# Managing Inter-Organizational Knowledge Sharing

**Abstract**

Corporate knowledge is considered a crucial determinant of sustainable competitive advantage. Recent resource-leveraging strategies emphasize inter-firm collaboration and knowledge sharing *across* firm boundaries, however. This strategic paradox of protecting versus sharing knowledge suggests the need for new paradigms that reconcile intra- and inter-organizational knowledge sharing. Building on organizational collaboration and control theory, this paper investigates contingencies of inter-organizational knowledge sharing and proposes four configurations of inter-organizational knowledge sharing for managing the paradox. It concludes with a critical review, suggestions for further conceptual and empirical research, and implications for research and practice.

Keywords: Knowledge management, knowledge sharing, coordination and control, coopetition, inter-organizational relationships, paradox

## 1 Introduction

A resource-based view of strategic management emphasizes a firm's need for unique, internal resources and competencies (Nelson and Winter, 1982; Shenkar and Li, 1999; Weick and Westley, 1996). Here, corporate competencies and capabilities – in particular knowledge resources – enable sustainable dynamic adaptation and competitive advantage (Gomes and Dahab, 2010; Spender, 1998). Since Penrose (1995), the resource-based view has emphasized the role of knowledge as a vital enabler of competitive differentiation. Matusik and Hill (1998, p. 683) state that "firms increasingly rely on building and creating knowledge as a necessary condition to survive".

While the resource-based view relies on firm heterogeneity (Felin and Hesterly, 2007), knowledge sharing is an action that is likely to reduce such heterogeneity given that "*even small, incremental knowledge can distinguish an organization from its competitors*" (Cohen, 1998, p. 23). As a result, academics have been investigating knowledge sharing processes across organizational boundaries in recent years (Gerlach et al., 2015; Loebbecke et al., 1999; Newell, 2015; Verdecho et al., 2006). Increasingly, firms' competitive advantage depends on co-operating with partners and sharing resources (Foss et al., 2010) – a phenomenon that has been referred to as the extended resource-based view of the firm (Caldwell and Howard, 2010).

Knowledge sharing has been defined as "*the transfer of useful know-how or information across company lines*" (Appleyard, 1996, p. 138). Research on inter-firm knowledge sharing recognizes that firms are involved in multiple temporal or more permanent agreements for co-operation (Chang and Gurbaxani, 2012; Jones and Lichtenstein, 2008; Marabelli and Newell, 2012; Zimmermann and Ravishankar, 2014). It assesses the strategic implications of a firm's knowledge-involved interactions with its direct environment (Reve, 1990). Enabled by the emergence of advanced information and communication technologies, co-operation between firms on the same horizontal level in an industry, even amongst those without prior long-term relationships, has become common (Feller et al., 2013; Hardy et al., 2003). Moreover, vertical co-

operation between customers and vendors has changed the organization of supply chains (Rollins et al., 2011).

Yet inter-organizational knowledge sharing confronts firms with a paradox of dealing with contradictory requirements (Hamel et al., 1989; Smith and Lewis, 2011; van Fenema and Loebbecke, 2014). On the one hand, it may enhance total value-added as firms can translate unique, scarcely accessible resources from their partners into new business opportunities. On the other, it may affect the uniqueness and thus competitive contribution of a firm's knowledge repository. Hence, a potential conflict in the context of collaboration between competitors under 'co-opetition' arises (Gnyawali and Park, 2011; Wiener and Saunders, 2014; Young et al., 2012). Although there is increasing competitive advantage from joint learning, firms also need to secure their own competitive advantage (Gnyawali and Park, 2011). Up on this, current research has elaborated on inter-organizational knowledge sharing from a strategic and social perspective (e.g., Abou-Zeid, 2005; Salvetat et al., 2013); yet it pays little attention to addressing the competitive paradox of inter-organizational knowledge sharing to reap the benefits of cooperating without losing one's own advantage.

The objective of this conceptual paper is to unpack the ability to balance inter-firm knowledge sharing as a challenge of co-ordinating and controlling the behaviors of people *within* an organization, while co-ordinating and controlling knowledge sharing *between* organizations. Thus, the paper investigates inter-firm collaboration involving knowledge with assumed operational and business value beyond the context of any co-operative agreement. Instead of collaboration resulting in '*asset specificity*' (Williamson, 1985), the focus is on the inverse situation of making assets more generally available. The paper assumes that both parties can translate collaborative knowledge into adjacent or overlapping business capabilities and hence exploit additional opportunities beyond the collaboration. It suggests partially diverging interests between collaborating partners that trigger political as well as operational processes (Child and Rodrigues, 2011).

Moreover, the paper offers insight into the contingencies pertaining to knowledge sharing related to co-ordination and control mechanisms (Vlaar et al., 2006). These mechanisms extend to both intra- and inter-organizational knowledge sharing challenges. This work thus complements and extends the knowledge-based theory of the firm. It stresses, on the one hand, coordination of knowledge practices within organizational boundaries and, on the other, the complexity of inter-organizational knowledge sharing. Taken together, this approach contributes to the understanding of the paradoxical requirements of intra- and inter-organizational knowledge sharing.

The paper is organized as follows. It first investigates three contingency dimensions of inter-organizational knowledge sharing: types of knowledge (tacit and explicit), mode of knowledge sharing (unilateral or bilateral), and dynamics of knowledge sharing (intended and actual). Acknowledging the difference between sharing intention and actual sharing outcome, the paper subsequently focusses on inter- and intra-organizational co-ordination and control processes and their implications of four configurations of inter-organizational knowledge sharing. It concludes with implications for practice and for research.

## 2 Inter-Organizational Knowledge Sharing

Sharing knowledge across organizational boundaries has been studied in domains as diverse as new product development and software projects (Heisig, 2009; Majchrzak et al., 2005; Malhotra et al., 2001; Peng et al., 2013; Popovic et al., 2014; Vlaar et al., 2008). These studies tend to

focus on micro-level organizational practices such as interpersonal interactions, team-based structures, network ties, business intelligence, and challenges of remote communications. However, knowledge sharing represents a process at this micro-, but also at the meso-organizational and inter-organizational level (Lepak et al., 2007; Loebbecke et al., 1999; Shollo and Galliers, 2015). It translates micro practices constituting knowledge sharing into a phenomenon with strategic implications. To conceptualize this knowledge sharing, the paper distinguishes three dimensions of contingency: the types of knowledge, the direction of knowledge sharing, and the dynamics of knowledge sharing.

### *2.1 Knowledge Types*

This research pursues Grant's (1996b) suggestion of focusing on types of knowledge, their inherent characteristics, and their respective managerial consequences. Especially the distinction between explicit and tacit knowledge has influenced conceptual and empirical research on strategic and organizational knowledge management (Kogut and Zander, 1992; Nonaka and Takeuchi, 1995, von Krogh, 2009; von Krogh et al., 2001).

