



A stratified system of knowledge and knowledge icebergs in cross-cultural business models: Synthesising ontological and epistemological views

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ABSTRACT

Because the lack of consensus on defining *knowledge*, coupled with its associated knowledge iceberg phenomenon, is a key barrier to effectively managing dispersed knowledge in the Internet-driven cross-cultural business model (CBM), we synthesised an ontological and epistemological understanding with the view of existential phenomenology, proposing a “dynamic hierarchical system of knowledge” and three primary knowledge iceberg archetypes as metaphors of cognitive variances in this context. Theoretically, this integrative perspective enriches the philosophical grounds of knowledge by transcending individual subjectivity to achieve a universal understanding of the objectivity of knowledge, thus contributing to the literature at the intersection of international business and knowledge management domains. It also responds to the calls for addressing larger, urgent problems by associating the social phenomena of reality to theoretical development. From a practical standpoint, this research is instrumental in enabling international leaders and managers to identify the cultural impediments to fulfilling their knowledge management objectives in CBMs.

1. Introduction

In today's digital era, advanced information and communication technologies (ICTs) allow organisations to easily build Internet-enabled platforms for creating, delivering and capturing values through global networks (Khan et al., 2018; Kotabe and Murray, 2018; Cavusgil and Knight, 2015). Therefore, cross-cultural business models (CBMs), in which a focal firm's suppliers, customers, employees, goods and services are located across separate geographic regions, have become a prevalent phenomenon (Fjeldstad and Snow, 2018; Del Giudice et al., 2017a; Wirtz et al., 2016). Given that cross-cultural knowledge is a vital source of corporate innovation and competitive advantage, the question of how organisations that utilise CBMs extract as much value as possible from the heterogeneous, dispersed knowledge of global stakeholders has drawn increasing attention from scholars in the international business (IB) and knowledge management (KM) domains.

Nevertheless, a plethora of studies have revealed that the transfer, sharing and integration of knowledge, particularly tacit and socially-complex knowledge between individuals and organisations, is exceptionally difficult in multi-cultural environments like CBMs (Del Giudice and Maggioni, 2014; Jiménez-Jiménez et al., 2014; Ferraris et al., 2017). This is primarily because there is a vast amount of ambiguity and complexity when trying to capture the abstruse nature and multi-faceted features of the concept of

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knowledge in such contexts. As indicated by Wang (2004), cultural variances often result in the emergence of a *knowledge iceberg phenomenon* in CBMs due to the frequent cognitive biases of the culturally-diverse stakeholders involved in the value-creating, delivering and capturing mechanisms of business models (BMs). More specifically, whereas diverse cultures obscure the establishment of higher-order organising principles, such as social norms, working values and practical reasoning (Cole, 2006), the prominent cross-cultural differences in cognition not only perplex the ability to define knowledge, they also affect *what* knowledge is and *how* it is interpreted, created and applied in inter-organisational arrangements across borders (Del Giudice and Maggioni, 2014; Chin et al., 2020a, 2020b).

Although the lack of consensus on the conceptualisation of *knowledge* has been recognised as a key barrier to implementing KM effectively in multiple-cultural environments (Zahra et al., 2020; Oliva and Kotabe, 2019; Tallman and Chacar, 2011a), there seems to be a definitional paralysis and vagueness on the ontic and epistemic nature of *knowledge* in the IB field. Partly, this may be attributed to some scholars' claims that *knowledge* can be treated as something residing and operating in human memory systems. Thus, it does not need an explicit definition or unequivocal measure in theorising management-related phenomena because too many types of knowledge are relevant to the organisation (Mitchell and Boyle, 2010; Conee and Feldman, 2004; Grant, 1996). In short, such a claim held that a comprehensive understanding of knowledge was not a determinant factor for developing a new knowledge-based view of the firm or for eliciting the interest of all firm-related stakeholders in the KM practices.

However, while the growth and proliferation of transnational cultures and global value chains are generating more forms of cosmopolitans in the world economy, we argue that it is imperative for contemporary organisations to accurately codify the relatively abstract, multifaceted concept of knowledge so as to realise their KM objectives in different types of multi-cultural contexts. Consequently, to fill the gap about the lack of precision in conceptualising knowledge, we build our theoretical rationale on a synthesis of the ontological and epistemological approaches, then we base it on an approach that employs the perspective of existential phenomenology (Schutz, 1966) to characterise *knowledge* as a “dynamic hierarchical system of knowing with multi-layer meanings”. The philosophy of existential phenomenology emphasises that only that which is already-experienced is meaningful. Related to this point, the essence of *metaphor* is a cognitive process that enables us to understand and *experience* one thing far apart from our memories by making analogical inferences of another thing (Lakoff and Johnson, 1999). Following this line of thought, we further propose a novel metaphor of *knowledge icebergs* as a strategic tool of creative sense-making to characterise the cognitive variances and noises in the CBM ecosystem.

The study presented in this paper offers valuable new insights into the theory and practice of CBMs. First, we synthesised an ontological and epistemological understanding with the view of existential phenomenology, proposing a “dynamic hierarchical system of knowledge” and three primary archetypes of *knowledge icebergs* as metaphors of cognitive variances in modern, ICT-driven CBMs. This integrative perspective with a prominent cross-disciplinary nature enriches the philosophical grounds of knowledge by transcending individual subjectivity to achieve a universal understanding of the objectivity of knowledge; thus, it contributes to the literature at the intersection of the IB and KM domains. Second, inspired by the growing knowledge-iceberg phenomenon in multi-cultural contexts, to a certain extent, this research responds to scholars' calls for addressing larger, urgent problems by associating the social phenomena of reality to theoretical development (Buckley et al., 2017). Third, in a digital world with intensifying global connectivity, the information presented in this paper is also instrumental in enabling international leaders and managers to identify the cultural impediments to fulfilling their KM objectives in the course of establishing CBMs.

This paper is conceptual in nature and is organised as follows. First, we clarify the definitional ambiguity between the notions of knowledge and information as well as between tacit and explicit knowledge. This is followed by a critical review of the literature on knowledge codification. Second, based on the insights distilled from our theoretical development, we synthesise ontological and epistemological views with the existential phenomenology, proposing a “dynamic hierarchical system of knowledge” and three primary archetypes of knowledge icebergs as metaphors of cognitive variances in the CBM context. Third, the theoretical and practical implications of this research are demonstrated.

