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ABSTRACT

A large and growing body of empirical research investigates the black box of intra-organizational knowledge transfer. Despite its richness, there is a paucity of theoretically-grounded research that integrates the role of governance and social mechanisms in knowledge transfer to understand how they can be simultaneously promoted to create value. In this paper, we rely on three theories: governance, norms and utility to develop a comprehensive model of knowledge transfer and its effects at the individual level. Our model is tested with a survey of 485 employees from a global knowledge service firm. Findings show that knowledge transfer (conceptualized as the contribution, and adoption of knowledge resources) in the context of knowledge platforms and its subsequent outcomes at the individual level can be promoted by three categories of mechanisms: norms-based (identification and collaboration), governance-based (knowledge structure role) and utility-based (knowledge attributes and accessibility). The present study thus contributes to a deeper understanding of the value of intra-organizational knowledge transfer.

Keywords: Knowledge transfer mechanisms, knowledge platforms, governance, individual performance.

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SYSTÈMES D'INFORMATION ET MANAGEMENT

RÉSUMÉ

Un nombre important de travaux de recherche se sont concentrés sur la boîte noire de transfert de connaissances intra-organisationnelle. Malgré sa richesse, peu de travaux ont intégré le rôle de la gouvernance et des mécanismes sociaux dans le transfert de connaissances pour comprendre comment ils peuvent être promus simultanément et créer de la valeur. Dans cet article, nous nous appuyons sur trois théories: la gouvernance, les normes et l'utilité afin de développer un modèle de transfert de connaissances et ses effets au niveau individuel. Notre modèle est testé à travers une enquête menée auprès de 485 employés au sein d'une multinationale des services. Les résultats montrent que le transfert de connaissances (conceptualisé comme la contribution, et l'adoption de connaissances) dans le cadre de plates-formes de connaissances ainsi que ces effets au niveau individuel peuvent être promus par trois catégories de mécanismes: normes (identification et collaboration), gouvernance (le rôle de de la structure en charge de la gestion des connaissances) et utilité (les attributs de la connaissance et son accessibilité). La présente étude contribue ainsi à une meilleure compréhension de la valeur de transfert de connaissances intra-organisationnelle.

Mots-clés : mécanismes de transfert de connaissances, plateformes de connaissances, gouvernance, performance individuelle.

INTRODUCTION

Almost two decades ago, Argote et al. (1990) noted that knowledge transfer within organizations was very much a black box. Since then, intra-organizational knowledge transfer has been addressed extensively and emerged as an underlying theme in strategy, organizations and Information Systems (IS) research. A large number of studies from various perspectives have been suggested to unpack the black box of intra-organizational knowledge transfer (e.g., Szulanski 1996; Benbya 2006; Watson and Hewett 2006; Kane 2009; Phelps et al. 2012; Newell 2015). These studies seek to understand the ways in which firms organize and benefit from knowledge transfer and focus on its antecedents and consequences.

Intra-organizational knowledge transfer refers to the process through which orga-nizational actors – individuals, teams, or units – exchange, receive, and assimilate knowledge. It usually denotes a two-way movement of knowledge on the inter-personal level: (1) an exchange between a source and a recipient (Szulanski 1996, p.28); (2) an assimilation and learning when the recipient understands the in-tricacies and implications of knowledge and is able to apply it (Argote et al, 2003). While the strategy and organization litera-tures focus mostly on knowledge transfer within and across units, IS research inves-tigates the role of knowledge platforms in supporting the transfer of knowledge between individuals within a firm and its value creation implications (e.g., Alavi and Leidner 2001; Markus 2001; Benbya 2008; 2011). In this context, knowledge may re-late to any information or know-how that is relevant to the accomplishment of or-ganizational tasks, and knowledge trans-fer has often been conceptualized as two

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behaviors: knowledge contribution and knowledge seeking (or access) (Kankanhalli et al. 2006, 2009; Phang et al. 2009).

Prior studies on knowledge transfer in the context of knowledge platforms have relied on various theoretical perspectives, such as social exchange and social capital theories, to derive a number of factors affecting knowledge transfer. Much of this work has focused on a person's motivation to contribute knowledge to others, suggesting that altruism (Wasko and Faraj 2005), enjoyment in helping others (Kankanhalli et al., 2005), reputation benefits (Chiu et al. 2006) and social context (Alavi and Leidner 2006; Bourdon and Hollet-Haudebert 2009) are important determinants. Similarly, studies that investigate knowledge seeking or access behaviors suggest that organizational context (i.e., culture, climate and social influence) and individual motivation are important determinants (e.g., Phang et al. 2009; Durcikova et al. 2011; Wang et al., 2013).

Despite their richness, most prior studies that investigate the antecedents of knowledge transfer in knowledge platforms have focused either on individual motivational factors (e.g., Bock et al. 2005; Wasko and Faraj 2005) or on the role of organizational context in promoting knowledge transfer (e.g., Alavi et al. 2006). While individual motivation and social context are important, less is known about the governance mechanisms that managers should activate to support knowledge transfer and drive value or about the complementarity between social and governance mechanisms (Foss et al. 2010). Foss (2012) defines "knowledge governance" as organizational design mechanisms aimed at influencing knowledge processes to create value. These include, for example, reward systems, organizational structure, job descriptions, managerial style, etc. The relationship between governance mechanisms and knowledge processes remains under-researched both theoretically and empirically (Michailova and Foss, 2010 (p. 3). Scholars have thus called for empirical studies to better understand how governance and social mechanisms affect knowledge transfer and its outcomes at the individual level (Foss 2009, 2012; Felin and Hesterly, 2007).

To fill this gap, we use the knowledge governance approach (KGA) as an overarching theoretical lens to investigate the mechanisms associated with knowledge transfer and its subsequent outcomes (Foss and Michailova 2009; Foss et al. 2010, 2007; Foss 2012). This approach finds its roots in mechanism-based explanation (Hedström and Swedberg1996; Machamer et al. 2000) and organizational design (Williamson, 1996). It asserts that knowledge processes, while influenced by the organizational social context, can also be directed through the deployment of governance mechanisms, particularly the formal aspects of an organization that can be manipulated by management, such as organizational structure, human resource practices, job design and roles, standard operating procedures, and other coordination mechanisms (cf. Grandori, 2001).

To develop a theoretical model of mechanisms of knowledge transfer (contribution and adoption) in the context of knowledge platforms and to account for the complementarity between governance and social mechanisms, we draw on two bodies of theories: utility and norms. We test our model by relying on a field study of a service-provider firm that designs, manufactures and sells networking equipment. Data from our research site is collected in two phases: interviews with 35 knowledge workers to obtain contextual information and a survey of 485 employees to test the proposed model.

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Our research makes three contributions. First, we rely on the overarching theoretical perspective of knowledge governance to investigate the complementarity between formal governance mechanisms (knowledge structure and incentives) and social mechanisms (collaboration and identification) on knowledge transfer (contribution and adoption) and its effects on individual performance. Our study therefore goes beyond existing IS studies on knowledge platforms that focus mostly on individual motivation and organizational context to uncover the relative importance of governance mechanisms, specifically the key role of knowledge structure in both knowledge contribution and adoption.

