnetic Resonance Imaging (MRI) techniques to measure neuro waves. Key problems include how brain represents value of diverse inclinations capitulate best possible neuromanagement economic decision making. Which are the limits for testability in neuromanagement economic decision making-experimentation? Could we experiment neuromanagement economic decision making-flawlessly mimicking valid contexts? Is top-down control involved? Do we have liberated will and to what extent we have room for inclination, if any? Key limitation is that it is able to spot different regions of brain in definite situations. These do not offer clarification or explain (behavioural). Experimental methodology assists in understanding as to why human beings make inclinations. Arguments happen to be significant in understanding human neuromanagement economic decision making.

Neuromanagement economic decision making involves detection of need, discontent within oneself, decision making to change and mindful perseverance to execute decision making. How are neuromanagement economic decision making carried out in brain? What are the general implications? Primary argument is that neuromanagement economic decision making-making is coupled with

factors of uncertainties, compound objectives, interactive intricacy and apprehension that makes neuromanagement economic decision making-making course of action difficult. There is the requirement for strategic neuromanagement economic decision making-making. Questions include; how to choose in situations where stakes are high with multiple conflicting objectives? How to plan for dealing with risks and uncertainties involved? How to craft options better than originally available? How to become better neuromanagement economic decision making makers? What resources will be invested? What would be the potential responses? Who will make this neuromanagement economic decision making? How should they be evaluated? How will one decide? Which of the things that could happen would happen? How can we ensure neuromanagement economic decision making will be carried out? These questions are crucial for understanding complex human behaviours.

The human brain is the most complex organ in the body. The human brain is one of the most complex objects of scientific research. Understanding the brain, its cognitive functions, and the related conscious experience requires cooperation of quite a number of different disciplines. The number of connections in the brain exceeds the number of atoms in the universe. The brain is foremost a control structure that builds an inner illustration of outer world and uses this depiction to make decision, goals and priorities, formulate plans and be in charge of activities with objective to attain its goals. Cognitive Neuroscience relies on non-invasive techniques to look at neural activities at different brain regions when Managers perform cognitive tasks. The techniques offer information concerning brain activity during diverse cognitive processes but not about underlying relationship linking brain expanse and cognitive functions. It is mysterious whether activities in brain regions are essential to analogous cognitive functions. These have confines.

All sciences are now under the obligation to prepare the ground for the future task of the philosopher, which is to solve the problem of value, to determine the true hierarchy of values. **Value** is arguably one of the most central concepts governing human life, as it is involved in practically every aspect that requires a decision: whether we choose between different consumer goods, whether we decide which person we marry or which political candidate gets our vote, whether we ask ourselves if something is beautiful, morally right, or sacred, value plays a crucial role. Value reflects the importance that something holds for us, what doesn't have any value is of no interest. Consistent with the central role of value in our

lives, ever since Plato scholars have been trying to understand what value is and where it comes from. Today, the investigation of value is central to many disciplines studying human feeling, thinking and behaviour, such as philosophy, psychology, sociology, economics, or neuroscience. Value plays a central role in practically every aspect of human life that requires a decision.

Over the last decade, neuroeconomic research has mapped the neural substrates of economic value, revealing that activation in brain regions such as ventromedial prefrontal cortex (VMPFC), ventral striatum or posterior cingulate cortex reflects how much an individual values an option and which of several options he/she will choose. However, while great progress has been made exploring the mechanisms underlying concrete decisions, neuroeconomic research has been less concerned with the questions of why Managers value what they value, and why different Managers value different things. Social psychologists and sociologists have long been interested in core values, motivational constructs that are intrinsically linked to the self-schema and are used to guide actions and decisions across different situations and different time points. Core value may thus be an important determinant of individual differences in economic value computation and decision-making. Based on a review of recent neuroimaging studies investigating the neural representation of core values and their interactions with neural systems representing economic value, we outline a common framework that integrates the core value concept and neuroeconomic research on value-based decision-making.

Research on economic value has produced many insights into the neurocognitive mechanisms that drive decisions in concrete situations, whereas research on core value allows explaining inter-individual differences in decision situations as well as intra-individual consistency across decisions over time. Whereas these different facets of the value concept so far have been investigated more or less in isolation from each other, we feel that an integration of the two perspectives would be extremely useful. In this contribution we review (a) neuroeconomic research delineating the neurocognitive mechanisms underlying economic value computations and (b) social psychological and sociological research concerning the universal structure of core values and the role of individual core value differences in decisions and behaviours. We then propose a common framework that aims at integrating the core value concept into a neuroscience of decision-making, and support our idea by a review of recent neuroimaging studies investigating the neural representation of core values and their potential interactions with neural

mechanisms underlying value computation and decision-making.

Volatility, Uncertainty, Complexity and Ambiguity

We are living in a World where volatility and uncertainty have become the new normal. We look at the World through a lens, which we call VUCA, which stands for 'Volatile, Unstable, Complex, and Ambiguous.' VUCA, as prescribed in Wikipedia, is describes or reflects on ischemic failures and behavioural failures, which are imperative to organisational failure. At some level, capacity for VUCA management and leadership hinges on enterprise value schemes, assumptions and natural goals. A 'prepared and resolved' enterprise is engaged with strategic agenda that is aware of and empowered by VUCA forces. The capacity for VUCA leadership in strategic and operating terms depends on a well, developed mindset for gauging the technical, social, political, market and economic realities of the environment in which people work. Working with deeper smarts about the elements of VUCA may be a driver for survival and sustainability in an otherwise complicated World,

- V = Volatility, The character and dynamics of change, and the character and speed of change forces and change catalysts,
- U = Uncertainty, The lack of predictability, the prospects for surprise, and the sense of awareness and understanding of issues and events,
- C = Complexity, The multiplex of forces, confounding of issues and disorder and confusion that surround an organisation,
- A = Ambiguity, The haziness of reality, the potential for misreads, and the mixed meanings of conditions; cause and effect confusion,

These elements present the context in which organisations view their current and future state, They present boundaries for planning and policy management, They come together in ways that either confound decisions or sharpen the capacity to look ahead, plan ahead and move ahead, VUCA sets the stage for managing and leading, The particular meaning and relevance of VUCA often relates to how people view the conditions under which they make decisions, plan forward, manage risks, foster change and solve problems, In general, the premises of VUCA tend to shape an organisation's capacity to:

- Anticipate issues that shape conditions
- Understand consequences of issues and actions
- Appreciate interdependence of variables

- Prepare for alternative realities and challenges
- Interpret and address relevant opportunities

Uncertainty pervades neuromanagement economic decision making. Nearly all real-world decisions involve some form of psychological uncertainty, whether about the likelihood of an event or about the nature of future preferences. Most studies in neuromanagement economic decision making neuroscience literature – like in its counterparts in the socio - Managerial sciences – have examined the effects of risk; for reviews see Knutson and Bossaerts (2007), Platt and Huettel (2008), Rushworth and Behrens (2008). While definitions vary across contexts, a ‘risky neuromanagement economic decision making’ involves potential outcomes that are known but probabilistic, such that risk increases with variance among those outcomes, potentially normalized by the expected value (Weber et al., 2004). Uncertainty can have other forms, however. Outcomes may be known but occur with unknown probability; such neuromanagement economic decision makings reflect ambiguity (Ellsberg, 1961). Only a handful of studies, so far, have investigated the neural basis of ambiguity (Smith et al., 2002; Hsu et al., 2005; Huettel et al., 2006; Bach et al., 2009). And, still other states of uncertainty might be evoked in cases where the outcomes themselves are unknown, as is the case in complex real-world neuromanagement economic decision makings. So far, neuromanagement economic decision making neuroscience research has established weak, albeit numerous, links between uncertainty and its neural substrates.

During active neuromanagement economic decision making, risk modulates regions of lateral prefrontal cortex, parietal cortex, and anterior insular cortex (Mohr et al., 2010), all of which contribute to the adaptive control of other aspects of behaviour. Yet, risk also influences activation in other regions seemingly associated with simpler sensory, motor, or attentional processes (McCoy and Platt, 2005), as well as in the brain's reward system directly (Berns et al., 2001; Fiorillo et al., 2003). The presence of ambiguity likewise modulates activation in both regions that support executive control (Huettel et al., 2006) and regions that track aversive outcomes (Hsu et al., 2005). In some of the above studies, these brain regions have been linked to the characteristics of the neuromanagement economic decision making problem, in others to the decisions made by a participant, and in still others to individual differences in uncertainty aversion. Still needed are characterizations of both common and distinct computational demands

associated with different sorts of uncertainty – which would in turn provide new insights into neural function.

