



## The problem with knowledge ambiguity



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### ABSTRACT

This paper proposes a new conceptualisation of the construct of knowledge ambiguity. This new conceptualisation is essential because (1) past researchers have tended to narrowly define and operationalise knowledge ambiguity in terms of causal ambiguity or tacitness and (2) the prevalent non-comprehensive conceptualisation constrains our ability to overcome the problem of knowledge ambiguity. Knowledge ambiguity has been identified as a major obstacle to effective knowledge transfer and to the implementation of overall knowledge management systems. The new conceptualisation proposes that knowledge ambiguity is composed of two types of ambiguity: component ambiguity and causal ambiguity. Component ambiguity is uncertainty about knowledge content, whereas causal ambiguity is uncertainty about how to use the knowledge. This re-conceptualisation is supported by previous studies on knowledge characteristics, absorptive capacity and cognitive learning. In this paper, theoretical propositions are developed to demonstrate the compatibility of the new conceptualisation with the current understanding of these concepts. The present paper not only advances our understanding of knowledge ambiguity, it also points towards solutions for overcoming the problems associated with knowledge ambiguity. Different measures are required to overcome problems created by component ambiguity vs. causal ambiguity. This paper's re-conceptualisation of knowledge ambiguity makes it easier to theorise about and operationalise the concept. It aligns the definition of knowledge ambiguity with current definitions of related constructs such as absorptive ambiguity and cognitive learning that are used in the broader knowledge transfer and knowledge management literatures.

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### Introduction

Knowledge has become a major factor driving production in today's knowledge-intensive and innovation-based economy (Nickerson & Zenger, 2004). Firms are turning to knowledge management (KM) initiatives to leverage their knowledge-based advantage over competitors (Schultze & Leidner, 2002). The knowledge-based view (KBV) of firms has highlighted the strategic role of KM in the development of modern firms (Kogut & Zander, 1992, 1996; Spender, 1996).

However, the strategic management of knowledge is never easy, particularly given the often ambiguous nature of knowledge (Grant, 1996; Tsoukas, 1996). Knowledge ambiguity is "the inherent and irreducible uncertainty as to precisely what the underlying knowledge components and sources are and how they interact" (Van Wijk, Jansen, & Lyles, 2008: p. 833). As a result of its problematic nature, knowledge ambiguity has become an important construct in a variety of theoretical perspectives, including KBV, organisational learning and the dynamic capabilities of firms (King, 2007).

Knowledge ambiguity has been linked to the immobility of knowledge (Grant, 1996) and identified as a major obstacle to effective knowledge transfer (Szulanski, 1996; Van Wijk et al., 2008). Many previous studies have examined the problem of knowledge ambiguity (Lee, Chang, Liu, & Yang, 2007; Simonin, 1999). This paper offers a more sophisticated and substantive conceptualisation of the construct of knowledge ambiguity than is available in the literature.

Despite significant attention and progress, the construct of knowledge ambiguity remains inherently problematic. In previous research it has been conflated with the construct of causal ambiguity (e.g., Lee et al., 2007; Simonin, 1999, 2004). Drawing on previous discussions of knowledge characteristics, absorptive capacity and cognitive learning, I argue that knowledge ambiguity is composed of two elements: component ambiguity and causal ambiguity.

In this study, I redefine knowledge ambiguity to better fit with its original conception, which identified the problematic nature of knowledge and its associated non-transferability (Grant, 1996; Nonaka, 1994; Tsoukas, 1996). In the following discussion, the two elements that characterise knowledge ambiguity – component ambiguity and causal ambiguity – will be respectively defined and contrasted with one another and with other related concepts to

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establish their conceptual and theoretical existence and distinctiveness. This new understanding of knowledge ambiguity will also lead to the development of theoretical propositions about the relationships between knowledge characteristics (tacitness, complexity, specificity), the two components of knowledge ambiguity and knowledge mobility.

This paper contributes to the literature in a number of ways. First, it clarifies the concept of knowledge ambiguity and provides us with a better understanding of how it affects knowledge mobility. Second, it succinctly establishes theoretical relationships between knowledge characteristics, knowledge ambiguity and knowledge mobility. Third, it points towards appropriate strategies to overcome the problem of knowledge ambiguity. Fourth, the new conceptualisation offers insight into the operationalisation of the construct of knowledge ambiguity.

The rest of this paper is organised as follows. It starts with an examination of the current conceptualisation of knowledge ambiguity and its deficiencies. Then a new conceptualisation is proposed, and relevant theoretical propositions are developed to demonstrate the compatibility of the new conceptualisation with previous research. The paper concludes with a discussion of the theoretical, research and practical implications of the new conceptualisation.