Second, most studies that investigate knowledge transfer focus either on knowledge contribution or on seeking/access behaviors and tend to separate these behaviors (for exceptions, see Watson and Hewett 2006; Monnier-Senicourt 2008; Phang et al. 2009). Knowledge seeking/access, however, is not synonymous with adoption, so an individual would first evaluate knowledge resources based on various subjective (e.g., norms, relational) and objective dimensions (e.g., knowledge attributes), assimilate and understand its content before deciding whether to adopt it and apply it to specific tasks (Todorova and Durisin, 2007; Kane 2010). Our study therefore goes beyond this limited conceptualization while simultaneously integrating knowledge contribution and adoption and identifying some common social and governance mechanisms that affect both behaviors.

Finally, our study investigates the effects of knowledge transfer at the individual level, where these effects directly manifest (Grant, 1996). Our study reveals that knowledge adoption from knowledge platforms speeds up access to knowledge that engineers need to perform their tasks, shortens the time necessary to complete these tasks and enhances the overall quality of work. Most research in this area explored knowledge outcomes at the process, team and organizational levels (e.g., Phelps et al. 2012), while the individual level has attracted insufficient attention (Foss et al. 2010). Our study therefore responds to calls to investigate the effects of knowledge at the individual level, where this knowledge is created and embodied (Felin and Hesterly, 2007).

This article is structured as follows. In the next section, we elaborate on the context of the study and its research model. Based on this elaboration, we develop the theoretical background and specific hypotheses of our model. After a discussion of the empirical findings, we present a discussion of the implications for both academic and managerial audiences.

Research Context and Method

In an attempt to address these important issues, we engaged in a field study at a global knowledge services firm, which we call Netco. We interviewed knowledge managers and engineers at Netco to gain contextual information, but our primary focus is quantitative. We follow the four-step methodology proposed by King and Zeithaml (2003) to study organizational knowledge; this method has been suggested to investigate knowledge sharing in organizations in the following ways: (1) defining its scope; (2) protocol design; (3) data collection through interviews; and (4) data collection through surveys. We first defined the scope of the study. The results of the study by King and Zeithaml (2003), as well as our preliminary analyses on mechanisms of knowledge transfer (see Benbya 2005, 2006, 2008), indicate that organizational knowledge

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resources vary significantly across industries and even among companies within the same industry. Thus, to better understand the mechanisms influencing knowledge transfer (*both* contribution and adoption) and its subsequent effects, we took a fine-grained research approach using a single case study.

We selected Netco, a leading, word-class networking and communication devices service-provider, as our research site. There are several reasons for this choice. First, the firm competes in a dynamic technological environment in which customer demands are increasing and the knowledge of its consulting engineers is the basis for its competitive advantage. Second, the firm has undertaken several initiatives to enhance the transfer of knowledge and experience of its engineers and what they do on a regular basis. Third, our preliminary interviews revealed the co-existence of a strong knowledge governance, along with a knowledge culture based on collaboration and knowledge sharing, making it an ideal context for analyzing the complementarity between governance and social mechanisms. Finally, choosing a single firm as the research setting helps to control for the confounding effects of firm-level characteristics.

Netco designs, manufactures, and sells networking equipment. This professional firm accumulates and applies knowledge that its engineers build collaboratively with their clients. Service-providers work in a knowledge-intensive industry, where a firm's ability to use its knowledge resources to create solutions for their clients is their main source of competitive advantage (Spohrer et al. 2007, Von Nordenflycht, 2010). At the time of data collection, our research site had deployed a knowledge platform to support its engineers (over 12,000 working in 1,100 labs around the world) in

their service deployment and enhance customer support. The second step of the study, protocol design, consisted of 10 face-to-face interviews with executives at the target firm to better understand the company's knowledge management efforts and to design an appropriate research study. These conversations indicated that one of the most integral parts of their knowledge-sharing efforts was a knowledge platform used to provide a unified and integrated access to the firm's knowledge assets.

This platform provides access to three complementary knowledge assets: (1) *communities*, (2) *leading practices* and (3) *rules-based intellectual capital*. *Communities* also known as virtual teams operate to leverage the technical expertise and share experience in the delivery of services. They serve as a primary source of reliable content and as a mechanism to develop and deploy the transfer of best practices and to reduce conflicting recommendations. These communities are supported by assigned roles, time dedicated to community activities, mentoring opportunities, and recognition and career development for high-performing teams.

Leading practices (LP) provides the overall structure for a best practice repository for leading practices. These are knowledge assets in the form of approved content and are considered as the foundation of a knowledge-sharing culture at Netco. The consulting teams initially identify what aspects, features and releases of their assigned technology are of greatest importance to the delivery teams. From this, they derive the detailed content requirements, that is, the assets needed in order to provide network-consulting engineers with a truly effective resource from which to leverage. They engage virtual teams for both content submission and content review. The LP content

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is peer-reviewed and then stored as approved LP. Key to the long-term success of this initiative is the ongoing management of content. There is a clear focus on feedback and metrics in relation to adoption.

Rules-Based Intellectual Capital (RBIC): During the course of customer engagements, consulting engineers learn certain networking configurations, organizing tips, and high-performance rules that can be published for the benefit of all. The RBIC takes these best practice ideas, formalizes them, and makes them available to the broader organization through custom network profile reports. Ideas undergo a formal process of review and approval before they are published to the rules database. Engineers can then use these reports to proactively track exceptions and suggest corrective actions to customers.

The knowledge platform used in Netco is based on Microsoft's SharePoint; it has advanced search and content management capabilities. It contains over 100,000 'knowledge assets' contributed by members of project teams. Knowledge assets come in the form of case studies, white papers, technical presentations, templates, design guides, etc. They are tagged with update information to ensure that they go through a review and refresh period every 12-18 months by a designated KM structure. It was clear in interviews with key executives that both the contribution *and* adoption of knowledge assets are high in our research site.

We also settled on a two-phase data collection process consisting of in-depth interviews followed by a large sample survey. In the first phase of the data collection, we conducted 35 in-depth semi-structured interviews with providers and adopters of knowledge within a large division of the firm (see Appendix

1). Respondents in Phase I of the study were engineers at multiple levels within the organization. All of the respondents regularly accessed and used existing knowledge in their projects, and nearly all of them had contributed their own knowledge to the knowledge platform. The goal of these interviews was twofold: 1) refine the research questions within the context of the research site, 2) understand the mechanisms related to knowledge transfer and become familiar with their operations and terminology to design a survey instrument for the second phase of the study. These interviews helped us to gain an understanding of the knowledge contribution and adoption processes and provided us with the theoretical perspectives we used to develop our conceptual model. Specifically, from a knowledge governance lens, interviews with both executives and knowledge workers revealed the role played by the dedicated knowledge structure in charge of installing monitoring mechanisms to make sure that knowledge that is shared is actually relevant and up-to-date. Second, the role of social mechanisms, particularly the prevalence of certain norms (collaboration and identification), has been clearly outlined during our interviews as key to knowledge transfer. Finally, the utility and comprehensiveness of knowledge have been highlighted as key to its adoption. Based on these interviews, we developed a multi-theoretical model linking mechanisms for knowledge contribution and adoption and its effects, as shown in our theoretical model depicted in Figure 1. In addition to using the knowledge governance lens, our model incorporates two theories. First, we use norms theories to develop a set of hypotheses regarding the social mechanisms that influence knowledge transfer (*both* contribution and adoption) in the context of knowledge platforms. In the second section of the model, in

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addition to employing social and governance mechanisms, we use utility theory to generate a model of the factors that lead individuals to adopt knowledge from the knowledge platform, with particular emphasis on how companies can increase the extent to which individuals within the firm adopt knowledge. We then test the individual hypotheses and the combined model using survey data collected in the second phase of the study.