Knowledge is commonly distinguished as explicit or tacit (Berry and Broadbent, 1988; Nonaka, 1991; Polanyi, 1967). Explicit knowledge refers to concepts, information and insights that are specifiable and can be formalized in rules and procedures (Walsh and Dewar, 1987). Access, storage and transfer of this knowledge are achieved by corporate documents and information systems such as databases. For Dyer and Singh (1998) explicit knowledge may just be information. For Cohen (1998), knowledge is information in context, with information being subsumed into knowledge, considering it a form of explicit, formalized knowledge. Examples of explicit knowledge include detailed engineering specifications for software development or product manufacturing.

Implicit or tacit knowledge refers to less specifiable insights and skills that are 'embedded' in individuals or an organizational context (Weick and Westley, 1996). It is associated with experience and may be about 'human asset specificity'. Employees develop and refine collectively routines to achieve organizational adaptation and learning (Nelson and Winter, 1982). March and Simon (1958, p. 142) refer to 'programs' to describe these routines: "Most programs are stored in the minds of the employees who carry them out, or in the minds of superiors, subordinates, or associates. For many purposes, the simplest and most accurate way to discover what a person does is to ask him." Understanding and transferring this type of knowledge depends on direct participation and inclusion in the context where it resides (Tyre and von Hippel, 1997). Researchers refer to this phenomenon as 'stickiness' (e.g., Szulanski, 1996) and point to the arduous process of explaining tacit knowledge (Grant, 1996a).

In terms of integrating knowledge types into a typology of knowledge, James et al. (2013) distinguish between individual and collective knowledge (see also von Krogh 2009), between private and public knowledge (i.e., differentiating the owner of knowledge), component knowledge (knowing about work elements) and architectural knowledge (knowing about a complete process), as well as between tacit and explicit knowledge, without any knowledge type having exclusive characteristic. Architectural knowledge, for example, is considered as private, collective, and tacit.

Von Krogh (2012), and similarly Hislop (2013), contend that explicit and tacit (implicit) knowledge can further be dichotomized into individual and social knowledge. Von Krogh argues that the resulting four types – conscious, automatic, objectified and collective – may each need a different theory of firm use.

In order to differentiate between knowledge types, this paper adopts and extends Matusik and Hills' (1998) knowledge typology (Figure 1). Starting with the distinction between private (organization-specific) and public knowledge, the typology then builds on the distinctions between component versus architectural knowledge, individual versus collective knowledge, and tacit versus explicit knowledge. According to Matusik and Hill (1998), private knowledge includes component knowledge (discrete) and architectural knowledge (systemic). Component knowledge can reside in individuals or collectives. Architectural knowledge is likely to be distributed over a collective. The tacit/explicit sub-divisions of private knowledge display the characteristics of automatic, conscious, collective and objective. Such mappings are not one-to-one, but ought to assist in understanding the general characteristics of knowledge and the management contingencies that may be applied to each. Public knowledge is essentially property-based and discrete. It concerns component knowledge (not architectural knowledge) and resides in individuals. Explicit public knowledge has 'conscious' features while tacit public knowledge is automatic (see also Spender 1998, 1996). Private knowledge is more likely to be knowledge-based than property-based. Overall, this extended typology of Matusik and Hill (1998) encompasses seven knowledge categories and provides a starting point for assessing knowledge sharing contingencies.

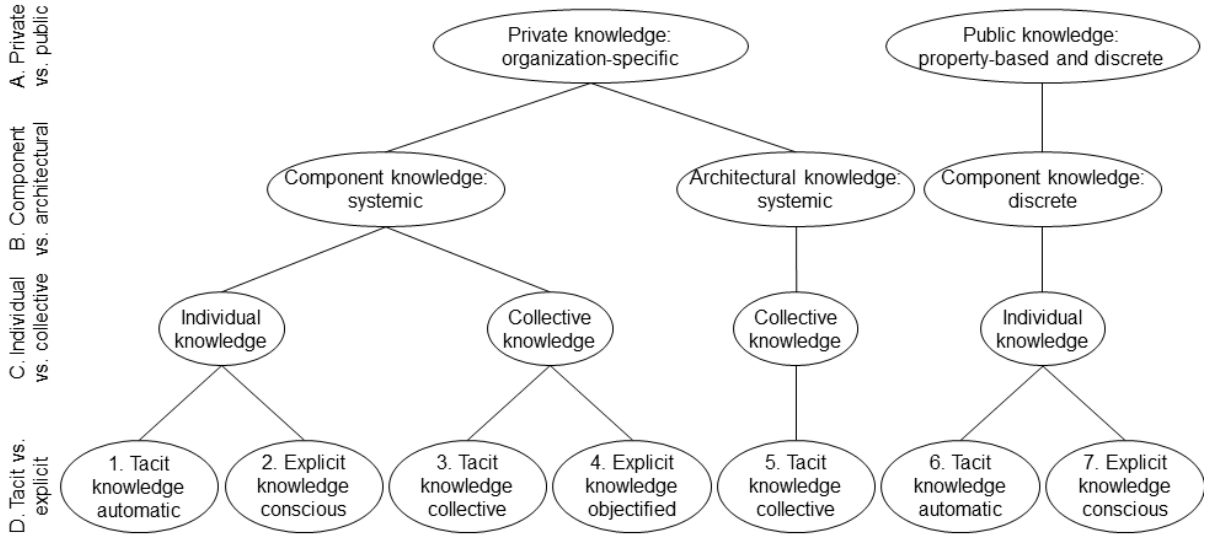


Figure 1. Knowledge Typology, after Matusik and Hill (1998)

### *2.2 Mode of Inter-Organizational Knowledge Sharing*

Knowledge sharing may be *unilateral* and take the characteristics of one-way traffic. For example, in an outsourcing agreement, clients share knowledge with their vendors to enable delivery of the product or service (Ko et al., 2005; Oshri et al., 2015). This does not necessarily mean that vendors will share their knowledge with clients, however. Unilateral knowledge

sharing typically occurs in organizations such as market researchers or news agencies whose business is selling knowledge and expertise. In other cases the underlying logic of collaboration suggests *bilateral* or reciprocal knowledge sharing (Vlaar et al., 2008). Reciprocal knowledge sharing is a principal determinant for reaping the anticipated benefits of co-operation synergies such as taking advantage of complementary knowledge and for creating knowledge synergistically. An example is the collaboration of R&D units involving joint investments of firms in development and manufacturing facilities.

On an operational level, unilateral and bilateral knowledge sharing are associated with different types of workflow inter-dependencies (Jasimuddin et al., 2012; Thompson, 1967). Unilateral knowledge sharing is of a pooled or sequential nature; it comprises steps of identifying and transferring, in a single direction, prior agreed-upon knowledge and information. However, pooled interdependence might be better thought of as indirect, bilateral sharing drawing from the same common pool. Bilateral knowledge sharing causes more complicated work-sharing arrangements, which require inter-firm taskforces of professionals to elaborate and control knowledge exchanges.