To meet the challenges of a complex World, strategic planners need to understand the differences between the four elements of VUCA. In a VUCA World, what's the point of strategy? Strategy does still have a purpose, but building one in a VUCA environment requires more nuanced thinking. Today's turbulent environment of volatility, uncertainty, complexity and ambiguity means new challenges for government managers and policymakers, VUCA environments require that we learn from big, picture thinkers from different disciplines and industries, And such learning can reduce the 'U' in VUCA, uncertainty, Volatility has to do with the nature, speed and magnitude of change, Volatility or turbulence is a phenomenon that is occurring more frequently than in the past, Uncertainty relates to the unpredictability of issues and events, Information about the past and present are less and less useful in anticipating the future, making it extremely difficult for decision makers to forecast and allocate resources effectively, Complexity, the multiple and difficult, to understand causes of problems, poses another challenge, Ambiguity adds to the other three factors, Ambiguity makes it difficult to understand the meaning of fast, moving, unclear and complex events,

Leadership agility and adaptability are now required skills if organisations are to succeed in a VUCA World, Leaders must be able to make continuous shifts in people, processes, technology and structure, This requires flexibility and speed in decision-making – the ability to diagnose, decide and deploy resources quickly , and preferably proactively rather than reactively, Theorists of some of the success factors we have identified around leading effectively in a VUCA World: always retain a clear vision against which judgments can be made, with agility to flex and respond appropriately to rapidly unfolding situations, provide clear direction and consistent messaging against a backdrop of continually shifting priorities, supported with the use of new virtual modes of communication where necessary, anticipate risks but don't invest too much time in long, term strategic plans, don't automatically rely on past solutions and instead place increased value on new, temporary solutions, in response to such an unpredictable climate, think big picture, make decisions based as much on intuition as analysis, capitalise on complexity, if your talent management strategy is working, then you should be confident that you have the right people in the right place, this will enable you to rapidly break down any challenge into bite size pieces and trust

in the specialist expertise and judgment of those around you, be curious, uncertain times bring opportunities for bold moves, seize the chance to innovate, encourage networks rather than hierarchies – as we reach new levels of interconnection and interdependency collaboration yields more than competition, leverage diversity – as our networks of stakeholders increase in complexity and size, be sure to draw on the multiple points of view and experience they offer, doing so will help you expect the unexpected, never lose focus on employee engagement, provide strategic direction, whilst allowing people the freedom they need to innovate new processes, products and services, get used to being uncomfortable, resist temptation to cling on to outdated, inadequate processes and behaviours, take leaps of faith and enjoy adventure.

How are Decisions carried in Brain?

How are decisions carried out in brain? Question is how manager make decisions. Psychological models of decision-making explain that humans gradually accumulate evidence for a particular choice over time, and execute that choice when evidence reaches a critical level. Brain considers sources of information before decision. In particular, the processes by which managers reach decisions have been ignored. Problems confronting decision makers often embody conflicting values. Manager often fail to design 'rational' decisions. When faced with obscure decision, managers engage in strategic simplifications of decision problems. How do parts of the brain that govern decision-making coordinate their activity when making a decision? This paper explores certain neuro-underpinnings in managerial decision modeling.

In neurosciences, how the brain processes different sensory stimuli (such as images or sounds) and which are the neural basis involved in deciding what we perceive, have been the deeply studied in the past decades. Impairments in decision-making are at the core of a variety of psychological and neurological impairments. Brain accumulates evidence when faced with a choice and triggers an action once that evidence reaches a tipping point. But, 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 scheme. It has the same general structure as brains of other mammals, but with developed cerebral cortex. Model of brain function can explain a wide range of anatomical and physiological aspects of brain schemes.

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. Certain neurons seem to represent the accumulation of evidence to a threshold and others represent the evidence itself, and that these two types of neurons interact to drive decision-making. 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.

What is mind? The decision-making mechanism consists on a loop, ie a connection back and forth between these two types of areas. 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?

An emerging theme in decision neuroscience is that organisms need to make a number of value-related computations to make even simple choices. Consider the case of action-based choice exemplified by the goalkeeper's problem. First, he needs to assign a value to each action under consideration. These signals, known as action values, encode the value of each action before choice and regardless of whether it is subsequently chosen or not, which allows them to serve as inputs into the decision-making process. Second, these action values are compared to generate a choice. Third, the value of the option that is selected, known as the chosen value, is tracked to be able to do reinforcement learning. In particular, by comparing the value of the outcome generated by the decision to the chosen value, the organism can compute a prediction-error signal that can be used to update the action value of the chosen option. Note that while the action values are computed before the decision is made, the chosen value and outcome of the comparator process signals are computed afterward.

A basic question, intimately tied to the problem of action choice, is that of how actions are assembled into organised 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 organised into a strict hierarchy, mirroring the hierarchical structure of naturalistic sequential behaviour. Based on recent neuroscience evidence, we model the brain as a dual-scheme organisation subject to three conflicts: asymmetric information, temporal horizon, and incentive salience. Under the first and second conflicts, we show that the uninformed scheme imposes a positive link between consumption and labour 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 schemes (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 and in a situation featuring conflict, 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 organisation of tabular memories. An embodiment level organisation 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 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 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, manager 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 in Decision Spectrum

Overall, this multi-dimensional and thus potentially integrative approach combines neuro-biological, socio - Managerial and trans-cultural dimensions of decision-making and trust into a 'stratified image' of the human being and its behaviour(s). Important to this paradigm is the need to characterize the interaction of physical, psychological, cultural, and even spiritual cognitions that establish various decisions, and which relate decisional-actions and outcomes to evaluations of trust. We opine that this explicitly experimental (heuristic) neuro-bio-psycho-socio - Managerial model of trust encompasses at least six dimensions:

- A neural level that proposes the neural networks involved in ecological / economic decision-making;
- A biological attribute that describes the evolutionary and developmental bases and relevance of decision-making and trust;
- An anthropological component that defines and describes the collective meaning and basic value of trust for human beings as a self-conscious species among other (conscious) species;

- A psychological aspect that provides a definition of trust pertinent to the specific cognitions, emotions and character of an individual;
- A philosophical dimension that regards the rational dimension of trust in the sense of an in-depth scrutiny of causes and origins as related to effects;
- A socio - managerial level of influence, that describes dependent inter-relations with others, respective past and present experiences of these inter-relations;

But why would specifically neurological experiments be relevant to causal knowledge concerning the Managerial neuroeconomic decision making realm? Practitioners and philosophers have advanced a number of arguments. First, neuromanagement economic decision makings holds out the promise to unify within the socio - Managerial sciences: uncovering the neural underpinnings of decision making would get us a theory that is applicable to all human behaviour in all socio - Managerial contexts. We could use the same theory to causally explanation for, not just rationalize post hoc, pro-socio - Managerial behaviour as well as for self-regarding Managerial neuroeconomic decision making decisions. Second, neuromanagement economic decision makings evidence has been thought to establish the reality of key Managerial neuroeconomic decision making variables; for example, some measurable neural phenomenon of decision (activation patterns in VTMPFC) is said to be the physiological referent of utility, thus vindicating a realist interpretation of Managerial neuroeconomic decision making theory.

Similarly activation of anterior insula and the effects of administration of oxytocin on behaviour in games are taken to establish the reality of socio - Managerial preferences. Third, neuromanagement economic decision makings has been claimed to improve on Managerial neuroeconomic decision making explanations by providing the mechanistic details behind decision-making. Whereas existing models of decision making are behavioural or based on poorly understood psychological constructs, neuromanagement economic decision makings provides hard mechanistic details, which, so the argument goes, automatically improve Managerial neuroeconomic decision making explanations. Direct causal control of these mechanistic variables can be seen as a more reliable form of causal inference than observational inference from behaviour, which even in an experimental setting has to rely on the assumption

that the subject's model matches the experimenter's model.

In this paper we show that neuromanagement economic decision makings do none of these things. First, it does little to unify socio - Managerial phenomena because knowledge of neurological mechanisms of decision-making is not explanatorily relevant for all or even most socio - Managerial scientific phenomena. Moreover, unification as such cannot be used as an evidential argument for the probable truth of neuromanagement economic decision making hypotheses. Second, that neuromanagement economic decision makings provides 'the mark of the real' for typical socio - Managerial scientific explanation rests on the mistaken intuition that causal relations are more real the closer we get to describing them in a purely physical vocabulary. Without this assumption, the finding that there is a correspondence between a psychological entity and a particular brain area does not, by itself, make the psychological entity any more real. Third, neuromanagement economic decision makings do not automatically improve Managerial neuroeconomic decision making explanations, because mechanistic details are not always explanatorily relevant for socio - Managerial and Managerial neuroeconomic decision making phenomena.

Mechanistic details only improve the explanation of the original socio - Managerial scientific explanandum if knowledge of them effectively increases our ability to make causal and explanatory inferences about the explanandum. Thus far, however, this has rarely been the case in neuromanagement economic decision makings. Consequently, just the fact that some neural variables are directly manipulated does not necessarily mean that Managerial neuroeconomic decision making relevant variables are been controlled. Moreover, the argument that unlike behavioural experiments, neuromanagement economic decision makings experiments obviate the need for matching the subject's and the experimenter's models, and hence afford more reliable causal inferences, overestimates the current status of neurological theories of decision making.