Data collection for Phase II consisted of a survey administered to a 1000 engineers working in a division of the firm located in northern California, where we conducted our interviews. This population represents the total number of engineers working in our field site and constitute 30% of the total workforce of Netco. The survey was administered via the company's email system, which is one of the primary means of intra-company communication. Accompanying the survey was a cover memo from a senior company executive requesting employee participation and ensuring the confidentiality of individual responses. Two mailings of the survey resulted in 485 responses, for a response rate of approximately 48 percent. Tests for non-response bias indicated that the respondents did not differ significantly from the non-respondents. The respondents were representative of the full sample in terms of gender (65% male, 35% female), average age (31.2 years), and tenure with the company (3 years), with no significant differences found between the respondents and the full sample.

THEORY AND HYPOTHESES ON MECHANISMS OF KNOWLEDGE TRANSFER

This study adopts the overarching theoretical perspective of knowledge governance (Foss, 2007, 2011) to investigate the mechanisms related to knowledge contribution and adoption from knowledge platforms. Since our aim is to derive a parsimonious set of mechanisms related to both knowledge contribution and adoption, in addition to using the knowledge governance lens, we draw on two bodies of theories: utility and norms. In presenting this model, our discussion is organized as follows: First, we describe how theories of governance and norms are relevant for knowledge contribution and adoption. Second, we present theories of utility and their role in knowledge adoption. Third, we present our model, which integrates these theoretical perspectives on knowledge contribution and adoption, a necessary step for knowledge outcomes to occur. Finally, we describe and report on the empirical study performed to explore and validate the model.

Governance Theories

Governance mechanisms find their root in organizational design theory (Williamson, 1996, 1999). This approach attempts to trace the specific mechanisms through which an organization exerts its influence on knowledge processes; that is, it creates a 'mechanism-based explanation' (Hedström and Swedberg, 1996; Machamer et al., 2000). Knowledge governance means deploying governance mechanisms that mitigate costs of sharing, integrating and creating knowledge owing to the above characteristics of knowledge (Heiman and Nickerson 2002: 98). Its premise is that knowledge processes – including knowledge transfer – can be influenced and directed through the deployment of governance mechanisms to maximize value from knowledge resources. Two governance mechanisms emerged from our interviews of executives and knowledge

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workers and are considered as important for knowledge governance: knowledge structure support and incentives.

Knowledge Structure Support

Knowledge structure support refers to the formal structure in charge of defining rules, policies, procedures, and processes of knowledge sharing. Regardless of how a knowledge structure is defined and whether it is represented by a department, a team, or the existence of a formal authority, it has a critical feature that has typically been overlooked in the literature: its ability to manage the flow of knowledge within the firm (Turner and Makhija, 2006). The role of this organizational structure may be invoked, but it is seldom – if ever – integrated into the analysis (Foss et al. 2010). Recent research, however, has begun to uncover its potential, especially in the processes of eliciting and validating knowledge in knowledge platforms (e.g., Benbya and Van Alstyne, 2008; Gray and Durcikova, 2009). Knowledge structure defines mechanisms that clearly specify the appropriate behaviors and processes in which employees must engage to ensure that knowledge is disseminated, interpreted, and used to accomplish organizational goals. Interviews with executives at our research site revealed that its knowledge structure has defined a detailed framework with a set of processes and key behaviors to ensure that the knowledge shared fulfills users' needs, is presented adequately, is of high quality, and remains current and up-to-date. This framework for structuring knowledge presents a roadmap for content requirement and requests for submission mechanisms, review and formatting policies, and content management and update rules. Based on these arguments, we hypothesize the following:

Hypothesis 1a: Knowledge structure support leads to higher levels of knowledge contribution.

Hypothesis 1b: Knowledge structure support leads to higher levels of knowledge adoption.

Extrinsic Incentives

Self-determination theory differentiates between two categories of incentives: intrinsic vs. extrinsic (Deci and Ryan, 1980). Intrinsically motivated behaviors are those that arise from performing the task, such as enjoyment and learning in the context of open source projects (e.g., Benbya and Belbaly, 2010), and that have been associated with a range of outcomes including innovation and knowledge transfer. Extrinsic motivation, in contrast, comes from outside the individual and requires an instrumentality between the activity and several separable consequences, such as tangible or verbal incentives. The importance of extrinsic incentives for sustaining knowledge transfer in organizations has long been recognized (Osterloh and Frey, 2000; Ba et al. 2001). However, research suggests mixed findings on the effects of extrinsic incentives (Frey and Jegan, 2001). For example, several studies find the use of extrinsic incentives to have no effect on participation (Bock et al. 2005), while others suggest that extrinsic incentives can have a detrimental effect on participation, such as a misallocation of effort away from engaging in cooperation or exploratory tasks (e.g., Nickerson and Zenger, 2004). Despite this controversy, the use of extrinsic incentives remains largely diffused in organizations (Baumann and Stieglitz, 2013). Given that intrinsic incentives have been largely investigated in the context of knowledge transfer (e.g., Wasko and Faraj, 2005), while the conditions under

which extrinsic incentives become beneficial for the organization remain unclear, we hypothesize the following:

Hypothesis 2a: The existence of extrinsic incentives leads to better knowledge contribution.

Hypothesis 2b: The existence of extrinsic incentives leads to better knowledge adoption.

Normative Theories

Previous research has noted that organizational knowledge transfer involves important social processes (Argote et al., 2000; Nonaka and Von Groh, 2009). It entails personal risks, costs, and rewards and therefore can be interpreted as a problem of organizational members' motivations to transcend their social practices. Explanations emphasizing social practices for knowledge transfer focus on the social context and norms through which organizational members learn about and develop attitudes towards it (Coleman, 1990). Parson defines a norm as "a verbal description of a concrete course of action, …, regarded as desirable, combined with an injunction to make certain future actions conform to this course" (1937: 75). Norms play a crucial role in individual choice since—by shaping individual needs and preferences—they serve as criteria for selecting among alternatives. Such criteria are shared by a given community and embody a common value system. These social mechanisms are suggested to influence knowledge transfer by impacting both individuals' willingness to contribute and to adopt knowledge available in knowledge platforms (Leidner and Kayworth 2006; Menon et al. 2006; Benbya 2008). Likewise, social mechanisms might significantly limit perceived costs of compliance to the system and reduce knowledge hoarding (Malhotra and Gal-

letta 2005; Bock et al. 2006, Ariely et al. 2009). In the context of our study, our interviews revealed the importance of two social mechanisms for knowledge transfer: collaboration and identification.

