Research Article

Quantum Mind-Induced Subjective Realism: a Quantum Consciousness-Based Management Model of Reality Perception

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Defined by enigmatic phenomena such as superposition, uncertainty, and entanglement, the quantum world represents the foundational reality beneath the perceivably deterministic classical environment. Despite our experiential interaction with the tangible classical world, it is crucial to acknowledge the elusive nature of the underlying quantum framework. This paper explores the ramifications of these quantum characteristics in management science.

Even the seemingly straightforward concept of matter transforms into a complex puzzle at the quantum scale. The propensity of subatomic particles to switch between wave and particle states underscores the integral role of observation and consciousness. Quantum entities, rather than being merely passive objects of measurement, dynamically participate in the observation process, hence generating a paradox that contradicts traditional notions of objective reality.

Traditionally, management science is grounded in the predictability of the classical world. However, these deterministic relationships and observable causality do not readily align with the quantum domain, where a probabilistic framework supersedes certain outcomes. The inherent uncertainties of quantum interactivity and the multitude of possibilities present a largely untapped potential for strategic management.

This paper introduces Quantum Mind-Induced Subjective Realism (QMISR), amalgamating quantum principles with management science, advocating for a transition from classical predictability to acceptance of quantum uncertainties. This innovative view on reality and cognition postulates that the interaction between a quantum mind and the external world forms our subjective reality experience. Recognising both classical and quantum realities is emphasised to enhance management practices and foster creative pathways for decision-making processes.

Primarily, this paper investigates quantum realities and their possible implications for management science. It calls for a shift from a deterministic, tangible classical world to an intricate, probabilistic quantum domain, potentially transforming traditional management science theories and practices.

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Introduction

The vast enigma of the quantum realm continues to baffle and intrigue scientists and philosophers alike.

> Quantum theory is based on a clear mathematical apparatus, has enormous significance for the natural sciences, enjoys phenomenal predictive success, and plays a critical role in modern technological developments. Yet, nearly 90 years after the theory's development, there is still no consensus in the scientific community regarding the interpretation of the theory's foundational building blocks (Schlosshauer et al., 2013, p. 14).

Within infinitesimal subatomic particles, the observer and the observed transform into phenomenological entities, entwined in a dance of quantum interactions. This paper endeavours to demystify this quantum weirdness, emphasising the pivotal role of consciousness in generating an observable reality. Concurrently, it exposes the paradox embedded in materialistic presuppositions about the nature of reality and expected properties. Through the intricate interface of consciousness, the subatomic world translates into tangible phenomena, thereby shedding light on the dualistic nature of matter at the quantum level (Ferrer, 2015). Wendt (2015) described the 'Quantum Man' as a "physical but not wholly material, conscious, in superposed rather than well-defined states, subject to and also a non-local causation, free, purposeful, and very much alive [...] a subject rather than an object, an less an agent than an agency, some always in a state of Becoming" (p. 206).

This portrayal diverges significantly from the materialistic worldview, suggesting a quantum perspective of consciousness wherein the mind interacts with matter in novel and complex ways. In such a paradigm, reality manifests duality, appearing mechanistic, material, relational, and dynamic. The traditional perspective, which emphasizes separation and overlooks interconnectedness, renders a deceptive illusion of discrete objects. However, the quantum view counters this by illuminating a

reality of intricate relations rather than isolated entities. It offers a vision of dynamic interactions that fundamentally redefine our understanding of reality (Bohm, 2002). Wendt's (2015) 'Quantum Man' encapsulates the profound implications of quantum physics for our comprehension of consciousness, identity, and reality. It calls for a shift away from purely materialistic interpretations, instead advocating for an appreciation of the interconnectedness and relational dynamics that permeate our quantum reality.

Gaining insight into the connection between matter and consciousness has been challenging, primarily due to the substantial disparity in their fundamental qualities as we perceive them.

> This difference has been expressed with particularly great clarity by Descartes, who described matter as 'extended substance' and consciousness as 'thinking substance'. Evidently, by 'extended substance,' Descartes meant something made up of distinct forms existing in space, in an order of extension and separation basically similar to the one that we have been calling explicate. By using the term 'thinking substance' in such sharp contrast to 'extended substance,' he was clearly implying that the various distinct forms appearing in thought do not have their existence in such an order of extension and separation (i.e., some kind of space), but rather in a different order, in which extension and separations have no fundamental significance. The implicate order has just this latter quality, so in a certain sense, Descartes was perhaps anticipating that consciousness has to be understood in terms of an order that is closer to the implicate than it is to the explicate (Bohm, 2002, p. 249-250).

The emergence of an entirely new field of scientific inquiry - the 'science of consciousness' (Velmans, 2007), or the 'new science of the mind' (Rowlands, 2010) - has been observed, mainly through the observer effect[1], which underscored the indispensable role of consciousness. Velmans (2007) proposed an alternative, 'reflexive' model "in which the external phenomenal world is viewed as part of consciousness rather than apart from it" (p. 81).

> Observed events are 'public' only in the sense of 'private experience shared'. Scientific observations are 'objective' only in the sense of 'intersubjective'. Observed phenomena are 'repeatable' only in that they are sufficiently similar to be taken for 'tokens' of the same event 'type'. This closes the gap between ***physical*** and ***psychological*** phenomena (Velmans, 2007, p. 81).

Simultaneously, quantum physics revealed that matter is fundamentally a manifestation of energy (Barad, 2007). Moreover, a paramount understanding is reached that consciousness and energy cannot be disentangled, affirming an underlying unity predicated on reciprocal relations and interdependence (Zaveri, 2012).

> There is a single integral community of the earth that includes all its component members, whether human or other than human. In this community, every being has its role to fulfil, its own dignity, its inner spontaneity.... Every being enters into communion with other beings. This capacity for relatedness, for presence to other beings, for spontaneity in action, is a capacity possessed by every mode of being throughout the universe (Berry, 1999, p. 4).

Interpretations forged by consciousness originate from entangled information distributed across the cosmos, enabling our relational self to engage with reality through sensory perceptions and decipher the universe's complexities (Brukner, 2014). Pavlovich (2020) posited that thoughts exist as information waveforms traversing the sub-atomic realm and contended that individuals become receptive to this flux of information in a state of heightened self-awareness and presence. It was previously perceived that 'empty space' is a field teeming with energy that facilitates the exchange of information, which all ontic beings are intrinsically part of. Echoing this notion, Merleau-Ponty (2012) underscored that space should not be conceptualised as an ether where all things levitate, but rather perceived as a comprehensive force fostering connections. Therefore, it may be inferred that subatomic matter is potentially a manifestation of an intertwined energy network residing within a domain of continuous fluctuations, which persistently engages in information transfer. Merleau-Ponty's (2012) proposition of an intrinsic unity between consciousness and the world necessitates a suspension of predetermined beliefs and a revival of a primal, immediate encounter with the world as it is perceived. Merleau-Ponty's (2012) phenomenological stance seeks to deliver an unmediated portrayal of our experience, disregarding its psychological genesis and causative explanations. In Merleau-Ponty's context, reality is not perceived as a mental construct or formulation, but as a directly apprehensible experience. Therefore, reality is not caused; it is distinctly and personally experienced.