### *2.3 Strategic Dynamics of Inter-Organizational Knowledge Sharing*

Researchers (e.g., Dekker and van den Abbeele, 2010; Spencer, 2003) point to the dynamic nature of inter-organizational knowledge sharing as organizations adopt a variety of strategies, such as collaboration, competition, compromise, accommodation and avoidance (Jasimuddin et al., 2012; Larsson et al., 1998). This paper differentiates between two dynamics of inter-organizational knowledge sharing: (1) enlarging knowledge sharing beyond formalized agreements, and (2) changing the mode of knowledge sharing from unilateral to bilateral and vice versa.

*Enlarging knowledge sharing beyond formalized agreements.* Access to partners' knowledge repositories is a tempting opportunity to collect knowledge in excess of agreed-upon boundaries as defined in the contract. This may include collecting more knowledge of the same type parties had formalized or extracting a different type of knowledge – for example, tacit knowledge on top of the contractually justifiable and specified explicit knowledge. Here, the potential discrepancy between actual and intended knowledge sharing depends on the type of knowledge shared (Davison et al. 2013). Objectified and conscious (i.e., explicit individual or collective) knowledge can be more easily bounded than automatic and collective (tacit individual or collective) knowledge.

*Changing the mode of knowledge sharing from unilateral to bilateral and vice versa.* In instances of knowledge sharing, there will be countervailing forces. Firms that are engaged in unilateral knowledge sharing may try to make sharing bilateral, while those engaged in bilateral exchanges may be motivated to make the sharing unilateral (Figure 2).

Based on an organization's capability to integrate knowledge (Grant, 1996a), firms that are engaged in unilateral knowledge sharing attempt to maximize the process of absorbing information and developing internally unique know-how, while minimizing knowledge leakage into their direct environment. Over time, they may be motivated to make sharing bilateral so that they gain knowledge beyond the original agreement. From a co-ordination and workflow theory perspective, most outsourcing agreements suggest a unilateral type of workflow. However, the sustainability of this type of knowledge flow is contingent upon the client's need to adapt business and operational processes to changes in technologies or market developments. This, in

turn, may trigger bilateral knowledge sharing to adjust performances and expectations mutually (Marabelli and Newell, 2012; Thompson, 1967). Conversely, firms may formally agree upon collaboration and bilateral information sharing. This could underpin an agreement to engage in inter-organizational R&D collaboration (van de Ven, 2005). Divergent interests may nevertheless trigger attempts organizations on both sides to restrict the mutual knowledge sharing to unilateral inputs in order to retain as much of one's knowledge as one can while still fulfilling the contract. The resulting asymmetry could strengthen the organization's competitive position.

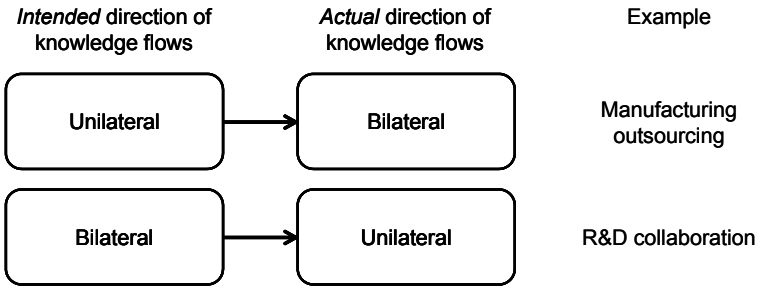


Figure 2. Intended versus actual unilateral and bilateral inter-organizational knowledge sharing

## 3 Co-ordination and control mechanism to tackle the knowledge sharing paradox

Research on strategic knowledge management has predominantly focused on cognitive processes within the firm boundaries, such as the conversion of tacit into explicit knowledge, the creation of knowledge, and the knowledge transfer and integration (e.g., Nonaka and Takeuchi, 1995; Snyman and Kruger, 2004). Sharing knowledge across organizational boundaries shifts the focus – in addition to close inter-firm contact, relational contracting and trust building (Powell, 1996) – onto co-ordination and control mechanisms to deal with the paradox of sharing and protecting knowledge (Gupta and Polonsky, 2013; Smith and Lewis, 2011; Trkman and Desouza, 2012; van Fenema and Loebbecke, 2014).

Following Caker (2008), this research applies four types of co-ordination and control mechanisms – structural, procedural, technical, or social – to inter-organizational knowledge sharing. These form part of what Lorenzoni and Lipparini (1999) term the architecture of inter-firm governance mechanisms. Each mechanism has a role to play in coordinating and controlling the paradoxical challenge of inter-organizational knowledge sharing. While interacting and not mutually exclusive, their usefulness for different type of knowledge exchange varies. Whilst explicit knowledge exchange is based mainly on procedure and structure, social co-ordination comes to the fore in tacit knowledge sharing. The sophistication of the technical co-ordination available especially modifies the roles of the other co-ordination types by allowing more, rapid, detailed, interactive communication across time and geography. Further, technical control can have a surveillance effect substituting for other coordination mechanisms (Jain and Thietart, 2013).

- *Structural co-ordination and control* is beneficial when there is increased risk of opportunistic behavior (i.e., where Williamson (1990) proposes hierarchy instead of markets or contracts). Further, intermediate (between intra- and inter-organizational) forms like joint ventures might be appropriate. The mechanism relies on hierarchy, team structure and liaison; it is neither useful for the exchange of tacit knowledge as this is embedded and transfer relies

on experience, nor is it fruitful for knowledge that is held by an individual or that is architectural (Carlile, 2004).

- *Procedural co-ordination and control,* including standards and contracts, is appropriate for explicit, specifiable knowledge, which allows for specifying and limiting what knowledge might be exchanged. This mechanism includes commitment to professional standards for dealing with sensitive information. However, as it does not guarantee conformance. It may cause a control problem betweenorganizations unless the contract provides insufficient remedy for post-project opportunistic behavior (Sobrero and Schrader, 1998). According to Williamson (1990), control between organizations is more difficult than within organizations.
- *Technical co-ordination and control* applies if the knowledge is put in systems which grant different levels of controlled access. Researchers have elaborated on technologies and related organizational mechanisms to manage risks (Majchrzak and Jarvenpaa, 2010; Marabelli and Newell, 2012). The mechanism appears to have the same characteristics as procedural co-ordination. It is useful for explicit, public, private and component knowledge, but unlikely to facilitate the management of the other knowledge types.
- *Social co-ordination and control* may take the form of relational contracting, personal relationships, team working and trust building. The mechanism is likely to be used at some level for any knowledge exchange involving direct human interaction. Extensive use of this mechanism, though, will always be costly, and might conflict with the temporal aspect of cooperation. Ensuring mutually beneficial inter-organizational knowledge sharing requires close inter-firm contact, relational contracting and trust building (Powell, 1996; Sobrero and Schrader, 1998).

Overall, while structural, technical and procedural mechanisms can be employed for explicit, component, public and private knowledge, all dominant knowledge types require some level of social coordination and control. Such inter-personal interaction is more likely to result in unintended knowledge sharing than any of the other mechanisms. Hence, when organizations seek to manage paradoxical requirements of sharing knowledge in a balanced manner, unintended sharing jeopardizes the achievement of such a balance – and, ultimately, unintended knowledge sharing could jeopardize firm interests.