2. Theoretical foundation

In this section, we provide the overarching theoretical rationale underlying the development of our new concepts.

2.1. The definitional differences between knowledge and information

In Western countries, most scientists claim that propositional knowledge is the *only* kind—or at least the primary type—of knowledge; in contrast, philosophers, such as Plato, Popper and Aristotle, embraced a greater variety of knowledge, such as know-how, experiential knowledge and religious knowledge, which covers a wide range of doxastic states involving ethics, aesthetics and intellectual virtues (Chappell, 2012). This is analogous to what happened in the East. For instance, in general, renowned Chinese philosophers, such as Confucius, Mencius and Laozi, deem the notion of knowledge as a complex, synthesised thinking system concerning cultural cognition, human intelligence, mental power and learning capacity (Gu and Zhu, 2000; Nakamori et al., 2011). Although defining knowledge has occupied the minds of well-known philosophers across the globe, and there have been numerous epistemological debates since the ancient era, there is no general agreement on the conceptualisation of knowledge or even the boundaries of the terms data, information and knowledge (Zahra et al., 2020; Tallman and Chacar, 2011a).

Many strategists regard information as a sub-category of knowledge; thus, to a certain extent they view knowledge and information as being equivalent (e.g., Kogut and Zander, 1992; Grant, 1996). In contrast, informationists, in general, consider data, information and knowledge as being distinct where data refer to raw numbers and unabridged facts, information refers to data

processed by individuals or patterns penetrated in data and knowledge is authenticated information involved with human cognition (e.g., Alavi and Leidner, 2001; Dretske, 1983). Despite the continuous debates about whether the terms knowledge and information are interchangeable, we view this from a cultural angle, embracing De Long and Fahey's (2000) stance that data, information and knowledge are different at a cognitive level. As indicated by Alavi and Leidner (2001), the most salient feature distinguishing knowledge from data and information is that knowledge may not necessarily have to reside in the mind of individuals or agents, but it *must* involve human reflection, enlightenment and experience; a massive amount of data or information cannot automatically form knowledge.

Considering the forgoing lines of thought, we first undertook a critical review of the literature on several widely-used definitions and categories of knowledge in management and organisational studies. In an attempt to further clarify the codification of knowledge in CBMs, we then selected the most appropriate taxonomy as the primary theoretical reference from our review in accordance with the contextual characteristics of CBMs, thereby providing a new conceptualisation of knowledge within that context.

2.2. Tacit knowing at the heart of all knowledge

As noted above, there are many and varied definitions of knowledge in the management literature (Zahra et al., 2020; Mitchell and Boyle, 2010), as scholars have proposed a variety of idiosyncratic conceptualisations in favour of their own research purposes spanning micro-to macro-organisational levels. Despite these variances, drawing on Polanyi's (1966) idea of tacit knowing, Nonaka (1994) defined and categorised *knowledge* as explicit and tacit knowledge, which has been viewed as one of the best-known, paradigmatic models since the late 1990s in the domains of knowledge and strategy management (Gourlay, 2006; Dhanaraj et al., 2004; Choo and Bontis, 2002). Given that this definition has exerted profound influence on many of other knowledge codifications in the majority of management studies, we began our critical review from Nonaka's (1994) and Polanyi's (1966) works on the explicitness and implicitness of knowledge.

In Nonaka's (1994) renowned theory of organisational knowledge creation, knowledge is characterised as tacit knowledge and explicit knowledge. According to Polanyi's (1966) claim from Gestalt psychology that we can know more than we can tell, tacit knowledge derived from Plato's epistemological inquiry of philosophy in *Meno* is deemed abstract and subjective, and it can only be transmitted through active involvement of the teacher; in contrast, explicit knowledge is highly-codified and objective, and it can be expressed in words, numbers and systematic languages. Tacit knowledge is difficult to formalise, communicate or share; however, it is a central feature that 'forms a dispensable part of all knowledge' (Polanyi, 1966: 20) as well as a 'rich untapped source of new knowledge' (Nonaka, 1994: 16).

Although Nonaka attributed his dual structure of knowledge (i.e. tacit and explicit knowledge) to Polanyi's theory of tacit knowing (Nonaka et al., 2006), their points of view are somewhat different. Polanyi considered knowledge as a *process* of knowing rather than an object in which explicit and tacit knowledge are not a dichotomous state of knowledge but mutually dependent and reinforcing dimensions/elements of knowledge (Gourlay, 2006; Alavi and Leidner, 2001). More specifically, explicit knowledge can only be constructed by being tacitly understood, previously. An irreducible tacit element is always dwelling within any explicit knowledge/knowing (Polanyi, 1966, 1969). To a certain extent, this claim shows that at least some tacit knowledge cannot be made explicit while the full conversion between explicit and implicit seems futile. This differs from Nonaka's (1994) knowledge-creating theory, which primarily focuses on how tacit knowledge is transformed to explicit knowledge, and vice versa. In this vein, many scholars have asked recondite questions about whether tacit knowledge can be, or needs to be, explicated (Gourlay, 2006; Spender and Grant, 1996; Adler, 1995).

However, our research does not aim to answer or address the fundamental issue raised above about the definition of knowledge, as it appears to be trivial relative to the operationalisation, creation and harvesting of valuable knowledge in management practice. In the above contentions, we merely aimed to highlight two crucial vantage points for further conceptualising knowledge in CBMs: 1) the tacit-explicit knowledge category is broadly acknowledged and cited, so it has a prominent presence in the literature; and 2) the tacit dimension of knowledge creates a link between an implicit human cognitive system rooted in culture and an explicit scientific quest for discovering the reality of comprehensive entities. Viewed from this angle, we take tacit and explicit knowledge as the meta-components of knowledge to build a novel knowledge ecosystem in CBMs.

