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Integrating knowledge and knowing: A framework for understanding knowledge-in-practice ☆

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ABSTRACT

The foundation of an organization's strategy often lies in its ability to generate, combine, recombine, and exploit knowledge. Two very different perspectives have emerged in knowledge management research: a commodity view which sees knowledge as something to be acquired, stored, and converted and a community perspective which emphasizes knowing and the ability to act on what one knows. We propose a new framework for understanding knowledge in organizations which integrates these two views and complements prior research by focusing on knowledge-in-practice. In doing so, we clarify the organizational knowledge construct by examining the underlying knowledge-based characteristics of work practices. We create a multidimensional understanding of the knowledge-in-practice construct and introduce the concept of learnability. We explain how the proposed framework can lead to future research and discuss managerial implications for achieving fit between knowledge-in-practice and organization policies.

1. Introduction

Over the last two decades, there has been tremendous growth in research on organizational knowledge, the knowledge-based view, and knowledge creating organizations (Grant, 1996; Nonaka & Takeuchi, 1995; Orlikowski, 2002; Tsoukas, 1996). During this time, the knowledge-based view of the firm has rapidly seized a dominant position in management research as a theory explaining firm performance (Eisenhardt & Santos, 2002). The underlying principle of the knowledge-based view is that the foundation of an organization's performance lies in its ability to generate, combine, recombine, and exploit knowledge (Kogut & Zander, 1996). Thus knowledge is often viewed as the most strategically significant resource of the firm (Dierickx & Cool, 1989; Grant, 1996; Kogut & Zander, 1992) and an important focus for strategic human resource management is the ability to induce learning and leverage know-how, information, and talent.

At the foundation of knowledge management theories, however, are two fundamental questions identified by Grant (1996: 110) (1) what is knowledge? And (2) what are the characteristics of knowledge which have critical implications for management? Answers to these two questions remain elusive and controversial. As the knowledge-based view of the firm suggests, knowledge is a strategically significant resource of the firm and the major determinant of sustained competitive advantage (Grant, 1996). Yet, "the concept of organizational knowledge is fuzzy and has been defined in a number of ways" (Smith, Collins, & Clark, 2005: 347). For example, Nonaka and Takeuchi (1995) view knowledge as justified true beliefs. Grant (1996) defines knowledge as "that which is known" with the understanding that there are many types of knowledge relevant to a firm.

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Davenport and Prusak (1998: 05) define knowledge as "a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information."

The inconsistency and vagueness surrounding organizational knowledge can be tied to the development of two distinct schools of thought. Researchers in the first school, the "commodity" school, have focused on understanding "knowledge" *as an artifact* and conceptualizing what the different types of knowledge in an organization are and how these various types of knowledge impact other organizational phenomena such as innovation, alliance formation, and performance (e.g., Becerra, Lunnan & Huemer, 2008; Nonaka & Takeuchi, 1995). In contrast, researchers in the second school, the "community" school, have focused on "knowing" and view knowledge more as a dynamic phenomenon that manifests in the very act of knowing something and using that knowledge (Brown & Duguid, 1991; Cook & Brown, 1999; Orlikowski, 2002; Pfeffer & Sutton, 1999; Tsoukas, 2003). Although potentially relevant to one another, the two schools of thought have evolved independently with little theoretical integration. Among knowledge theorists, however, a debate continues about what the important and meaningful characteristics of knowledge are and how they should be studied (Newell, Roberts, Scarbrough, & Swan, 2002). This debate concerns not only identifying the important characteristics of knowledge, but also understanding which characteristics have critical implications for organizations.

The purpose of this article is to clarify the knowledge construct that has been defined in numerous ways across many disciplines. While knowledge is not a new construct in the human resource management literature, it is a construct that has been built upon without much examination. For example, from a selection perspective, knowledge—along with skill, abilities, and other characteristics (KSAOs)—forms a basis for making hiring decisions. However, dimensions of knowledge (e.g., codifiability, tacitness) are rarely considered. A training perspective offers another example. Knowledge acquisition and transfer of training are addressed typically from a job/task analysis focus, yet organizational practices often transcend both tasks and jobs. By critically examining the construct of knowledge, as we do in this paper, we provide HR researchers with new ways of looking at an old construct as well as provide new avenues for research, particularly in strategic human resource management.

We assert that a crucial research question concerns identifying the characteristics of knowledge that have important implications for management and human resource management activities. To do this, we propose a focus on bridging the gap or integrating what sociologists or the community school calls "knowing" and what western epistemology or the commodity school refers to as knowledge (Eisenhardt & Santos, 2002). We focus on working knowledge because this perspective acknowledges that knowing (the dominant feature of the community school) has important tacit elements (reflecting the commodity school) that are embedded in action, or as Schon (1983: 49) explains "knowing is in our action."

We build on the contributions of prior work and integrate the two positions on organizational knowledge to address both what has to be known and how knowing takes place. We propose a framework that complements each of the prior perspectives to focus on the knowledge involved in doing organizational work which we call knowledge-in-practice. Practice implies doing and refers to coordinated activities of organizational members informed by meanings in their specific context. In other words, practice refers to the way in which work gets done and knowing how to do it (Brown & Duguid, 2001: 200). Context is an essential ingredient to consider because organizational practices will differ across different domains and settings.

An integrated framework of knowledge-in-practice makes several contributions to management theory in general and to the expanding domain of knowledge management. First, by integrating the two perspectives on knowledge management we clarify some of the misunderstandings associated with efforts to distinguish between knowledge and knowing. To do this, we introduce the notion of knowledge-in-practice learnability and suggest it is a missing component in management and knowledge management research. Combined with tacitness, learnability allows for the breakdown of various forms of knowledge-in-practice (hereafter, KIP). Second, with a refocused dimensional understanding of the knowledge construct based on Polanyi's (1966) original work, we hope to redirect the focus to the learnability and tacitness of knowledge involved in organizational practices, and we aim to bridge the two theoretical schools of thought (i.e., knowledge as a resource and the process of knowing) to create a more accurate picture of knowledge-in-practice. We explain why this is an important step toward clarifying the knowledge construct. Third, we articulate the implications of this refocused dimensional understanding for knowledge management and management research in general as well as specific implications for human resource management processes.

2. Conceptual background

Many contradictions in the current literature stem from two alternative perspectives on organizational knowledge (see Table 1). The first, which Tsoukas (1996: 203) distinguishes as a "possession" or commodity approach, proposes that organizations have different types of knowledge and that identifying, categorizing, and examining these types of knowledge will lead to more effective means of codifying information, and developing strategies to convert tacit knowledge to explicit knowledge or to make individual knowledge more widely known (Nonaka & Takeuchi, 1995; Nonaka & von Krogh, 2009). Other researchers, often critical of the commodity approach, use the foundations of Lave and Wenger's (1991) communities of practice learning theory to suggest that practices or actions should be the critical point of analysis and that to understand knowledge requires examining the context in which it is used (Brown & Duguid, 2001; Tsoukas, 1996).

2.1. The commodity or possession perspective

Researchers advocating the commodity or possession perspective use Polanyi's works as a reference point and emphasize two distinct kinds of knowledge: tacit and explicit. This distinction has led to additional taxonomies such as local vs. universal, codified vs. non-codified, procedural vs. declarative, and know-how vs. know-what (Orlikowski, 2002). In an attempt to direct both

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Table 1
Comparing views on alternative perspectives of knowledge.