The paper has, thus far, identified the types of knowledge that firms may need to share, it has acknowledged the modes of inter-organizational knowledge sharing, and the dynamics of that sharing. Given these, this section focused on co-ordination and control mechanisms for sharing knowledge and identified the sharing 'paradox'. The next section seeks to integrate these by understanding the contingent nature of the configurations of inter-firm knowledge sharing.

## 4 Configurations of Inter-Organizational Knowledge Sharing

Contingency theory seeks to explain variations in the structuring of organizations and their performance by the characteristics of the task technology and environment (Pennings, 1992). Co-ordination and control theory has been structured by a contingency perspective. The common notion of 'knowledge work' refers to tasks being non-routine, cognitive, and interdependent (Purser and Montuori, 1995). Hence, researching the co-ordination and control of such tasks suggests adopting task contingencies that reflect the knowledge characteristics, here tacit and explicit. The inter-firm dimension of work-flows suggest a focus on two types of co-ordination and control mechanisms depending on their focus on unilateral or bilateral knowledge sharing (Gittell and Weiss, 2004).

Table 1 applies unilateral and bilateral knowledge sharing to explicit and tacit knowledge and results in four configurations of inter-organizational knowledge sharing. This section now elaborates on each configuration in light of the two strategic dynamics of inter-organizational knowledge sharing.

Table 1. Configurations of Inter-Organizational Knowledge Sharing

| | **Unilateral knowledge sharing** | **Bilateral knowledge sharing** |
|---|---|---|
| **Tacit knowledge** | Outsourcing strategies: Client-supplier software specifications | Exchange of complementary market research information between competitors |
| **Explicit knowledge** | Client-supplier nexus in automotive industry | Collaboration of R&D units in semi-conductor industry |

### *4.1 Unilateral Sharing of Explicit Knowledge*

Unilateral sharing of explicit knowledge is most likely in vendor-client situations that involve paying for a specific good or service. Paradoxical requirements concentrate on the unilaterally sharing organization giving more than required for its own value. In a strategy aimed at concentrating and nurturing core competencies, firms increasingly outsource peripheral business services like IT projects, marketing, and investment management (Dedrick and Kraemer, 2010; Trusson et al., 2014). Vendor firms need corporate knowledge and information to provide services. Client firms will allow vendors to pull from their know-how repository to the extent that this is a prerequisite for executing outsourcing services.

The explicit character of shared knowledge allows for detailed and comprehensive description, codification and formalization of unilateral inter-firm knowledge sharing. Explicit knowledge is most easily protected by law. This results in transparency for both firms as to (1) which knowledge will (not) be shared, and (2) how the transfer process will be organized (Liu and Aron, 2014.). The former refers to the completeness of the contract and facilitates internal guidelines and task assignments to collect and prepare the knowledge for sharing (Leidner, 2010). The latter makes it possible to define the transfer modes and planning. The articulated character of the knowledge enables transfer modes with low information processing capacity, such as document hand-overs or limited access to corporate databases (Carlile, 2004) - that is, technical co-ordination.

Considering the issue of enlarging knowledge sharing beyond formalized agreements, vendors focused on a particular industry that serve clients that compete with one another may build increasingly sophisticated industry-specific knowledge and use it synergistically in their network. If a client's knowledge is leveraged to the vendor's clientele, it becomes a commonly-shared good and may lose its uniqueness (and thereby perhaps becoming public knowledge). Second, vendors may collect industry specific know-how to strengthen their competitive position. This may enable a strategy of bypassing clients and entering their markets. Client firms may attempt to trigger knowledge sharing in the opposite direction by requiring vendors to display their internal competencies. Incorporation of this know-how decreases the uniqueness of the vendor's performance and hence its competitive position.

### *4.2 Bilateral Sharing of Explicit Knowledge*

A presence in, and knowledge of, local markets often differs between firms that otherwise have comparable R&D and marketing competencies. In order to enable both firms to leverage their competencies, exchange of such complementary local knowledge often appears to be a viable strategy. This may trigger a process of exchanging, for example, marketing and sales information, knowledge of local business opportunities and economic developments, and information on quality procedures, factory operations, IT or business models, and product or process designs (Hevner et al., 2010), as well as regulatory requirements. Both organizations face a *quid pro quo* balancing act of sharing and receiving knowledge. They strive for extensions to their competitive advantage without diluting their unique resources. The explicitness of knowledge allows for similar strategies as those outlined in the previous section. That is, comprehensive contracts specify the contents and procedures for knowledge transfer. Internally, explicit guidelines and task partitioning define the organizational expectations for collecting and formatting the transferable know-how. Reciprocity of knowledge sharing provides for a more complicated knowledge transfer process. The collaborative agreement stresses the reciprocity and equivalence of firms' expected performances. However, in practice, each partner may be tempted to unilaterally enhance the added value from the cooperation (Loebbecke et al., 1999). This comprises strategies aimed at decreasing the amount and value of the information that an organization shares. In addition, from a recipient's point of view, it suggests attempts to increase the amount and value of incoming sharing. For example, a firm may ask for clarifications and additional contextual information beyond the knowledge sharing covered by the formalized agreement.

The reciprocal character of bilateral knowledge sharing implies adaptations of co-ordination and control mechanisms; the contract not only comprises specifications for managing unilateral knowledge sharing. In addition, the *quid pro quo* character suggests interdependence between the work sharing and thus exacerbates the needs for co-ordination (Crowston, 1997). Contracts will therefore contain stipulations defining the modes of intertwining knowledge exchange and mutually dependent planning of intermediate deliveries. In practice, the reciprocal dependence necessitates frequent meetings between firm representatives to provide feedback and mutually to adjust corporate performances (van de Ven and Delbecq, 1976). Even with explicit knowledge, social mechanisms are required to complement bureaucratic and contractual mechanisms (Vlaar et al., 2006). Internally, the contractual clauses are complemented by, and translated into, bureaucratic guidelines (Jaeger and Baliga, 1985).

### *4.3 Unilateral Sharing of Tacit Knowledge*

This section analyses the unilateral adaptive behavior of a supplier to the client's processes. This induces the client to share knowledge that is intricate, contextual and tacit, enabling adjustment and integration of the supplier's business and operational processes. The fine line of sharing sufficiently, but not too much, becomes ambiguous and uncertain - and hence, difficult to manage.

It may be that the '*supplier*' and '*client*' are both members of a joint venture, but the knowledge flow is unilateral as often happens in relationships between dominant customers and small firms (Levy et al., 1999; Oxley and Wada, 2009). The tacit dimension of unilateral inter-firm work sharing provides for ambiguity and uncertainty. Consequently, firms are limited in their capacity to specify and contractually formalize reciprocal behaviors considered appropriate versus those

deemed illegitimate. This means that the transfer of the supplier's contextual knowledge requires frequent face-to-face interaction between supplier and client personnel (von Hippel, 1994).