2.3. A critical review of the literature on knowledge codification

Scholars have crystallised the abstruse concept of knowledge from diverse disciplines at both the micro- and macro-organisational levels. From the philosophical perspective, individual knowledge as an epistemology has been defined as a "justified true belief" (Nonaka, 1994; Huber, 1991), which demonstrates the intimate correlation between cognitive processes and tacit epistemology; thus, it has been widely used in knowledge creation studies (Tsoukas, 2009). Some research studies have claimed that knowledge could be understood as a performative verb of *knowing* that embodies a state of mind; therefore, it cannot be independent of human beings (Piaget and Inhelder, 1969; Spender and Grant, 1996). This point of view focuses on addressing how individuals apply their personal knowledge to meet organisational needs. Considering knowledge as an objectively-knowable asset, scholars have suggested that knowledge is a thing/object to be stored and manipulated; consequently, it is very important for firms to access the knowledge objects in order to gain competitive advantages (Alavi and Leidner, 2001; Zack, 1998). With a more pragmatic, functionalist angle, Tsoukas and Vladimirou (2001) reported on what firms can benefit from their knowledge, and they defined organisational knowledge as the set of collective understandings embedded in a firm that allows it to more effectively leverage its resources.

In terms of knowledge taxonomies at the organisational level, Kogut and Zander (1992) were among the first to suggest an

evolutionary perspective that viewed a firm as being a repository of distinct knowledge in the strategic management domain, thereby rejecting the idea of a firm as a bundle of contracts. Departing from the resource-based view (RBV), Barney (1986) divided knowledge into two categories: information (also called *declarative knowledge*) and know-how (also called *procedural knowledge*). Information refers to explicit facts, axiomatic propositions and symbols, while know-how is tacit, sticky and difficult to imitate. This approach—which paraphrased Polanyi's (1966) dictum as noted above that 'organizations know more than what their contracts can say' (Kogut and Zander, 1992: 383)—has been recognised as having made remarkable contributions to organisation and management theories about explaining how firms create sustainable competitive advantages (Foss, 1996).

Many subsequent studies were inspired by Kogut and Zander's (1992) sophisticated view to define the notion of knowledge. Among them, Grant's (1996) seminal work seems to be the most influential; it also integrated the RBV with Polanyi's (1966) idea of tacit knowing, proposing the well-known, widely-cited knowledge-based theory of the firm (Zahra et al., 2020; Zander and Zander, 2010; Dyer and Singh, 1998). Grant's (1996) underlying premise is that the forms of knowledge differ according to their transferability, aggregability and appropriability, which has largely deepened our understanding of the two critical characteristics of knowledge: declarative knowledge (i.e. know-that/facts/theories) and procedural knowledge (i.e. know-how). It should be noted that Grant (1996) did not explicitly *define* the concept of knowledge; rather, he *clarified* the ontological features of it.

To elucidate the types of product technology innovation, Henderson and Clark (1990) took organisational knowledge as the basis underlying product-development innovation, suggesting two types of organisational knowledge: component knowledge and architecture knowledge. The former refers to a combination of tacit and explicit knowledge about each of the core design concepts of products and the way in which they are executed in a particular component. The latter refers to more tacit, inherently immobile knowledge about the ways in which the components are integrated and linked in a coherent whole (Henderson and Clark, 1990: 11). This taxonomy is believed to capture the distinction of knowledge at a more pragmatic level because, often, product development and innovation cannot be completed by a single organisation; rather, cooperation with the supply chain or a strategic alliance is needed (Tallman and Chacar, 2011b).

Using a broader, more systematic approach, De Long and Fahey (2000) adopted a cultural perspective deciphering Polanyi's (1966) tacit dimension of knowledge, underscoring that knowledge should be seen as a product of human reflection and experience. De Long and Fahey (2000) stated:

Dependent on context, knowledge is a resource that is always located in an individual or a collective, or embedded in a routine or process. Embodied in language, stories, concepts, rules, and tools, knowledge results in an increased capacity for decision making and action to achieve some purpose (116).

Taking into account individual, group and organisational contexts, they classified knowledge as: *human knowledge*, *social knowledge* and *structured knowledge*. Given that their context of the emergence of knowledge emphasised the interactions of individuals and their environments spanning organisational and cultural boundaries, we think this categorisation is particularly suitable for this current research. Thus, we used it as our theoretical grounding, presenting a deeper discussion of it later in this paper.

Building upon a comprehensive review of the knowledge definitions found in the literature, Zahra et al. (2020) conceptualised knowledge using a more synthesised approach to further define the term: knowledge integration. They claimed: 1) knowledge must be encoded by human cognition, and it can be absorbed into people's long-term memories, 2) knowledge's form affects its transfer, 3) knowledge differs by the degree to which it is consciously (unconsciously) obtained and 4) the ontological nature of knowledge maps onto the declarative-procedural distinction, which can be integrated with any other forms. In other words, knowledge may be declarative or procedural component knowledge, declarative or procedural architectural knowledge, etc. The unique merit of their conceptualisation is that it captured not only the ontological traits of knowledge but also the epistemological understanding of how knowledge is defined.

Overall, the critical literature review of the existing definitions of knowledge enables us to draw the following conclusions:

- 1) A heavy reliance on the tacit-explicit classification to the categorising knowledge was found in the literature, which further corroborates our previous decision to employ tacit and explicit elements as the meta-components to develop a system of *knowledge* beyond a single-level analysis.
- 2) Although the RBV was frequently utilised to justify knowledge classifications at the firm level in prior studies, the intensifying global interconnectivity coupled with ICTs have allowed contemporary firms to more easily create, transfer and acquire knowledge beyond organisational and national boundaries. Given that the diverse actors of a CBM do not share a common organisational affiliation, confining our analysis to a mono-level or only one realm may result in a critical logical error. Thus, we organically synthesise the micro-and macro-level influences, and advance our analysis to the more sophisticated, complex system level.
- 3) As previously mentioned, De Long and Fahey's (2000) study that used a cultural lens to interpret the notion of knowledge is in concert with our research study's aim to conceptualise knowledge and to identify a culturally-grounded knowledge iceberg phenomenon in CBMs. Therefore, it is appropriate to use their taxonomy as our primary theoretical reference.

3. Systematising knowledge in the CBM ecosystem

In this section, grounded on the insights distilled from the previously-elaborated upon theoretical foundation, we synthesise ontological and epistemological perspectives with the existential phenomenology theory, proposing a "dynamic hierarchical system of knowledge" and three primary archetypes of knowledge icebergs as metaphors of cognitive variances in CBMs.