Knowledge as commodity	Knowing through communities-of-practice	Knowledge-in-practice
Knowledge can be objectively defined	Knowledge is socially constructed based on experience	Practices have varying amounts of know-how and information
Analysis of different types of knowledge	Analysis of participative action	Analysis of information and know-how involved in practices
Knowledge can be explicit or tacit	All knowledge is at least partially tacit	Knowledge involved in a practice includes both information and experiential know-how
Knowledge can be converted from tacit to explicit	Tacit knowledge is unspecifiable	Tacit know-how is unspecifiable and information can be codified and documented
Knowledge is transferred though codified text	Tacit knowledge is transferred through participation and learning by doing	Information is transferred and shared through text and know-how is learned through participation
Nonaka and Takeuchi, 1995; Becerra et al., 2008	Lave and Wenger, 1991; Brown and Duguid, 2001	

management researchers and practitioners toward productive agendas for managing knowledge, Nonaka and Takeuchi (1995) published their influential book *The Knowledge-Creating Company*. Their theory suggests that knowledge creation and management is an iterative process in which subjective tacit knowledge and objective explicit knowledge are converted interchangeably in a continuous cycle through the four modes of socialization, externalization, combination, and internalization (SECI). In their model, socialization describes the implicit sharing of tacit knowledge, externalization involves the conversion of tacit to explicit knowledge, combination describes the process of transferring explicit knowledge from one person to another, and internalization takes explicit knowledge back to its tacit form.

Management researchers use distinctions such as tacit vs. explicit, procedural vs. declarative and other taxonomies that focus on knowledge as a commodity as a foundation for empirical research that has resulted in many theoretical contributions to a variety of management related topics. The traditional dichotomy between knowledge characteristics has been well documented and is based primarily on whether knowledge can be codified and transmitted in a formal, systematic language (Simonin, 1999; Zander & Kogut, 1995). For example, in their study of knowledge transfer and performance implications within international joint ventures, Dhanaraj, Lyles, Steensma and Tihanyi (2004) measured tacit knowledge by gauging managerial techniques, marketing expertise, knowledge about foreign culture, and consumer tastes transferred from the parent organization. Explicit knowledge was captured by focusing on written knowledge gained in the area of technology and management and the transfer of procedural manuals. Two particularly important findings were that the transfer of tacit knowledge assists in explaining explicit knowledge, and that the influence of tacit knowledge on international joint venture performance was dependent principally on the transfer of explicit knowledge. These findings suggest that the two types of knowledge are highly interdependent and complementary.

Similarly, in his study of the role of network ties on technical knowledge transfer, Hansen (1999) operationalized non-codified knowledge as knowledge that was not fully documented, insufficiently explained in writing, and was mainly personal, practical know-how. He used a survey to ask about the thoroughness of knowledge documentation and whether transferred knowledge was mainly documented records or personal experience. He also distinguished between dependent and independent knowledge. Independent knowledge can function or be leveraged as a "stand alone" source whereas dependent knowledge relies on other components, products, or divisions. This was gauged by examining the extent to which software and hardware components could be detached from other systems or from context.

These studies have a common thread stemming from their elaboration on Nonaka and Takeuchi's (1995) knowledge creation model which, in turn, references Polanyi's (1966) heavily cited work on the tacit dimension of knowledge and his most quoted line "we know more than we can tell" (Polanyi, 1966: 4). A tacit-explicit distinction is used as the foundation for many theories of knowledge management based on the idea of translating the inarticulate form into the explicit form so that it can be more easily transferred, managed, and used (Becerra et al., 2008; Dhanaraj et al., 2004; Osterloh & Frey, 2000). In this view "knowledge is modeled as unambiguous, reducible and an easily transferable construct, while knowing is associated with processing information" (Eisenhardt & Santos, 2002: 140). Proponents of this view suggest knowledge as an entity has commodity-like characteristics and can be accumulated and stockpiled independently of an individual mind (Buckley & Carter, 1999). In other words, knowledge is regarded as "an objective entity… as a thing out there that can be transmitted or exchanged without any intervention by a cognizing mind" (Ringberg & Reihlen, 2008: 914). However, as we discuss in the next section, Brown and Duguid (2001) suggest that while work by Polanyi, Nonaka and Takeuchi are often cited within the management literature to justify the idea that there are two kinds of knowledge (one tacit and one explicit) this does not accurately represent Polanyi's initial premise.

2.2. The community or 'knowing' perspective

Researchers from the 'knowledge as knowing' research stream, which we refer to as a community approach to knowledge, have been critical of a purely taxonomic or possession perspective. These scholars argue that knowledge is less of an "object" and more of a dynamic phenomenon that manifests itself in the very act of knowing something (Brown & Duguid, 1991, 2001; Cook & Brown, 1999; Orlikowski, 2002; Pfeffer & Sutton, 1999; Tsoukas, 2003). These researchers follow Lave and Wenger's (1991) communities of practice (hereafter, CoP) learning theory and have attempted to shift the focus from exploring knowledge

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to exploring the links between knowledge and the practices of organizational members, that is, to examine what is termed a process of knowing. To CoP researchers the conception that knowledge is something that is explicit, tangible, and quantifiable draws a problematic distinction between knowledge as a tangible good and the use of that good in practice (Pfeffer & Sutton, 1999).

This distinction is often made clear by highlighting the difference between *knowledge* which implies something that can be located and is independent and *knowing* which implies a process or action of knowers which is inseparable from them (Pfeffer & Sutton, 1999). A process of knowing or community of practice perspective examines the specific activities that people engage in while solving problems during their day-to-day interactions in the real world (Brown & Duguid, 2001; Cook & Brown, 1999; Orlikowski, 2002). In this perspective, knowledge is fundamentally indeterminate and it is only through practice that the value of knowledge becomes apparent. Thus, knowledge becomes an organizational concept through its local manifestations in practices and activities (Nag, Corley, & Gioia, 2007). The key insight from a practice perspective is that the value of organizational knowledge will emerge from the situated actions of organizational members (Orlikowski, 2002). In this view, merely distinguishing between explicit and tacit knowledge is not sufficient to understand the nature of knowledge or to account for all somebody knows; it is also necessary to understand the concept of knowing from a practice perspective (Cook & Brown, 1999).

Brown and Duguid (2001), and others (Blackler, 1993; Spender, 1996; Tsoukas, 1996), argue that a knowing perspective more accurately reflects Polanyi's conclusion that all knowledge has an inarticulate component (Brown & Duguid, 1991; Cook & Brown, 1999; Nag et al., 2007; Orlikowski, 2002). As they explain, Polanyi did *not* argue for two different types of knowledge or for two ends of a continuum; instead he asserted a more integrative perspective:

"We have seen *tacit knowledge* to comprise two kinds of awareness, *subsidiary awareness* and *focal awareness*. Now we see tacit knowledge opposed to *explicit knowledge*; but these two are not sharply divided. While tacit knowledge can be possessed by itself, explicit knowledge must rely on being tacitly understood and applied. Hence, all knowledge is *either tacit or tacit knowledge*. A wholly explicit knowledge is unthinkable" (Botez, 1998).