Collaboration

Several studies suggest that a supportive social context, in which collaboration norms exist, will increase networking activities and knowledge sharing within the organization, increasing the usage of knowledge which may otherwise stay in an individual's head (DeLong and Fahey, 2000; Bertels et al. 2011). Collaboration norms provide a structure as well as a social and ethical context that encourages employees to interact through formal and informal means, both person-to-person (as well as people-to-documents) to share information, insight, experience, and tools. Collaboration norms have often been contrasted with competition which prompt knowledge hoarding and lead individuals to keep their knowledge for themselves (Haas and Park, 2010). Competition within firms also affects how knowledge workers assess acts of taking or adopting the knowledge of their colleagues because of the psychology of interpersonal comparison, ego-threats, and self-affirmation (Menon et al 2003, 2006). By contrast, collaboration norms lead to a state of less self-interest, in which the individual no longer considers the organization's knowledge as distinct from his/her own and even feels the moral obligation to transfer knowledge. We expect the level of collaboration within an organization to significantly affect both knowledge contribution and adoption from knowledge platforms. This leads to the following hypotheses.

Hypothesis 3a: As the level of collaboration norms within the organization in-

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creases, the level of knowledge contribution in knowledge platforms increases.

Hypothesis 3b: As the level of collaboration norms within the organization increases, the level of knowledge adoption from knowledge platforms increases.

Identification

Social identity theory suggests that people gain social identity, a part of their identity, from the groups to which they perceive themselves as belonging (Tajfel and Turner, 1979). This shared (group) identity is a psychological state derived from employees' sense of belonging to a higher-order group that impacts attitudes and behaviors. It has been associated with a range of outcomes, such as problem solving, co-creation of ideas (Elsbach and Flynn, 2013) and performance (Ellemers et al. 2004). In recent years, the reach of the identity concept has extended to more macro levels of analysis and is now becoming central to understanding what it means to be an organization (Gioia, et al. 2010; Ashforth et al. 2008). Organizational or collective identification (OI) is often conceptualized as a complex property of the organization itself (e.g., Hardy et al. 2005; King, Felin, and Whetten, 2010) and is discernable mainly through the patterns of an organization's entity-level commitments and actions (Corley et al., 2006). The notion of OI, however, goes beyond commitment to include affect and emotions both positive (e.g., pride, excitement, joy, and love) and negative (e.g., shame, sadness, disgust, and guilt) as necessary concomitants of identification (Ashforth et al. 2008). Scholars have shown in numerous studies that OI can serve as an important range of individual and organizational outcomes, including effort, participation, job involvement, strategic decision making and organizational

change (Corley et al., 2006; Olkkonen and Lipponen 2006). Likewise, IS studies find OI to be associated with job satisfaction and to reduce IT turnover intentions (Lee, 2004). As such, investigating the relationships between OI and knowledge transfer in the context of knowledge platforms is warranted, especially considering the vast resources organizations have committed to these platforms. Following this perspective, we suggest that knowledge transfer into and from the knowledge platform will be higher for people who identify with their organization.

Hypothesis 4a: As the level of identification norms with the organization increases, the level of knowledge contribution to the knowledge platform increases.

Hypothesis 4b: As the level of identification norms with the organization increases, the level of knowledge adoption from the knowledge platform increases.

Utility Theory

Utility theory is concerned with people's choices and decisions. It is also concerned with people's preferences and with judgments of preferability (Fishburn, 1968). According to utility theory (Rogers 1983, Tornatzky and Klein 1982), people adopt knowledge available in knowledge platforms when the benefits from adoption and use exceed its costs. Some of the value of knowledge adoption derives from its specific properties (Argote et al. 2005, Kane et al. 2005). However, prior to adoption, users will assess if the knowledge available on the platform is easy to locate and find. From a utility perspective, if knowledge available on the knowledge platform is easier to *access* than other alternatives, people can then recognize its merits and will be especially likely to adopt it and apply it if they perceive it to be superior.

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Knowledge Accessibility

Knowledge accessibility, which is the ease with which knowledge assets can be located and accessed in knowledge platforms, is an important dimension for knowledge adoption to occur. A growing number of knowledge workers find it difficult to access knowledge available in knowledge platforms and end up giving up on their efforts to find valuable content that may help them serve clients better (Benbya, 2008). Research suggests that the problems associated with employees' access to relevant knowledge yield various common frustrations (Weiss et al. 2004; Ichijo and Nonaka, 2006). The first comes from the need to navigate through several repositories, which significantly complicates and delays knowledge search and access. The second, browsing the knowledge platform or performing a keyword search, yields inconsistent and confusing results. Utility theory suggests that workers assess the time and effort required to locate and find knowledge available on the platform with other alternatives (i.e., colleagues); if the costs exceed the benefits, they would prefer to rely on other sources than the platform. This is also consistent with theories of technology adoption (i.e., Venkatesh et al. 2007; 2010) that predict that the intention to accept a particular technology depends on the degree of simplicity associated with its use.

Hypothesis 5: As the level of knowledge accessibility in knowledge platforms increases, its level of adoption increases.

Knowledge Comprehensiveness

Research on the relationship between knowledge attributes, its adoption and subsequent outcomes remains scarce (Phelps et al. 2012). A variety of knowledge attributes have been identified by researchers to influence knowledge transfer. The IS research has particularly focused on the notion of knowledge quality (e.g., Kulkarini et al. 2007, Durcikova and Gray, 2009). Quality, although important, is not the sole knowledge property that impacts its transfer. The knowledge-based literature on strategy and organization theory, for instance, investigates other important dimensions of knowledge, which affects the extent to which a source can understand and assimilate knowledge to subsequently adopt it. While knowledge adoption decisions might be affected by a number of subjective dimensions (e.g., the nature of a person's different relationships Menon et al. 2006), we limit the scope here to key knowledge attributes that affect its comprehensiveness.

Knowledge comprehensiveness reflects the extent to which knowledge is unambiguous, diverse and complete. The dimensions often associated with knowledge comprehensiveness in the literature include knowledge codifiability (Haas & Hansen, 2007; Kogut & Zander, 1992), complexity (Zander and Kogut, 1995) and completeness (Turner and Makhija, 2006). Codifiability refers to how particular knowledge is stored with respect to aspects such as its ability to be easily broken down into specific components, unambiguity and the rate at which individuals can assimilate and understand knowledge. Highly codifiable knowledge, also known as 'explicit knowledge' (Makhija & Ganesh, 1997), is therefore less ambiguous and easier to integrate into one's existing knowledge base. In contrast, tacit knowledge is difficult to articulate or express. The knowledge creation theory, however, has indicated that "knowledge is explicit and tacit along a continuum" and that "explicit knowledge is always grounded in tacit knowledge". In line with this perspective, we do not argue for the distinc-

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tion between explicit or tacit knowledge and their relative impact on knowledge adoption. Instead, given the nature of our research context (knowledge platforms), where knowledge is always codified and interactions are computer-mediated, we expect that knowledge that is well-codified is more comprehensive and that its level of adoption will consequently be higher. Completeness refers to the degree to which the knowledge to make decisions or to complete tasks is entirely sufficient and available for the decision maker's use (Snell & Youndt, 1995; Van de Ven et al., 1976). In this case, the decision situation does not vary over time, outcomes are expected, and the relevant process does not change. Turner and Makhija (2006) note that completeness/incompleteness can characterize both tacit and explicit knowledge. Specifically, knowledge is incomplete "when new knowledge is required by the organization and its current stock of knowledge is inadequate for achieving certain results" (p. 200). Finally, knowledge diversity reflects both the amount and relatedness of information required to characterize the knowledge in question (Galunik and Rodan, 1998). This notion of diversity overlaps with that of "complexity" as used by Kogut and Zander (1993). According to Bartunek et al. (1983), such "complex" knowledge incorporates multiple complementary perspectives in relation to decision situations. These dimensions reflect knowledge comprehensiveness and affect its extent of adoption by employees.