However, within this intricate network of quantum interactions, lies an enigmatic layer invisible to the observer. This hidden realm is profoundly shaped by the observer effect, a principle deriving from the foundations of quantum mechanics. According to this principle, mere observation influences the

observed phenomenon, insinuating a role for consciousness within the quantum domain. The observer effect has profound implications for understanding reality, suggesting that conscious observation is critical in shaping perceived reality. This paradoxical interaction between consciousness and physical phenomena invites a reconsideration of the understanding of consciousness itself. Is consciousness merely an emergent property of classical brain processes, or does it fundamentally intertwine with the quantum structure of the universe? Venturing into these inquiries uncovers new territories for the science of consciousness, suggesting a model wherein the observer and the observed are not discrete entities, but deeply interwoven within reality's quantum framework. This observer-participant universe concept, posited by John A. Wheeler in 1981, is an integral part of the Copenhagen Interpretation, asserting the inseparability of objective reality from the act of observation (Kozlowski & Marciak-Kozlowska, 2017).

This paper explores key quantum phenomena, namely entanglement, coherence, superposition, and complementarity, within the framework of materialism and quantum realism. By delving into the intricate fabric of quantum mechanics, we aim to navigate the uncertainty that pervades emergent phenomena. Through a nuanced analysis of these quantum elements and their implications, this paper seeks to gain insights into the reality experienced by the relational and phenomenological self, prompting a re-evaluation of classical perceptions of materialism. Moreover, this research sheds light on the implications of quantum realities for our understanding of material reality and consciousness, illuminating the interplay between consciousness and physical phenomena. Additionally, recognising the potential for applying these quantum insights to the field of management science, offering novel perspectives and strategies that challenge traditional notions of determinism and causality.

Pavlovich (2020) suggested the dissolution of the self-other divide at the quantum level. This view, resulting from the sub-atomic field's nonlocality, posits the potential for organisational reshaping, enhancing work performance, individual well-being, and workplace relationships. Within management science, deterministic causality often forms the basis for decision-making models (Hrebiniak & Joyce, 1985). However, the intricacies of quantum realities, including inherent uncertainties and various possibilities, may be overlooked (Barad, 2010). The parallels between the quantum entanglement of the observer and the observed and the manager-managed relationship necessitate a re-evaluation of deterministic relationships in management science (Gronn, 2002).

Applying quantum principles challenges the conventional assumptions underpinning management theories, which often mirror classical physics, emphasising objective reality and clear causality (Chen

& Stroup, 1993). Yet, the quantum realm's inherent uncertainty and superposition facilitate an expansion of the theoretical frameworks of management science. However, while quantum mechanics provides a potent metaphor, it should not be seen as a direct equivalent to management science. The superposition of quantum states and entanglement lack direct analogues in the macroscopic world, necessitating caution in metaphor extension (Everth & Gurney, 2022).

The remainder of this paper is structured as follows. After elucidating the foundational concepts of quantum mechanics and the implications of some of its core features, this paper develops a quantum approach to organisational practices. Before concluding, it discusses future research opportunities and implications for managerial practice.

Quantum Uncertainty, Entanglement, and Superposition

Uncertainty is ubiquitous in our lived experiences, permeating nearly every scientific discipline. Generally, uncertainty is categorized into two distinct types: aleatory and epistemic. Aleatory uncertainty denotes the inherent randomness found in nature, originating from the physical world's natural variability. On the other hand, epistemic uncertainty emanates from our limited understanding and knowledge of the physical world and our ability to measure and model it accurately. This sense of uncertainty extends to organisational management (Li et al., 2013). Organisational paradoxes, typified by seemingly contradictory yet interlinked demands that persist over time, are an integral part of organisational life. These paradoxes, embedded within the complexities of organisational dynamics, further underscore the pervasiveness of uncertainty. In essence, grappling with such paradoxes necessitates navigating through layers of uncertainty, mirroring the complexities observed in the physical world.

"Organisational life is beset with paradoxical tensions; that is, contradictory yet interdependent demands that appear simultaneously and persist over time" (Hahn & Knight, 2019, p. 362). This calls into question the nature of these paradoxes: do they inherently exist within the fabric of an organisation, or are they constructed through the sensemaking and experiences of individuals within the organisation? In quantum physics, the uncertainty principle and the paradox presented by Schrödinger's cat underscore a similar tension.

Schrödinger's cat is a thought experiment presented by Erwin Schrödinger in 1935 to illustrate the concept of superposition and the role of observation in quantum physics (Villars, 1986). Leong (2023) argued that "fate and entanglement are closely integrated, as in the discussion of the fate of

Schrödinger's cat. In quantum mechanics, Schrödinger's cat is a thought experiment demonstrating the paradoxical nature of quantum superposition" (p. 193). The thought experiment presents a cat in a sealed box with a radioactive substance and a poison-releasing mechanism that would be triggered if an atom of the radioactive substance decayed. According to quantum mechanics, the radioactive atom is in a superposition of decayed and undecayed states until observed. Therefore, the cat, whose fate depends on the atom's condition, should also be in a superposition of dead and alive states until observed. It is only the act of opening the box and observing the cat's state that 'collapses' this superposition into a definite state: the cat is observed to be either dead or alive, not both. This quantum paradox offers a compelling metaphor when considered within organisational paradoxes or tensions. Much like the cat in Schrödinger's thought experiment, organisational paradoxes can be viewed as existing in a state of superposition. These paradoxes or tensions—contradictory yet interrelated demands within the organisation—are simultaneously present and persistent, coexisting in multiple states until they are observed or made sense of by individuals within the organisation. These paradoxes arise from "individual and collective sensemaking, discourse, and relational dynamics" (Smith et al., 2017, p. 5).

> Organisations are rife with paradoxes. Persistent and interwoven tensions emerge from and within multiple levels, including individual interactions, group dynamics, organizational strategies, and the broader institutional context. Examples of such tensions include those between stability and change, empowerment and alienation, flexibility and control, diversity and inclusion, exploration and exploitation, social and commercial, competition and collaboration, learning and performing (Smith et al., 2017, p. 1).

Drawing on the work of Smith et al. (2017), the persistent tensions in organisational life can be considered as a form of superposition. These tensions include the competing demands of innovation and efficiency, short-term results and long-term sustainability, or individual autonomy and collective coordination. The presented examples highlight a stark contrast between concepts, suggesting a potential dichotomy; a choice between A or B. However, the social world is inherently pluralistic, characterized by multiple intertwined tensions, where distinguishing between A and B often proves challenging. Consequently, 'either/or' approaches tend to externalize tensions as if they exist outside the purview of individuals or observers and generally necessitate a response to uncertainty and choice

via action, much like unveiling the state of the cat in Schrödinger's experiment, reducing anxiety and fostering confidence for ensuing decisions.