To researchers from the community of practice perspective, the knowledge that underlies explicit knowledge is more fundamental. They contend that all knowing is either tacit or rooted in tacit knowledge (Polanyi, 1966). Explicit knowledge is not seen as a self-sufficient knowledge base, but instead it is viewed as a dependent form of information involved in practices (Polanyi, 1958). Furthermore, CoP researchers point out that a tacit-to-explicit conversion model not only fails to examine a firm's knowledge entrenched in team-based and socially embedded routines (Nelson & Winter, 1982), but more importantly ignores knowledge embedded in individual human capital (Berman, Down, & Hill, 2002; Hitt, Biermant, Shimizu, & Kochhar, 2001; Lepak & Snell, 1999). They argue that the commodity perspective treats knowledge as an exogenous variable (Priem & Butler, 2001). The important dimension, therefore, is the amount or proportion of tacit know-how and the critical role tacit know-how plays in the knowledge involved in practices. As Tsoukas (1996: 14) explains:

"Tacit knowledge is not explicit knowledge 'internalized'…tacit knowledge is the necessary component of all knowledge…to split tacit from explicit knowledge is to miss the point—the two are inseparably related."

3. A practice perspective

Drawing from the community of practice literature, a practice is an activity which is sustained and reproduced over time and is critical to the analysis of knowledge (Duguid, 2005; Lave & Wenger, 1991). A practice-based approach has become influential among researchers studying organizational knowledge management and organizational productivity (Orlikowski, 2002). A practice perspective views the representation, creation, and transfer of knowledge through work practices and organizational activities (Ringberg & Reihlen, 2008). For example, Blackler (1993: 879) argues that the appropriate research focus is not knowledge or knowledge workers but rather activity or practice. Similarly, Brown and Duguid (2001) argue that practice is a remedy that establishes an integrative conceptual framework across streams of knowledge management research. Thus, an understanding of the characteristics of practices becomes fundamental to understanding knowledge management and provides insight that can influence future research.

According to Cook and Brown (1999), *practice* implies doing and refers to coordinated activities of organizational members informed by meanings within their specific context. In other words practice refers to *the way in which work gets done and knowing how to do it* (Brown & Duguid, 2001: 200). Practice can be broadly conceptualized as arrays of human activity or events that do not happen in isolation. Thus organizational practices will differ according to domain and context and can range from a simple act of tying a shoelace to innovative know how, from riding a bicycle to playing chess, or from making hamburgers to coordinating organizational merger activities. Practices are comprised of sequences, routines, capabilities or activity systems which are invoked patterns (Carlson, 2006). For example in professional service firms, practices can include such things as customer service initiatives and order processing routines and can vary with regard to types of deliverables, degree of routinization, and types of client relationships (Carlson, 2006). In manufacturing firms, practices can range from inventory management to production processes to after-sales service activities.

Practice oriented researchers argue that it is logically unsound to separate the practice from the know-how that constitutes it (Brown & Duguid, 1991; Orlikowski, 2002). For example, by removing the "knowing how of playing chess from the practice, we no longer have anything recognizable as chess-playing practice" (Orlikowski, 2002: 251). Similarly knowing the agenda for a meeting is quite different from the practice of orchestrating a group of employees as they engage in complex decision making activities. In other words, merely knowing does little good unless that knowledge can be applied through practice. Brown and Duguid (2001) make similar arguments suggesting that learning how is accomplished through participation in practice and practice underpins successful circulation of knowledge.

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Some knowledge transfer researchers have actually used practices as the unit of analysis for exploring the transfer of knowledge within organizations (Szulanski, 1996; Szulanski, Cappetta, & Jensen, 2004). For example, Winter (1987) classified knowledge along four dimensions: (1) tacitness (which is further broken down into teachability and codifiability), (2) complexity, (3) systems dependence, and (4) observability. Zander and Kogut (1995) used this taxonomy to examine the speed of transfer of manufacturing capabilities and found that codifiability and teachability had a strong influence on the risk of transfer. What is unique about Zander and Kogut's (1995) approach is that the unit of analysis in their study was not tacit or explicit knowledge as a commodity or some form of packaged good that can be converted and transferred between two entities, but instead was the information and know-how involved in the dominant manufacturing practices within a given firm. Specifically, the questions concerning codifiability, teachability, observability, complexity, and systems dependence were asked about the characteristics of a manufacturing practice in a particular organization. For example, to measure codifiability (the variable used most often in management research to gauge tacitness) they asked respondents to indicate the extent to which a useful manual describing the manufacturing process could be written, extensive documentation describing critical parts of the manufacturing process existed, and whether manufacturing control activities were embodied in standard software that had been modified or was developed in-house exclusively for the company's use. These measures focused on the firm's manufacturing practices.

We derive two important conclusions from these studies. First, there is no mention of knowledge as a commodity or a thing that can be packaged and transferred; rather the focus is on the organization and characteristics of the information and knowing involved in performing work activities. Research questions focused on the amount of tacitness involved in a practice, how easily a practice could be performed, whether tacit components could be learned, and if information describing the manufacturing process was available or could be made available. Second, these studies emphasize the information and knowing (i.e., knowledge-in-practice) underlying organizational capabilities, activities, and processes. Thus, the unit of analysis is the underlying knowledge characteristics of the manufacturing process or practice and not knowledge as a commodity.

In sum, an emphasis on building stocks and creating flows of knowledge through the conversion of tacit knowledge to articulated explicit knowledge creates an impression that knowledge is separate from actual practice. In addition, it suggests that all knowledge potentially can be codified. A stocks and flows knowledge conversion emphasis also assumes that knowledge will be used appropriately and correctly (if used at all), once possessed (Pfeffer & Sutton, 1999). Rather than focus on the tacit or explicit categorization of knowledge, a practice-based perspective argues that the focus needs to be repositioned toward how the learning, application, and execution of practices or work activities is accomplished within an organization. This is an important shift and offers a focal point for integrating the commodity approach with a communities of practice approach by focusing on the ways in which knowledge is used and the value that emerges from the ongoing situated actions of organizational members as they engage the world (Nag et al., 2007; Orlikowski, 2002). While the potential value of this approach to knowledge management has been articulated in the literature, a framework for conceptualizing and measuring knowledge-in-practice has not yet been presented. The next section of the paper provides a framework intended to fill that gap in the knowledge management literature.

4. A framework for conceptualizing knowledge-in-practice

Eisenhardt and Santos (2002) argue that a bridge between the commodity perspective and the community perspective is needed to create a more accurate and complete depiction of the role of knowledge in organizations. The framework we present attempts to create such a bridge between these two theory orientations by focusing on the knowledge involved in actual work practices as a basis for understanding the relevant characteristics of knowledge in organizations. Our framework focuses on the process of knowing and know-how emphasizing the interaction of individuals with the real world through practices. Other researchers also have focused on actual work practices (e.g., Szulanski, 1996) or capabilities (Zander & Kogut, 1995). For example, Zander and Kogut (1995) studied the transfer of manufacturing capabilities among a sample of project engineers and found that the degree to which capabilities are codifiable and teachable (i.e., have a low degree of tacitness) significantly influences the speed of their transfer. Studies examining work practices have focused on how knowing and individual skills are developed through situated participation in communities of practice (Lave, 1988; Lave & Wenger, 1991; Orr, 1987, 1990). However, as Orlikowski (2002) points out, little is known about practices viewed as organizational competencies, or as she frames it the capacity to enact useful situated organizational activity in complex organizations.