Hypothesis 6: More comprehensive knowledge will be more likely to be adopted than will less comprehensive knowledge.

Knowledge contribution, adoption and individual performance

Numerous scholars have noted that ef-

fective management of knowledge is the basis of firms' ability to compete (Barney, 1991; Kogut and Zander, 1992; Nonaka, 1994; Wernerfelt, 1984). The knowledge transfer literature, for instance, often builds on the assumption that improving employees' access to knowledge has a range of positive outcomes (e.g., Alavi and Leidner, 2001; Prencipe and Tell 2001; Felin and Hesterly, 2007; Haas and Hansen, 2007). These outcomes can manifest at several levels including those of employees, teams, processes, products and the overall organization. Research suggests that knowledge platforms influence sales performance (Gil Ko and Dennis, 2010), enable new product introduction (Benbya and Meissonier 2007; Knudsen, 2007) or improve products that provide a significant additional value over earlier products (Schultze and Hoegl, 2006). The individual level, though, remains the most immediate level through which knowledge outcomes manifest. The literature on knowledge sharing, for instance, often builds on the assumption that it saves time and effort and enhances work quality (Levin and Cross, 2004). Based on this, we hypothesize the following:

Hypothesis 7: As the level of knowledge adoption from knowledge platforms increases, its effects at the individual level increase.

Finally, we note that the concept of knowledge adoption implies in part *a priori* knowledge contribution. Knowledge needs to be acquired, assessed and assimilated before it can be applied (Todorova and Durisin, 2007). Of course, individuals can acquire knowledge through their own learning and experiences (Argote and Spektor, 2011). However, in an organizational setting, both formal and informal knowledge contribution serve as important mechanisms by which individuals acquire knowledge. Thus, we hypothesize the following:

Hypothesis 8: As the level of knowledge contribution to knowledge platforms increases, its adoption level increases.

Figure 1 represents the specific hypotheses we test in our empirical study. However, our multi-theoretical model can be viewed as a single, complex system that models the flow of knowledge both from individuals *into* the system and *out of* the system to other individuals, as shown in Figure 1. The effectiveness of a firm's knowledge transfer is dependent on the flow of knowledge in *both* directions.

Measures

A literature review was conducted to locate past operational measures of the constructs under investigation. Where available, tested questions from prior studies were used to measure constructs in this study, with the aim of enhancing the va-lidity of the constructs. Where tested questions were not available, a broad and thorough literature review informed the generation of the initial constructs and the priori assignment of items to measure those constructs (see Appendix 2).

Consultation with subject experts and feedback obtained when piloting the questions helped refine the choice of constructs, identify the most relevant items for those constructs, and select their proper wording, given the empirical context. All items were measured using a standard five-point Likert scale ranging from 1= Strongly Disagree to 5 = Strongly Agree. Prior to actual data collection, pre-testing of the instrument was performed with a sample of 34 working professionals through an electronic questionnaire distributed by e-mail. The pre-test indicated that the items were unambiguous for the professionals.
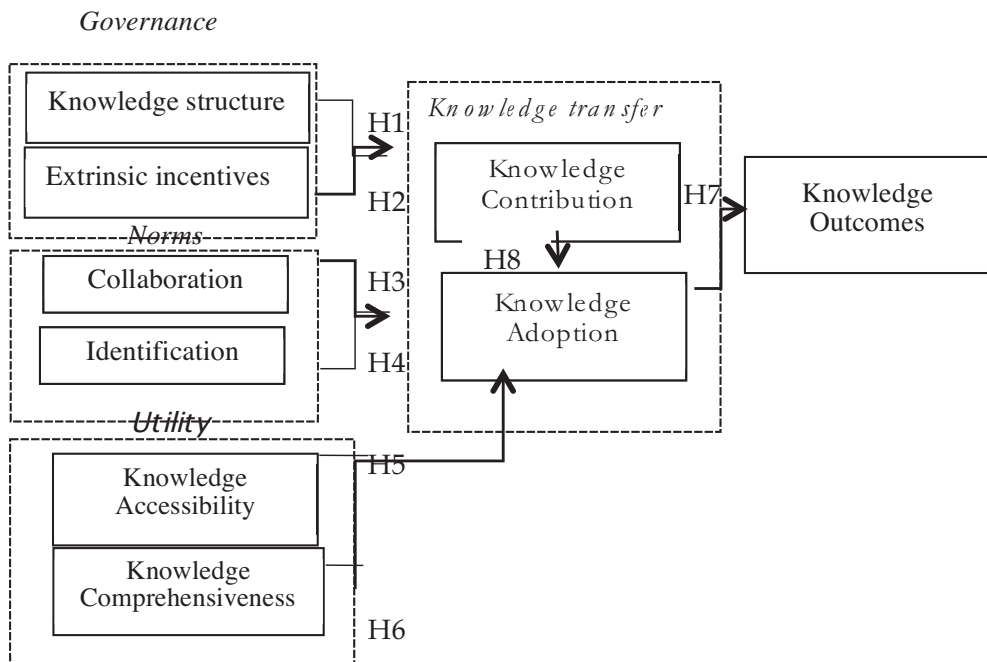

Figure 1: Mechanisms for Knowledge Transfer

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Identification was measured with three items developed by Ashforth and Mael (1989) reflecting perceptions of belonging and affect toward the organization. Collaboration norms were assessed with four items adapted from Chatman and Flynn (2001) reflecting the degree of importance people place on their personal interests and shared pursuits (Wagner, 1995), shared objectives, mutual interests, and commonalities among members. Knowledge structure's role in designing practices, processes, and policies with regard to knowledge transfer was measured with four items developed based on previous literature (e.g., Turner and Makhija, 2006; Foss 2003) and refined based on feedback from key executives and managers. To measure the effect of extrinsic incentives, we asked respondents three questions indicating how their perceptions of incentives affected their knowledge transfer. These measures were adapted from Bock et al. (2005). Knowledge comprehensiveness was measured with six items adapted from Turner and Makhija (2006). Knowledge accessibility reflects the degree to which the knowledge available on the platform can be accessed with relatively low effort. It was measured with three items. Respondents were asked to indicate how difficult or easy it is to access knowledge from the knowledge platform compared to other alternatives, where 1 = very difficult to access and 5 = very easy to access.

To measure the *frequency of knowledge contribution*, respondents were asked three questions to indicate how frequently they submitted documents and contributed knowledge to be considered for the knowledge platform, where 1=almost never and 5=always (e.g., for every project); these questions were adapted from Kankanhalli et al. (2005).