3.1. Synthesising ontological and epistemological views with the existential phenomenology

While many renowned Western studies adhered to Plato's philosophical interpretation of individual knowledge as "justified true belief" (Nonaka, 1994; Huber, 1991), we also adopt this philosophical definition as the starting point to further systemise and shape our views of knowledge in pragmatic reality.

Amid the increase in modern scientific inquiries, one of the ultimate quests and goals has been to seek some kind of ontological and epistemological common ground. Regarding the concept of knowledge, its ontology captures its nature of being and existing, while its epistemology is concerned with *how* knowledge is acquired. Polanyi's (1966, 1969) theory of tacit knowledge—which suggests an unconventional correspondence, namely a parallel structure between tacit knowing and identifiable beings as well as an associated dual control system—has been widely used in response to the above inquiry (Dillern, 2019). His proposition, which implies a remarkable, deep connection between the stratified ontological structure of a particular entity and the way we know it, was deemed an idiosyncratic 'epistemontology' (Lowney, 2014: 18).

Given the epistemological character embedded in the tacit-explicit distinction, our research, which adopts this tacit-explicit category, can be viewed as an integration of the ontological and epistemological approaches to systemising knowledge in the CBM context. It should be noted that Polanyi's tacit knowing created a reasonable correspondence from the knower to the object that explains how the cognitive and semantic clues of a knower are used to apprehend a comprehensive entity as a whole; however, he still neglected the crucial role of contexts from which humankind's perceptual system integrates contextual clues into a phenomenal entity to identify an object (Margitay, 2012; Lowney, 2014).

The perspective of existential phenomenology ascertains that meaning is dependent upon *reflexivity*, namely the process of self-reflection and looking at what has been going on (Burrell and Morgan, 1979: 245), which largely supports the primacy of Polanyi's tacit knowing in social science. Nevertheless, unlike Polanyi's emphasis on personal transcendental tacit clues, phenomenologists (Schutz, 1966; Heidegger, 1963) have claimed that every concept makes sense as per the context in which it resides, as this contextual relationship enables the concept to be what it is. In other words, the existential phenomenology may complement the forgoing theoretical deficiency of tacit knowing by highlighting the meaning of contextual heterogeneity and the intersubjective understanding among different objects in a specific time and space (Burrell and Morgan, 1979: 245).

On the basis of the arguments presented above, we built our theoretical foundation by synthesising the ontological and epistemological approaches; thus, the perspective of existential phenomenology is employed to conceptualise multi-tiered forms of knowledge and to metaphorize knowledge icebergs as cognitive variances in the CBM context.

3.2. Reifying knowledge in CBMs through "a dynamic hierarchical system of knowing"

Polanyi (1966, 1969) believed that the world has a hierarchical—or perhaps a plural—ontological structure in (tacit) knowing as well as a formidable correspondence between knowing (epistemology) and being (ontology) in knowledge-like entities, such as minds and individuals. Referring to Polanyi's hierarchical structure of ontology, while *concepts* embody mental structures, underlying human thinking, cognitive processes and Polanyi's tacit epistemology (Nisbett et al., 2001; Chin et al., 2018), we used the logic of *concept hierarchies* (Zimbaro et al., 2009; Medin et al., 2000) as the building block of cognitive interpretative mechanisms to create a hierarchical system of knowledge.

According to Zimbaro et al. (2009), people unconsciously organise their declarative memories into unique concept hierarchies that will be narrowed down from general to specific along with their idiosyncratic cognitive processes. The most generic and abstract category is at the top of a concept hierarchy; the most specific and concrete category is at the bottom. For example, people may consider a broad, inclusive concept of "living being" at the top of the hierarchy, which can be divided into "animal" and "plant" categories; these two categories still have their own smaller sub-categories, respectively, such as the sub-categories of dog and bird (belonging to animal) and that of flower and tree (belonging to plant).

Following the foregoing lines of thought, knowledge, whose philosophical core is a person's justified true belief, can be understood as a *dynamic hierarchical system of knowing with multiple layers of meanings* in the CBM context. In the next section, we elaborate on the process of conceptualising knowledge in such a cross-cultural ecosystem.

3.3. A stratified system of knowledge in the CBM ecosystem with a set of nested subsystems

3.3.1. The symbiotic co-existence of tacit and explicit components constitutes the underlying ontology of knowledge at the highest level (i.e. a proximate physical context-free layer)

Given that the structure of tacit knowing determines the structure of a comprehensive entity (Polanyi, 1966, 1969), we further contend that tacit-explicit knowing forms the underlying ontology of knowledge. Tacit knowledge is an abstract personal quality, practice-based, deeply rooted in action, commitment and involvement; thus, it is difficult to acquire and transfer. Explicit knowledge is highly-codified and transmittable in sentences, writing and drawings; thus, it is easier to utter or formulate it (Polanyi, 1966; Nonaka, 1994). Echoing this logic, the explicit dimension of knowledge is thought to provide the building blocks of knowledge, while tacit dimension offers the glue and integrating mechanisms about learning to bind those blocks (see Dhanaraj et al., 2004). As stated by Polanyi (1966: 60), the tacit dimension is acknowledged as an indispensable element of all knowing and as the ultimate mental power by which all explicit knowledge is endowed with meaning.

The insightful definition presented above delineates the symbiotic co-existence of the tacit and explicit components of knowledge, which transcends the traditional Western epistemology that applies explicit knowledge to characterise elements of human perception,

experience, skills and history (Nonaka et al., 2006). More specifically, it sheds light on a crucial, previously-ignored fact that knowledge can never be separated from a person's cultural values and unconscious cognition, and that knowledge can partly be seen as a dynamic process of tacit-explicit knowing.

To conclude, the symbiotic co-existence of the tacit and explicit components of knowledge inarguably constitutes the underlying ontology of knowledge at the highest level of our proposed dynamic knowledge ecosystem. Considering the unique paragenetic, inseparable relationship between the tacit and explicit elements, we believe it is more appropriate to call them a “tacit-oriented” and “explicit-oriented” dimension/component due to their respective compositional character. It should be highlighted that this layer is context-free.