We argue that the relevance of neuroscientific findings is mostly to be understood in terms of triangulation of evidence by independent means of determination. Triangulation is a standard term in the methodology of the socio - Managerial sciences. It refers to the use of multiple different and independent sources of evidence or theoretical perspectives to check whether a putative phenomenon is an artifact of some particular method or perspective. The epistemic rationale of triangulation is thus to distinguish the real from the

artefactual by controlling for errors and biases of particular methods. Conceiving neuromanagement economic decision making experimentation as triangulation explicates what is correct behind some of the arguments discussed above. For example, a finding that a certain brain area is involved in altruistic punishment does not, as such, render socio - Managerial preferences more real by providing a physical realiser, but provides additional confirmatory evidence through another independent means of determination (i.e. imaging studies of the brain or the measurement of hormonal levels in the body) of the involvement of socio - Managerial preferences in the explanation of altruistic punishment.

A similar point applies to unification: when appraising neuromanagement economic decision making hypotheses, the sound evidential principle of triangulation should be distinguished from the common intuition that neuromanagement economic decision making hypotheses are likelier to be true in virtue of explaining much by little. The latter mixes evidential and explanatory virtues. Unification in this case is relevant only insofar as a unifying hypothesis related to diverse sources of evidence actually has more, and mutually independent, evidence. Our claims apply beyond the case of neuromanagement economic decision makings: the epistemic contribution of neuroscience to socio - Managerial scientific theories and explanations lies in the generation of (further kinds of) evidence for the triangulation of socio - Managerial scientific hypotheses.

Traditionally, object of economic theory and experimental psychology, economic decision recently became a lively research focus in systems neuroscience. Traditional Managerial decision economic theory assumes that human beings behave rationally. That is, that they understand their own preferences, make perfectly consistent decisions over time, and try to maximize own well-being. This peculiar assumption has its roots in publications like *Exposition of a New Theory on Measurement of Risk* by Daniel Bernoulli (1738) and *Theory of Games and Economic Behaviour* by John von Neumann and Oskar Morgenstern (1944). The idea has some validity: traditional economic theory is good at predicting some behaviours, but it's not very good at describing more-complex phenomena. The problem, of course, is that Managers don't always behave rationally. They make decisions based on apprehension, greed and envy. They indulge in risky behaviour such as gambling. Economists understand this as well as anyone, but in order to keep their mathematical models tractable, they make simplifying assumptions. Then they try to adjust their equations

by adding terms that explanation for 'irrational' behaviour.

The irrationality of human decision-making attracts the fierce interest of two very different fields: neuroscience and economics. Economic theories of human decision-making are essentially based on two parameters: what something is worth and the probability of its occurrence. Neuroscientists, on the other hand, think of decision-making as a product of physical neural circuits: sensory information enters the brain, journeys through the brain where a decision is 'made,' and eventually exits the brain to evoke bodily responses. Economics ignores these biological, more proximal roots of behaviour, whereas neuroscience ignores the economic goals that ultimately guide our decisions. These two approaches have recently been integrated in the hybrid field of Managerial neuroeconomic decision making. Managerial neuroeconomic decision making attempts to unify abstract economic variables with neuroanatomical, and thus understand physical mechanisms by which our brains make decisions.

The basic premise is that somewhere along sensory-motor circuits are the neural substrates that represent 'value' and 'probability.' These areas must interact and influence flow of information along the circuit, thereby prompting a certain decision and its subsequent behaviour. Pressing questions, then, are how and where these abstract variables are combined in the brain, and the dynamics of the neural computation which engenders a 'decision.' Because economists base their models on optimal behaviour, they have the ability to develop a precise, unified framework for interpreting human behaviour; this is, essentially, that humans choose alternatives that maximize rewards. Managerial neuroeconomic decision making draws upon the precision and rigor of formal models of economics to go beyond the sensory-motor circuit, allowing opportunities for understanding neural basis of more abstract economic ideas, such as value and the profitability of outcomes (a bit more challenging to study than sensory and motor systems). Thus, principle of economics allows neuroscientists to explore physical mechanisms underlying high level cognitive processes.

But if Managerial decision Economists could develop models that explain for subtleties of human brain, they might be able to predict complex behaviours more accurately. This, in turn, might have any number of practical applications: investment bankers could hedge against financial euphoria like Internet boom; advertisers could sell products more winningly. The idea that understanding the brain can inform Managerial

decision Economics is controversial but not new; for 20 years, behavioural economists have argued that psychology should have a greater influence on the development of economic models. What is new is use of technology: economists, like other researchers, now have at their disposal powerful tools for observing brain at work. Functional Magnetic Resonance Imaging (fMRI) has been around since late 1980s; but only in past few years has it been used to study decision-making, which is crux of economic theory. The result is emerging field of 'neuromanagement decision Economics.' A flurry of recent papers in scientific and economic by Caltech Managerial decision Economics Professor Colin Camerer shows how researchers are using neural basis of decision-making to develop new neuromanagement decision economic models.

Neuroeconomic decision making has always relied on a careful modeling of decision-makers. They are described by utility functions that represent their goals, and they interact at (Nash) balance. Nevertheless, discrepancies between theoretical predictions and observed behaviour have haunted the field for many decades. The objective of neuroeconomic theory is to build models based on evidence from brain sciences, such as experimental neuroeconomic decision making, but also other fields in neuroscience and neurobiology. Measurement of brain activity provides information about the underlying mechanisms used by the brain during decision processes. In particular, it shows which brain regions are activated when a decision is made and how these regions interact with each other. This information can then be used to build a model that represents this particular mechanism. Contrary to behavioural neuroeconomic decision making, the model does not rely on introspection or plausible assumptions but rather on an existing and documented biological property of the brain.

Deciphering brain - environment transactions requires mechanistic understandings of neurobiological processes that implement value-dependent decision-making. There is a crucial difference between 'thinking about thinking' and actually enhancing brain and mental processes by developing latent potential of each individual. Theoretical explanations posit that human brain accomplishes this through a series of neural computations, in which expected future reward of different decision options are compared with one another and then option with highest expected value is selected. If human brain is often compared with computer, one aspect is crucially missing. Humans define goals for information processing in computers, whereas goals for biological brains are determined by need for survival in uncertain and competitive environments. How to handle brains

behind businesses in age of dramatic alter and growing uncertainty? What then are the coherent brain dynamics underlying prediction, control and decision-making? To cope with this mismatch, behavioural economists have developed new theories of decision-making that are a better fit for the behavioural data than traditional models. The methodology consists in building models to demonstrate the relationship between cause (preference for particular object) and behavioural anomaly. This line of research formulates possible explanations for behavioural data, but it is nevertheless subject to shortcomings. Often the cause is not observable, and there is no evidence of the relationship provided by the model. Most notably, freedom provided by introspection method leads to model selection problem. Also, cause of behavioural anomaly may simply lie elsewhere.

The methodology used in neuroeconomic theory has two advantages. Primarily, evidence from the brain sciences provides precise guidelines for the constraints that should be imposed on decision-making processes. This can help uncover the 'true' motivations for the 'wrong' decisions and improve the predictive power of the theory. Behavioural theories that explanation for biases in judgment build on specific models of preferences over beliefs or non-Bayesian updating processes. Rather than guessing a cause for biases, neuroeconomic theory builds a model based on the existing physiological properties underlying learning and belief formation. In principle, this can help pinpoint biological foundations for anomalous decisions. For example, research in neurobiology demonstrates that the brain cannot encode all the information contained in a signal. A decision is triggered when 'enough' information supporting one alternative is obtained, and the brain uses a variety of biological mechanisms to filter information in a constrained optimal way. In a recent paper we show that these properties of the brain result in a behavioural tendency to confirm initial priors (Brocas and Carrillo; 2009).

Behavioural data reports precisely that individuals stick too often to first impressions. These confirmatory biases may all emerge from the same set of physiological information processing constraints. Further work in that direction may help uncover the causes of other biases and determine whether they are all related to the same physiological limitations. The second advantage is that by explicitly modeling physiological properties, it is possible to provide foundations for some elements of preferences traditionally considered exogenous, such as risk aversion, ambiguity aversion, or time-preference rates. Decisions involving risk, uncertainty, or time delays may require complex trade-offs. Measures

of brain activity allow us to determine if the evaluation process is centralised or if different brain systems compete to influence the final decision. Neuroeconomic theory proposes to model the actual brain organisation, determine the behaviour that emerges from it, and evaluate which theory fits best.

Thoughts, though abstract and vaporous in form, are determined by actions of exact neuronal circuits in 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 manager components and decipher how they are integrated when we ponder. Eventually, such findings will lead to a better perceptiveness 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 neuroscience behind decision making requires a cross-disciplinary, 'all hands on deck' approach to research.