To measure the *frequency of knowledge adoption*, respondents were asked three questions to indicate the frequency with which they access, assimilate and apply the knowledge assets available in the knowledge platform, where 1 = never and 5 = almost always. These items were developed based on Todorova and Durisin (2007). *Individual performance* was measured using six items based on prior literature (e.g., Levin and Cross 2004; Haas and Hansen 2007). Two items measure the extent to which the knowledge platform consolidates the knowledge they need to perform their tasks, two items measure how it enhances the quality of their tasks, and the other two remaining items reflect time and effort saved in performing their tasks. These items were tested and validated by key KM personnel.

DATA ANALYSIS AND RESULTS

We used partial least squares (PLS), a latent structural equation modeling (SEM) technique, to test the hypothesized relationships in our research model. PLS is a second-generation path analysis technique that uses a correlational, principal component-based approach to estimation. Prior studies cite PLS for its robustness in conducting causal-predictive analysis and its ability to handle deviations from normality (Ringle et al. 2012). We chose PLS because of its ability to handle model complexity and its robustness in handling deviations from normality. We modeled each multi-item construct as reflective of the latent variable. Following Podsakoff and Dalton (1987), we tested for common method bias by using a factor analysis procedure to search for a common method influence on all factors, and we found none. Additionally, the condition index and variance inflation factors (VIF) indicated that multicollinearity was not a problem, as the highest

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VIF was 1.06 (Mason and Perreault, 1991; Neter et al., 1990).

Correlations and descriptive statistics for all independent and dependent variables are presented in Tables 1 and 2. Individual hypotheses were tested using partial least squares with Smart PLS. Smart PLS is a path-modeling tool that is well-cited for highly complex predictive path models. There were two stages of data analysis. In stage 1, all the instruments were assessed in a measurement model for reliability and validity. In stage 2, the proposed model and hypotheses were tested, with the individual path coeffi-

cients and variance explained in the dependent variables examined in the structural model.

Measurement Model

The first step of PLS is to assess the convergent and discriminant validity of the measurement scales. Convergent validity was assessed according to the (1) reliability of items, (2) composite reliability of constructs, and (3) average variance extracted (AVE). Item reliability was assessed by each item's loading on its corresponding construct. A rule of thumb suggests that the

Construct	N° of items	Std Dev.	Cronbach alpha	CR	AVE
1. Identification	3	0.78	0.78	0.86	0.68
2. Collaboration	4	0.80	0.80	0.87	0.63
3. Knowledge Structure	4	0.81	0.81	0.87	0.57
4. Extrinsic Incentives	3	0.72	0.72	0.93	0.68
5. Knowledge Accessibility	3	0.89	0.89	0.92	0.86
6. Knowledge Comprehensiveness	6	0.91	0.91	0.89	0.73
7. Knowledge Contribution	3	0.84	0.84	0.84	0.76
8. Knowledge Adoption	3	0.86	0.86	0.91	0.78
9. Individual Performance	6	0.90	0.90	0.92	0.68

Table 1: Standard deviations, Cronbach alpha, composite reliability and AVE

Construct	1	2	3	4	5	6	7	8	9
1. Identification	**0.68**								
2. Collaboration	0.16	**0.63**							
3. Knowledge Structure	0.41	0.22	**0.57**						
4. Extrinsic Incentives	0.04	0.03	0.10	**0.68**					
5. Knowledge Accessibility	0.22	0.06	0.18	0.01	**0.86**				
6. Knowledge Attributes	0.28	0.1	0.4	0.09	0.12	**0.73**			
7. Knowledge Contribution	0.32	0.22	0.18	0.21	0.22	0.26	**0.76**		
8. Knowledge Adoption	0.21	0.12	0.19	0.01	0.32	0.28	0.32	**0.78**	
9. Knowledge Outcomes	0.24	0.18	0.15	0.03	0.26	0.25	0.22	0.40	**0.68**

Table 2: Shared variance (variance extracted) among constructs

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item loading should exceed 0.70. As seen in table 1, the loadings for all items exceeded 0.70 (Fornell and Larcker, 1981). Composite reliability is recommended to be 0.70 or higher. Table 1 shows that the composite reliabilities (CR) of all the constructs exceeded 0.70, with the lowest value being 0.84 for knowledge contribution. AVE measures the amount of variance that a construct captures from its indicators relative to the amount due to measurement error. It is recommended that it should exceed 0.50 (Chin, 1998). Table 1 shows that all the AVEs of all constructs exceeded 0.50, with the lowest value at 0.57. Hence, all three conditions for convergent validity were met.

Discriminant validity indicates the extent to which a given construct is different from other constructs. A criterion for adequate discriminant validity is that the construct should share more variance with its measures than with other constructs in the model (Barclay et al., 1995). We used Fornell and Larcker's recommendation that the square root of the AVE for each construct should exceed the correlations between this construct and all the other constructs (Chin, 1998).

In table 2, the boldface numbers on the diagonals are the AVEs. Off-diagonal elements are the correlations among constructs. All diagonal numbers are much greater than the corresponding off-diagonal ones, indicating satisfactory discriminant validity of all the constructs.

Another criterion for discriminant validity is that no measurement item should load more highly on any construct other than the construct it intends to measure. First, all questions were subjected to factor analysis to ensure that questions measuring each construct loaded more highly on their intended construct than on other constructs (Thompson et al.

1991). Second, the results indicate that all items had loadings above 0.7 on their respective constructs and cross-loadings below 0.5 thresholds of item reliability and discriminant validity, as recommended by Hair et al. (1998).

We tested the hypotheses by examining the size and significance of structural paths in the PLS analysis. The explanatory power of the structural model is evaluated by looking at the R^2 value of the dependent constructs: knowledge transfer and its outcomes. Because we consider *both* the contribution and adoption of knowledge from knowledge platforms, we present two sets of results. Next, we present results for knowledge contribution. To examine the specific hypotheses, we assessed the t-statistics for the standardized path coefficients and calculated p-values based on a two-tailed test with a significance level of 0.05. Table 3 presents the results of the PLS analysis used to test the model.

Mechanisms of Knowledge Contribution

The R^2 for the relationship between the mechanisms proposed and knowledge contribution was .463. We proposed direct links between knowledge structure (H1a), extrinsic incentives (H2a), collaboration (H3a), identification (H4a), and knowledge contribution in knowledge platforms. The paths between knowledge structure (b = 0.14, p < 0.01), collaboration (b = 0.27, p < 0.01), identification (b = 0.36, p < 0.01), and knowledge contribution were all positive and significant. However, H2a, which predicted that the existence of extrinsic incentives would relate positively to knowledge contribution, was not supported. The results from hypothesis testing are summarized in table 3.

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		Knowledge Transfer			
		Knowledge Contribution		Knowledge Adoption	
	Constructs		t-statistics		t-statistics
H1	Knowledge structure	0.14	2.86**	0.34	4.76***
H2	Extrinsic Incentives	n.s	n.s	n.s	n.s
H3	Collaboration	0.27	3.81**	0.21	2.94**
H4	Identification	0.36	6.79***	0.26	4.85***
H5	Knowledge Comprehensiveness	-	-	0.55	6.5***
H6	Knowledge Accessibility	-	-	0.31	5.2**

* $p < .05$, ** $p < .01$, *** $p < .001$.