However, such a tacit-explicit classification of knowing also implies an inherent existence of *cognitive biases* that result in *knowledge icebergs* in a cross-cultural knowledge ecosystem, such as CBMs, because, the meanings and connotations associated with cognition-related knowledge can vary greatly in different cultures (Zimbaro et al., 2009; Chin et al., 2018). We will elaborate on this in the next section.

3.3.2. Three ontic modalities of knowledge (i.e. human, social and structured knowledge) represent the most general, contextualised knowledge in CBMs at the second level

As indicated above, the ontological structure of knowledge is layered (Polanyi, 1966, 1969). Hence, by categorising the tacit-explicit dimension of knowledge as the upper-level of this hierarchy, we continued to draw up the classification at the second level.

Given that this classified layer describes common, practice-oriented yet still somewhat contextualised knowledge applicable to all kinds of CBMs, as opposed to the upper, physical context-free feature of the tacit-explicit layer, it is first essential to clarify the prevailing characteristics of the CBM context in the contemporary era.

3.3.2.1. *The contemporary characteristics of the CBM ecosystem.* In recent decades, the BM perspective has ushered in radical changes in the domains of strategy and innovation (Massa et al., 2017; Tongur and Engwall, 2014; Casadesus-Masanell and Zhu, 2013; Zott et al., 2011). While the external environment outside organisational boundaries is central to the assumptions of strategic management, the concept of a BM implies a new way of thinking in the environment of a firm, namely a modern, more comprehensive idea of a *business ecosystem* (BE) that can be defined as a business community of interconnected heterogeneous actors with complementary competences to collaborate on or participate in value-creating processes (Moore, 1996). The core of a BE lies precisely in a firm's choice of BM with its distinct ontological reality (Demil et al., 2018). Therefore, the ontological nature of the CBM can be seen as a *sub-ecosystem* nested in the *global BMs*.

It has been recognised that the breakthrough of the ICTs resulted in the emergence of new e-business ventures and Internet-enabled platforms spanning national borders; thus, it was a key catalyst for activating economic development in the contemporary, boundaryless digital era (Chin et al., 2019). Therefore, we took the advent of the ICT age as the starting point and referred to the BM construct proposed by Osterwalder and Pigneur (2010), summarising the modern characteristics of the CBM ecosystem as follows:

- 1) The ontology of the CBM context can be viewed as an embedded, subordinate ecosystem of the global BE. While it also contains a set of nested sub-systems, per se, the key structuring elements of such an ecosystem are determined by and involved with macro- and micro-environments in which industry is believed to be the primary level of analysis.
- 2) The construct of CBMs embodies how a focal firm exploits ICTs collaborating with its key stakeholders, transcending a variety of traditional macro- and micro-boundaries to form a *cross-border architecture of value logic* to realise economic and social value.
- 3) The *value logic* structure that characterises the core content of CBMs includes four primary pillars: the *value proposition*, *value creation*, *value delivery* and *value capture dimensions*. It is derived from the composite mental schema, namely the complex collective *cognition* of the top management team members.

3.3.2.2. *The primary archetypes of knowledge in the CBM ecosystem.* In light of the three principles presented above, “industry” appears to stand at the centre at this level of analysis. As previously indicated, we referred to De Long and Fahey's (2000) taxonomy that can fuse macro- and micro- organisational analyses of knowledge, suggesting three ontic modalities to delineate the most general, contextualised knowledge in CBMs at the second level, as follows:

1) *Human knowledge* that is manifested in an individual's skills and abilities reflects a combination of explicit and tacit knowing about what individuals know or how they know how to do something; 2) *Social knowledge* refers to the sum of a team's member's individual knowledge or a kind of collective knowledge in a specific society, which is created through people cooperating with one another because it is rooted in the network of interpersonal relationships (Nahapiet and Ghoshal, 1998). Given that social knowledge is only present in relationships among individuals or within groups, it is mostly tacit; 3) *Structured knowledge* that resides in the routines, processes and sub-systems of a BM ecosystem can exist apart from human knowers, and it is largely explicit.

3.3.3. The context- and organisation-specific forms of knowledge at the third level

Based on the three principles presented above, we proceeded to break down the most general knowledge of CBMs at the second level into more context- and organisation-specific, as well as more pragmatic knowledge, at the third level based on the value logic, namely the core content of CBMs. Osterwalder and Pigneur's (2010) BM canvas is widely acknowledged as a particularly pragmatic tool for crystallizing the key constituent components of the value logic frame of BMs (Massa et al., 2017; Joyce and Paquin, 2016). Osterwalder and Pigneur (2010) categorised the value logic frame of BMs into four functional modules as primary pillars capturing the value proposition, value creation, value delivery and value capture mechanisms, respectively, each of which also encompasses

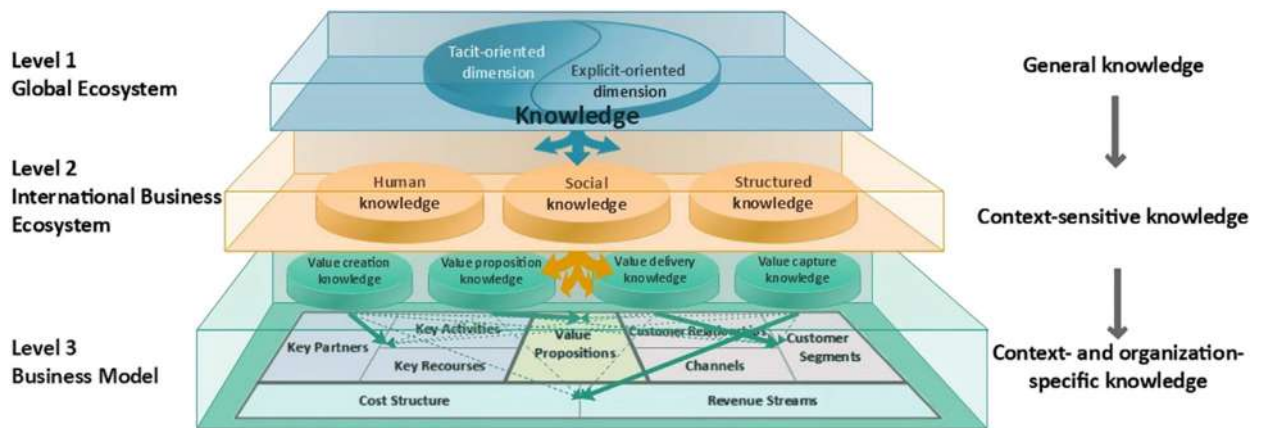


Fig. 1. A dynamic hierarchical system of knowledge.