### Knowledge ambiguity: current conceptualisation and research

In organisations, knowledge resides in individuals, team memories, organisational routines, documentation and databases. To perform a task, the individual or group must have access to different types of knowledge: know-what, know-how and know-why (Brown & Duguid, 1998; Kogut & Zander, 1992). According to the KBV of firms, leveraging knowledge assets is the primary goal of most organisations in the modern knowledge-based market (Grant, 1996; Kogut & Zander, 1992). The successful leverage of knowledge assets greatly depends on the degree to which knowledge is disseminated or transferred within the organisation. However, ‘stickiness’ in intra-firm knowledge transfer often limits the mobility of knowledge (Szulanski, 1996). As a result, managing the transfer of knowledge within organisations has become one of the greatest challenges for modern managers. Successful knowledge management is critical to the survival and competitiveness of organisations (Grant, 1996; Szulanski, 1996).

One factor obstructing the mobility of knowledge is its inherent ambiguity. Hamel, Doz, and Prahalad (1989) note that knowledge transfer depends on the ease with which knowledge can be transported, interpreted and absorbed. Hedlund and Zander (1993) point to the need to consider how the ambiguous nature of knowledge contributes to its immobility. In his study of knowledge transfers in international strategic alliances, Simonin (2004: p. 413) concludes that the work of Hamel et al. (1989), Hedlund and Zander (1993) and others are all “indicative of the existence of an important underlying latent construct – knowledge ambiguity – that needs to be explicitly recognised and integrated in modeling efforts”.

In their meta-analysis, Van Wijk et al. (2008) find that knowledge ambiguity represents one of the major antecedents of knowledge transfer effectiveness. Knowledge ambiguity, as the authors explain, “is one of the most important predictors of organisational knowledge transfer (e.g., Levin & Cross, 2004; Simonin, 1999; Szulanski, Cappetta, & Jensen, 2004)... Explaining and learning the specifics of the knowledge source takes time and constrains the ultimate success of the transfer process. Knowledge ambiguity has, therefore, been suggested to negatively affect organisational knowledge transfer” (Van Wijk et al., 2008: p. 833).

Notwithstanding the consistent findings on the negative influence of knowledge ambiguity on knowledge transfer, there are fun-

damental deficiencies in how researchers have conceptualised knowledge ambiguity. Researchers have conflated knowledge ambiguity with causal ambiguity (Simonin, 1999, 2004; Szulanski et al., 2004; Yucelen, 2007) or tacitness (Lee et al., 2007; Levin & Cross, 2004; Worasinchai & Daneshgar, 2012).

A review of the literature on knowledge characteristics, absorptive capacity and broader KM research suggests that knowledge ambiguity is not equivalent to causal ambiguity and cannot be completely represented by the degree of tacitness. The definition of knowledge ambiguity devised by Van Wijk et al. (2008) contradicts the narrow definition of knowledge ambiguity adopted by previous researchers. In their definition, knowledge ambiguity has two elements: the ambiguity of “the underlying knowledge components and sources” and the ambiguity of “how they interact” to generate performance.

Unfortunately, this theoretical approach has not been developed and they did not use this definition to operationalise the construct of knowledge ambiguity in their meta-analysis. In the literature, the conceptualisation of knowledge ambiguity remains narrow. In this paper, I use the work of Van Wijk et al. (2008) to develop a more comprehensive conceptualisation of knowledge ambiguity.

### Resolving the problem: a new conceptualisation of knowledge ambiguity

I conceptualise knowledge ambiguity as being composed of two sub-constructs: *component ambiguity* and *causal ambiguity*. Component ambiguity refers to “the inherent and irreducible uncertainty as to precisely what the underlying knowledge components and sources are” (Van Wijk et al., 2008; p. 833), and causal ambiguity refers to the uncertainty about “how they interact” (p. 833).

In their study of absorptive capacity, Zahra and George (2002), building on the unitary definition of Cohen and Levinthal (1990), argue that absorptive capacity should be a multi-dimensional construct that includes acquisition, assimilation, transformation and exploitation. The first two dimensions form potential absorptive capacity and the latter two form realised absorptive capacity. This re-conceptualisation has been widely adopted (e.g., Lichtenthaler, 2009; Noblet, Simon, & Parent, 2011; Vasudeva & Anand, 2011). My new conceptualisation of knowledge ambiguity resonates with Zahra and George’s (2002) formulation; both concepts postulate that the learning of knowledge and the application of knowledge are, and should be, distinguishable in the process of knowledge transfer. Specifically, I advocate that component ambiguity presents difficulties in mastering the knowledge content whereas causal ambiguity presents difficulties in applying the acquired knowledge to generate performance. As Zahra and George (2002: p. 191) argue, “firms can acquire and assimilate knowledge but might not have the capability to transform and exploit the knowledge for profit generation”. Similarly, individuals may encounter component ambiguity when acquiring and assimilating knowledge and later encounter causal ambiguity when trying to transform and exploit the knowledge to generate performance.

From a cognitive perspective, Shariq (1999) argues that knowledge transfer is ultimately a human-to-human process, which involves cognitive understanding of one another’s interpretation and representation of knowledge schema. Cognitive ability is thus an essential contributor to effective knowledge transfer. Johnson-Laird (1983) and Nonaka (1994) elaborate on the cognitive processes of knowledge transfer. According to Nonaka (1994), the acquisition of knowledge involves a sense-making process, which is made up of two main elements: one cognitive and the other technical. The cognitive elements centre on what Johnson-Laird

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