Interfirm workflow characteristics amplify the strategic dynamics. The supplier's legitimate access to tacit knowledge sustains gaining in-depth understanding of the client's competencies and integrative capabilities (Grant, 1996b). If the supplier has connections to firms competing with the client organization, this access becomes somewhat undesirable. The supplier may then share, leverage or even sell their understanding to these competing firms. For the supplier, this is a tempting option as tacit knowledge is assumed to provide more intricate and, thus, valuable information. Alternatively, under the guise of a temporary role as supplier, a firm can copy clients' competencies and subsequently intrude on their market (Hamel et al., 1989). In turn, clients may attempt to modify the knowledge flow from unilateral to bilateral or vice versa and trigger opposite sharing of know-how from their suppliers. Reciprocal sharing enables them to decrease the uniqueness of the client's competencies and invade the supplier's business. Reputation effects may act as a counter to the temptation to enlarge knowledge sharing, however.

Both sources of strategic dynamics suggest exacerbated and specific needs for co-ordination and control modes. But the goal is to achieve a balance in the paradoxical requirements of knowledge sharing and knowledge protecting. Contextual, non-articulable knowledge provides for transaction uncertainty and is, therefore, probably not contractable in a comprehensive manner (Williamson, 1991). Informal safeguards take much longer to establish and operate effectively. Several strategies are at the client's disposal to co-ordinate and control this exchange process and hedge for undesirable dynamics. The clients can limit the time and connections for supplier personnel in collecting the knowledge they need. Further, they can manage the partially-internal process of collecting and transferring tacit knowledge, that is centralize know-how handovers by assigning formal gatekeepers. For the supplier, those liaisons provide an exclusive gateway to corporate knowledge. For internal personnel, they are the focal point for collecting knowledge and managing the transfer process.

### *4.4 Bilateral Sharing of Tacit Knowledge*

The analysis in this section focuses on tacit, reciprocal knowledge sharing between firms. The strategic dynamics of bilateral tacit knowledge sharing concern the 'equality' of knowledge sharing. An assumption is that firms equally participate in, and contribute to, a co-operative agreement with respect to, for example, the quality and added value of know-how. However, the leveragability of the information being shared and firms' partially conflicting interests may tempt them to deviate from the initial agreement. Tensions easily arise, with the potential of escalating uncertainty and distrust (Hsu and Chang, 2014; Lewis, 2000). Examples are strategies to deliver limited and possibly inaccurate information, combined with enhancing the reception of valuable knowledge, that is effective intra-organizational knowledge strategies.

Managing the cost/benefit dynamics is hampered by the tacitness and reciprocity of knowledge exchange. The former impedes – as indicated – *ex ante* specification of the know-how content and procedure for transferring. Implications of the latter are more complicated. Reciprocity of work-sharing necessitates intensive interdependence and interaction between professionals from both firms. To sustain these increased information processing needs, prior research proposes group modes of coordinating work (e.g., van de Ven and Delbecq, 1976). In practice, partners will organize inter-firm task forces or project teams to foster synergetic knowledge exchange and creation (Majchrzak and Jarvenpaa, 2010). Firms would like to be able to specify task force membership from all parties. The first '*battle-ground*' is in the choice of individuals to put into

inter-organizational teams, since project team members will import and export both public and private knowledge. Firms might best view task force members, both from their partner organizations and from their own, as contingent workers. Matusik and Hill (1998) analyze the management of contingent workers so as to maximize knowledge creation. Firms need to limit the ability of contingent workers leaking private knowledge into the public domain. Matusik and Hill (1998) suggest that knowledge gains from contingent workers is maximized by picking contingent workers with strong public knowledge, by the firm striving to integrate the knowledge, perceiving it as useful, motivating contingent workers to transfer knowledge and 'home' workers to be receptive, and focusing on the firm's knowledge absorption capabilities. Yet, any attempt to introduce knowledge protection mechanisms into the firm is likely to impede communication and any infrastructural changes to protect knowledge are likely to become rapidly obsolete (Liebeskind, 1996).

In order to make teams work effectively, subsequent stages of socialization and interpersonal contacts are required (Katzenbach and Smith, 1993). These dynamics should yield strong feelings of collegiality and commitment to the group's functioning (McGrath, 1994). Such a context induces team members to share their know-how as a mode for reciprocally co-ordinating teamwork. From the firm's perspective, however, a different rationality may prevail. Team-centered commitments may conflict with the interests of the firms. Apart from commitments, the connection between project members working in inter-organizational teams and their firm also features issues related to knowledge sharing.

Taken together, this configuration provides for a complicated co-ordination and control context in the sense of co-operating organizations failing to balance their paradoxical requirements. Formalized contractual agreements and internal corporate task-based controls seem to cover little know-how content and few transfer procedures, as formal co-ordination modes cannot comprehensively capture the mutual contingencies introduced by reciprocal task interdependence (McCann and Galbraith, 1981). Hence, the inevitably incomplete contractual statements and internal bureaucratic procedures must be complemented with people-based strategies.

This section has identified four configurations of knowledge sharing between firms and the contingencies involved thereof. The final section of this paper seeks to draw together the threads of this research.

## 5 Discussion, Conclusions and Implications

Managing knowledge and information processes plays an increasingly prominent role in achieving sustainable competitive advantage. For three decades, strategic management and organization theory reflect on the necessity to develop and apply novel, integrative conceptual perspectives (e.g., Grant, 1996b). In conjunction with conceptualizations on intra-organizational knowledge processes (Nonaka and Takeuchi, 1995; Szulanski, 1996), scholars have started to explore the intricacies of managing knowledge sharing among firms (Lia et al., 2006; Loebbecke et al., 1999; Wiener and Saunders, 2014; Yaoa et al., 2007). This paper contributes to this work by elaborating on two contingencies of managing inter-firm knowledge sharing: (1) the type of knowledge firms share (explicit or tacit) and (2) the mode of knowledge sharing between organizations (unilateral or bilateral). These contingencies yield four configurations of knowledge sharing. Derived from insights in the coordination and control literature, this work proposes management approaches geared to address the four configurations.

The configurations and management approaches of inter-organizational knowledge sharing offer a useful contribution to practitioners and academics.. They provide professionals involved in business processes or projects crossing their organization's boundaries with insights and guidelines to manage and anticipate opportunities and pitfalls. Based on an assessment of the type and direction of knowledge sharing, they can develop, implement, and fine-tune intra-, and especially inter-organizational, co-ordination and control modes. From an academic perspective, analyzing the four configurations suggests a role for externally-oriented corporate competencies that complement more internally-oriented competencies aimed at the transfer, integration and creation of knowledge (Kale et al., 2002; Szulanski, 1996). Extending the current literature on inter-organizational knowledge sharing, the analysis shows that – even with explicit knowledge – co-ordination and control challenges will arise beyond mere codification and bureaucratic, or contractual, control (Dekker, 2004; Hadaya and Cassivi, 2012).