Nonetheless, not all tensions are readily resolved. Upon exploring the character of these tensions, dualities that are contradictory and fundamentally interdependent are researched. These tensions resist easy disentanglement when caught in a nexus of reciprocal interactions. Schneider (1990) presented the human experience as an elastic band, persistently caught between forces of expansion and contraction. The act of observation resolves the superposition in Schrödinger's cat experiment. The act of sensemaking by individuals 'collapses' the superposition of these competing demands into a specific resolution or strategy (Hahn & Knight, 2019). The characteristics of a concept are fundamentally contingent; they gain definiteness only within a specific context. Should a concept exist in an eigenstate[2] relative to a particular context, it merely reflects the concept's actualised state (Busemeyer & Bruza, 2012). However, if the concept is in a superposition state, the context can exert influence, potentially shifting the state of the concept.

> This unfortunate Schrödinger's cat is placed in a quantum superposition of being dead and alive, correlated with a single radioactive atom that has and has not decayed. This entangled fate depends on a correlated event—the decay of the radioactive atom. Entrepreneurs' fates are tied to fine-grained interactions. Whether in the neighbourhood of nearer heterogeneous entities or with parties further away, it depends on the heterogenous agents' correlated actions (colleagues, subordinates, vendors, suppliers, shareholders, bankers, collaborators, etc.). The entanglement produces the emergent order for success or otherwise (Leong, 2023, p. 193-194).

The shift between actuality and potentiality is observed in the transition of concept properties. Each state of a concept exists in an eigenstate, or a superposition state, where the former represents actual properties and the latter represents mostly potential properties. Aerts (2010) argued that context plays a crucial role in transforming a superposition state into an eigenstate, aligning with the quantum principle of superposition and the influence of observation or consciousness in determining the state of a quantum system. As Freeman and Vitiello (2016) proposed, the entanglement of matter and mind emphasised their interconnected nature, operating through two streams of images that impact behaviour and inform conscious awareness. This perspective highlights the dynamic interplay between physical processes and mental phenomena, wherein images interact to shape experiences

and guide actions. This understanding deepens the comprehension of consciousness and behaviour, underscoring the significance of imagery and awareness in bridging the gap between the material and subjective domains. At the subatomic level, elementary particles are not viewed as autonomous entities but as units that manifest in relation to the act of observation, making any quantum event dependent on the observer's participation (Barad, 2007).

Accordingly, the concept's superposition state may be influenced and potentially shifted by contextual elements. The quantum quandary of Schrödinger's cat serves as a poignant illustration of this principle. According to the thought experiment, the feline exists in a quantum superposition of being both dead and alive, a state that is intricately linked with the radioactive decay - or lack thereof - of a solitary atom. This entangled state hinges on the correlational relationship of the decaying atom (Schrödinger, 1935).

Similarly, in entrepreneurship or organisations, the fate of business ventures is often tied to intricate interactions at a granular level. Whether these interactions occur in the immediate proximity of diverse entities or at a greater distance, their outcomes depend on the correlated actions of heterogeneous agents such as colleagues, subordinates, vendors, suppliers, shareholders, bankers, and collaborators (Leong, 2023b). The resulting entanglement fosters an emergent order determining entrepreneurial or organisational success or failure. The shifting in state witnesses a transition in the properties of the concept, oscillating between actuality and potentiality. Hence, every state of a concept is either an eigenstate, with actual properties, or a superposition state, with predominantly potential properties (Aerts, 2010). This understanding aligns with the quantum superposition principle and highlights the critical role of observation, or consciousness, in determining the state of a quantum system.

Viewing through the lens of quantum metaphors enables a profound exploration of organisational paradoxes. In the same way that quantum uncertainty and Schrödinger's cat paradox confound classical logic, organisational paradoxes might be perceived as inherent, inevitable aspects of their complex and dynamic nature. Similarly, drawing a parallel to the observer-influenced wave function collapse in quantum physics, one might interpret organisational paradoxes as outcomes of individual sensemaking processes, whereby personal experiences fashion these conflicting scenarios.

The quantum quandaries of wave-particle duality and Schrödinger's cat challenge classical determinism and demand an acceptance of inherent quantum uncertainty. Analogously, the organisational paradoxes may call for a transition away from conventional, deterministic models

towards paradigms that accommodate complexity, ambiguity, and constant flux. The interpretation of these paradoxes, whether considered inherent organisational attributes or socially constructed phenomena, impacts our comprehension of and navigation within the organisational environment.

Adopting a quantum viewpoint, Hahn and Knight (2021) viewed latency not as a dormancy stage, but as a domain teeming with potential paradoxes, moving beyond fixed realities or actualized paradoxes (Schad et al., 2016). Salience, they proposed, is a context-influenced activation of paradoxes chosen from a pool abundant with potential latent paradoxes. This salience, however, is transient. Persistence, they argue, is better understood as a repetitive emergence of salient paradoxes by organisational actors within similar socio-material contexts. From this perspective, latency, salience, and persistence are redefined—latency as a reservoir of paradoxical potentialities, salience as the context-driven manifestation of these potentialities, and persistence as the cyclical recurrence of such manifestations.

This quantum-informed perspective enriches our understanding of organisational complexity, providing deeper insights into how organisations grapple with and manifest paradoxes within their unique socio-material contexts.

The inseparable, interdependence, and interconnectedness unified field with consciousness as an autonomous sub-totality

The core of Bohm's (2002) holistic conception of the unified holomovement underscores the indivisibility and interconnectedness inherent in the quantum field, regardless of the spatial extent of the interactions (illustrated in Figure 1). This understanding is crucial in grasping the holographic and nonlocal features of the quantum domain. It is evident that the outcomes of these entanglements, irrespective of whether they occur across vast spatial distances or within the immediate vicinity of various entities, hinge on the correlated activities of a range of heterogeneous agents. These interconnected activities appear unpredictably linked, echoing the principles of inseparability, interdependence, and interconnectedness of Bohm's (2002) wholeness carried in a holomovement.

This paper initiates an inquiry by positioning the individual human being as an autonomous sub-totality characterised

> with a sufficient recurrence and stability of his total process (e.g., physical, chemical, neurological, mental, etc.) to enable him to subsist over a certain period of time. In this

> process, we know it to be a fact that the physical state can affect the content of consciousness in many ways. (The simplest case is that we can become conscious of neural excitations as sensations.) Vice versa, we know that the content of consciousness can affect the physical state (e.g., from a conscious intention, nerves may be excited, muscles may move, the heart-beat may change, along with alterations of glandular activity, blood chemistry, etc.) (Bohm, 2002, p. 264-265).