Table 3: Mechanisms for Knowledge Transfer Results

Mechanisms of Knowledge Adoption

The R^2 for knowledge adoption was 0.234. We proposed direct links among knowledge structure (H1b), extrinsic incentives (H2b), collaboration (H3b), identification (H4b), knowledge accessibility (H5), knowledge comprehensiveness (H6), and the adoption of knowledge from knowledge platforms. The path between knowledge structure support and knowledge adoption is significant and positive ($b = 0.34$, $p < 0.01$). The paths between collaboration, identification and knowledge adoption were positive and significant ($b = 0.21$, $p < 0.01$) and ($b = 0.26$, $p < 0.01$). The other hypothesized relationships between knowledge accessibility, knowledge comprehensiveness and adoption were also supported, ($b = 0.31$, $p < 0.01$) and ($b = 0.55$, $p < 0.01$). Finally, H2b, which argued that extrinsic incentives would increase knowledge adoption, was not supported.

Link to individual performance

We finally find that knowledge contribution has a positive impact on knowledge adoption (H7, ($b = 0.29$, $p < 0.05$), which,

in turn, has a direct impact on individual performance. We find this hypothesis (H8) to be strongly significant ($R^2 = 0.64$; $b = 0.79$, $p < 0.05$).

DISCUSSION

Implications for Research

The existing knowledge management literature lacks empirical studies that investigate how governance mechanisms along with social mechanisms shape knowledge transfer and its effects at the individual level. We found that both knowledge contribution and adoption are influenced by social and governance mechanisms. Specifically, the results of this study provide evidence that the knowledge structure, which provide practices, policies and processes to manage the knowledge life cycle, shapes individual-level knowledge contribution and adoption behaviors. While several studies suggest that formal rules and processes for the storage of knowledge might lead to significant delays in knowledge contribution and less reactivity in

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the updating of knowledge (Alavi and Leidner, 2006), our results suggest otherwise. The processes, guidelines and practices for formatting and updating knowledge defined by the knowledge structure at Netco are perceived to facilitate engineers' knowledge transfer and influence not only knowledge adoption but also their level of contribution. Our interviews with engineers confirm that these guidelines and processes have been defined with consulting engineer teams based on a thorough analysis of their behaviors, providing the Network Consulting Engineer with a truly effective resource from which to leverage content. Updates on knowledge assets are customized depending on knowledge types, and the content management tool used to support these behaviors is perceived as user-friendly. These results suggest that the support of the knowledge structure to facilitate knowledge transfer practices and behaviors, rather than focus on rules and monitoring mechanisms itself should be a key area of focus for knowledge governance.

Our results also accord with prior studies suggesting that the organizational context (i.e., culture, climate and social influence) promote knowledge transfer (Phang et al. 2012). Specifically, we find identification (H3) to be a strong predictor of knowledge contribution and adoption, followed by the existence of collaborative norms (H4). These norms cause employees to regard their colleagues as partners rather than competitors and results in behaviors that create useful knowledge (Menon et al. 2006). The importance of these norms for engineers was also highlighted in many interviews. One respondent commented, "*We have the best engineers creating the best solutions to the toughest problems – a wealth of information readily available*". According to another respondent, "*Collaboration on delivering multiple design deliverables, leveraging the best available expert to maintain the quality of the deliverable to maximize the efficiency of delivery though advanced planning is an outstanding knowledge management cultural adoption. This cultural shift enables the team to manage the efficient delivery of expertise to customers, as well as drive increased profitability and efficiency in these accounts*". An implication of this result is that organizations seeking to improve knowledge transfer in the context of knowledge platforms would be well-served by pursuing initiatives intended to strengthen employees' level of identification with the organization. Identification is complex, and employees might possess multiple identities (Ashforth et al 2011). Several studies, for instance, suggest that group or workgroup identification is important for knowledge transfer (e.g., Kane, 2009). Others, how-

	Constructs	Knowledge adoption		Individual performance	
			t-statistic		t-statistic
H7	Knowledge contribution	0.28**	2.57	n.s	n.s
H8	Knowledge adoption	-	-	0.79***	15.98

* p <.05, ** p < .01, *** p < .001.

Table 4: Individual performance Results

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ever, have pointed to the fact that strong identification with the workgroup might lead group members to follow group norms even if they are in conflict with those of the larger organization (Van Knippenberg and Van Schie 2000).

Our study was not designed to test these explanations or to compare group and organizational identification and its effects on knowledge transfer, but given that the overall aim of the KM program was to enhance customer support, an outcome variable at the organizational level, and that the overall program is targeted to a population that extends around the world, a focus on organizational identification is more appropriate (Riketta and Dick 2005). Engineers' knowledge transfer was also positively influenced by collaboration norms (H3). Our interviews reveal that, historically, Netco's leaders have appreciated and recognized the importance of teamwork and collaboration; long before the firm formalized a knowledge management program, the company found ways to enhance collaboration, reduce barriers between organizations, and optimize the intellectual capital of its human assets. Annually measuring employee performance on teamwork and collaboration is one such example. Additionally, every quarter, the CEO recognized one organization for achieving the results functionally. The KM program and the knowledge structure build on this culture and emphasize key behaviors to support it.

With respect to the effects of extrinsic incentives on knowledge transfer, prior work has been unable to achieve consensus. Some work suggests that the presence of extrinsic incentives enhances knowledge transfer (Ba et al. 2001). Other work suggests that introducing extrinsic incentives for knowledge transfer tend to decrease individual-level contributions (Mendys-Kamphorst, 2004).

However, our analysis failed to find evidence that extrinsic incentives influence knowledge transfer and is in line with studies that suggest that presence of external incentives might not affect participation (e.g., Bock et al. 2005). A potential explication for this finding is that the level of identification and collaboration in our research site is very high, so even if there are extrinsic incentives offered for knowledge transfer, they do not shape individual knowledge transfer behavior. Another explanation of this result is that the relationship between extrinsic incentives and individual-level outcomes such as knowledge transfer is not linear and might take the form of an inverted-U function (Vroom, 1964). That is, participation is low when rewards are low, it reaches its maximum point under a moderate level of reward, and it drops off again even though the rewards are high. Though not definitive, our results suggest that research on extrinsic incentives should focus more on the temporal dimension, type and amount of extrinsic rewards offered rather than on existence of extrinsic rewards to be further able to disentangle their effects and achieve consensus. Insights can certainly be gained from experimental approaches, but a complete understanding of how these behaviors unfold must also consider how social mechanisms and intrinsic incentives directly influence individuals' choices.

Our results also find that knowledge accessibility (H5) and comprehensiveness (H6) are key to knowledge adoption. As it becomes easier to access knowledge through the knowledge platform and assess its specific attributes, its adoption increases. Interviews with executives confirm this issue: "*There are many ways to add baggage to a content repository in the hope of making the process easier. In fact,*

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the result is often added complexity and poorer system performance. Our objective was to make the platform as simple, attractive and intuitive as the tools they are used to, such as Google, Skype, etc. We implemented a search function with a far easier uploading mechanism, and all content is organized through metadata tagging to facilitate its location and adoption of the repository". Finally, as the adoption of knowledge from the knowledge platform increases, its outcomes at the individual level increase (H8). Our study reveals that knowledge adoption from knowledge platforms speeds up access to the knowledge engineers need to perform their task, shortens the time necessary to perform their work, and enhances its overall quality. By analyzing how governance and social mechanisms affect individual-level knowledge transfer behaviors and outcomes, we further our understanding of why some organizations' investments in knowledge lead to value creation while others do not (Reus et al. 2009).