Firms involved in inter-firm knowledge sharing need to develop capabilities and routines to understand and handle complex knowledge sharing across their boundaries. This will result in opportunities for further research in the context of strategic information systems (IS). For instance, by distinguishing the seven knowledge types shown in Figure 1, it is possible to conjecture IS requirements to adequately support inter-organizational knowledge sharing efforts or a ranking of the costs at which knowledge may be shared. Moreover, the relative size and power of co-operating organizations as well as an analysis of complementary outsourcing arrangements warrant further investigation. Extending research into large organizations acquisition of smaller firms (Puranam et al., 2006), size and power may influence the mode (unilateral or bilateral) of knowledge sharing and the requisite co-ordination and control mechanisms.

As in any effort of contributing to theory building, limitations need to be taken into account. For instance, reading the knowledge typology (Figure 1), it is clear that, in practice, most knowledge cannot be compartmentalized into discrete categories; it will span a number of dimensions. Thus, the interest is in the dominant characteristics of any piece of knowledge so as to allow investigation of the associated coordination and control aspects. The paper recognizes the limitations of suggesting such a rather fine granularity when it comes to developing practical implications. Similarly, the set of contingencies and the resulting large number of possible configurations (four of which are investigated here) necessarily lead to fine distinctions in management strategies, which are difficult to implement as such in practice. This should not constrain researchers from demonstrating the full spectrum and then applying themselves to the task of developing meaningful and implementable aggregations.

In order to bridge between the various theoretical research contributions and the real world, the paper concludes – in line with scholars from adjacent research foci and disciplines (Galliers et al., 2012; Peppard et al., 2014; Whittington, 2014) – with a plea for insights into challenges and opportunities in the field of inter-organizational knowledge sharing on practical projects and implementations. As a start, and as an impetus to further endeavors, this paper provides the beginnings of a theory of managing inter-firm knowledge sharing. The next stages require: further refinement of the conceptual model and extension and integration with related theories such as economic theories, recent developments in organization theory such as complexity theory, strategic management theories, and by no means last, IS and social media theories. In parallel, empirical research may start to investigate a set of hypotheses based on the configuration theory outlined in this paper. This may include survey-type of research based on for instance inter-

organizational cooperation in a particular industry or associated with an institutional field. Case study research could focus on (transitions between) particular configurations in dyadic or multi-party cooperation.

!!!PP: please help?!!!

**References**


Abou-Zeid, E., 2005. A culturally aware model of inter-organizational knowledge transfer. Knowledge Management Research & Practice 3 (3), 146-155.

Appleyard, M., 1996. How does knowledge flow? Interfirm patterns in the semiconductor industry. Strategic Management Journal 17 (Winter Special Issue), 137-154.

Berry, D., Broadbent, D., 1988. Interactive tasks and the implicit-explicit distinction. British Journal of Psychology 79 (2), 251-272.

Caker, M., 2008. Intertwined coordination mechanisms in interorganizational relationships with dominated suppliers. Management Accounting Research 19 (3), 231-251.

Caldwell, N., Howard, M., 2010. Procuring Complex Performance: studies of Innovation in Product-Service Management. Routledge, Oxford.

Carlile, P., 2004. Transferring, translating, and transforming: an integrative framework for managing knowledge across boundaries. Organization Science 15 (5), 555-568.

Chang, Y., Gurbaxani, V., 2012. Information technology outsourcing, knowledge transfer, and firm productivity: an empirical analysis. MIS Quarterly 36 (4), 1043-1053.

Child, J., Rodrigues, S., 2011. How organizations engage with external complexity: a political action perspective. Organization Studies 32 (6), 803-824.

Cohen, D., 1998. Towards a knowledge context. California Management Review 40 (3), 22-39.

Crowston, K., 1997. A co-ordination theory approach to organizational process design. Organization Science 8 (2), 157-175.

Davison, R., Ou, C., Martinsons, M., 2013. Information technology to support informal knowledge sharing. Information Systems Journal 23 (1), 89-109.

Dedrick, J., Kraemer, K., 2010. Impacts of internal and interorganizational information systems on the outsourcing of manufacturing, Journal of Strategic Information Systems 19 (2), 78-95.

Dekker, H., 2004. Control of inter-organizational relationships: evidence on appropriation concerns and coordination requirements. Accounting, Organizations and Society 29 (1), 27-49.

Dekker, H., van den Abbeele, A., 2010. Organizational Learning and Interfirm Control: the Effects of Partner Search and Prior Exchange Experiences. Organization Science 21 (6), 1233-1250.

Dyer, J., Singh, H., 1998. The relational view: cooperative strategy and sources of inter-organizational competitive advantage. Academy of Management Review 23 (4), 660-679.

Felin, T., Hesterly, W., 2007. The knowledge-based view, nested heterogeneity, and new value creation: philosophical considerations on the locus of knowledge. Academy of Management Review 32 (1), 195-218.

Feller, J., Parhankangas, A., Smeds, R., Jaatinen, M., 2013. How companies learn to collaborate: emergence of improved inter-organizational processes in R&D alliances. Organization Studies 34 (3), 313-343.

Foss, N., Husted, K., Michailova, S., 2010. Governing knowledge sharing in organizations: levels of analysis, governance mechanisms, and research directions. Journal of Management Studies 47 (3), 455-482.

Galliers, R., Jarvenpaa, S., Chan, Y., Lyytinen, K., 2012. Strategic information systems: reflections and prospectives. Journal of Strategic Information Systems 21 (2), 85-90.

Gerlach, J., Widjaja, T., Buxmann, P., 2015. Handle with care: how online social network providers' privacy policies impact users' information sharing behavior. Journal of Strategic Information Systems 24 (1), 33-43.

Gittell, J., Weiss, L., 2004. Coordination networks within and across organizations: a multi-level framework, Journal of Management Studies 41 (1), 127-153.

Gnyawali, D., Park, B., 2011. Co-opetition between giants: collaboration with competitors for technological innovation. Research Policy 40 (5), 650-663.

Gomes, P., Dahab, S., 2010. Bundling resources across supply chain dyads: the role of modularity and coordination capabilities. Journal of Operations & Production Management 30 (1), 57-74.

Grant, R., 1996a. Prospering in dynamically-competitive environments: organizational capability as knowledge integration. Organization Science 7 (4), 375-387.

Grant, R., 1996b. Toward a knowledge-based theory of the firm. Strategic Management Journal 17 (Special Issue), 109-122.

Gupta, S., Polonsky, M., 2013. Inter-firm Learning and Knowledge-Sharing in Multinational Networks: an Outsourced Organization's Perspective. Journal of Business Research 67 (4), 615-622.

Hadaya, P., Cassivi, L., 2012. Joint collaborative planning as a governance mechanism to strengthen the chain of IT value co-creation. Journal of Strategic Information Systems 21 (3), 182-200.

Hamel, G., Doz, Y., Prahalad, C., 1989. Collaborate with your competitors - and win. Harvard Business Review 67 (1), 133-139.

Hardy, C., Phillips, N., Lawrence, T., 2003. Resources, knowledge and influence: the organizational effects of interorganizational collaboration. Journal of Management Studies 40 (2), 321-347.