Notably, the individual's physical state can influence the contents of their conscious experience through various means. Consciousness is variedly described by Bohm (2002) and is summarised in Table 1:

Bohm's (2002) description of consciousness	Implications and Contribution to Practice and Theory
[O] ne can feel a sense of flow in the 'stream of consciousness' not dissimilar to the sense of flow in the movement of matter in general (p. xi)	Bohm's proposition that one can experience a sense of flow in the stream of consciousness, akin to the movement of matter, has implications for theory and practice. Recognising consciousness's dynamic and interconnected nature expands our understanding of consciousness and its relationship to the broader universe. It invites us to embrace the sense of flow within consciousness, fostering mindfulness and presence in daily life. These insights have practical applications in therapy, self-development, and education, where approaches aligned with the dynamic nature of consciousness can enhance well-being and promote holistic growth.
[T] hink coherently of a single, unbroken, flowing actuality of existence as a whole, containing both thought (consciousness) and external reality as we experience it, (p. xi)	It challenges the conventional dichotomy between mind and matter, emphasizing their interconnectedness. Practically, this perspective encourages a holistic approach to understanding and engaging with the world, promoting unity and integration. Theoretical contributions lie in exploring a comprehensive framework that embraces the interplay between consciousness and external reality, fostering a deeper understanding of existence as a whole.
'[S] tream of consciousness'. This flux of awareness is not precisely definable, and yet it is evidently prior to the definable forms of thoughts and ideas which can be seen to form and dissolve in the flux, like ripples, waves and vortices in a flowing stream. As happens with such patterns of movement in a stream some thoughts recur and persist in a more or less stable way, while others are evanescent (p. 14).	Bohm's concept of the 'stream of consciousness' as a flux of awareness, where thoughts and ideas form and dissolve like ripples, waves, and vortices in a flowing stream, has implications for theory and practice. It highlights consciousness's dynamic and ever-changing nature, with certain thoughts recurring and persisting while others are transient. The practical implications lie in cultivating awareness of this flux, allowing individuals to observe and detach from passing thoughts, promoting mindfulness and reducing attachment to transient mental states. Theoretical contributions involve a deeper understanding of the fluidity and patterns within consciousness, enriching theories of cognition and subjective experience.

Bohm's (2002) description of consciousness	Implications and Contribution to Practice and Theory
[I] t is possible to comprehend both cosmos and consciousness as a single unbroken totality of movement (p. 219)	It challenges the traditional separation between the external world and subjective experience, offering a holistic perspective. Practically, this viewpoint encourages a deeper connection with the world and fosters a sense of unity and interconnectedness. Theoretical contributions involve re-evaluating our understanding of reality, consciousness, and their interplay, offering new insights into the nature of existence.
[T] he explicate order of matter in general is also in essence the sensuous explicate order that is presented in consciousness in ordinary experience (p. 264).	This viewpoint encourages a deeper appreciation of the interplay between perception and reality, informing theories of consciousness and phenomenology. In practice, it emphasizes the importance of attending to and understanding the relationship between our sensory experiences and the underlying physical reality, fostering a more holistic and embodied engagement with the world.

Table 1. Varied definitions of consciousness

This web of connections and relationships remains elusive to the human observer, who grapples with incomplete information and may not fully comprehend the network of relationships underpinning these outcomes. This innate unknowability, mirroring the profound depths of quantum reality, underlines the existence of complex entanglements pervading the universe in potentially inscrutable ways. Acknowledging these interactions demands a holistic approach, embracing the embedded uncertainty and appreciating the constraints of existential knowledge (incomplete information). Each component within this quantum domain embodies the complete information of the entire system, akin to a holographic model. This principle may be generalized across various scales, bridging the gap between the microscopic and the macroscopic, thus offering a coherent view of the universe's organisational complexities. Di Biase (2009) proposed "a dynamic concept of consciousness seen as a holoinformational flux interconnecting the holonomic informational quantum brain dynamics with

the quantum informational holographic nature of the universe" (p. 207). The dynamism inherent in self-organisation arises from the holographic treatment of neural information. This process may be enhanced through practices such as deep meditation, prayer, or other states associated with heightened consciousness, which facilitate the coherence of brain waves (Di Biase, 2009). In parallel, one can observe this holographic principle in operation at the biological level. Each cell in the human body carries a comprehensive copy of the original DNA, thus demonstrating the universality of holographic realities, from quantum particles to biological entities (Hameroff, 2014; Miller et al., 1975). The field's nonlocal nature correlates with its intrinsic holographic characteristics, implying that every constituent part encapsulates the totality of the field's information (Bohm & Stapp, 1994). This principle of nonlocality and the holographic feature of the quantum realm mirrors the profound quantum dimensions of reality. At the subatomic level, the components of matter and their interrelations form a network of interconnectedness, corresponding to Bohm's (2002) concept of the unified field, a holistic representation of information. This interconnectedness results in a reciprocal process of 'implication' and 'explication', each reflecting different layers of reality (explained in Figure 1). Bohm (2002) employed the term 'enfoldment' to describe the deeper forays into the implicate order and 'unfoldment' to refer to the journey towards the explicate order of the manifest empirical domain. The physical universe unfolds from more profound dimensions of reality, while simultaneously, everything within the universe is enfolded within the implicate order (Bohm, 2002). This implicate order extends in layers, progressively delving into deeper strata of the unfathomable unknown. In this process, Bohm (2002) identified holomovement as the essential foundation of all matter and information. This represents a unified, unfathomable wholeness at the very essence of existence. It defies complete comprehension by human observers or consciousness, who are perpetually situated in unknowing states or constrained by incomplete information.