Orlikowski's (2002) qualitative study of global product development provides an initial step forward, but much still remains unknown about the characteristics of organizational work practices or how practices differ from one another. As Orlikowski (2002) points out, many questions remain regarding the differences between competence generation practices and the practices they are trying to generate. Understanding these differences is important both for managing and developing practices and for understanding practices in context. For example, Orlikowski's study examined the development of know-how for global product development. Questions remain as to whether these know-how generation practices themselves or the resources devoted to creating know-how are generalizable to the development of other practices. We believe that developing a framework of knowledge-in-practice that is useful for both researchers and practitioners complements many of the perspectives on organizational knowledge discussed previously and provides a useful integration mechanism for moving forward.

4.1. Fundamental features of a knowledge-in-practice perspective

A practice perspective focuses on the ways in which knowledge is used and the value that emerges from the ongoing situated actions of organizational members as they engage the world (Nag et al., 2007; Orlikowski, 2002). Using this lens, knowledge is

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generated, captured, and shared through situated participation in activities and practices (Ringberg & Reihlen, 2008). "This involves viewing knowledge less as an object and more as a dynamic phenomenon that manifests itself in the very act of knowing something. The move from objectified knowledge to processes of knowing shifts the focus to the specific activities of knowing something…Thus knowledge is viewed more as an ongoing dialogue between practice (action) and meaning (cognition)" (Nag et al., 2007: 823). Thus, the aim of any definition of knowledge-in-practice is to capture the manifestation of knowledge involved in action.

Several assumptions underpin a knowledge-in-practice orientation. First, knowledge-in-practice contains both information (i.e., know-that) and know-how (i.e., knowing), and the two are interdependent. Information depends on know-how to provide a basis for determining how to use it. While know-how invariably contains some measure of tacit understanding even if procedures are detailed, documented, and familiar, information provides the details, parameters, conditions, and criteria that enables know-how to be used effectively in a particular setting. What varies is the relative proportion of information and know-how that is needed to accomplish a particular work practice effectively. Information can take the dominant role in some practices such as determining the economic order quantity (EOQ) for inventory management, while know-how and the accompanying tacit knowledge can take precedence in other practices such as designing an innovative advertising campaign. In other words, while all knowledge has a tacit component, that tacit component or the knowing-how is often directed or steered by information (i.e. knowing-that). From a knowledge-in-practice perspective, both information and know-how are necessary and neither is sufficient without the other.

Second, tacit knowledge or know-how is not knowledge that has yet to be specified and articulated; it is knowledge that is unspecifiable because it can only be acquired as innate talent or through personal experience (Leonard & Sensiper, 2002; Polanyi, 1966). As such, tacit knowledge cannot be reduced to explicit knowledge or a codified form. As Leonard and Sensiper (2002: 485) explain, the view that knowledge exists on a spectrum from "almost completely tacit, semiconscious and unconscious knowledge held in peoples' heads and bodies" to knowledge that is "almost completely explicit, codified and structured" builds upon "Polanyi's original, messier assumption." This is a continuum of the amount and the importance of tacitness in a practice not a continuum in which explicit knowledge and tacit knowledge are at opposite ends. In other words, the continuum ranges from a high amount of tacitness to a low amount of tacitness involved in a practice. Put differently, the proportion of tacit know-how to information involved in a practice and the role or importance of the tacit knowledge can vary among organizational practices. This assumption is consistent with Nelson and Winter's (1982) concept of tacit knowledge embedded in organization routines going beyond anything a single individual can fully understand.

Finally a practice perspective assumes that information and know-how can occur in various forms. For example, information and know-how can be task-specific, firm-specific, industry-specific, general, or combinations of these forms of knowledge, but the important issue is the relative proportion of information and know-how needed to achieve a particular practice. To address some of these issues and to develop a framework for understanding practices, we sought a simpler and clearer definition of knowledge.

At an individual level, Lave (1988) argued that knowledge takes on the character of a process of knowing and that knowledge in practice is situated knowing formed by a person acting in a particular setting and engaging aspects of the self, body, and the physical social worlds. Similarly, Spender (1996: 64) argued that knowledge was about the ability to intervene "knowledgeably and purposefully in the world." Morgeson and Hofmann (1999: 253) recommend that collective constructs (i.e. those that result from interactions among organization members) be conceptualized and measured in terms of their function or outcome as this focuses attention on the actions by which these phenomena "emerge, are transmitted, and persist." To improve construct clarity in this area, we propose the following definition of knowledge-in-practice. *Knowledge-in-practice is the information and know-how involved in the sequences, routines, capabilities, or activity systems in an organization (i.e., customary ways of doing something).*

Several aspects of this definition are important to highlight. First, we focus on the process of knowing, that is, the ability to knowledgeably and purposefully intervene or engage in organizations. Second, by including both information (i.e., know-that) and know-how we reiterate the need for both know-how and information and shift attention to understanding the extent to which they vary in their proportion and importance. Third, incorporating sequences, routines, capabilities or activity systems in the definition makes it possible to view a practice as a cluster of activities performed in organizations. Finally, by viewing knowledge-in-practice as a multilevel construct, we recognize that the know-how and information needed and involved in practices is complex and sometimes accomplished by a collective of individuals and sometimes by a single person.

From a strategic perspective, two aspects of knowledge-in-practice are particularly important to a firm's ability to leverage what it knows and make managerial decisions: tacitness and learnability (Pfeffer & Sutton, 1999; Winter, 1987). Each of these two dimensions is comprised of a number of characteristics that indicate the degree to which a practice reflects the underlying attribute. We discuss these two dimensions in the next sections of the paper.

4.2. All knowledge is at least partially tacit

Tacit knowledge is a form of knowing and thus is inseparable from action because it is constituted through such action (Orlikowski, 2002). Tacitness is an important strategic characteristic because the greater the proportion or amount of tacit knowledge that is associated with a practice the more difficult that capability becomes to imitate, adapt and leverage or diffuse, thus leading to various forms of competitive advantage (Hatch & Dyer, 2004). As a result, an important focus for management is the ability to leverage and induce learning and understanding of practices that have a tacit base or, put differently, tacit knowledge-in-practice. Therefore, we propose that one important dimension characterizing knowledge-in-practice (KIP) is the degree of tacitness.

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According to Polanyi (1958), tacit knowledge/knowing is impossible to communicate to others through articulation or is the unspecifiable process of knowing in action. Tacit knowledge is difficult to capture because it is hard to formalize and not easily visible, making it difficult to share with others because it is often highly context- or firm-specific. It often involves many intangible factors embedded in personal beliefs, experiences, and values or judgments.