Heisig, P., 2009. Harmonisation of knowledge management – comparing 160 KM frameworks around the globe. Journal of Knowledge Management 13 (4), 4-31.

Hevner, A., Zhang, D., Zhao, J., 2010. Introduction to the special issue on modeling and implementation of service enterprise systems. IEEE Computer Society 3 (2), 86-88.

Hislop, D., 2013. Knowledge management in organizations: a critical introduction. Oxford University Press, Oxford.

Hsu, M., Chang, C., 2014. Examining interpersonal trust as a facilitator and uncertainty as an inhibitor of intra-organisational knowledge sharing. Information Systems Journal 24 (2), 119-142.

Jaeger, A., Baliga, B., 1985. Control systems and strategic adaption: lessons from the Japanese experience. Strategic Management Journal 6 (2), 115-134.

Jain, A., Thietart, R., 2013. Knowledge based transactions and decision framing in Information Technology Outsourcing. Journal of Strategic Information Systems 22 (4), 315-327.

James, L., Guile, D., Unwin, L., 2013. Learning and innovation in the knowledge-based economy: Beyond clusters and qualifications. Journal of Education and Work 26 (3), 243-266.

Jasimuddin, S., Connell, N., Klein, J., 2012. Knowledge transfer frameworks: an extension incorporating knowledge repositories and knowledge administration. Information Systems Journal 22 (3), 195-209.

Jones, C., Lichtenstein, B., 2008. Temporary inter-organizational projects: how temporal and social embeddedness enhance coordination and manage uncertainty, in: Cropper, S., Ebers, M., Huxham, C., Smith Ring, P. (Eds.), The Oxford Handbook of Inter-Organizational Relations. Oxford University Press, Oxford, 231-255.

Kale, P., Dyer, J., Singh, H., 2002. Alliance capability, stock market response, and long-term alliance success: the role of the alliance function. Strategic Management Journal 23 (8), 747-767.

Katzenbach, J., Smith, D., 1993. The wisdom of teams: creating the high-performance organization. Harvard Business School Press, Boston.

Ko, D., Kirsch, L., King, W., 2005. Antecedents of knowledge transfer from consultants to clients in enterprise system implementations. MIS Quarterly 29 (1), 59-85.

Kogut, B., Zander, U., 1992. Knowledge of the firm, combinative capabilities and the replication of technology. Organization Studies 3 (3), 383-397.

Larsson, R., Bengtsson, L., Henriksson, K., Sparks, J., 1998. The interorganizational learning dilemma: collective knowledge development in strategic alliances. Organization Science 9 (3), 285-305.

Leidner, D., 2010. Globalization, culture, and information: towards global knowledge transparency. Journal of Strategic Information Systems 19 (2), 69-77.

Lepak, D., Smith, K., Taylor, M., 2007. Value creation and value capture: a multilevel perspective. Academy of Management Review 32 (1), 180-194.

Levy, M., Powell, P., Galliers, R., 1999. Assessing information systems strategy development frameworks in SMEs. Information and Management 36 (5), 247-261.

Lewis, M., 2000. Exploring paradox: towards a more comprehensive guide. Academy of Management Review 25 (4), 760-775.

Lia, J., Sikorab, R., Shawa, M., Tan, G., 2006. A strategic analysis of interorganizational information sharing. Decision Support Systems 42 (1), 251-266.

Liebeskind, J., 1996. Knowledge, strategy and the theory of the firm. Strategic Management Journal 17 (Special Issue), 93-107.

Liu, Y., Aron, R., 2014. Organizational control, incentive contracts, and knowledge transfer in offshore business process outsourcing. Information Systems Research 26 (1), 81-99.

Loebbecke, C., van Fenema, P., Powell, P., 1999. Co-opetition and knowledge transfer. The Data Base for Advances in Information Systems 30 (2), 14-25

Lorenzoni, G., Lipparini, A., 1999. The leveraging of interfirm relationships as a distinct organizational capability. Strategic Management Journal 20 (4), 317-338.

Majchrzak, A., Beath, C., Lim, R., Chin, W., 2005. Managing client dialogues during information systems design to facilitate client learning. MIS Quarterly 29 (4), 653-672.

Majchrzak, A., Jarvenpaa, S., 2010. Safe contexts for interorganizational collaborations among Homeland Security professionals. Journal of Management Information Systems 27 (2), 55-86.

Malhotra, A., Majchrzak, R., Carman, R., Lott, V., 2001. Radical innovation without collocation: a case study at Boeing-Rocketdyne. MIS Quarterly 25 (2), 229-249.
Marabelli, M., Newell, S., 2012. Knowledge risks in organizational networks: the practice perspective. Journal of Strategic Information Systems 21(1), 18-30.
March, J., Simon, H., 1958. Organizations. John Wiley & Sons, New York.
Matusik, S., Hill, C., 1998. The utilization of contingent work, knowledge creation and competitive advantage. Academy of Management Review 23 (4), 680-697.
McCann, J., Galbraith, J., 1981. Interpersonal relations, in: Nystrom, P., Starbuck, W. (Eds.), Handbook of Organizational Design. Oxford University Press, Oxford, 60-84.
McGrath, J., 1994. Groups: Interaction and Performance. Prentice-Hall, Englewood Cliffs.
Nelson, R., Winter, S., 1982. An Evolutionary Theory of Economic Change. Belknap Press, Cambridge, MA.
Newell, S., 2015. Managing knowledge and managing knowledge work: what we know and what the future holds. Journal of Information Technology 30 (1), 1-17.
Nonaka, I., 1991. The Knowledge-Creating Company, Harvard Business Review 69 (6), 96-104.
Nonaka, I., Takeuchi, H., 1995. The Knowledge-Creating Company. Oxford University Press, New York, NY.
Oshri, I., Kotlarsky, J., Gerbasi, A., 2015. Strategic innovation through outsourcing: the role of relational and contractual governance. Journal of Strategic Information Systems 24 (3), 203-216.
Oxley, J., Wada, T., 2009. Alliance structure and the scope of knowledge transfer: evidence from U.S.-Japan agreements. Management Science 55 (4), 635-649.
Peng, G., Wan, Y., Woodlock, P., 2013. Network ties and the success of open source software development. Journal of Strategic Information Systems 22 (4), 269-281.
Pennings, J., 1992. Structural Contingency Theory: a reappraisal. JAI Press, Greenwich.
Penrose, E., 1995. Theory of the Growth of the Firm. Oxford University Press, New York.
Peppard, J., Galliers, R., Thorogood, A., 2014. Information systems strategy as practice: micro strategy and strategizing for IS. Journal of Strategic Information Systems 23 (1), 1-10.
Polanyi, M., 1967. The Tacit Dimension. Routledge, London.
Popovic, A., Hackney, R., Coelho, P., Jaklic, J., 2014. How information-sharing values influence the use of information systems: an investigation in the business intelligence systems context. The Journal of Strategic Information Systems 23 (4), 270-283.
Powell, W., 1996. Trust-based forms of governance, in: Kramer, R., Tyler, T. (Eds.), Trust in Organizations: Frontiers of Theory and Research. Sage, Thousand Oaks, 51-67.
Puranam, P., Sing, H., Zollo, M., 2006. Organizing for innovation: managing the coordination-autonomy dilemma in technology acquisition. Academy of Management Journal 49 (2), 263-280.
Purser, R., Montuori, A., 1995. Varieties of knowledge work experience: a critical system inquiry into the epistemologies and mindscapes of knowledge production, in: Beyerlein, M., Johnson, D., Beyerlein, S. (Eds.), Knowledge Work in Teams. JAI Press, Greenwich.
Reve, T., 1990. The firm as a nexus of internal and external contracts, in: Aoki, M., Gustafsson, M., Williamson, O. (Eds.), The Firm as a Nexus of Treaties. Sage, London.
Rollins, M., Pekkarinen, S., Mehtaelae, M., 2011. Inter-firm Customer Knowledge Sharing in Logistics Services: an Empirical Study. International Journal of Physical Distribution & Logistics Management 41 (10), 956-971.