two to three building blocks. We adopted their framework to demonstrate the forms of this level of knowledge as follows:

1) *Value proposition knowledge* involves knowledge about a CBM's main product and service offerings, such as what products and services should be provided and how they can cater to the needs of target customers; 2) *Value creation knowledge* relates to the conduct of value-creating activities, the acquisition of necessary resources and the building of corresponding infrastructures among all BM stakeholders, thus covering the knowledge of key innovation activities, partners and resources; 3) *Value delivery knowledge* involves the knowledge related to the areas that a CBMs needs to create value, such as the interfaces to specific or diverse customer segments, the establishment of long-term customer relationships and the design of cost-efficient channels to deliver value propositions to customers; and 4) *Value capture knowledge* relates to the knowledge about how and in what ways to generate revenue streams in specific contexts.

Although the above-mentioned layering of our system of knowledge is very significant, a more concrete framework is needed to visualise it. Consequently, we created a diagram to more clearly illustrate this novel, dynamic hierarchical system of knowledge (Fig. 1).

3.3.4. More specialised, peripheral or team-based knowledge at the lower levels

Ideally, our dynamic hierarchical system of knowledge implies that a higher-level of knowledge can be broken down into more specialised, more peripheral/distal or functionally team-based knowledge. However, given our focus on the CBM context, lower categories of knowledge will not be discussed in this paper.

4. Knowledge icebergs as a metaphor of cognitive variances in neogenesis: an integrative perspective of culture and existential phenomenology

4.1. Cognitive variances as an impediment to KM practice in CBMs

As a blend of human language, beliefs, customs, values and traditions (Zimbardo et al., 2009), culture reflects a human being's mental programming (Hofstede, 2015); thus, it has profound impacts on people's cognition regarding a variety of mental characteristics and activities. Therefore, people with different cultural values may perceive and learn knowledge in their culturally-distinctive ways because the cognitive processes of human beings are highly susceptible to cultural differences (Nisbett et al., 2001; Del Giudice et al., 2017a). Evidence also indicates that multinational enterprises (MNEs) with employees and strategic partners from diverse cultures often encounter cultural barriers in intra- and inter-organisational knowledge transmission and exchange (Matricano et al., 2019; Kotabe and Murray, 2018; Papa et al., 2018; Del Giudice et al., 2017b; Ahammad et al., 2016; Jiménez-Jiménez et al., 2014).

For example, Muslim Pakistanis seek truth from the Koran, while Hindu Indians look for truth from the Upanishads. Given knowledge as "justified true belief", it is obvious that Pakistanis and Indians seem to prefer to pursue an indigenous cultural way of knowing instead of a modern, scientific mode of knowing. Scholars have noted that there is a built-in cognitive bias on the knowledge of personality across cultures. Westerners with individualist cultures tend to put the *self* at the centre of personality, thus praising people who stand out from the crowd, while Asians and Africans with collectivist cultures often believe that the *self* is embedded in an individual's social network, thus rewarding people for fitting into the group (Segall et al., 1999; Nisbett et al., 2001). In relation to KM processes, such as transferring and sharing knowledge, Chinese and Japanese people are inclined to avoid direct disagreement in order to maintain good interpersonal relationships; in contrast, Americans and Europeans tend to leave the procedure of neogenesis impersonal with a clear distinction between the people involved and the opinions they display. It should be noted that, when language differences are coupled with translation difficulties, it may either elicit greater existing cognitive biases during the procedure of neogenesis or worsen them.

Taking the foregoing arguments together, it is plausible to see the frequent emergence of cognitive variances and even prejudices

in KM practice within a complex cross-cultural environment where individuals draw on their own cultural understanding to manage and produce knowledge; moreover, the CBM context is deemed to be a typical knowledge-based ecosystem beyond borders (Chin et al., 2020a; Del Giudice and Maggioni, 2014). However, in comparison to ordinary MNEs, CBMs involve a far wider range of external stakeholders from multiple cultures, such as suppliers, clients, governments and social organisations, through whom knowledge is produced, transferred and integrated. While knowledge in CBMs can be characterised as a dynamic hierarchical system of knowing with multiple layers of meanings, it is reasonable to infer that there are far more intricate, possibly inextricable cognitive variances among the actors in such a context.

4.2. Knowledge icebergs as a metaphor of cognitive variances in neogenesis

To better understand the perplexing cognitive differences across cultures in CBMs, we used a metaphorized approach to elaborate on our new theory. This approach has been recognised as an effective cognitive tool, particularly in the fields of cognitive psychology, linguistics and philosophy, for people to visualise and comprehend a relatively complex and abstruse idea that is unfamiliar to them (Fisher, 2014). *Metaphor*, as a cognitive process, enables us to understand and experience one thing as an abstract “target” domain that is far apart from our memories by making analogical inferences of another thing as a concrete “source” domain (Lakoff and Johnson, 1999).

As indicated above, we adopted the perspective of existential phenomenology (Schutz, 1966) to underpin the theoretical logic of our proposed dynamic hierarchical system of knowledge. It emphasises the true comprehension of the subjective meanings in life as experienced in the social world, as well as the existence of multiple, independent realities from one context to another. Given that existential phenomenology focuses on analysing the intersubjectivity among objects with intuition and imagination (Burrell and Morgan, 1979), we used it as the basis for the analogical reasoning of our metaphor.

Moore (1996) used a biological metaphor to define the business environment as an ecosystem of interconnected heterogeneous actors with complementary competences spanning organisational boundaries to participate in the process of value creation. Referring to his point of view, we considered CBM to be a sub-ecosystem of the world's ecosystem; thus, we created two inter-related metaphors: the *marine ecosystem* (i.e. the sea) as a metaphor of CBM and *knowledge icebergs* as a metaphor of cognitive variances that act as a critical impediment to KM practice in CBMs.