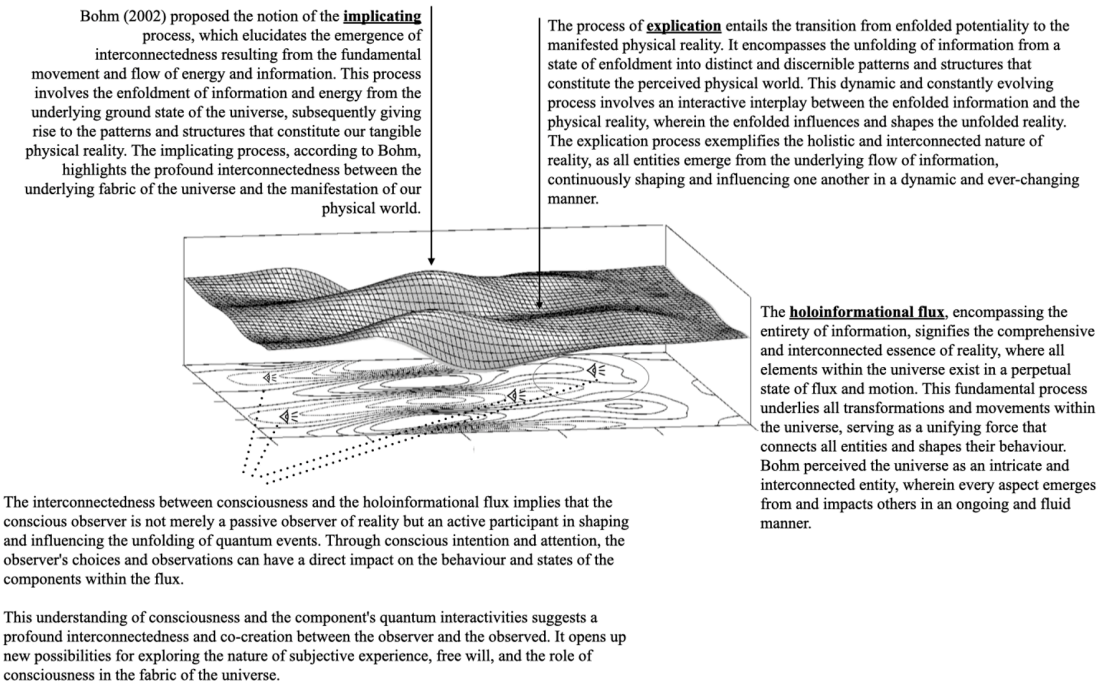

Figure 1. Illustrates the holoinformational flux. Illustration credits to (Oberleithner, 2012)

The implicating process contributes to the development of a more comprehensive worldview, where the boundaries between mind and matter, subject and object, are dissolved. It invites a deeper exploration of the nature of reality and consciousness, fostering new avenues of inquiry in fields such as physics, philosophy, and psychology.

In conclusion, Bohm's concept of the implicating process underscores the emergence of interconnectedness from the movement and flow of energy and information. It highlights the enfoldment of information and energy from the underlying ground state of the universe, giving rise to the patterns and structures that constitute our physical reality. This perspective has profound implications for our understanding of reality and invites a shift towards a more holistic and interconnected worldview in theory and practice.

Discussion

Quantum Mind-Induced Subjective Realism (QMISR) proposes a novel perspective on understanding reality and the mind. As per this theory, the subjective experience of reality emerges from the interaction of a quantum mind/ consciousness with the outer world. Crucially, QMISR postulates that

free will exerted by conscious beings can trigger quantum events within the brain, manifesting as the perception of objective reality.

The perspective resonates with Wendt's (2015) proposal of the ‘Quantum Man’, suggesting that quantum phenomena operate at both the microscopic level and macroscopic dimensions. Wendt (2015) argued that the universe is a ‘big quantum’ and that humans are essentially ‘walking wave functions’. Furthermore, Wendt (2015) conceptualised social structures as ‘holographic organisms’ possessing consciousness (subjectivity) and collective intentionality (agency). In this light, Wendt (2015) challenged the classical mechanics’ perspective and postulated that the physics of the mind aligns more with quantum mechanics. Expanding further on this, Wendt (2015) postulated that social structures are intrinsically tied to cognitive processes within the mind's sphere. According to Wendt (2015), these structures are consequent manifestations of our perceptions and cognitive activities. To tap into the domain of ‘subjectivity’, Wendt (2015) proposed that consciousness is an inherent facet of the material world, interacting at the minutest subatomic level. From this perspective, reality can be perceived as a manifestation of quantum potentialities. Furthering the argument, Tahko (2013) argued that the realist’s perspective of mind-independent identity conditions as the determinant for categorising and recognising objects and types is often referred to as ‘carving nature at the joints’.

Conversely, the conventionalist posits that such mind-independent identity conditions do not exist. Instead, all our endeavours to discern natural demarcations are subjected to our perception, implying an inherent subjectivity. This viewpoint underscores the integral role of cognitive processes and subjectivity in shaping our understanding of the world, echoing Wendt’s (2015) proposition of social structures existing within the cognitive domain and reality as a manifestation of quantum potentialities. Bohm's (2002) view is that “an illusion may arise in which the manifest static and fragmented content of consciousness is experienced as the very basis of reality, and from this illusion one may apparently obtain a proof of the correctness of that mode of thought in which this content is taken to be fundamental” (p. 262).

The assertion that cognitive processes and subjectivity play a vital role in shaping our understanding of the world aligns with Wendt’s (2015) argument that social structures exist within the cognitive domain and that reality manifests quantum potentialities. Bohm (2002) further emphasised the illusory nature of our experience, noting that the fragmented and static content of consciousness can lead us to perceive it as the fundamental basis of reality. This perspective serves as a reminder that the limitations and illusions of our subjective experiences influence our understanding of the world. When

we examine the macroscopic world, such as entities like a cat, we perceive them as existing within the dimensions of space and time, with a sense of ontological stability. This perception leads us to conceptualize these entities as solid matter, persisting through the continuum of space and time (Figure 2). However, the understanding that emerges from quantum mechanics challenges this perception, revealing the granular nature of matter at the molecular level and the substantial emptiness between particles.

In our macroscopic world, entities such as a cat are perceived as existing within space and time, exhibiting ontological stability (illustrated in Figure 2). This perception leads to an understanding of these entities as solid matter, persisting through the space-time continuum. However, as investigation delves deeper into the structure of matter, we encounter a more complex reality. At the molecular level, matter reveals its granular nature, composed of particles such as atoms and molecules. These constituent particles exhibit peculiar behaviour at the quantum level, where the notion of solidity begins to unravel (Davies, 1985). The idea of solid matter persisting through a space-time continuum becomes questionable. Quantum mechanics, the fundamental theory governing the behaviour of particles at this level, introduces us to wave-particle duality, where particles possess both wave-like and particle-like properties (Rauch & Werner, 2015).

This duality implies that particles do not possess definite positions or trajectories like macroscopic objects, but instead exist in a superposition state where they can simultaneously occupy multiple states. Consequently, the perception of solidity is merely an illusion that arises from our macroscopic observations. The observed solidity in the macroscopic world is an illusion, masking the underlying quantum nature of matter. Furthermore, as we probe even deeper into the sub-particle level, we encounter the astonishing reality that the constituents of matter are primarily composed of empty space. The size of particles, such as electrons or quarks, relative to the vast distances between them, highlights the substantial emptiness within matter. This realisation challenges our conventional understanding of solidity, where the apparent solidity of matter is diminished when considering the significant gaps of emptiness between particles. Thus, each moment of consciousness has an explicit content which is the observable matter, which is a foreground, and an implicit content, which is a corresponding background with quantum interactivity (Bohm, 2002).

Therefore, when examining the nature of matter from a quantum perspective, the perception of solidity that we attribute to macroscopic objects appears to be an emergent property arising from the collective behaviour of countless particles within a coherent structure like the cat in Figure 2. Bohm

(2002) noted that "matter in general is, in the first instance, the object of our consciousness" (p. 251). This illusion of solidity by the observers' consciousness is intricately tied to the interplay between quantum phenomena such as superposition and the probabilistic nature of particle interactions.