Salvetat, D., Géraudel, M., d'Armagnac, S., 2013. Inter-organizational knowledge management in a coopetitive context in the aeronautic and space industry. Knowledge Management Research & Practice 11 (3), 265-277.
Shenkar, O., Li, J., 1999. Knowledge search in international cooperative ventures. Organizational Science 10 (2), 134-144.
Shollo, A., Galliers, R., 2015. Towards an understanding of the role of business intelligence systems in organisational knowing. Information Systems Journal (forthcoming).
Smith, W., Lewis, M., 2011. Toward a Theory of Paradox: a dynamic equilibrium model of organizing. Academy of Management Review 36 (2), 381-403.
Snyman, R., Kruger, J., 2004. The interdependency between strategic management and strategic knowledge management. Journal of Knowledge Management 8 (1), 5-19.
Sobrero, M., Schrader, S., 1998. Structuring inter-firm relationships: a meta-analytic approach. Organization Studies 19 (4), 585-615.
Spencer, J., 2003. Firms' knowledge-sharing strategies in the global innovation system: empirical evidence from the flat panel display industry. Strategic Management Journal 24 (3), 217-233.
Spender, J., 1996. Making knowledge the basis of a dynamic theory of the firm. Strategic Management Journal 17 (Special Issue), 77-91.
Spender, J., 1998. Pluralist epistemology and the knowledge-based theory of the firm. Organization 5 (2), 233-256.
Szulanski, G., 1996. Exploring internal stickiness: impediments to the transfer of best practice within the firm. Strategic Management Journal 17 (Special Issue), 77-91.
Thompson, J., 1967. Organizations in Action. McGraw-Hill, New York.
Trkman, P., Desouza, K., 2012. Knowledge Risks in Organizational Networks: an Exploratory Framework. Journal of Strategic Information Systems 21 (1), 1-17.
Trusson, C., Doherty, N., Hislop, D., 2014. Knowledge sharing using IT service management tools: conflicting discourses and incompatible practices. Information Systems Journal 24 (4), 347-371.
Tyre, M., von Hippel, E., 1997. The situated nature of adaptive learning in organizations. Organization Science 8 (1), 71-83.
van de Ven, A., 2005. Running in packs to develop knowledge-intensive technologies. MIS Quarterly 29 (2), 365-377.
van de Ven, A., Delbecq, A., 1976. Determinants of coordination modes within organizations. American Sociological Review 41 (2), 322-338.
van Fenema, P., Loebbecke, C., 2014. Towards a framework for managing strategic tensions in dyadic interorganizational relationships. Scandinavian Journal of Management 30 (4), 516-524.
Verdecho, M., Alfaro-Saiz, J., Rodriguez-Rodriguez, R., 2006. Understanding knowledge sharing in virtual communities: an integration of social capital and social cognitive theories. Decision Support Systems 42 (3), 1872-1888.
Vlaar, P., van den Bosch, F., Volberda, H., 2006. Towards a dialectic perspective on formalization in interorganizational relationships: how alliance managers capitalize on the duality inherent in contracts, rules and procedures. Organization Studies 28 (4), 437-466.

Vlaar, P., van Fenema, P., Tiwari, V., 2008. Cocreating understanding and value in distributed work: how members of onsite and offshore ISD vendor teams give, make, demand and break sense. MIS Quarterly 32 (2), 227-255.
von Hippel, E., 1994. 'Sticky information' and the locus of problem solving: implications for innovation. Management Science 40 (4), 429-439.
von Krogh, G., 2009. Individualist and collectivist perspectives on knowledge in organizations: implications for information systems research. Journal of Strategic Information Systems 18 (3), 119-129.
von Krogh, G., 2012. How does social software change knowledge management? Toward a strategic research agenda. Journal of Strategic Information Systems 21 (2), 154-164.
von Krogh, G., Nonaka, I., Aben, M., 2001. Making the most of your company's knowledge: a strategic framework. Long Range Planning 34 (4), 421-439.
Walsh, J., Dewar, R., 1987. Formalisation and the organizational life cycle. Journal of Management Studies 24 (3), 215-231.
Weick, K., Westley, F., 1996. Organizational learning, in: Clegg, S., Hardy, C., Nord, W. (Eds.), Handbook of Organization Studies. Sage, London.
Whittington, R., 2014. Information systems strategy and strategy-as-practice: a joint agenda. Journal of Strategic Information Systems 23 (1), 87-91.
Wiener, M., Saunders, C., 2014. Forced coopetition in IT multi-sourcing. Journal of Strategic Information Systems 23 (3), 210-225.
Williamson, O., 1985. The Economic Institutions of Capitalism: firms, Markets, Relational Contracting. Free Press, New York.
Williamson, O., 1990. A comparison of alternative approaches to economic organization. Journal of Institutional and Theoretical Economics 146 (1), 61-71.
Williamson, O., 1991. Comparative economic organization: the analysis of discrete structural alternatives. Administrative Science Quarterly 36 (2), 269-296.
Yaoa, Y., Eversb, P., Dresnerb, M., 2007. Supply chain integration in vendor-managed inventory, Decision Support Systems 43 (2), 663-674.
Young, M., Kuo, F., Myers, M., 2012. To share or not to share: a critical research perspective on knowledge management systems. European Journal of Information Systems 21 (5), 496-511.
Zimmermann, A., Ravishankar, M., 2014. Knowledge transfer in IT offshoring relationships: the roles of social capital, efficacy and outcome expectations. Information Systems Journal 24 (2), 167-202.
Non included yet although Bob likes von Krogh ….
von Krogh, G., 2012. How does social software change knowledge management? Toward a strategic research agenda. The Journal of Strategic Information Systems, 21 (2), 154-164.
Nonaka, I., von Krogh, G., 2009. Tacit knowledge and knowledge conversion: controversy and advancement in organizational knowledge creation theory. Organization Science 20 (3), 635-652.
von Krogh, G., 2012. How does social software change knowledge management? Toward a strategic research agenda. Journal of Strategic Information Systems 21 (2), 154-164.