As a result, field raises 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 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 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 theoretical 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, managers 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 (Satpathy;2015).

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 study of mechanism. The goal of this discipline is thus to understand the processes that connect sensation and action by revealing the neurobiological mechanisms by which decisions are made. Such union is almost exclusively attributable to changes within economics. Neuroeconomics has inspired change because important findings have posed more of a challenge to standard economic perspective. The important source of inspiration for neuro economist has been neuro judgment research, which can, in turn, be seen as an amalgamation of ideas from cognitive science and economics. Neuroeconomics has primarily challenged customary economics postulation 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 (Satpathy;2015).

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-schemes

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 gargantuan questions are; How do neurons code emotional weight of 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 cumulative buildup of firing neurons that tip balance to final choice? How do we alter decision-making rules when we encounter new information that makes those rules obsolete? (Satpathy; 2015).

Neuroeconomic Managerial decision Traps: Review by Thanh Pham in Neuroeconomic Managerial decision Traps indicate that most neuroeconomic Managerial decision makers commit some kinds of errors and explore components of those errors and steps to rectify those common mistakes in neuroeconomic Managerial decisions making. The author indicates that becoming a good neuroeconomic Managerial decision maker is to examine process of neuroeconomic Managerial decision-making systematically and need to work consistently to eliminate errors. Every good neuroeconomic Managerial decision-maker must, consciously or unconsciously, go through each phase of neuroeconomic Managerial decisions making process. The ten most common barriers often encountered in making good neuroeconomic Managerial decisions are:

- 1) Plunging in - Here, we beginning to gather information and reach conclusion without first taking a few minutes to think about the crux of issue you're facing or to think through how we believe neuroeconomic Managerial decisions like this one should be made.
- 2) Frame blindness - Setting out to solve the wrong problem because we have created a mental framework for your neuroeconomic Managerial decision, with little thought, that causes you to overlook the best options or lose sight of important objectives.

- 3) Lack of Frame control - Failing to consciously define the problem in more ways than one or being unduly influenced by others.

- 4) Overconfidence in our Judgment - Failing to collect key factual information because we are too sure of our assumptions and opinions.

- 5) Shortsighted Shortcuts - Relying in appropriately on 'rules of thumb' such as implicitly trusting the most readily available information or anchoring too much on convenient facts.

- 6) Shooting from the Hip - Believing we can kept straight in our heads all the information you are discovered, and consequently 'winging it' rather than following a systematic procedure when making the final decision.

- 7) Group Failure - Assuming that with many smart Managers involved, good decisions will follow automatically and consequently failing to manage the group neuroeconomic Managerial decision-making process.

- 8) Fooling Ourselves About Feedback - Failing to interpret the evidence from past outcomes for what it really says, either because we are protecting our ego or because we are tricked by hindsight.

- 9) Not Keeping Track - Assuming that experience will make its lessons available automatically, and consequently failing to keep systematic records to track the results of your neuroeconomic Managerial decisions and failing to analyse these results in ways that reveal their key lessons.

- 10) Failure to Audit our Neuroeconomic Managerial decision Process - Failing to create an organised approach to understanding our own neuroeconomic Managerial decision making, so we remain constantly exposed to the entire above mistake.

The author indicates that good neuroeconomic Managerial decisions making can be broken into four main elements and they are as follows:

- 1) Framing - Structuring the Question, this means defining what must be decided and determining in preliminary way what criteria would cause us to prefer one option to another.

- 2) Gather Intelligence - Seeking both the knowable facts and reasonable estimates of 'unknowable' that we will need to make the neuroeconomic Managerial decision.

- 3) Coming to Conclusion - Sound framing and good intelligence do not guarantee a wise neuroeconomic Managerial decision. Managers are simply unable to consistently make good neuroeconomic Managerial decisions using seat-of-

the-pants judgment alone, even with excellent data in front of us.

4) Learning from Feedback - Everyone needs to establish a system for learning from the results of past neuroeconomic Managerial decisions. This usually means keeping track of what we expected would happen, systematically guarding against self-serving explanations, than making sure we review the lessons our feedback has produced the next time a similar neuroeconomic Managerial decision comes along. The author also reviews each barrier and recommended steps necessary to address them. Addressing the first barrier, the author indicates a wise and timely meta neuroeconomic Managerial decision based on four key elements above can help to avoid the neuroeconomic Managerial decision trap one Plunging in when we start working on any major issue. We should spend time to think about the large issues we are facing.

Meta neuroeconomic Managerial decision involves asking questions like 'what is the crux of this issue? In general, how do I believe neuroeconomic Managerial decisions like this one should be made? How much time should I spend on each phase-as the first guess?' So before any major neuroeconomic Managerial decision process is launched, review the Meta neuroeconomic Managerial decision questions. To address the second barrier, the author indicates that from the greatest genius to the most ordinary clerks, we have to adopt mental frameworks that simplify and structure the information facing us. But often than not, Manager simplify in ways that force them to make the wrong decisions and get into the neuroeconomic Managerial decision trap number two frame Blindness. Consequently to avoid it, we should attempt to understanding frames. No frame, indeed any way of thinking, can consider all possibilities and no one can completely avoid the dangers of framing. However, we would pay dearly if we do not even know the problem exists. Here, the author' correlation of a window frame nicely illustrates the difficulties. Architects choose where to put windows to give a desired view. But no single window can reveal the entire panorama.

When we choose which window to look through, or even if we decide to keep track of what's happening through three different windows, we can never be sure in advance that you will get the most useful picture. Thus, framing of a neuroeconomic Managerial decision inevitably sets boundaries; it controls what is in and what is out. Moreover, not all elements that are 'in' will be treated equally. Our frames tend to focus us on certain things while leaving others obscured. Frames have enormous power. The way Manager frame a problem greatly

influences the solution they will ultimately choose. Also, the frames that Manager or organisations routinely use for their problems control how they react to almost everything they encounter. Consequently, when we face a new issue, good neuroeconomic Managerial decision-maker create a neuroeconomic Managerial decision frame specifically designed for dealing with that problem. Neuroeconomic Managerial decisions makers fall into the neuroeconomic Managerial decision trap number three, Lack of Frame control because we often do not choose frames. We stumble into them and found ourselves using inadequate frame.

Consequently, if we match our own frame to the frames of Manager influence us, we can improve our performance significantly by:

- 1) Know Your Own Frames - we need to know how we have simplified our problems
- 2) Know the Frames Of Others - if we know others frame problems, we can tailor our communication to them.
- 3) Open Minded Framing - when we approach a new issue, try to remain open minded about the frame. Two neuroeconomic Managerial decision traps common to most of us is Overconfidence in our judgment and Shortsighted shortcuts.

These dangers can cause problems throughout the neuroeconomic Managerial decision making process, but they particularly affect the gathering of information and intelligence. Wise neuroeconomic Managerial decision makers avoid them and work to assure high quality intelligence. Many Manager suffer from overconfidence in what they believe even if their belief entails a negative view of their own worth and abilities. To address this, the author indicates that we should sizing up what we know - That is, collecting information and using it systematically will reduce the dangers from overconfidence, availability bias, and anchoring. The author also indicates that overconfidence is related to another problem called Confirm bias, where Manager's fondness for evidence that will confirm, rather than challenge, their current beliefs. Avoiding overconfidence means developing good secondary knowledge where primary knowledge consists of facts and principles we believe are true. In additional to overconfidence, we must also watch out for neuroeconomic Managerial decisions making shortcuts. Misleading shortcuts give Manager false intelligence, and can derail the entire neuroeconomic Managerial decision process. Shooting from the hip barrier is when we rely on institution to make a neuroeconomic Managerial decision, our mind processes part or all of the information you possesses automatically, quickly and without awareness of any details.

But it seldom takes proper explanation of all the information available. The author believes that initiative neuroeconomic Managerial decisions are affected not only by the evidence that should affect our decision, but also by factors such as fatigue, boredom, distractions and recollection of a fight with your spouse at breakfast. But on other hand, initiative neuroeconomic Managerial decisions making does have at least one advantage. It takes less time than making a neuroeconomic Managerial decision with systematic methods. However, disadvantages of intuitive neuroeconomic Managerial decisions making are more profound than most use realize. Manager who make neuroeconomic Managerial decision intuitively achieve much less consistency than they generally suspect. The author indicates that to maximize chances of making best decision if we find a systematic way to evaluate all evidence favourable to each possible decision, compare the strength of evidence on each side rigorously, then pick the decision that system indicates evidence favours. Here, neuroeconomic Managerial decision theorists call this kind of decision system a subjective linear model. It is subjective because the importance assigned to each pro and con from human being's head, not from direct calculations based on the real world. Group Failure barrier, here groups of smart, well-motivated Manager are mismanaged. Members agree prematurely on the wrong solution. Then they give each other feedback that makes the group as a whole feel certain that it is making the right decision. Members discourage each other from looking at the flaws in their thought process. The groups may become polarized, with members shifting unreasonably to more extreme position or clinging to opposite sides of an issue. Consequently, progresses toward a rational neuroeconomic Managerial decision become impossible.