Based on our stratified system of knowledge discussed above, we identified three ontic modalities of knowledge—human, social and structured knowledge—representing the most general forms of knowledge in the CBM context. On the premise of synthesising ontological and epistemological understanding, we further postulated that there should be at least three epistemic forms of knowledge icebergs corresponding to the three ontic modalities of knowledge, respectively.

4.3. Three primary, generic archetypes of knowledge icebergs

Considering that metaphor is a powerful epistemic tool for framing abstract ideas or phenomenon through analogical reasoning (Lakoff and Johnson, 1999; Fisher, 2014), we used our intuition and imagination to create three primary archetypes of knowledge icebergs that match the ontic characteristics of the above-mentioned three generic modalities of knowledge presented below. It should be highlighted that the completely visible tips of the icebergs above the ocean surface are the cognitive variances that are easier for outsiders to observe and identify.

- 1) *Human knowledge iceberg*. Human knowledge is manifested in personal capabilities, skills and expertise; therefore, this type of iceberg may embody various combinations of tacit-oriented and explicit-oriented knowledge due to differences in the intellectual qualities and professional abilities of individuals. In a hyper-competitive CBM environment, a large part of explicit knowledge and almost all valuable tacit knowledge is stored within individuals. While this archetype of the knowledge iceberg is created within the BM, or one or more of the participating firms, it is BM- or firm-specific and is partly caused by the intention of individual knowledge owners to protect their property rights for competitive advantages. In this vein, as shown in Fig. 2, this archetype of knowledge icebergs should resemble translucent crystals with a stable structure, but it may further morph into a greater variety of shapes and forms due to the miscellaneous configurations of tacit-oriented and explicit-oriented knowledge among people and affiliations.
- 2) *Social knowledge iceberg*: In light of De Long and Fahey's (2000) claims, social knowledge exists only in the relationships between individuals or entities; thus, it is highly tacit-oriented. In a digital age, advanced ICTs have enabled actors from diverse cultures within a CBM to enjoy better and more convenient knowledge-sharing spaces. Nevertheless, individuals who do not have strong ties with one another may still lack the motivation to share knowledge or produce collective knowledge, particularly when knowledge is not expressed in a common language or when there is ambiguity over the ownership of knowledge. Consequently, as shown in Fig. 3, the archetype of the social knowledge iceberg should look like opaque glass with a relatively unstable, fragile structure, as it often stems from ever-changing complexities and difficulties related to creating, transferring and integrating knowledge in the dynamic processes of socialisation among diverse stakeholders spanning micro-to macro-levels and multiple cultures.
- 3) *Structured knowledge iceberg*: According to De Long and Fahey (2000), the structured knowledge embedded in the operation procedures, systems and routines mainly involves information-processing and organisational resources; it is explicit-oriented and rule-based, and it is independent of human knowers. For example, the knowledge attached to statistical software was originally created by humans in the form of statistical methods and computer codes. Following this logic, a key distinction between the



Fig. 2. Human knowledge iceberg.

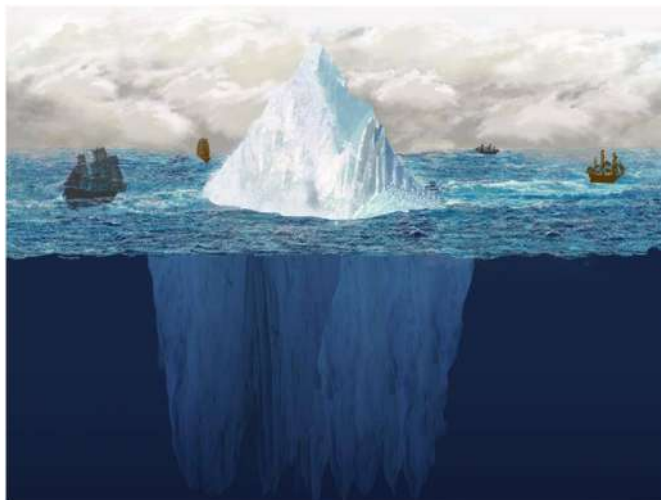


Fig. 3. Social knowledge iceberg.

structured knowledge icebergs and the first two types of knowledge icebergs is that structured knowledge icebergs reflect the cognitive biases of the predecessors' memories and experience. In this sense, the archetype of the structured knowledge icebergs should be characterised by small icebergs with an ancient coastal glacier, because the icebergs were originally a part of this flowing glacier but had broken away from it and flowed from land to sea, as shown in Fig. 4.

To help crystallise our proposed novel concepts of knowledge icebergs, we also use a recent phenomenon that reflects prominent West-East differences in relation to the CBM of the facemask industry during the COVID-19 crisis, particularly between Westerners in developed countries and Easterners in non-developed countries. Although the global demands for face coverings has risen sharply, the value logic of the facemask CBM is rife with knowledge icebergs caused by cognitive variances. For instance, in terms of creating and capturing value, the selling price and quality standards of protective and medical facemasks are generally higher in developed countries with developed economies than in developing countries with less robust economies (implying the existence of human and structural knowledge icebergs). Related to the value delivered to customers with diverse cultural backgrounds, only one-third of the people in Great Britain are willing to wear face coverings in public spaces, despite the government's guidance on using them to stop the spread of the coronavirus¹; in contrast, almost all people in China comply with the government's advice to wear face masks outside their home (implying the existence of human and social knowledge icebergs).

¹ <https://www.msn.com/en-gb/health/familyhealth/revealed-the-number-of-brits-wearing-face-coverings-during-the-covid-19-crisis/ar-BB14M9yW?li=AAJt1k3>.



Fig. 4. Structured knowledge iceberg.

5. Contribution

The study discussed in this paper was motivated by the frequently-occurring knowledge iceberg phenomenon in a multi-cultural era of the globalised business environment (Wang, 2004). Thus, it proposes a novel, more systematic theoretical framework to reify knowledge in the CBM as “a dynamic, hierarchical system of knowing” with multi-layer meanings. Based on this, the study further proposed three primary archetypes of knowledge icebergs to metaphorize the typical cognitive variances that impede neogenesis across cultures in such a context. Overall, we make several unique, cross-disciplinary contributions to the literature and practice, as follows.