In conclusion, our understanding of matter and its perceived solidity undergoes a profound transformation as we delve into quantum mechanics. The apparent solidity of macroscopic objects gives way to a granular nature at the molecular level and, ultimately, to the realisation that matter primarily consists of empty space at the sub-particle level. This challenges our conventional notions of solidity and underscores the importance of recognising the illusory nature of macroscopic solidity when exploring the profound connection between matter and consciousness. This dovetails with the central argument of QMISR, indicating that the interplay between the mind and the external world profoundly influences our subjective experiences of reality. Expanding QMISR requires comprehensive research, including empirical examination, theoretical advancement, and philosophical inquiry.

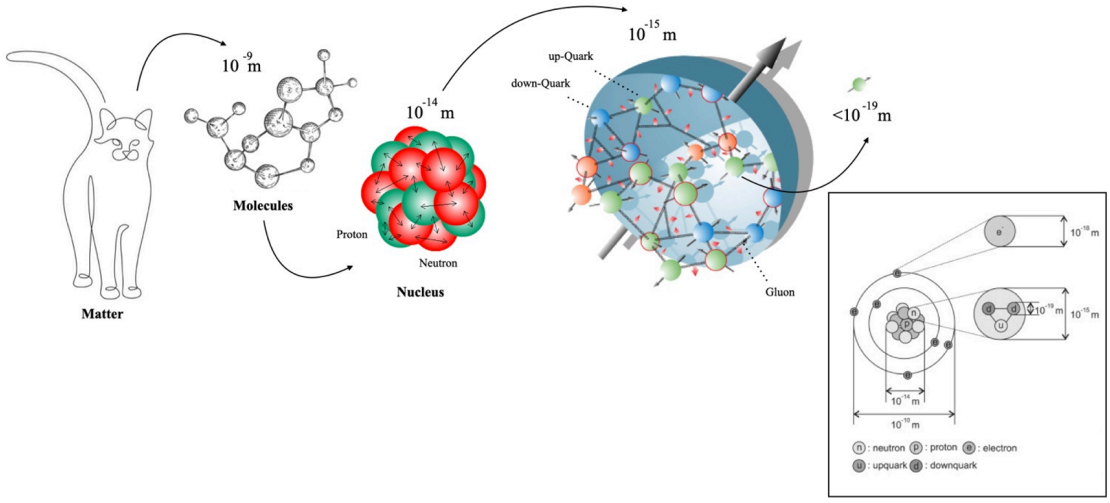

Figure 2. Relative size of matter to quarks, illustration credits to (Park & Kang, 2011)

[1] It is now necessary to go into the question of how in consciousness the explicate order is what is manifest. As observation and attention show (keeping in mind that the word 'manifest' means that which is recurrent, stable, and separable), the manifest content of consciousness is based essentially on memory, which is what allows such content to be held in a fairly constant form. Of course, to make possible such constancy, it is also necessary that this content be organized, not only through relatively fixed associations,

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> but also with the aid of the rules of logic, and of our basic categories of space, time, causality, universality, etc. In this way, an overall system of concepts and mental images may be developed, which is a more or less faithful representation of the 'manifest world' (Bohm, 2002, p. 260-261).

Understanding the relationship between the explicate order in consciousness and the manifestation of its content necessitates recognising the crucial role of the fluctuating flux. Bohm (2002) emphasised that fluctuation plays a significant part in the manifesting content (emerging reality). Consequently, a comprehensive system of concepts and mental holograms/images arises, representing the 'manifest world'. This understanding sets the stage for investigating the impact of quantum processes on subjective experiences using advanced neuroimaging methods like fMRI. Pavlovich (2020) highlights fMRI's potential in empirically studying quantum processes' influence on subjective experiences.

Moreover, fMRI research has revealed that shared experiences with others involve activating identical neural pathways during the personal experience and observation of a situation, implying a shared neural framework for experience and perception (Keysers & Fadiga, 2008). Oberman and Ramachandran (2007) proposed that this commonality in neural activation allows us to empathise with others by recognising shared experiences. This shared neural mechanism has been attributed to a specific type of neuron known as a mirror neuron. These neurons are activated during the performance and observation of a particular action or emotion, often termed 'empathy neurons' (Gallese, 2007). According to Iacoboni (2009), mirror neurons underpin our ability to empathise with others and play a crucial role in connecting us in a mutually dependent relationship. This reciprocal nature of our actions, mediated by mirror neurons, helps form meaningful relationships within a shared interpersonal space (Gallese, 2007). Trout (2009) reiterated the importance of mirror neurons in facilitating empathy, acting as a bridge connecting individuals. Trout (2009) emphasised that this process does not eradicate boundaries between individuals; instead, it enables crossing these boundaries to enrich shared meanings and understandings.

Pavlovich (2020) posited that our interconnectivity at the quantum level implies that events affecting others also impact us. This recognition necessitates a fundamental reconsideration of societal organisation. This perspective carries significant implications for the management of organisations, urging a re-evaluation of their role and purpose in this transformative process as catalysts for change within a broader system. Drawing on principles of quantum physics, Pavlovich (2020) introduced the notion of 'quantum empathy'. This concept is envisioned as a resonant frequency of the universe, a

realm where all elements are entangled, interconnected, fluid, and indeterminate. At this quantum level, a dichotomy between self and other ceases to exist, with the relational self encompassing both 'I and We' through entanglement. This interconnectedness is a consequence of nonlocality at the sub-atomic level, where waves of information traverse the universe, transcending the physical realm. Pavlovich (2020) argued that engaging in these relational-self practices could foster an expansive sense of consciousness, leading to a transformative shift in human consciousness. This hints at the potential of quantum information's nonlocal, indeterminate, and entangled nature to serve as the resonant frequency of the universe (Bohm, 2002). Such a perspective presents the possibility for growth and prosperity through 'quantum empathy' as a macro-level organizing principle.

Additionally, theoretical development through interdisciplinary collaborations could further enrich the understanding of QMISR and its implications for the nature of consciousness and reality (Kafatos, 2015). Moreover, philosophical explorations of QMISR can enhance the discourse on the nature of reality, consciousness, and free will within the context of a quantum universe. As the theory of QMISR evolves and matures, it may offer profound insights into the mind-reality interplay, potentially revolutionizing our understanding of consciousness and subjective reality.