Implications for Practice

Our findings have a few clear implications for knowledge management practice in organizations. First, to enhance employee productivity, managers must carefully consider the design of an integrated knowledge platform. Our model integrates and empirically tests the effects of various mechanisms on the knowledge transfer cycle and its effects at the individual level. Therefore, if the investment in a knowledge platform is made in the absence of these mechanisms that positively affect knowledge transfer, the firm might be better off by addressing these other issues first.

Second, firms must pay close attention to knowledge adoption and knowledge contribution. Often, firms use various aspects of knowledge contribution as an important metric of knowledge platforms' success. While knowledge contribution is certainly important (particularly as an antecedent of knowledge adoption), knowledge contribution alone cannot improve employee performance: the contributed knowledge must be effectively applied.

Third, our findings indicate the role of governance for knowledge transfer, especially knowledge structure's role in defining mechanisms, procedures and rules that affect both knowledge contribution and knowledge adoption. The implication is that management can positively influence knowledge transfer by deploying a knowledge structure and investing in mechanisms to shape both individual behaviors towards knowledge to contribute and to invest in tools to facilitate knowledge formatting, updates and search, which, in turn, raise the motivation of individuals to adopt knowledge.

Fourth, we find that organizational norms, especially identification and collaboration, have strong effects on both knowledge contribution and adoption. Managers should consequently favor an environment where these norms are considered as strategic for value creation. Intervening processes, specifically, those on how identification and collaboration norms are constructed and the factors that lead organizational members to focus on their shared fate, are also important. Our research also identifies how norms operate in conjunction with other important mechanisms to influence knowledge contribution and adoption and their subsequent outcomes.

Finally, firms must design knowledge platforms so that knowledge is easily accessible, search and content management tools are necessary to avoid the overload from which knowledge workers suffer

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when they try to locate useful knowledge for potential consideration. Once knowledge is located, its value is judged based on its key attributes; if they are perceived to be high, knowledge can be adopted and will contribute to individual performance by saving time and enhancing the quality of work.

Limitations and Research Opportunities

Similar to other studies, ours has a few limitations. Those limitations, however, offer future research opportunities. First, our study is conducted on a single firm that operates in an external environment with manageable uncertainty and equivocality and in which internal norms, especially collaboration and identification, are very strong. Our study therefore clarifies when knowledge investments are likely to have positive effects on value creation. However, because knowledge investment effects (positive or negative) are likely to vary widely across organizations, future research should replicate our findings in an organization with different norms surrounding knowledge transfer or compare firms with different internal (Cameron and Quinn, 2005) and external contexts (Reus et al. 2009).

Second, we limited the scope of this paper to organizational norms (i.e., identification and collaboration), future research may investigate professional and work group norms and how group versus organizational norms interact to affect individual- and group-level knowledge transfer behavior and its effects. Likewise, other governance mechanisms, such as management styles and practices, including building trusting relationships with key employees (Wang et al. 2009) and job design, might influence knowledge transfer behaviors and outcomes.

Third, past research has shown that value from knowledge platforms is dynamic and evolves as members learn, and develop various sources of expertise (Argote and Spektor, 2011). Future research relying on longitudinal studies should explore how the relative effects of knowledge transfer change and evolve over time. Finally, our research finds that the use of extrinsic incentives to promote knowledge transfer is not significant; however, we did not investigate different types of extrinsic incentives and whether their effects change over time. Future research can disentangle the effects of extrinsic incentives by comparing the effects of low- versus high-powered incentives through experimental design. Future research may also examine under what conditions extrinsic and intrinsic incentives operate and affect individual behaviors and outcomes, for example, how emerging incentive mechanisms designed to promote online reputation and status, where badges and virtual point systems are used, affect participation.

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APPENDIX 1: INTERVIEW GUIDE

1) What's your role/position in Netco? How long have you been in your current position?

2) Do you use the knowledge platform? If yes, how often and how do you use it?

3) Can you describe your experience as a contributor to the knowledge platform?

4) Can you describe your experience as an adopter of knowledge from the knowledge platform?

5) What drives you to contribute content in the knowledge platform?

6) What barriers limit your contribution to the knowledge platform?

7) What drives you to adopt knowledge available on the knowledge platform?

8) How do you assess the knowledge available on the knowledge platform?

9) What limits your adoption of knowledge available on the knowledge platform?

10) What benefits do you derive from your use of the knowledge platform?

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APPENDIX 2

We use the abbreviation KP to refer to Knowledge Platform in our survey items.

Table 5: Operationalization and measures of constructs

Constructs	Indicators	References
Collaboration (4 items)	- There is little collaboration among team members, tasks are individually delineated (Reverse Item) - There is a high level of cooperation between team members - People are willing to sacrifice their self-interest for the benefit of others - There is a high level of sharing between members.	Chatman and Flynn (2001)
Identification (3 items)	- This company's successes are my successes. - When someone praises my company, it feels like a personal compliment - When someone criticizes my organization, it feels like a personal insult	Mael & Ashforth, (1992) Hogg and Terry (2000)
Knowledge structure (4 items)	- The knowledge structure in my organization designs processes to facilitate knowledge transfer to the KP - The knowledge structure in my organization has clear rules for categorizing knowledge in the KP - The knowledge structure in my organization has clear policies for knowledge transfer. - The knowledge structure in my organization has defined formal peer review process to ensure that the documented knowledge is valid and relevant	Developed based on (Foss et al. 2012) and Turner and Makhija (2006)
Extrinsic Incentives (3 items)	- I will receive monetary rewards in return for my knowledge transfer. - I will receive additional points for promotion in return for my knowledge transfer - I can get better bonus for my knowledge transfer	Bock et al. (2005)
Knowledge Accessibility (3 items)	The KP allows information to be readily accessible to me -The KP makes knowledge very accessible -The KP makes knowledge easy to access	Adapted from Ryan et al. (2005)

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Knowledge Comprehensiveness (6 items)	- The KP provides you with a complete set of information -The KP includes comprehensive knowledge. - The KP provides you with all the knowledge you need -The knowledge with which I work is easy to write down - Others can easily grasp the meaning of the knowledge I contribute to the KB - I readily understand knowledge I find in the KP	Developed based on Turner and Makhija (2006)
Knowledge contribution (3 items)	- I frequently submit documents to be considered for the KP - I regularly use the KP to contribute knowledge related to my job - I contribute my experience and know-how through the knowledge platform	Kankanhalli (2005)
Knowledge adoption (3 items)	- I often access the KP to locate knowledge that is relevant to my wok - I regularly adopt the knowledge available in the KP - I apply the knowledge adopted from the KP to solve new problems	Developed based on Durisin and Todorova (2006), Zhang and Watts (2003)
Individual performance (6 items)	- The KP consolidates the knowledge I need to perform my task - The KP provides me with useful knowledge to conduct my work - The KP of the organization shortens the time I need to perform my job - The KP of the organization lets me rapidly access the knowledge I need to perform my duties - The KP of the organization greatly reduces the effort required to perform parts of my job. - The KP of the organization helps me do my job with a higher quality	Developed based on Haas & Hansen (2006), Cross and Parker (2004)

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