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Abstract
An under-researched issue in work within the "knowledge movement" is the relation between organizational issues and knowledge processes (i.e., sharing and creating knowledge). We argue that managers can shape formal organization structure and organization forms and can influence the more informal organizational practices in order to foster knowledge sharing and creation. Theoretically, we unfold this argument by relying on key ideas of organizational economics and organizational behaviour studies. We put forward a number of refutable propositions derived from this reasoning.

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Keywords: Knowledge creation, knowledge sharing, governance, organizational economics, organizational behavior.

I. Introduction: Towards an Understanding of Knowledge Governance

"Knowledge" has been all the rage for almost a decade in a number of fields in management studies (e.g., Grandori and Kogut 2002; Eisenhardt and Santos 2003). Thus, the strategy field has witnessed a proliferation of approaches that all place knowledge assets center stage (e.g., Grant 1996); the international business field is in the process of developing a view of the multinational corporation as a knowledge-based entity (Hedlund 1994; Foss and Pedersen 200); network ideas that stress connections between knowledge nodes are becoming increasingly influential (Kogut 2000); and, of course, "knowledge management" has become a widespread organizational practice (Easterby-Smith and Lyles 2003).

Still, we are still lacking an adequate theoretical and empirical understanding of many of the causal mechanisms and contextual factors in relations among knowledge, competitive advantage and organization. Two gaps are particularly pertinent, important, and possibly related.[1]

First, the body of empirical knowledge about the *firm-level performance effects* of knowledge assets is very significantly smaller than existing theoretical knowledge.

Second, there is relatively little systematic knowledge about *how organizational issues are related to knowledge issues*,[2] at least when compared to how much has been written about the characteristics of knowledge, knowledge taxonomies, how knowledge may be disseminated in and between organizations through ICT, the philosophical foundations of the "knowledge movement," the relation between organizational learning into theories of organizational knowledge, etc. In the view adopted here, the organization of knowledge processes — including the *governance* of knowledge processes — is a *big* issue, and one that has been comparatively under-researched.

To be sure, there are ideas around on, for example, alliances and joint ventures as vehicles for knowledge-building (Mowery, Oxley and Silverman 1996; Heimann and Nickerson 2002), internal venturing as means of accomplishing the same goal (Eisenhardt

[1] Thus, Foss and Mahnke (2003) argue that these two gaps may be two sides of the same coin: The lack of attention to organizational issues means that the impact of knowledge processes on organizational costs is not considered and therefore the net value outcomes associated with various processes cannot be ascertained.

[2] The "knowledge-based theory of the firm" (Grant 1996) has not yet made the move from basic conceptualization to theory that clearly links characteristics of knowledge and of knowledge processes to organization in a discriminating manner; therefore, it is not a predictive theory and not one that is directly relevant to managers.

[3] Foss and Mahnke (2003) argue that these two lacunae may be two sides of the same coin: The lack of attention to organizational issues means that the impact of knowledge processes on organizational costs is not considered and therefore the net value outcomes associated with various processes cannot be ascertained.

and Brown 1998), of high-performance HRM practices as driving innovation performance (Laursen and Foss 2003), on the "differentiated MNC" as a means of superior leverage of knowledge (Hedlund 1994), on "organizational knowledge structures" (Lyles and Schwenk 1992), and on the role of reward systems in fostering knowledge-sharing (Lord and Ranft 1998). These ideas all relate organization and knowledge issues on some level.

Still, such ideas are developed from the perspectives of different fields and orientations in management studies (e.g., transaction cost economics, agency theory, social constructivism, network approaches, etc.), and implicitly from different underlying disciplinary foundations (e.g., economics and sociology). It is therefore not clear how these ideas fit together, and how they differ in terms of unit of analysis, mode of analysis (process vs endstate), underlying disciplinary foundation, etc. Thus, it is not too unfair to say that existing theoretical and empirical knowledge about the relation between organization and knowledge is highly *fragmented*.[4] While we have excellent (static) conceptualizations of and answers to the problems of organizing traditional kinds of transactions under traditional modes of production — for example, in the form of transaction cost economics (Williamson 1996)—, there is nothing resembling the efficient alignment framework of transaction cost economics when we are dealing with transactions that involve knowledge, when virtually all important co-specialized assets are knowledge assets that may or may not be tied to a human actor, etc.

Part of the reason is that there are no well-established research heuristics linking organization/governance and knowledge. It is not clear how one goes about doing this kind of research.[5] We address these foundational issues. Thus, we put forward an approach to the governance of knowledge processes that is micro-oriented and builds off of key insights of the organizational economics and organizational behavior fields.[6] In particular, we argue that managers can shape formal organization structure and

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[4] Also, much of the relevant work does not explicitly begin from the motives and actions of organizational members, but rather moves on the more aggregate level of molecular organizational units, whether these be teams, project groups, departments or even divisions.