Consciousness and Holographic Visualisation

Consciousness, seen as a holoinformational flux interconnecting the holonomic information-processing brain and the holographic cosmos, is pivotal in shaping our understanding of the universe and ourselves (Di Biase, 2009). This concept of consciousness underscores a profound level of interconnection fundamental to the universe, transcending the traditional constraints of space and time. In Di Biase's (2009) holoinformational model, consciousness is not an isolated, individual phenomenon. Instead, it operates on a quantum level, suggesting an intrinsic relationship between subjective experience and the material universe. Here, consciousness, an inherent and indivisible part of the universe or Bohm's (2002) wholeness, engages in a dynamic, reciprocal relationship with the external world, influenced by and influencing the informational structure of the universe. Moreover, holonomic brain theory (Pribram et al., 1991) aligns with this perspective, suggesting that cognitive functions emerge from the quantum superposition of wave patterns. "This highly coherent brain state generates the nonlocal holographic informational cortical field of consciousness interconnecting the human brain and the holographic undivided cosmos" (Di Biase, 2009, p. 208).

Similarly, as theorised in physics, the holographic principle posits that all the information in a given volume of space can be represented as a hologram - a two-dimensional projection. Consequently, this understanding of consciousness, coupled with these theories, provides a novel perspective on the deep interrelation between consciousness, cognitive function, and the universe's fundamental structure.

Karl Pribram's seminal holonomic theory of brain dynamics posited that the cerebral cortex is not merely a passive recipient of sensory information, but an active processor engaged in a holographic information process, a so-called multiplex neural hologram (Pribram, 1977, 1993). Further reinforcing his theory, Pribram (1977, 1993) presented compelling evidence suggesting that conscious experience occurs within a phase space orchestrated by a densely interconnected network of teledendrons, synapses, and dendrites, termed the synaptodendritic web. The intricate nature of this web hints at a highly sophisticated and complex information processing system within the brain, potentially allowing for holographic interactions between receptive fields in the cortex and the quantum universe described by Bohm (2002). When viewed in tandem with Bohm's quantum universe paradigm, Pribram's holonomic theory invites us to reconsider our understanding of neural information processing. It suggests that a holographic paradigm, which integrates the complexities of neural networks and the principles of quantum mechanics, might be elucidating the enigmatic processes underlying cognition and consciousness. The fMRI research provided remarkable insight into the brain's interplay with shared experiences, allowing us to observe common neural pathways and coding mechanisms that form in response to these experiences (Keysers & Fadiga, 2008). It becomes evident that neural activation is not strictly contingent on first-hand experiences; remarkably, observing a situation can lead to the firing of the same neural substrates as though we were experiencing it ourselves. This neural congruence, triggered by direct participation or mere observation, allows us to empathise with others and appreciate their experiences through a semblance of similarity (Oberman & Ramachandran, 2007). Thus, our brains serve as a bridge to others' experiences, connecting us through shared neural activations that underscore our fundamental human capacity for empathy and understanding. This body of research has profound implications for our understanding of human interaction, social behaviour, and the neuronal underpinnings of empathy. Further exploration in this direction could provide a more detailed map of the connective neural landscape that binds us to others and enhances our collective human experience.

This understanding of consciousness could potentially reshape leadership and management practices in an organisational context. Recognising consciousness as a holistic, interconnecting mechanism

implies that individual and collective agency, decisions, and actions within an organisation are not isolated occurrences, but part of a complex, interconnected informational system. Therefore, this perspective challenges us to reconsider conventional organisational and leadership paradigms, fostering a more integrated and holistic approach.

Implications of Quantum Realities for Management Science

Interpreting the Quantum Mind-Induced Subjective Realism (QMISR) theory (explained in Figure 3), it seems that the dual nature of reality – both as a wave and a particle at the quantum level, and as macroscopic entities in the observable world – may be an outcome of interactions with human consciousness. This aligns with the core premise of QMISR, which posits that the subjective experience of reality is a product of the interaction between a quantum mind and the external world.

The QMISR framework presents a compelling account of the dualistic nature of reality, encompassing both wave-particle duality at the quantum level and macroscopic, tangible entities within the observable universe. This duality emerges from interactions with human consciousness. In a holistic informational process within the quantum-holographic-informational system, uncertainty arises not inherently, but due to an observer's limited knowledge and inability to comprehend the totality of information (Briggs, 2016). This instantaneous, holistic informational dynamics between the brain and the cosmos is underpinned by two pivotal concepts from contemporary scientific thinking. First, Karl Pribram's seminal work on holographic processing within neural networks provides an understanding of the brain's information processing at a foundational level (Pribram, 1952, 1977, 1986, 1987). Pribram's theorisations offer insights into the complexities of neural processing, highlighting the interconnected and holistic nature of neural networks. Second, David Bohm's quantum-holographic theory of the universe introduces a unique perspective on the fundamental structure and dynamics of the universe (Bohm, 1986, 1990, 2002). Bohm's theorisation, which suggests a profoundly interconnected, holistic universe, resonates with the idea of a holistic informational dynamic.

The understanding of quantum realities brings about a shift in management perspectives. While classical management theories are built on the deterministic, observable world, acknowledging the role of quantum mechanics and consciousness in shaping our reality calls for integrating these principles into management science. The complex nature of organisational processes, underscored by the inherent uncertainty, superposition, and entanglement of quantum mechanics, has begun to

challenge traditional deterministic management models. Instead of the usual linear, predictable pathways, outcomes within an organisation might emerge from a myriad of interconnected factors (Stacey, 2001), a notion reminiscent of the probabilistic essence of quantum mechanics (Suppes, 1993). QMISR provides a framework that helps elucidate this shift. It proposes that conscious decisions by individuals within an organisation can induce quantum events, thereby influencing the organisation's reality with probabilistic emergence. Thus, individual agency and consciousness, as defined within the QMISR theory, have considerable significance in organisational decision-making and processes.