According to the dictionary tacitness is defined as "understood or implied without being stated." Extending this definition to KIP and integrating it with relevant literature, we propose that the relative tacitness of KIP can be assessed in terms of at least four practice characteristics: (1) *observability*, defined as underlying know-how that is easy to identify and understand while watching the implementation or performance of practices (Winter, 1987), (2) *teachability* defined as the extent to which the underlying know-how is easy to teach using various pedagogies (Zander & Kogut, 1995), (3) *specifiability* defined as underlying know-how that can be encoded or precisely described (Nelson & Winter, 1982) and (4) *embeddedness* defined as underlying know-how that is highly contextualized and codependent on unidentified aspects of the local (i.e., firm-specific, unit-specific) environment or setting (Galunic & Rodan, 1998). To further the goal of construct clarity, we propose the following definition of KIP tacitness:

Proposition 1. *Tacit knowledge-in-practice is the know-how involved in the sequences, routines, capabilities, or activity systems in an organization that is unobservable, difficult to teach, unspecifiable, and highly embedded in the practice and/or setting.*

4.3. Assessing learnability

Management discussions in "both academia and practice have often centered on learning, know-how, experience, skill and wisdom" (Bettis & Wong, 2003: 350). For example, Prahalad and Hamel (1990: 82) originally defined core competence as "the collective learning in the organization, especially how to coordinate diverse production skills and integrate multiple streams of technologies." Furthermore, the community of practice view has recently become a key driver towards a focus on learning. In this perspective learning is situated in the context of the activity or practice (Brown & Duguid, 1991). Here we focus on the interrelationship between cognition and action and acknowledge that individuals and groups can learn by understanding, then acting or by acting, then understanding (Argyris & Schon, 1978; Vera & Crossan, 2003). In other words a cyclical interaction of thinking and doing (Carroll, Rudolph, & Hatakenaka, 2003) can result in learning.

Building on these thoughts we propose that the second dimension characterizing knowledge-in-practice is learnability. The Compact Oxford Dictionary defines learnability as the *degree* to which knowledge or skill (in something) can be acquired through study or experience or by being taught. In other words, it refers to the ease with which new or occasional users may accomplish certain tasks. To extend this to KIP, learnability is a concept that captures the ability of employees to acquire the information and know-how necessary and sufficient to execute organizational practices. If knowledge-in-practice is characterized by low learnability, then gaining the necessary information and know-how requires long periods of experience, information accumulation, situated application, and extended effort by learners (Nieto & Perez-Cano, 2008). While individual differences in ability, effort, skill and other factors can influence the level of practice performance and the length of time it takes to acquire knowledge-in-practice, our concern here is to understand how the characteristics of information and know-how influence the threshold of knowledge-in-practice necessary to execute a practice at an adequate level and how these characteristics differ across practices.

The dimension of learnability is an important extension to the current literature for a number of reasons. First, there is an implicit assumption within some of the knowledge management literature that tacit know-how implies or is synonymous with difficult to learn and information is associated with being easy to grasp. However we propose here that some tacit know-how is relatively easy to learn compared to both other types of tacit know-how and certain types of information. Likewise, some information is relatively hard to learn and understand compared to both other types of information and certain forms of tacit know-how. For example while a substantial amount of tacit knowledge or know-how is crucial for learning the practice of riding a bicycle, this practice is relatively easy to learn and once learned, the practice is relatively stable across time and between iterations. In contrast, a greater proportion of information plays a critical role in the practice of solving calculus problems. Becoming proficient in calculus requires a vast amount of sequential learning of information and the specific information that is used in solving calculus problems changes between problems making the practice more difficult to learn. The crucial point is that while tacit knowledge is unspecifiable, it does not necessarily follow that skilled performances cannot be discussed, observed, and learned. It does, however, mean that instead of concentrating on how to convert tacit knowledge into explicit knowledge, our focus needs to be on how to *create tacit* or *know-how understanding* (Tsoukas, 2003). Tacit knowledge is learned by observation, imitative application, participating in routines, and personal experience.

Second, as Duguid (2005: 113) points out, CoP was "introduced as a theory of learning, drawing much of its evidence from studies of apprenticeship" and there is a distinct difference between *learning about* and *learning how* or the "art of practice." Learning about only requires the accumulation of knowing *that*, which as he states "only confers the ability to talk a good game, but not necessarily to play one" (Duguid, 2005: 113). However, as we have argued, some measure of learning about is essential for playing the game well.

Finally, as Gourlay (2006) points out many critics of the possession, or commodity, theories of knowledge management often focus on how learning theory is overlooked. For example, referencing Bereiter (2002) Gourlay (2006) points out that many knowledge management models fail to explain how ideas are produced and how a depth of understanding necessary for expertise develops. Despite the critiques, however, few knowledge management theories and frameworks address the nature of learning.

To fill this gap, we propose a framework in which learnability is the second dimension used to categorize KIP. *Learnability is defined* as *the type and amount of effort, study, accumulated comprehension, and expertise that is required to understand the information and know-how involved in work practices.* Learnability captures the ease with which someone unfamiliar with a practice, such as a new

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employee, is able to develop the ability to perform it. In contrast to the tacitness dimension of KIP that only considers know-how, learnability incorporates both the information and the know-how involved in practices. This is important because it reiterates the point that performing a practice requires both information and know-how. Learnability distinguishes between KIP that is difficult to learn and KIP that is relatively easy to learn regardless of the underlying proportions of know-how and information required. For example, learnability distinguishes KIP that has a high degree of tacitness relative to the information component but is easy to learn from KIP that has a high degree of tacitness relative to information but remains difficult to learn. This distinction addresses an implicit, but arguably incorrect assumption in the literature that views all tacit knowledge as difficult to learn as well as the assumption that some knowledge omits a tacit component. Furthermore, by incorporating both learning about and learning how, learnability considers how a depth of understanding necessary for expertise develops.

As with tacitness, learnability results from a number of different elements. At least four characteristics appear to make KIP difficult to learn: (1) the *complexity* of the knowledge-in-practice defined as the number of intricate connections and relations among various forms of both information and know-how and conditions or contingencies that must be understood (Kogut & Zander, 1992), (2) the *causal ambiguity* of knowledge-in-practice defined as both the clarity of the cause and effect outcomes and the clarity of the processes and procedures required to gain the information and know-how needed to develop an understanding of the cause and effect outcomes associated with a practice (Szulanski, 1996), (3) the *inconsistency* of knowledge-in-practice which refers to the lack of fidelity and reliability of a practice across contexts and time and relates to the degree of adjustment in know-how and information needed during and between the execution of practices (Ansari, Fiss, & Zajac, 2010), and (4) the *volume* of KIP defined as the amount of information and know-how and the amount of sequential learning of the information and know-how required for practices (Simon, 1991).

Each of these dimensions influences how difficult or easy it is to learn a practice. For example, when large quantities of information and know-how must be understood, retained, and accessed to achieve a capability, and many intricate connections are involved, the learnability of KIP is severely reduced. Numerous connections lead to high levels of dependence across knowledge elements in the practice which, in turn, means that knowledge possessed by different individuals and groups inside and outside the organization must be integrated in the learning process (Nieto & Perez-Cano, 2008). Causal ambiguity means that the connections between actions and consequences are not understood and/or the steps needed to acquire know-how and information are unclear or ambiguous. Causal ambiguity can make it more difficult to learn practices because common knowledge is not available and the proper processes and procedures are unclear and fuzzy. Likewise ambiguity surrounding the sufficient and required learning process decreases the learnability of a practice. Inconsistency means practices are non-routine and need to be adjusted for each implementation and even during iterations. This is similar to the concept of fidelity used by Ansari et al. (2010) to capture the extent to which successive iterations of a practice deviate from prior implementation. Inconsistent routines make learning more difficult. As Perrow (1967) explains, practices that vary because they are non-routine or involve difficult-to-analyze problems and have a large number of exceptions to contend with are much more challenging to learn than practices that are relatively stable, involve few choices during implementation, are familiar, and have well-established protocols. A practice that needs to be adapted and adjusted each time it is implemented is difficult to learn as all underlying contingencies and interactions must be understood. Practices that are low in fidelity or reliability require additional creativity and judgment during implementation making them more challenging to learn. Thus, they will often change as new information and know-how are sought to improve or alter the practice. Often times this knowledge needs to be obtained from outside the organization (Szulanski, 1996). To improve construct clarity in this area, we propose the following definition of KIP learnability:

Proposition 2. *Difficult to learn (low learnability) knowledge-in-practice is the information and know-how involved in the sequences, routines, capabilities, or activity systems in an organization that is complex, causally ambiguous, inconsistent, and deep in volume.*

5. A multidimensional view of knowledge-in-practice

We propose a multidimensional conceptualization of knowledge-in-practice based upon the two dimensions discussed in the previous sections: tacitness and learnability. As shown in Fig. 1, integrating these two dimensions results in four types of knowledge-in-practice: (1) enacted information, (2) accumulated information, (3) apprenticed know-how, and (4) talent and intuitive know-how. Again, this framework complements previous research by integrating the commodity approach with the communities of practice approach. These distinctions offer useful and valuable ways of thinking about and distinguishing organizational practices although two caveats are important to keep in mind. One, the boundaries should be downplayed recognizing that there is a continuum between the end poles and that there are variations within organizations and across organizations with regard to the practices involved. Two, practices often do not operate independently of each other and often overlap and interact simultaneously and over time. The ontological separation suggested in the framework provides a level of analytical convenience needed in research.

5.1. Enacted information

Quadrant I in Fig. 1—*enacted information*—includes practices with underlying KIP having a relatively low proportion of tacitness that can be learned with relative ease. That is, even though tacit knowledge is involved, information is the primary driver of performance and activities remain relatively stable. The knowledge underlying these practices can be more easily observed, taught, codified, and disaggregated from its context. It is less difficult to learn because it is based on principles, rules, heuristics, and stable relationships that are limited in scope. Enacted information can be learned in a variety of sequences and through numerous pedagogies. The KIP

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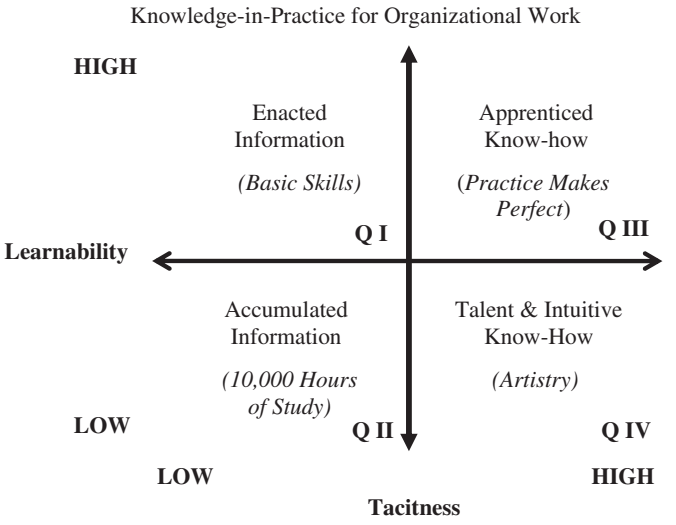

Fig. 1. Knowledge-in-practice for organizational work.

underlying these practices undergoes few variations and has been well-established through repeated trials in a variety of settings. Individuals can gain this type of KIP through various forums such as conventional classes, training seminars, online courses, reading process manuals and so forth. The tacit knowledge underlying enacted information practices is deemphasized or less significant for the overall execution of the practice relative to the available information. Alvesson & Karreman (2001), for example, claim that for certain activities information provides templates for thinking as well as action. The driving motivation is economics of reuse and the focus is on consistent repetition of routinized practices as opposed to the development of new solutions (Hansen, 1999). Standardization and simplification of practices through the use of blueprints and information technology become important means for empowering workers to do things they were previously incapable of doing "thus making relatively unskilled workers productive on a higher skill-level more or less instantaneously" (Alvesson & Karreman, 2001: 1007). It is information or know-that is understood relatively easily and applied 'as is' with little variation.

Organizational practices that follow standard operating procedures and thrive on consistency are examples of enacted information practices. Examples include fast food order processing and total quality management (TQM) protocols. Operating manuals and technology reduce the amount and importance of tacit knowledge involved in the practice. As orders are taken and processed, templates based on stored information provide structured guidelines on how clustered activities in the process should be performed and how they sequentially unfold. Likewise information stored in manuals describing acceptable and inappropriate behavior not only helps to guide actions, but also helps coordinate the clustered activities and drives decision making. Moreover, the templates are simplistic, based on a small volume of information, and remain relatively consistent. Cause and effect relations between actions and outcomes are clear and reliable as are the steps needed to learn and understand the actions.

5.2. Accumulated information

Quadrant II of Fig. 1—*accumulated information*—are practices with underlying KIP which, like enacted information is low in tacitness, but unlike Quadrant I practices the information component is difficult to learn. The foundation of Quadrant II practices remains primarily information, but the amount of information is vast and often contingent and there is a frequent need for new information both during execution and to fit new contexts. This form of KIP can be observed, codified, and disaggregated from its context but is more difficult to learn because the expertise involved in the practice requires extensive mastery of large amounts of information. Proficiency in these practices can only be acquired through a path-dependent learning process. KIP needed for accumulated information practices arises from accruing and synthesizing large amounts of specific, detailed, complex, and contingent information. It requires sustained cognitive effort and personal sensemaking over long periods of time (Weick, 1995). Although the necessary facts often are documented in volumes of work, applying and understanding the information and comprehending the vast amount of information required is much more difficult and complicated than applying and enacting proven standardized templates.

In other words, the *learning about* accrues over years of time by studying a specific subject and often by obtaining an encyclopedic mastery of the topic. In addition to the volume of information necessary to absorb, know-that or information underlying these practices is difficult to learn because its application and use changes during and between practice iterations. As practices change and new information emerges, a solid foundation of current and related information is required to absorb the new facts. In their discussion of absorptive capacity, Cohen and Levinthal (1990) point out that prior relevant knowledge is important for the assimilation, transformation, and exploitation of new information. Not only must individuals invest time (in some cases many years) to acquire an adequate foundation of information through reading and studying, they must also have the ability to recognize patterns and see subtle

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connections among various portions and forms of information. While all knowledge-in-practice is at least partially tacit, accumulated information contains a higher relative amount of information and this information provides the foundation for actions and activities. Tacit understanding is still required to determine how and when to apply information and how best to use what is known.

Organizational practices categorized as accumulated information often involve blending a company's internal information with new external information and/or recombining current information in different ways and turning it into actionable practices. Accumulated information practices are characterized by activities founded on an in-depth base of information with complex interconnections, that change both during and between iterations (i.e., are inconsistent) and/or have unclear paths to solutions. The practices of research teams who retrieve, understand, and make sense of an array of relevant information, diagnose problems based on that information and make logical arguments provide a good example of accumulated information. Often times the information is fully documented and articulated in various written forms (e.g., journal articles and textbooks). To gain a conceptual and technical understanding of the required material, researchers must invest in sequential, path-dependent effort and focused study. Even though the necessary wisdom has been previously articulated and documented, researchers need to accumulate a substantial foundation of information to create the requisite absorptive capacity for proficiency in these activities. Moreover, as tasks and assignments unfold the role of various forms of information and the requirements for new information change. Connections between information which emerges in different contexts is ambiguous or at the very least unproven. Knowledge allowing a physician to distinguish subtle differences in symptoms, the practice of a lawyer's assistant preparing for a case, or the process the Centers for Disease Control (CDC) implements to produce a flu vaccine each year provide examples of accumulated information KIP. Although, tacit context and case- or firm-specific knowledge is involved, a grounding in anatomy and oncology, a foundation in law, and knowledge of viral trends and vaccine production processes guide the necessary actions.