Through researches, the author believe that groups can make better neuroeconomic Managerial decisions than individuals, but only if they are helped along by a skillful leader. There is little excuse for using costly group meetings to make inferior neuroeconomic Managerial decisions. The author indicates that to make better group neuroeconomic Managerial decisions we should do as following:

- 1) Intelligent, well-motivated Manager make superior neuroeconomic Managerial decisions in groups only if they are managed with skill.
- 2) The heart of good group management is encouraging the right kind of conflict within the group, and resolving it fully and fairly through further debate and intelligence gathering.

3) Leaders must decide where in the four elements of a neuroeconomic Managerial decision (framing, intelligent-gathering, coming to conclusions and learning from past cases) the group can make its greatest contributions.

4) Leader should rarely state their own opinions early in group's deliberations, because many group members will fear to offer their own ideas if they contradict the leader's.

5) Generally, leaders should encourage disagreement in early stages of any group process. Then as more facts and insights are gained, the leaders should guide the group toward convergence on a final decision.

6) If a neuroeconomic Managerial decision process really deadlocks, you can often narrow the gap by separating factual issues from value issues. The author indicates that we fall into neuroeconomic Managerial decision trap number 8, fooling yourself About feedback, because our natural biases make learning much more difficult than we realize. When events come out well, we tend to see the success as a result of our own genius. But when events turn out badly, we rationalize an explanation that preserves our positive self-image. In addition to these biases produced by our desires, we suffer from hindsight effects caused largely by the way our minds work. Consequently, attempting to understand our biases, and can interpret feedback realistically, we can consistently turn our experiences into reliable knowledge. The author also indicates that learning from experience is not automatic.

Experience, after all, provides only data, not knowledge. It offers the raw ingredients for learning and we can turn it into knowledge only when they know how to evaluate the data for what they really say. They suggested that Manager often do not learn as easily from experience as you might expect, even intelligent, highly motivated Manager. When making a decision between two or more options, one may not always know the odds of a favourable outcome. Decision-making under ambiguity and under explicit risk are two examples of decision-making without knowledge of the outcome. The author indicates that most Manager's experience is afflicted with neuroeconomic Managerial decision trap number 9 - Not keeping track by:

- 1) Missing feedback - lack of information on the key question
- 2) Entwined feedback - evidence is effected by actions taken by the neuroeconomic Managerial decision maker and associates after making the initial judgment, these factors are called treatment effects

3) Confuse feedback - uncontrollable, unpredictable factors, 'random noise' that affect neuroeconomic Managerial decision outcomes;

4) Ignore feedback - incomplete use of information on outcomes they already possess Learning from experience is especially difficult when you face an uncooperative environment like missing feedback or ambiguity due to random noise or treatment effects.

To improve with experience, consequently, we need to:

1) Regularly analyse what you are learned recently and how you could be learn more

2) Conduct experiments to obtain feedback you could get in no other way and

3) Learn not just from the outcomes of past neuroeconomic Managerial decisions but also by studying the processes that produced them. The 10th neuroeconomic Managerial decision trap is Failure to audit your neuroeconomic Managerial decision process. Here, we should analyse your own neuroeconomic Managerial decisions making and identify a few key steps we ought to take to improve our neuroeconomic Managerial decisions. Once we are located the few crucial errors, we will find that our neuroeconomic Managerial decisions making can be improved much easily. Often than not, the author indicates that this is the most neglected or misunderstood barrier of the ten neuroeconomic Managerial decision traps.

What are the limits of understanding thinking as a form of computing?

The computational theory of mind holds that the mind is a computation that arises from the brain acting as a computing machine. The theory can be elaborated in many ways, the most popular of which is that the brain is a computer and the mind is the result of the program that the brain runs. Computational theory of mind names a view that the human mind or the human brain (or both) is an information processing scheme and that thinking is a form of computing. Is the universe naturally symmetric, or do our brains simply look for certain types of symmetry which then become our reality? Why are we symmetric beings? Would an asymmetric intelligent being find a different looking universe here, based on asymmetrical laws of a very different physics? A manager is not a single entity of a single mind: a human is built of several parts, all of which compete to steer the ship of state. As a consequence, people are nuanced, complicated and contradictory. We act in ways that are sometimes difficult to detect by simple introspection. Are we governed by unconscious processes? Neuroscience believes so – but isn't the

human condition more complicated than that? Thinking like a computer scientist means more than being able to program a computer. It requires thinking at multiple levels of abstraction. Thinking may be more than computing.

What follows is a description of some of the scientific, philosophical and practical issues that lead inevitably to uncertainty in data, and to limitations in our ability to draw conclusions from it. Such questions are complex and uncertain. Intelligent behaviour presumably consists in a departure from the completely disciplined behaviour involved in computation, but a rather slight one which does not give rise to random behaviour or pointless repetitive loops. Computational thinking builds on the power and limits of computing processes, whether they are executed by a human or by a machine. Computational thinking is using abstraction and decomposition when attacking a large complex task or designing a large complex scheme. It is separation of concerns. It is choosing an appropriate representation for a problem or modeling the relevant aspects of a problem to make it tractable. It is using invariants to describe a scheme's behavior succinctly and declaratively. Having to solve a particular problem, we might ask: How difficult is it to solve? What's the best way to solve it? Computational thinking is thinking recursively. It is parallel processing. It is interpreting code as data and data as code. It is type checking as the generalization of dimensional analysis. It is recognising both the virtues and the dangers of aliasing, or giving someone or something more than one name. It is recognising both the cost and power of indirect addressing and procedure call. It is judging a program not just for correctness and efficiency but for aesthetics, and a scheme's design for simplicity and elegance.

Computational theories of mind are often said to require mental representation because 'input' into a computation comes in the form of symbols or representations of other objects. The universe is complete and understandable through mathematics, although we do not yet understand completely. Such a universe is predictive, which leads to a conflict with the idea of free will. Are all of our "choices" and decisions already laid out before us? The universe is incomplete, and we will never understand it through mathematics. The universe is complete, but not completely understandable through mathematics.

How does previous Experience Alter Behavior?

Behaviour results from complex interactions between genetic and environmental components. Every individual has a unique collection of experiences to draw upon; therefore we each

behave slightly differently in a similar situation. This makes disentangling the genetic components of behaviour in humans challenging. Traditional models of operations management involve dynamic decision-making assuming optimal (Bayesian) updating. However, behavioral theory suggests that individuals exhibit bias in their beliefs and decisions. Experiences we remember are defined by change. Previous work largely ignored internal neuronal activities representing prior knowledge that occurred before a new event, space or situation. Intriguing questions in behavioral neuroscience concerns the manner in which the nervous system can modify its organisation and ultimately its function throughout an individual's lifetime. It is generally assumed that experiences early in life have different effects on behavior than similar experiences later in life. Behaviour is initiated by the accurate detection and cognitive processing of sensory cues to release an appropriate emotional, physical or physiological response. This process is greatly influenced by learning and memory. The reason for this difference is not understood, however.

These findings explain at the neuronal circuit level the phenomenon through which prior knowledge influences our decisions when we encounter a new situation. This explains in part why different individuals form different representations and respond differently when faced with the same situation. To investigate this question, we placed animals in complex environments either as juveniles, in adulthood, or in senescence. It was our expectation that there would be quantitative differences in effects of experience on synaptic organisation, but to our surprise, we also found qualitative differences. Although the brain was once seen as a rather static organ, it is now clear that the organisation of brain circuitry is constantly changing as a function of experience. These changes are referred to as brain plasticity, and they are associated with functional changes that include phenomena such as memory, addiction, and recovery of function. Recent research has shown that brain plasticity and behavior can be influenced by a myriad of factors, including both pre- and postnatal experience, drugs, hormones, maturation, aging, diet, disease, and stress (Kolb; 1998).

“We actually don't choose between experiences, we choose between memories of experiences. And even when we think about the future, we don't think of our future normally as experiences. We think of our future as anticipated memories (Kahneman; 1987).” One way to control for environmental influence is to study behaviours that are highly stereotyped between individuals and are reproducibly initiated irrespective of prior

experience. These, often called instinctive or innate behaviours, are critical for survival and successful social integration, and are therefore likely to be under a strong genetic influence. Furthermore, similar innate behaviours are found in many different species, suggesting there are common underlying neural mechanisms even if the social signals themselves vary significantly.

What are the general implications of neuro (managerial) management?