[5] Pondering the issue of what "knowledge approaches can contribute to organizational theory," Grandori (Grandori and Kogut 2002: 225) recently observed that what has been added is "a new 'contingency' factor for understanding organizational arrangements … Knowledge complexity, differentiation, and specialization, complementarity and interdependence are emerging as important contingencies affecting effective organization and governance solutions" (see Kogut and Zander 1995; Birkinshaw, Nobel and Ridderstråle 2002; Foss and Pedersen 2002 for this research strategy).

[6] A brief note on the notion of knowledge processes. Firms are characterized by a division of labour and therefore by a dispersion of knowledge among firm members. Since no individual firm member can possess all of this dispersed knowledge, firms confront the Hayekian "… problem of the utilization of knowledge which is not given to anyone in its totality (Hayek 1945: 78). We see what we call "knowledge processes" as intimately connected to this problem. Thus, the process of *knowledge sharing* may be understood as an attempt to reduce the Hayekian problem of dispersed knowledge by making individual knowledge overlap to a larger extent. And the process of *knowledge creation* may be understood in terms of the bringing together and integrating complementary knowledge, that is, dispersed knowledge whose value is enhanced by combination (Buckley and Carter 1996; Galunic and Rodan 1998).

organization forms and can influence the more informal organizational practices in order to foster knowledge transfer, sharing and creation. This is what we mean by "governing knowledge processes."

The paper is designed as follows. We begin by providing examples of "knowledge governance." We then discuss the key theoretical inputs that we argue are important for understanding the governance of knowledge processes, namely organizational economics and organizational behavior theory. On this basis, we outline a strategy for research in knowledge governance, based on these two main theoretical inputs.

II. Knowledge Governance: Examples and Definitions

Examples

In order to get a grasp of what is meant here by knowledge governance as well as the research challenges it poses, consider the following two mini-cases.

Buckman Laboratories[7]. Established in 1945 by Stanley Buckman, Buckman Laboratories is at present a $300 million chemical company serving industries in more than 100 countries selling 1.000 different specialty chemicals. The company leadership has been managing knowledge ever since the company's existence. The periods 1945-1991 and 1992-1998 can be identified as two major stages in the Buckman Laboratories' knowledge management development. While in the first period the focus was primarily on problem solving and international expansion, it also provided important factors for shaping the knowledge management strategy and activities in the more transformative second period. Both internal and external changes invited for the appearance and surfacing of knowledge sharing initiatives. In 1989, CEO Bob Buckman, Stanley Buckman's son, declared that knowledge would become the foundation of his company's competitive advantage. His vision materialized in 1992 in the K'Netix© knowledge network that connects knowledge suppliers and knowledge users on a world-wide basis.

An example illustrates how the knowledge-sharing network functions. When the Singapore based managing director of all company activities in Asia needed insights on a specific process in order to finalize a tender, he put a request through the network. Three hours later he had the first response. In all, he received 11 replies from six different countries. This initiated new discussions and further knowledge sharing. As a result, a significant $6 million order was secured. If he had not received any replies after a few hours, the network would have activated assigned specialists to address the request.

One of the decisive factors for the success of this ambitious knowledge sharing initiative was the fact that the *core values and attitudes of Buckman employees were reflected in their willingness to share knowledge* in order to solve company problems, without the usual political baggage and ulterior motives. This is in line with Buckman's statement that 90% of what happens in the company, also in terms of knowledge management, is cultural change. Buckman Laboratories' management understands the two dimensions of cultural

[7] The following paragraphs are based on Pan and Scarbrough (1998, 1999).

change, namely as evolving in an evolutionary manner as well as inviting for proactive management interventions, and works with both of them. The challenges the management sees ahead are associated with maintaining the knowledge-enterprising culture and developing an innovative knowledge-focused reward system.

The Oticon spaghetti organization.[8] One of the most heavily cited organizational change cases is the organizational turnaround in Danish hearing aids producer, Oticon A/S (Peters 1992; Morsing and Eiberg 1998) in the beginning of the 1990s. The radical organizational form — the so-called "spaghetti organization" — that was introduced in Oticon in 1991 was a very flat one, encompassing only two hierarchical levels. It was explicitly adopted to boost knowledge-processes in Oticon. In order to reach this aim, the organization was almost entirely project-based and characterized by a very substantial delegation of decision rights. For example, anybody could suggest, initiate and head a product development or marketing project, or sign up to a project, the idea being to emulate the spontaneous forces of market organization, and thereby better mobilize dispersed knowledge. In order to bring coherence to what might otherwise become chaos, the management team worked extremely hard to develop a corporate ethos that was appropriate to the new organizational form, and which stressed initiative coupled with responsibility. An elaborate incentive system was also adopted in order to curb the problems of moral hazard that would arise, once decision rights were (more extensively) delegated. Thus, management pulled the levers of formal and informal organizational mechanisms in order to influence knowledge process.