5.3. Apprenticed know-how

Quadrant III of Fig. 1—*apprenticed know-how*—portrays practices with underlying KIP that have a relatively high proportion of tacitness, but like knowledge underlying enacted information, the relevant knowledge remains relatively easy to learn. These practices often require limited information since tacit based know-how is the foundation for action. This form of knowledge-in-practice is often hard to observe, difficult to teach directly through instruction, largely unspecifiable, and is embedded in the practice context. However, the connections between required actions and performance are comparatively simple and consistent and the steps that are required to learn how to perform these actions can be readily identified. Thus, although apprenticed know-how competencies contain a relatively high proportion of tacitness, they can be learned and developed by recreating and rehearsing the experiences needed to gain the know-how. In other words, learning takes place by doing, enabling learning by trial-and-error, experiencing what works and what doesn't, and recreating activities through repetition. Learning can be facilitated by highlighting relevant features of the context to narrow the scope of information that must be mastered and by outlining the procedures and principles that enable efficient learning to take place.

Apprenticed know-how practices are often the basis for creating communities of practice (CoP) (Lave & Wenger, 1991). CoP researchers have suggested that even though some amount of information is essential for any practice, information often gets in the way of learning and developing apprenticed know-how practices. As Duguid (2005) points out "a brief list of all that is involved in tying a shoelace would overwhelm a learner". Lave and Wenger's (1991) study provides good examples of apprenticed know-how practices in their illustrations of naval quartermasters and meat cutters. They found that quartermaster chiefs charged with training new sailors in the practice of plotting a ship's position preferred newcomers without previous classroom training to those with classroom training (Lave & Wenger, 1991) because of the importance of tacit know-how that is relatively easy to learn and their observation that extensive information often restrains as opposed to assists that learning from taking place. Numerous vocations that have requirements for trade schools and apprenticeship training programs like carpentry and plumbing are examples of professions in which many of the involved practices are based primarily on learnable tacit know-how.

5.4. Talent and intuitive know-how

Quadrant IV of Fig. 1—*talent and intuitive know-how*—are practices with underlying KIP which, like apprenticed know-how is primarily tacit, but unlike apprenticed know-how the underlying KIP is very difficult to learn. These practices are based on know-how that is complex and which evolves as new experiences arise and as the context changes. This type of know-how is rarely generalizable and can only be developed over long periods of time through implementation experience. Information is involved, but it is limited and often less pivotal. This form of KIP is unobservable, unteachable, unspecifiable, and deeply embedded in the specific practice context. Connections between required actions and performance are often complex and inconsistent and the actual steps needed to learn required actions are uncertain, ambiguous, or unclear. The know-how for talent and intuitive KIP is difficult to articulate, and often operates at an instinctive or intuitive level or involves unique endowments. This type of knowledge-in-practice is more difficult to learn because there is no set of experiences, or contingent relationships that can be identified to enable the activities to be developed.

Organizational practices with underlying talent and intuitive know-how KIP are often rare, inimitable, non-substitutable, and difficult to appropriate (Barney, 1991). They are typically built on the unique talent of individuals participating in the practice or on the collaborative know-how and unique blend of complementary skills of a community of participants. These practices and the activities involved are extremely difficult for newcomers or others without the necessary innate aptitude to learn regardless of the amount of on-the-job training and time on task. The creative insight that enables an author to repeatedly write best-selling novels, the accumulated experience that enables a basketball player to go to where the ball is going to be thrown as opposed

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to where it is, not to mention other unique skills such as jumping and shooting, provide examples of practices with underlying talent and intuitive know-how KIP. Similarly, competent leaders who know instinctively how to diffuse dysfunctional conflict while maintaining teamwork and collaborative relationships demonstrates the inherent insight underlying talent and intuitive know-how KIP. Likewise the practices used by creative teams to develop appealing and successful advertising campaigns or the insight that enables an entrepreneur to spot an unconventional opportunity provide additional organizational examples.

6. Implications for management and HRM research

A clear understanding of tacitness and learnability results in a framework categorizing four types of knowledge in practice. Case examples and KIP research suggests that organizations will perform an array of practices as they conduct their work, and that these practices are likely to be derived from the various forms of knowledge-in-practice identified as enacted information, accumulated information, apprenticed know-how, or talent and intuitive know-how. For example, the practice of order processing would have an underlying KIP orientation of largely enacted information whereas the practice of engaging in R&D for discontinuous technologies would have a KIP orientation predominantly based on talent and intuitive know-how. This leads to the following proposition:

Proposition 3. *Practices will vary according to the degree of tacitness and learnability of the knowledge-in-practice required for execution.*

This suggests two practical implications for effective management strategies. First, since the theoretical underpinnings of our model assert that organizational practices vary according to underlying tacitness and learnability of the related knowledge-in-practice requirements, it follows that managers must carefully examine and understand their unique organizational knowledge context. Second, after completing a contextual diagnosis, depending on the type of knowledge-in-practice identified, managers can proactively seek to improve performance by either adapting policies to fit their knowledge-in-practice conditions or by seeking to create practices with certain knowledge-in-practice characteristics.

6.1. Implications from two concepts of fit

Adapting policies to fit their knowledge-in-practice context builds on the concept of fit (also termed co-alignment, consistency, contingency, or configuration) which has served as an important cornerstone for theory development in several areas of management research (Aldrich, 1979; Delery & Doty, 1996; Miles & Snow, 1978; Miller & Friesen, 1984; Venkatraman, 1989) With a strategy designed to achieve co-alignment, managers would fit organizational and HR policies to the identified knowledge-in-practice. Venkatraman and Prescott (1990) suggested two perspectives on fit: (a) the reductionist perspective; and (b) the holistic perspective. The reductionist perspective of fit is based on a central assumption that the co-alignment between two constructs (such as environment and strategy) can be understood in terms of pair-wise co-alignment among the individual dimensions that represent the two constructs. This approach also has been labeled the contingency approach by other researchers (e.g., Delery & Doty, 1996). A contingency argument suggests that the adoption of certain management policies would be appropriate for certain types of knowledge-in-practice. This is consistent with research findings demonstrating that initiating and investing in knowledge management is expensive, has many opportunity costs, often is not needed (Reus, Ranft, Lamont, & Adams, 2009), and can hurt performance in some situations (Haas & Hansen, 2005). Researchers using a fit perspective also make distinctions between different types of employment modes (e.g., develop, acquire, contract, alliance), distinctions between the characteristics of human capital (value, uniqueness) and distinctions among HR policies that are appropriate for certain employment modes (Lepak & Snell, 1999).