New brain imaging technologies have motivated neuromanagement studies of internal order of the mind and its links within spectrum of human managerial choices from managerial choice making among fixed gambles to managerial choice making mediated by market and other institutional rules. We are only at the beginning of the enterprise, but its promise suggests a fundamental change in how we think, observe and model managerial choice in all its contexts (Smith; 2002). 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 basis of human decision-making, the ability to process multiple alternatives and to choose an optimal course of action, especially in a managerial context, a growing number of scientists from different background have combined research methods from neuroscience, experimental and behavioral economics, and cognitive and social psychology. 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 people in their daily management behavior such as consumption, investment, production, circulation, financial management, human activities such as various acts of the neurophysiological basis, thereby from brain science perspective on human management activities of the mechanisms behind, and brings forward corresponding management measures and strategies.

And neuroeconomics, nerve management emphasis on specific situations, individual differences and the operational level of behavior, study different conditions managed object evolution rule and achieve the most effective management method. Nerve management specific subjects may include neural decision science, neural marketing personnel management, neural, neural engineering, behavioral neuroscience, neural finance innovation management, nerve, nerve pathological behavior management.

Managerial choice neuroscience offers a novel approach to the study of both individual and interactive managerial choicemaking by combining the methods of behavioral experiments, functional neuroimaging, and formal management models. Use of this methodology has the potential to advance our knowledge of existing theoretical accounts of how people make managerial choices and judgments by informing and constraining these models based on the underlying neurobiology. Examining sophisticated high-level behavior at a neural level, such as deciding on how much risk to take with an investment or deciding on a strategy when playing a competitive game with an opponent, can provide important clues as to the fundamental mechanisms by which managerial choicemaking operates. Despite substantial advances, the question of how we make managerial choices 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. However, the field of neuromanagement has recently emerged as an inter-disciplinary effort to bridge this gap. Research in neuroscience and psychology has begun to investigate neural bases of managerial choice predictability and value, central parameters in the management theory of expected utility. Management, in turn, is being increasingly influenced by a multiple schemes approach to managerial choice making, a perspective strongly rooted in psychology and neuroscience. The integration of these disparate theoretical approaches and methodologies offers exciting potential for the construction of more accurate models of managerial choice-making. 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 managerial choices, depict routine model for managerial 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 behaviour (Satpathy et.al. ;2015).

How can we leverage our brain in business? How can we capitalise / invest on the brain? How can we make the best decision? How can we find the productivity 'hot buttons' in the brain? How can we encourage creative and ethical brain? What is the nature of explanation in Managerial neuro - Economics? What information about the past is relevant to Managerial neuro - economic decision making? What past experiences cannot be

'unlearned' in view of subsequent developments? How does experience influence our decisions? What kinds of experiences would produce better decisions and better adaptation? How does experience transfer to new situations? What learning processes take place during sampling and repeated consequential decisions? How do these processes alter when decisions are interrelated over time? When feedbacks are delayed? When decisions are time-dependent? How do we address consequential and sampling decisions when the 'environment' is dynamic? When it involves other individuals? What learning processes take place during sampling and repeated consequential decisions? How do these processes alter when decisions are interrelated over time? When feedbacks are delayed? When decisions are time-dependent? How do we address consequential and sampling decisions when the 'environment' is dynamic? When it involves other individuals? How do Managers make decisions in dynamic stock management tasks? How do Managers perceive accumulation over time? Why do Managers perform so poorly at control tasks? How can judgments of accumulation be improved? What are the effects of feedback complexity and feedback delays? How are theories represented in computational models? How can we validate and test theories/hypotheses with computational models? What is the value of using video games and simulations in behavioural decision research? How can we best present, measure, and analyse data on human learning? How do Managers make inferences from numbers? How do Managers process logic representations of data relationships? Is the representation of the past in any sense 'rational'? Are affective as well as cognitive processes involved? Can the Managerial neuro - economic present rewrite the Managerial neuro - economic past? What are the implications of memory-dependence for modeling and policy-making? Is there place for emergence in Managerial neuro - economical explanations; in particular, how does one take into explanation downward causality? Is psychology indispensable for understanding of Managerial neuro - economical phenomena? What can and cannot one expect of mathematical modeling in Managerial neuro - Economics? Does Managerial neuro - Economics have an ontologically sound domain? How dissimilar are biological systems and Managerial neuro - economical ones? Is an analysis of various notions of rationality (including bounded rationality) still important, and if so, why? What is bounded rationality? A complete answer to this question cannot be given at the present state of the art. However, empirical findings put limits to the concept and indicate in which direction further inquiry should go. What has philosophy of

Managerial neuro - Economics to say about the present crisis? What has philosophy to offer the methodology of behavioural Managerial neuro - Economics and neuromanagement economics?

Economics have always relied on a careful modeling of decision modeling. To cope with this mismatch, economists have developed theories of decision-making that are a better fit for neuro data than traditional models. Methodology consists in building models to demonstrate relationship between cause and neuro anomaly. Freedom provided by introspection method leads to a model selection problem. Neuro - management decision-making can be regarded as a mental process (cognitive process) resulting in selection of a course of action among several alternative scenarios. Every decision-making process produces a decision. Process must be regarded as a continuous process integrated in interaction with environment. Analysis is concerned with logic of decision-making, rationality and invariant decision making it leads to. This reflects more than compensatory interaction of decision making-related regions. Specific brain schemes potentiate decision-makings depending on strategies, traits and context. Therefore, 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 a 'neuro - management decision making paradox'.

Some managerial behaviors patently fail to achieve the goals of the organisation in which they are performed, leading often to the downfall of the managers who are responsible for them and sometimes to the failure of the entire organisation in which they arise. Neuromanagement has bridged management and psychology. It challenges standard management assumption that decision-making is a unitary process-a simple matter of integrated and coherent utility maximization. The goal is a mathematical theory of how brain implements decisions that is tied to behaviour. This theory is likely to show some decisions for which rational - decision making is a good approximation (particularly for evolutionarily sculpted or highly learned decision makings), provide deeper level of distinction among competing alternatives and provide empirical inspiration to incorporate nuanced ideas about endogeneity of preferences, individual difference, emotions and endogenous regulation. Researches investigate central parameters viz. neural bases of decision predictability and value in theory of expected utility.

The key question is what level of management is likely to be involved in each decision type? This starts with the premise that most basic decisions (in

form of decision makings or effort allocation) can be traced back in structure of macro-scale brain activity, as measured with modern neuroimaging apparatus. Typically, such responses involve regions in brain whose precise function depends upon specific task the brain is solving. This 'context-dependency' expresses itself through (induced) specific plasticity of networks, in parallel to tonic changes in neuromodulatory activity. In turn, this reconfiguration networks subtends learning and yield (mal) adaptive behaviour. In other words, it is very likely that goal-directed behaviour emerges from interactions that shape spatio - temporal dynamics of macro-scale brain networks (Satpathy; 2015). This means that understanding mechanics of multimodal observation of brain activity (electrophysiology, fMRI) and neuro measurements (explicit decision makings, reaction times, autonomic arousal signals, grip force) poses exciting challenge of quantitatively relating information processing to brain effective connectivity.

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. *How are decisions carried out in brain? Do we interpret research findings when neurological results conflict with self-report? What are the general implications of neuro management? Central argument is that decision-making is at core of all managerial functions and future of any organisation lies on vital decisions made. However, there are certain critical issues coupled with factors such as uncertainties, multiple objectives, interactive complexity and anxiety make decision-making process difficult. At times when making a decision is complex or there are many interests at stake, then we realize the need for strategic decision-making. Questions include; how to choose in tough situations where stakes are high and there are multiple conflicting objectives? How should we plan? How can we deal with risks and uncertainties involved in a decision? How can we create options that are better than 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? How can we ensure decision will be carried out? These questions are crucial for understanding complex human behaviours (Satpathy; 2015).*

Challenges

Neuromanagerial economic decision making neuroscience research, as currently practiced, employs the methods of neuroscience to investigate concepts drawn from the socio - Managerial sciences. A typical study selects one or more variables from psychological or economic models, manipulates or measures decisions within a simplified decision task, and then identifies neural correlates. Using this 'neuroeconomic' approach, researchers have described brain systems whose functioning shapes key economic variables, most notably aspects of subjective value. Yet, the standard approach has fundamental limitations. Important aspects of the mechanisms of neuromanagerial economic decision making – from the sources of variability in neuromanagerial economic decision making to the very computations supported by neuromanagerial economic decision making-related regions – remain incompletely understood. Neuromanagerial economic decision making neuroscience, including its subfield of neuroeconomics, has provided new insights into the mechanisms that underlie a wide range of economic and socio - Managerial phenomena, from risky decision and temporal discounting to altruism and cooperation. However, its greatest successes clearly lie within one domain: identifying and mapping neural signals for value. Canonical results include the linking of dopaminergic neuron activity to information about current and future rewards (Schultz et al., 1997); the generalization of value signals from primary rewards to include money (Delgado et al., 2000; Knutson et al., 2001), socio - Managerial stimuli and interpersonal interactions (Sanfey et al., 2003; King-Casas et al., 2005); and the identification of neural Markers for economic transactions (Padoa-Schioppa and Assad, 2006; Plassmann et al., 2007).