First and foremost, based on a sophisticated synthesis of ontological and epistemological understanding, coupled with the phenomenological view, we created a novel dynamic system of knowing characterised by the intricate interactions of the tacit and explicit meta-components of knowledge in a modern, ICT-driven cross-cultural environment, namely the CBM. This new codification of knowledge with a salient interdisciplinary characteristic makes significant contributions to the literature at the intersection of IB and KM domains because most previous studies have used MNEs instead of CBMs as the background setting to address international KM issues (e.g. Buckley and Carter, 2002; Andreeva and Kianto, 2012; Sarala et al., 2016; Kotabe and Kothari, 2016; Castaneda et al., 2018). It is important to note that CBMs involve a far wider range of external stakeholders than ordinary MNEs. Given that such an integrative perspective elucidates why the stratified objective being of knowledge is formed and extracted from an individual's subjective experiences in culturally-diverse contexts, this stratified system of knowledge may help bridge the disjunction between subjectivity and objectivity, thereby enriching the philosophical grounds of knowledge in many areas of social science research (Burrell and Morgan, 1979).

Second, despite the profound and sweeping influence of Polanyi's tacit-explicit distinction of knowledge on KM-related domains, his theory cannot illuminate knowledge about background contexts, environmental pressures and the functioning of the whole that are sometimes independent of humans (Margitay, 2012; Lowney, 2014). Viewed from this angle, our proposed knowledge system, which underscores the role of contextual idiosyncrasies in affecting human judgement and perception through the lens of existential phenomenology, partly complements Polanyi's philosophical idea of tacit knowing. While scholars are advocating for the development of phenomenal theory with cross-disciplinary assumptions to solve grand challenges in social reality (Ployhart and Bartunek, 2009; Buckley et al., 2017), the study discussed in this paper can be viewed as a response to this appeal because it draws on a true, somewhat emergent, phenomenon of human cognitive differences and conflicts that commonly occur in CBMs to theorise knowledge; it also identifies three modalities of knowledge icebergs in such a context.

Third, this research also contributes to the field by deepening the understanding of the business ecosystem theory (Moore, 1996; Rong et al., 2015), as it treats the CBM as an ICT-enabled, independent knowledge-based ecosystem that creates new ways or modes to define, utilise, combine and reconfigure dispersed knowledge from multi-level stakeholders, including direct industrial players, government agencies, industry affiliations, competitors and customers around the globe. Within the hierarchy of our conceptual framework of knowledge (see Fig. 1), the overall complexity increases with each level because the rising amount of information and clues that need to be authenticated perplexes the level of abstraction. The higher-order knowledge becomes more personalised, less static and more difficult to control for; at the lower levels, it is easier to cognitively process, interpret and comprehend the more contextualised or even more firm-specific knowledge. This implies that it is vital to identify the connections embedded in various levels of knowledge across vertical and horizontal organisational boundaries in the CBM, whereby firms can build an indispensable strategic partnership with the person or entity with whom they intend to engage in collaborative knowledge sharing or joint knowledge production.

In terms of practical implications, this research highlights the imperative for contemporary organisations to place greater

emphasis on being open to external knowledge resources beyond traditional borders by designing and operating a feasible CBM (Wang et al., 2020). In doing so, they can co-create idiosyncratic knowledge with extramural partners at different levels and more quickly achieve a sustainable competitive advantage. Additionally, practitioners can use the three archetypes of knowledge icebergs to diagnose how and why diverse cultures and the associated cognitive conflicts hinder or reinforce KM practices in their BMs. From this standpoint, the dominant culture of the CBM seems to represent a repository of transferable perceptions, shared values and beliefs among the participating individuals and entities; this may also act as an underlying, unconscious knowledge for focal firms to constitute their distinctive higher-order organising principles, enabling them to effectively leverage existing knowledge and create new knowledge assets in their BMs. Related to this point, it is suggested that policy makers and international managers should consider the development of cross-cultural sensitivity and empathy as a crucial human resource strategy at both the organisational and national levels to enhance the strategic competitiveness of industries and organisations beyond borders.

In summary, this paper offers deeper, more pragmatic insights into concretising the modern yet intricate ICT-driven inter-organisational arrangements to a dynamic, stratified knowledge system between the focal firm and its culturally-diverse stakeholders, which mirrors the ubiquity of new, knowledge-based ecosystems that are caused by intensifying global connectivity in a digital age.

6. Conclusion

The increasing flourish of modern, ICT-driven inter-organisational cooperative arrangements, such as CBMs and digital platforms, has brought forth new ways of thinking about creating, managing and utilising knowledge in a context with multiple cultures. Although knowledge has been, and will continue to be, a central topic for management—and sociology-based theories of organisations, including organisational economics (Alavi and Leidner, 2001; Dhanaraj et al., 2004; Gavrilova and Andreeva, 2012; Del Giudice et al., 2017a; Oliva and Kotabe, 2019)—its conceptualisation and associated measure are still being debated, as scholars have proposed many idiosyncratic definitions to support the purposes of their own interests and studies. For instance, strategists tend to depart from the knowledge-based view investigating how a firm, as a core institution, acquires, creates and deploys knowledge for innovation and competition; in contrast, sociologists often emphasise the need to analyse how different organisations in a society generate and use knowledge to reconcile their conflicting goals in order to achieve harmony and cooperation.

However, the study discussed in this paper did not aim to engage in controversies about discovering, questioning or reframing the universal concept of knowledge (Mitchell and Boyle, 2010; Grant, 1996; Kogut and Zander, 1992). Rather, it considered CBMs as a knowledge-based ecosystem encompassing micro- and macro-cosmoses, and it proposed a “dynamic stratified system of knowledge” and three archetypes of knowledge icebergs through an expanded, interdisciplinary lens. Such a synthesising perspective, incorporating the views of ontology, epistemology and existential phenomenology, transcends individual subjectivity to present a more holistic understanding of the objectivity of knowledge. It links knowledge with whatever context people are situated in; thus, it may help solve a long-standing conundrum about whether and how diverse cultures promote the KM of firms, or conversely, how they perplex it. Overall, we believe the approach presented in this paper provides many constructive ideas that stimulate a fundamental re-thinking and a more open-minded attitude towards eliminating the boundaries between scientific knowledge and human culture in a globalised world.

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