For example, Shaw, Gupta and Delery (2001) found that compensation policies built around team incentives and skill based pay that reinforced collective effort, teamwork, and flexibility enhance the effectiveness of integrated manufacturing systems. Applying a similar contingency notion to the knowledge-in-practice framework here would suggest that different types of managerial policies surrounding compensation issues, information systems, training and development activities, and many other management choices would be needed for units or organizations dominated by different types of knowledge-in-practice. In Shaw et al.'s (2001) study, integrated manufacturing is a practice intended to facilitate high-quality, error free production, to avoid logistical impediments, and to focus particular attention on customer needs. In this example, the authors describe how engineers utilize computer aided technologies and seek continuous improvement in which shared information is vital. Based on this description the practice of integrated manufacturing could be categorized requiring vast amounts of accumulated information that is constantly changing. Tacit know-how is needed for judgment on how to utilize the information to best serve customers and work as a team, but the underlying accumulation of information and technology builds the foundation of these capabilities. This suggests that team-based compensation policies might be appropriate for accumulated information practices. In a similar study, Guthrie & Datta (2008) found that managerial policies leading to downsizing are particularly harmful in research and development intensive industries partly due to the tacitness of practices found in these industries. This suggests a link between organization restructuring policies and the information and know-how involved in practices. A contingency orientation leads to the following proposition:

Proposition 4. *Organizations can improve performance by matching management policies to the knowledge-in-practice characteristics of value-creating practices.*

A holistic perspective contrasts with the reductionist perspective (Venkatraman & Prescott, 1990). The central premise of a holistic perspective is that it is important to retain the complex, interrelated linkages among important and relevant concepts

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and activities. Delery and Doty (1996) labeled this a configuration approach and argued that it is important to identify configurations of unique and comprehensive patterns of factors that work together to achieve performance outcomes. A configurational argument suggests that the adoption of particular systems of management policies would be appropriate for certain types of knowledge-in-practice and that all systems are not appropriate for all knowledge-in-practice types.

Within strategic human resource management the most notable systems approach is the use of theoretically derived HR architectures (Delery & Doty, 1996; Kang, Morris, & Snell, 2007; Kang & Snell, 2009). For example, Delery and Doty (1996) distinguish between a market type and an internal employment system based on the overall configuration of human resource policies in an organization. Extending this to our knowledge-in-practice framework it seems logical to assume that a market-type system would be appropriate for practices with underlying enacted information KIP whereas an internal system might be more appropriate for practices with underlying apprenticed know-how or talent and insight know-how.

Datta, Guthrie, and Wright (2005) provide evidence of the influence of configurational human resource management systems on knowledge work. They found that research and development intensity enhances the impact of high performance work systems on labor productivity. Firms with high levels of R&D are generally in knowledge-intensive industries that could be categorized as requiring talent and intuitive know-how demanding creative human and social capital. Many of the practices in firms having research-intensive strategies are complex and difficult to learn due to the evolving information and know-how requirements of the emerging domains. This suggests potential benefits from examining the relation between high performance work systems and various forms of knowledge-in-practice. Likewise, it seems beneficial to extend work regarding relational and intellectual archetypes (Kang & Snell, 2009; Kang, et al., 2007) to the knowledge-in-practice framework presented here. Examining the influence of an entrepreneurial or cooperative relational archetype with various types of knowledge-in-practice could provide useful insights for both scholars and managers. It may appear that a logical connection between human resource systems and knowledge-in-practice should be straightforward, but research findings suggest a more nuanced relationship. For example, Kacmar, Andrews, Van Rooy, Steilberg, and Carrone (2006) found negative performance consequences to be associated with high turnover in organizations dominated by knowledge-in-practice that we would characterize as enacted information. One possible explanation is that knowledge management strategies were not designed to capitalize on the low-tacitness, high learnability characteristics of the knowledge-in-practice. This suggests performance might be improved either by reducing turnover or by changing knowledge management practices so they were a better fit with a firm's KIP requirements. Similarly, our KIP framework provides an additional theoretical explanation for Batt's (2002) findings that reduced quit rates associated with high involvement HR practices led to sales growth in call centers. As she indicates in her study, effective performance depends on firm-specific human capital including extensive knowledge of a firm's products, customers, and work processes (Batt, 2002: 588). Based on our framework, the crucial KIP would be classified as accumulated information requiring extensive investment of time, effort, and experience to master the vast knowledge and further explaining the link between turnover and performance.

A stream of research examining different types of knowledge management strategies and customized approaches to knowledge management is slowly emerging (Newell, et al., 2002). Alvesson and Karreman (2001) for example, propose four different views among practitioners and researchers on the management of knowledge. Similarly, distinctions have been made between knowledge management strategies that focus on information technology and information processing and knowledge management strategies that focus on social interaction (Swan, Newell, Scarbrough, & Hislop, 1999). Likewise, important organization performance benefits may result from a better understanding of the connection between knowledge management systems and knowledge-in-practice characteristics. This leads to our next proposition:

Proposition 5. *Organizations can improve performance by aligning systems of management policies and knowledge management strategies to knowledge-in-practice characteristics of key value-creating processes.*

An additional fruitful stream of research would be to examine the relation between certain types of knowledge-in-practice and a firm's ability to create and sustain competitive advantage. This line of inquiry reflects the central premise of the resource-based view (RBV) and the knowledge-based view (KBV) that firms differ in important ways (Barney, 1991; Wernerfelt, 1984). Both RBV and KBV theories contend that firms can enhance their performance and earn economic rents by combining their valuable capabilities with other assets that are not perfectly tradable in the market nor easily developed internally by other organizations. Researchers argue that heterogeneous knowledge bases and capabilities among firms are the main determinants of sustained competitive advantage and superior performance (Winter & Szulanski, 2001). The knowledge-in-practice framework presented here offers a new lens for examining why and how firms differ in terms of their underlying assets and capabilities. Categorizing and measuring different forms of KIP can offer new insights for helping us understand what enables some firms (but not others) to be able to develop practices or build combinations of practices that provide value but are difficult to imitate or substitute. We encourage researchers to examine how firms both utilize and manage different types of knowledge-in-practice. This will require both extensive theory building and the development of methods and measures for examining knowledge-in-practice to conduct empirical examinations.

7. Conclusion

A growing body of research provides evidence that a key to achieving competitive advantage is understanding how organizations manage what they know and the human resources that apply this understanding (Ansari, et al., 2010; Grant, 1996; Pfeffer & Sutton, 1999; Zander & Kogut, 1995). Yet, conflicting perspectives on knowledge and knowing have led to an inconsistent and divergent stream of research on organizational knowledge. While the evolving research on knowledge management is ripe for

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theoretical and empirical advancements, this split is making progress more difficult. We propose a model that builds on previous seminal work and provides a first step towards integrating the diverging streams of knowledge management research. We offer a more precise, nuanced, and multidimensional understanding of knowledge-in-practice that provides new insight into how organizations can capitalize on this valuable resource by focusing on the learnability and tacitness of the information and know-how involved in practices. We propose that the study of organizational knowledge from a knowledge-in-practice perspective offers numerous opportunities to develop multidisciplinary and multilevel research programs that can provide insight and inform managers on how to effectively pursue and manage knowledge within organizations. Our framework has important implications for HRM research and practice. For example, selection processes and decisions could be more effective if KIP characteristics were considered along with job and organizational characteristics. Likewise, the effectiveness of employee development or training programs could be enhanced by designing them to fit KIP requirements. Retention efforts might be more effective if they were directed more toward employees who provide talent and intuitive know-how since they provide a more substantial influence on organization performance over time than employees who perform work that is primarily enacted information. We believe our framework complements previous work in this area and offers new and valuable opportunities for both research and practice.

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