And, in recent studies, these value signals can be shown to be simultaneously and automatically computed for complex stimuli (Hare et al., 2008; Lebreton et al., 2009; Smith et al., 2010). In all, research has coalesced on a common framework for the neural basis of valuation; for reviews see Platt and Huettel (2008), Rangel et al. (2008), Kable and Glimcher (2009). Despite these successes, other aspects of the neural basis of neuromanagerial economic decision making remain much less well understood. Even where there has been significant progress – as in elucidating the neural basis of other neuromanagerial economic decision making variables like probability and temporal delay – there remain key open and unanswered questions. Below are described ten major problems for future research in neuromanagerial economic decision making neuroscience (Table 1). By focusing on theoretical and conceptual challenges specific

toneuromanagerial economic decision making neuroscience, this review necessarily omits important future methodological advances that will shape all of neuroscience: applications to new populations, longitudinal analyses of individuals, genomic advances, and new technical advances (e.g., linking single-unit and fMRI studies). Even with these caveats, this list provides a broad overview of the capabilities of and challenges facing this new discipline.

What happens in brain or is activated when we make managerial choices or are in the process of making managerial choices? Is neuromanagerial study of managerial choice-making processes relevant for management? Many managerial choice makers seek information than required to make a managerial choice. When too much information is sought delay in managerial choice occurs because of time required to process information. This impairs effectiveness of managerial choice. In this state, neuromanagerial seeks to explain human managerial choice-making, ability to process multiple alternatives and choose optimal course of action. It studies how management 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 valuedependent managerial choice-making. Theoretical accounts posit that human brain accomplishes this through neural computations. What are the coherent brain dynamics underlying prediction, control and managerial choice-making?

This leads to formulation of a 'neuro - management managerial choice making paradox'. The goal is a theory of how brain implements managerial choices that is tied to behaviour. This paper attempts to explore phenomena through individual action, managerial choice-making and reasoning processes. Objective is to put forward a model for neuro - management managerial choice, in which interaction between variables of neuro - management managerial choice processes are addressed (Satpathy; December 2014). How do people make managerial choices without having clear preferences? How do short-lived mental states bias preferences or managerial choices outside of the managerial choice-makers' awareness? How are choices encoded in the brain? How do we make choices when the managerial choice options are equally likely or valuable? How does context bias preferences or judgments outside of the choice-makers' awareness? How is information updating represented in the brain? What is the role of time perception in intersequential managerial choice? How can we avoid making unhealthy and

dangerous managerial choices? How do we correct for managerial choice errors? These approaches allow to investigate neural basis of choicemaking and related processes, as well as to directly predict choice outcomes from brain signals (Bode; 2014). The brain sciences influence understanding of human behavior.

Many now believe that the brain is what makes us human, and it seems that neuroresearchers are poised to become the new experts in the management of human conduct. Neuro describes the key developments--theoretical, technological, management, and biopolitical--that have enabled the neurosciences to gain such traction outside the laboratory. It explores the ways neurobiological conceptions of personhood are influencing everything from child rearing to criminal justice, and are transforming the ways we 'know ourselves' as human beings. In this emerging neuroontology, we are not 'determined' by our neurobiology: on the contrary, it appears that we can and should seek to improve ourselves by understanding and acting on our brains. Neuro examines the implications of this emerging trend, weighing the promises against the perils, and evaluating some widely held concerns about a neurobiological 'colonisation' of the social and human sciences. Despite identifying many exaggerated claims and premature promises, Neuro argues that the openness provided by the new styles of thought taking shape in neuroscience, with its contemporary conceptions of the neuromolecular, plastic, and social brain, could make possible a new and productive engagement between the social and brain sciences (Nikolas; 2013).

Quantification of choice has been a major area of research for neuro researchers for several decades. This is, in part, due to the discovery of the 'Matching Law' that stipulates that relative response rate on concurrently available alternatives 'match' the available relative reinforcement rates. This theoretical construct has been developed to describe response allocation in more complex situations. People often fail to design 'rational' choices. Management 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 complex choice, individuals engage in simplifying strategies. Adaptive choice making in realWorld contexts relies on strategic simplifications of choice problems. Yet, neural mechanisms that shape these strategies and their implementation remain largely unknown. Although we now know much about how brain encodes specific choice factors, much less is known about how brain selects among multiple strategies for

managing computational demands of complex choice-making task.

Expansion of neuromanagement parallels development of cognitive science. Neuromanagement has bridged the contrasting fields of management and psychology. Management, psychology, and neuroscience are converging today into a single, unified discipline with the ultimate aim of providing a single, general theory of human behaviour. This is the emerging field of Neuromanagement in which consilience, accordance of two or more inductions drawn from different groups of phenomena, seems to be operating (Satpathy; 2014). Economists and psychologists are providing rich conceptual tools for understanding and modeling behaviour, while neurobiologists provide tools for the study of mechanism. The goal of this discipline is thus to understand the processes that connect sensation and action by revealing the neurobiological mechanisms by which choices are made. Such union is almost exclusively attributable to changes within management.

The human brain is the most complex organ in the body. The human brain is one of the most complex objects of scientific research. Understanding the brain, its cognitive functions, and the related conscious experience requires cooperation of quite a number of different disciplines. The number of connections in the brain exceeds the number of atoms in the universe. The brain is foremost a control structure that builds an inner illustration of outer World and uses this depiction to make choice, goals and priorities, formulate plans and be in charge of activities with objective to attain its goals (Satpathy;2014). Choice neuroscience research, as currently practiced, employs the methods of neuroscience to investigate concepts drawn from the social sciences. A typical study selects one or more variables from psychological or management models, manipulates or measures choices within a simplified choice task, and then identifies neural correlates. How are organisational and management's choices making processes carried out in brain? Do we interpret research findings when neurological results conflict with selfreport?

Knowing how brain is working explains little about what mind produces; what we think, what we believe and how we craft choices.' What are the general implications of neuro managements? Neuroscience techniques permit to look inside brain while it experiences outcomes and crafts choices. Neuromanagement uses techniques to ask how people craft choices and examine implications. Central argument of this proposal is that Neuro - managements, organisational psychology and neuroscience each benefit from taking account of

insights that other disciplines offer in understanding choice-making. Using this 'neuromanagement' approach, researchers have described brain schemes whose functioning shapes key management variables, most notably aspects of subjective value. Yet, the standard approach has fundamental limitations. Important aspects of the mechanisms of choice making – from the sources of variability in choice making to the very computations supported by choice-related regions - remain incompletely understood (Huettel; 2010). Emerging neuroscience evidence suggests that sound and rational neuro - management choice making depends on prior accurate emotional processing. Somatic marker hypothesis provides a schemes-level neuroanatomical and cognitive framework for neuro - management choice making and its influence by emotion. Key idea is that neuro - management choice-making is a process that is influenced by marker signals. This influence can occur at multiple levels of operation, some of which occur consciously, and some of which occur nonconsciously (Satpathy;2014).

The issues, because modern models ignore influence of emotions on neuro - management choice-making, that crop up is; what happens when we change our minds? What are the algorithms that allow useful sensor motor behaviours to be learned? What computational mechanisms allow the 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 of this computation? What neural schemes track classically defined forms of expected and discounted utility? Under what conditions do above computations break down. To what extent do tracking utility computations generalize to choice that is tasks that are more complex? How is utility metric different from neural signals of attention and motor preparation? How is negative utility signaled? Is there a negative utility prediction signal comparable to one for positive utility? How do schemes that seem to be focused on immediate choices and actions interact with schemes involved in longer term planning? 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? Under what circumstances do these various schemes cooperate or compete? When there is competition, how and where is it adjudicated? Do higher-level deliberative processes rely similarly on multiple mechanisms, or a single, more tightly integrated (unitary) set of mechanisms (Satpathy; 2014)?

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making processes relevant for management? Many choice makers seek information than required to make a choice. 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 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 valuedependent choice making.

Theoretical 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 theory of how brain implements choices that is tied to behaviour. This paper has attempted 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 (Satpathy; 2014). 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 choices, 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 behaviour.

In the past 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 choice making, it is important to see what techniques are being used to study the brain. Research demonstrates that brain cannot encode all information. Choice 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 confirmatory 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 choice-making processes. This helps uncover 'true' motivations for 'wrong' choices and improve predictive power of the model (Satpathy; 2014). Neuro theories that account for biases in judgment build on specific models of inclinations over beliefs or non-Bayesian updating processes.