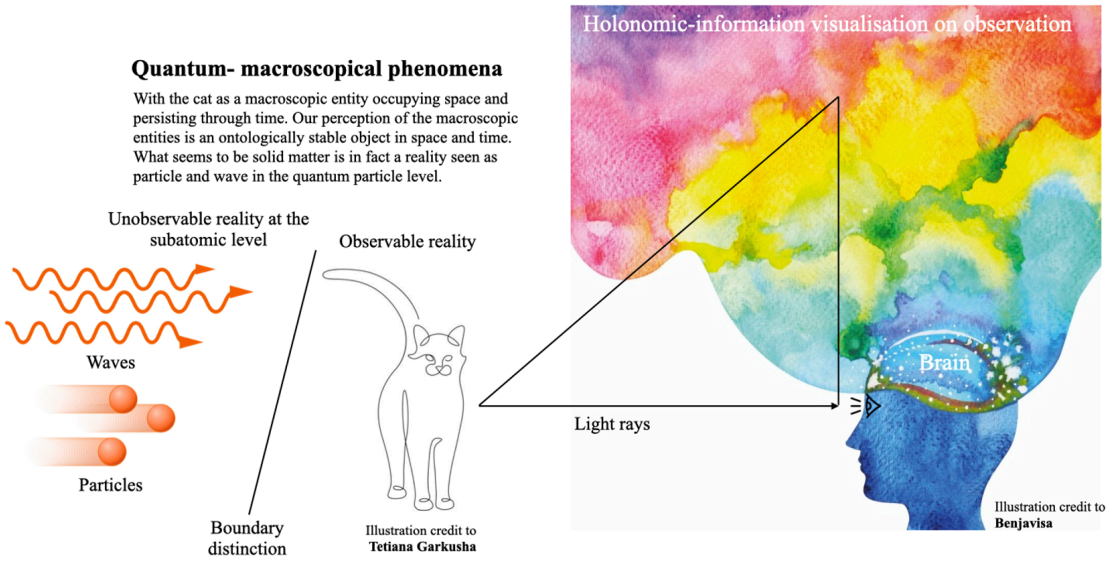

Figure 3. Illustrates the quantum-holographic-informational system

Moreover, recent advances in neuroscience and psychology suggest that conscious activities like active imagining and holographic visualisation could potentially influence these quantum events (Leong, 2023). Active imagining involves mentally simulating a particular event or situation (Leong, 2023a). This process can help shape attitudes, enhance problem-solving abilities, and improve performance - all of which could potentially influence an organisation's outcomes (Isen et al., 1987).

One promising area of research in exploring the intersections between human consciousness and organisational operations is the application of holographic visualisation. This approach encourages individuals to holographically visualise all available resources and network holographically, far and near, emphasizing the recognition of complex interconnections and dependencies inherent within

organisational structures (Leong, 2023). When individuals engage in this visualisation process, they actively immerse themselves in the entire information sphere, recognising and appreciating the intricate network of connections, resources, and information, both immediate and remote, linking disparate information for a synergistic effect (Sinkula et al., 1997). By doing so, individuals can simulate the effects of nonlocality in their cognitive processes, integrating disparate elements of the organisation into a comprehensive, holistic perspective. In effect, individuals mentally traverse the conventional boundaries of time and space, mirroring the fundamental principle of quantum nonlocality. If applied effectively, this cognitive manoeuvre could potentially enable a profound shift in understanding and managing the complexities inherent in organisations. The approach essentially echoes the quantum reality, emphasizing that the whole is present in each of its parts and that every aspect of an organisation. This perspective finds resonance with the concept of nonlocality in quantum physics, a principle that underscores the notion that all parts of a quantum system remain interconnected, regardless of distance (Bohm & Hiley, 1977).

As explained by Leong (2023), holographic visualisation is conducive to apprehending the intricacies within organisations. By employing this approach, individuals may attain a more comprehensive understanding of the intricate networks within the organisation and devise more effective responses to arising challenges. Consequently, this perspective challenges us to reconsider the role of individual agency and consciousness within organisations. Our conventional focus on observable, macroscopic reality may limit our ability to apprehend the full scope of organisational phenomena, neglecting the quantum, probabilistic realm that may significantly influence organisational outcomes (Leong, 2022). Therefore, incorporating an understanding of quantum physics and its principles into our management paradigms could enhance our capacity to navigate and influence organisational realities. Bearing this in mind, the notion of consciousness - both at the individual and collective level - becomes pivotal in linking these realms. The active role of consciousness in creating reality, as proposed by Quantum Mind-Induced Subjective Realism (QMoISR), suggests that our subjective perceptions and decisions induce quantum events (unpredictably) within the organisation. Therefore, studying consciousness and its potential effects on organisational dynamics necessitates further exploration.

The challenge and opportunity for management science, then, lie in bridging the gap between the macroscopic, observable reality and the less tangible quantum realm to harness the potential of both for improved organisational outcomes.

Conclusion

The quantum mind state, underpinned by high levels of coherence, is instrumental in creating a non-local holographic informational field of consciousness that establishes a link between the human mind and the holographic universe. Understanding this holonomic, quantum, and informational essence of the mind-consciousness-universe interconnectedness allows us to address the age-old mind-matter dilemma originally posed by Descartes, facilitating the integration of science, philosophy, and spiritual traditions into a more holistic, transdisciplinary framework.

In this revamped cosmological perspective, consciousness and transpersonal phenomena are not merely abstract concepts but integral to understanding the holoinformational nature of a consciously aware multiverse. This comprehensive model underscores the creation of Quantum Mind-Induced Subjective Realism (QMISR), in which subjective perceptions and decisions actively stimulate quantum occurrences within organisational structures.

While further empirical research and theoretical development are necessary to validate and refine these ideas fully, they provide a starting point for deepening our understanding of the complex relationship between conscious agency, quantum mechanics, and the nature of reality as experienced subjectively.

About the Author

David Leong, Ph.D., is an entrepreneurship theorist with over twenty-five years of practical experience as a serial entrepreneur. His entrepreneurial journey commenced shortly after obtaining his Bachelor of Business Administration degree from the National University of Singapore in 1994. Dr Leong has been the driving force behind the inception of no fewer than fifteen ventures, traversing sectors that include corporate finance, consultancy in business and marketing, technology solutions, asset management, and human resources.

Acknowledged as an authoritative figure and thought leader in the business domain, Dr. Leong's expertise is frequently solicited by local media outlets like The Straits Times, Business Times, Lianhe Zaobao, and Channel News Asia, particularly for his insights on economic trends, political analyses, and human resources developments. His academic endeavours are focused on the study of entrepreneurship, while he also has a scholarly interest in the ancient Chinese Yijing (Book of Changes), exploring its intersections with contemporary scientific fields such as quantum physics.

Dr. Leong is a prolific contributor to academic and professional literature, authoring numerous articles and book chapters that span his diverse research interests. He has also penned a book titled "Uncertainty, Timing and Luck on Quantum Terms in Entrepreneurship", which delves into the nuanced interplay of chance and strategic decision-making in the entrepreneurial landscape- https://www.amazon.com/Uncertainty-Timing-Quantum-Terms-Entrepreneurship/dp/1636483534

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Statements and Declarations

Conflict of Interest Statement

The author declares that the research was conducted without any commercial or financial relationships that could be construed as a potential conflict of interest.

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Footnotes

[1] The observer effect refers to the phenomenon wherein the act of observation inevitably alters the situation or phenomenon being observed (Baclawski, 2018). The traditional interpretation of quantum

mechanics posits that no phenomenon can exist without first being observed, suggesting that reality itself is contingent upon observation. This intriguing conclusion, known as the observer effect or measurement problem, was challenged by Albert Einstein. He logically pointed out that the moon's existence continues unabated, regardless of whether it is being observed or not (Mermin, 1985).

[2] In quantum mechanics, an 'eigenstate' describes a situation where a system's variables, like energy or momentum, have a definite value. The uncertainty principle, however, suggests that we can only predict probabilities for position or momentum. In our everyday reality, it seems intuitive that each object has its unique eigenstate, signifying a definite position, momentum, and temporal occurrence (Brunetti & Fredenhagen, 2002).

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