Neuro - Models in Decision Making

Decision theories postulate bounded rationality to be the basic problem in decision-making in a complex environment, assuming a trade-off between costs and benefits for or against extensive decision making in situations where information is typically incomplete and cognitive resources are limited. Thus, it is thought that two options might exist to deal with this problem and find a resource-sparing solution: (i) relying on optimization strategy under given constraints; or (ii) basing decisions on heuristics, i.e. over-learned habits and hard-wired solutions. Both approaches would support the idea of dual processing theories which distinguish between two schemes: an automated, intuitive processing scheme which is typically involved in fulfilling the heuristic approach, and an analytic reasoning scheme which alone might be overwhelmed when reaching its analytic processing capacity. Usage of one or the other scheme depends on influencing factors such as saliency of incoming stimuli and availability of resources. It was particularly argued that especially experts make use of the automated processing scheme by acquiring respective gist knowledge, whereas novices would need to rely on analytic reasoning instead. The automated scheme comes in handy in situations with equably repetitive decisions which can easily be based on known rules or categories while it might be prone to errors in novel situations.

With respect to decision making, managers may be regarded as experts since their job, independent of hierarchy, requires them to decide and to answer for this decision. In its basic ideas, this is independent of the success of the manager since it is just a basic job requirement. Overall, the need for fast decisions in the work environment increased, aggravating the problem of incomplete information. It was therefore assumed that managers as opposed to non-managers must have access to respective strategies to adequately deal with this situation. The manager should be able to make fast choices with limited information and limited cognitive resources, but at the same time be as accurate as possible, e.g. by relying on simplified mechanisms and heuristics.

Thus, it was thought that managers might often make use of the non-rational, intuitive processing

scheme. Such processing approach could be learned and might develop by repetitive confrontation with the same kind of decisions. However, it is still unknown if this strategy of managers has its neurofunctional correlate in the recruitment of other neural networks than in non-managers. It has to be noted that this kind of decision only encompasses one type of decisions required in daily work life. Depending on the situation, decisions might be based on a profound analysis of the complete situation and all available background information. In the present study, we focused on decisions which can be based on rules or heuristics due to their equable repetitiveness.

From a neuroscientific perspective, ample evidence supports the view of such bipartite processing schemes. The two schemes were described with differing attributes: deliberative vs. affective scheme, long-run vs. short-run player, controlled vs. automatic, or controlled vs. emotional. Irrespective of the respective label, it was assumed that for decision-making both schemes interact: the affective or automatic scheme was assumed to be the standard operating scheme, being only overruled by the control scheme if necessary (e.g. bad outcome, suboptimal decision processes). Depending on the task, different cortical areas are involved in either of these schemes. Typically, areas of the lateral and medial prefrontal cortex were found to be activated during decision-making tasks. Additional activations are found in occipital, parietal, and temporal areas for stimulus processing (e.g. visually presented stimuli) and for preparation for decision-making. For categorization of stimuli, the relevance of a loop between prefrontal cortex and the basal ganglia was stressed. Nevertheless, it still remains elusive how other factors might influence the use of either scheme, especially with respect to adaptation to new situations.

Functional MRI (fMRI): Functional magnetic resonance imaging or functional MRI (fMRI) is a functional neuroimaging procedure using MRI technology that measures brain activity by detecting associated changes in blood flow. Functional magnetic resonance imaging (fMRI) is a type of functional brain imaging technology. It localizes regions of activity in the brain by measuring blood flow and/or metabolism following task activation, and is generally used to identify areas of language (e.g., Broca's area, Wernicke's area) and sensorimotor function (e.g., sensorimotor cortex). This technique relies on the fact that cerebral blood flow and neuronal activation are coupled. fMRI concept builds on the earlier MRI scanning technology and the discovery of properties of oxygen-rich blood. The outline of an fMRI study consists of four key steps:

- (1) formulating the research question,
- (2) designing the fMRI protocol,
- (3) analyzing fMRI data, and
- (4) interpreting and reporting fMRI results.

MRI brain scans use a strong, permanent, static magnetic field to align nuclei in the brain region being studied. Another magnetic field, the gradient field, is then applied to kick the nuclei to higher magnetization levels, with the effect depending on where they are located. When the gradient field is removed, the nuclei go back to their original states, and the energy they emit is measured with a coil to recreate the positions of the nuclei. MRI thus endow with a static structural view of brain matter. The central thrust behind fMRI was to extend MRI to capture functional changes in the brain caused by neuronal activity.

Functional neuroimaging studies of decision-making so far mainly focused on decisions under uncertainty or negotiation with other persons. Dual process theory assumes that, in such situations, decision making relies on either a rapid intuitive, automated or a slower rational processing scheme. However, it still remains elusive how personality factors or professional requirements might modulate the decision process and the underlying neural mechanisms. Since decision making is a key task of managers, we hypothesized that managers, facing higher pressure for frequent and rapid decisions than non-managers, prefer the heuristic, automated decision strategy in contrast to non-managers.

Such different strategies may, in turn, rely on different neural schemes. We tested managers and non-managers in a functional magnetic resonance imaging study using a forced-choice paradigm on word-pairs. Managers showed subcortical activation in the head of the caudate nucleus, and reduced hemodynamic response within the cortex. In contrast, non-managers revealed the opposite pattern. With the head of the caudate nucleus being an initiating component for process automation, these results supported the initial hypothesis, hinting at automation during decisions in managers. More generally, the findings reveal how different professional requirements might modulate cognitive decision processing.

Magneto Encephalography (MEG) : Magneto Encephalography is a functional neuroimaging technique for mapping brain activity by recording magnetic produced by electrical currents occurring naturally in the brain, using very sensitive magnetometers.

Electrocardiography (ECG) is the process of recording the electrical activity of the heart over a

period of time using electrodes placed on a patient's body. Transcranial Direct Current Stimulation (tDCS) is a form of neurostimulation which uses constant, low current delivered to the brain area of interest via electrodes on the scalp.

Electroencephalography (EEG): Electroencephalography (EEG) is typically a non-invasive (however invasive electrodes are often used in exact applications) method to record electrical activity of the brain along the scalp. Positron Emission Tomography (PET) is a nuclear medicine, functional imaging technique that produces a three-dimensional image of functional processes in the body.

Transcranial Magnetic Stimulation (TMS): Transcranial Magnetic Stimulation is a noninvasive method used to stimulate small regions of the brain.

Eye Tracking: Eye Tracking is the process of measuring either the point of gaze (where one is looking) or the motion of an eye relative to the head.

Electro dermal Activity: Electrodermal Activity (EDA), is the property of managerial body that causes continuous variation in the electrical characteristics of the skin. Historically, EDA has also been known as skin conductance, galvanic skin response (GSR), electrodermal response (EDR), psychogalvanic reflex (PGR), skin conductance response (SCR), and skin conductance level (SCL). Brain Mapping is a set of neuroscience techniques predicated on the mapping of (biological) quantities or properties onto spatial representations of the (managerial or non-managerial) brain resulting in maps.

BOLD: Blood-Oxygen-Level Dependent Contrast Imaging, or BOLD-contrast imaging, is a method used in functional magnetic resonance imaging (fMRI) to observe different areas of the brain or other organs, which are found to be active at any given time. Cognitive Maps are mental representations of physical locations.

This is the science of the most complex 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 sub-problems, 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. Combining information obtained from structural and functional imaging methods is particularly powerful, and by using such complimentary techniques, our knowledge of both physiology and pathophysiology can be greatly enhanced.

Conclusion: Real-world problems are often complicated. Psychological scientists have been interested in how people make decisions for several decades, but philosophers and economists have been studying decision making for centuries. Highlighting areas of overlap between cognitive modeling and multi-attribute judgment will stimulate further cross-fertilization and inspire research examining the boundary conditions of various models. Deciphering brain - environment transactions requires mechanistic understandings of neurobiological processes that implement value-dependent organisational decision-making. There is a crucial difference between 'thinking about thinking' and actually enhancing brain and mental processes by developing latent potential of each individual. Theoretical accounts posit that human brain accomplishes this through a series of neural computations, in which expected future reward of different organisational decision options are compared with one another and then option with highest expected value is selected. If human brain is often compared with computer, one aspect is crucially missing. Humans define goals for information processing in computers, whereas goals for biological brains are determined by need for survival in uncertain and competitive environments. How to handle brains behind businesses in age of dramatic change and growing uncertainty? What then are the coherent brain dynamics underlying prediction, control and organisational decision-making?

Organisational cognitive neuroscience is a brave new World of research opportunities. Neuroimaging has attracted most concerns from those critical of neuroscientific research in business and other fields. Organisational cognitive neuroscience research has made a number of inroads into understanding economic decision-making. There is growing interest in exploring the potential links between human biology and management and organisation studies, which is

bringing greater attention to bear on the place of mental processes in explaining human behaviour and effectiveness. This represents a multidisciplinary and multi-method approach to the conceptualization of management and organisations. In keeping with the method's dominance, there is a focus on particular concerns when conducting neuroimaging work, and especially functional magnetic resonance neuroimaging (fMRI) based research. While much of the above discussion covered issues that are of particular concern to fMRI and other neuroimaging research methods, studies that which use alternative research methods possess their own unique caveats.

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