However, the organizational design in itself formally implied little exercise of central authority; thus, the role of the central management committee was only to ratify or reject projects on the basis of strict and transparent criteria, as well as to monitor projects on a regular basis. However, in actuality, the CEO possessed very considerable decision-making powers, *and* regularly exercised these by intervening in projects, perhaps closing these. He arguably intervened because he perceived certain unfortunate effects of the strong delegation of discretion that characterized the Oticon spaghetti organization. Among other things, knowledge tended to be held back within projects, because of the perception that project teams were essentially in competitive over corporate resources. High-powered incentives fueled the competitive spirit in Oticon, and apparently worked against the cooperative corporate ethos preached by the management team. Continuous CEO intervention was increasingly perceived of as a break with the psychological contract between Oticon management and employees, and the attendant motivation loss eventually led to the demise of the radical organizational form in Oticon and a change to more traditional matrix structure that was less prone to the problems that had plagued the spaghetti structure (Foss 2003).

Challenges in Understanding Knowledge Governance

We have provided the examples of Buckman Laboratories and Oticon in order to provide some initial intuition of key elements and processes in knowledge governance, and in order to suggest the complexity of theoretical explanation of actual knowledge

[8] The following paragraphs are based on Foss (2003).

governance activities. Here are some stylized observations suggested by the two cases, and the research problems these indicate:

- ***Observation***: Cultural factors influence knowledge processes, such as knowledge sharing. Thus, to Buckman Laboratories it was key that the core values and attitudes of Buckman employees were reflected in their willingness to share knowledge. And the very flat and heavily decentralized Oticon spaghetti organization was partly kept together by a shared corporate ethos.
    - ***Research challenge:*** While cultural factors are, of course, not peculiar to production processes that involve knowledge creation and sharing to a substantial extent, could it be that governance through cultural factors is more prevalent in connection with such processes than in connection with more traditional production processes? And what are the differences between those cultural factors that support knowledge processes and those that support more conventional production processes?
- ***Observation***: Employees need to be motivated to engage in knowledge creation and knowledge sharing. Thus, Buckman Laboratories stress the importance of a "knowledge-focused reward system" and Oticon implemented a completely new, more high-powered and more fine-grained evaluation system in connection with the change to the new structure.
    - ***Research challenge****:* While the assumption that employees need motivation is conventional, note that the experience of the two case firms indicates that explicitly designing the organization so that it supports knowledge processes requires changing the reward systems. Both firms opted for higher-powered incentive systems. However, as the Oticon experience suggests, providing incentives for knowledge processes is tricky business: How does one measure an employee's contribution to knowledge-sharing efforts in a reliable and objective way (thus minimizing the risk one imposes on the employee)? Could it be that motivation for knowledge processes to a certain extent *needs* to be intrinsic (as argued by, e.g., Osterloh and Frey 2000), and that providing too high-powered incentives may harm knowledge processes? To what extent are multi-tasking considerations (Holmström and Milgrom 1991) relevant?
- ***Observation:*** Employee motivation for engaging in knowledge sharing and creating activities is upheld by psychological contracts with management. Managerial intervention which appears to be unfair and breach these contracts destroy motivation.
    - ***Research challenge:*** While there is a vast literature linking organization level psychological contracts with employee motivation and managerial behaviour (e.g., Robinson and Rousseau 1994), the implications of this literature for knowledge processes has not been researched. Knowledge processes often involve extensive delegation of decision rights to employees (e.g., empowerment programs). They are also likely to manifest many

interdependencies, requiring managerial intervention. These two characteristics may clash, with reduced motivation being the result (Foss 2002). Thus, it may be hypothesized that motivational problems are likely to be more strongly associated with knowledge processes than with more conventional production processes (all else being equal).

The implicit argument that we have driving towards so far is that knowledge processes pose unconventional management and governance challenges. We discuss some of the reasons for this in the following section.

Some Salient Characteristics of Knowledge Processes

The concept of "knowledge" is a notoriously thorny one (Boulding 1966), and discussions of it have a tendency to be degenerate into esoteric issues of questionable relevance. We are agnostic in our understanding of knowledge. However, we take issue with notions of knowledge as inherently subjective or as "action potential." To us, knowledge can be objective (Popper 1972), and can be made transferable and tradable, even though the latter operations may be very costly, perhaps prohibitively so. This already suggests that knowledge is multi-dimensional. Thus, the knowledge literature in management studies has arrived at numerous taxonomies and distinctions. An early contribution was Winter (1987) with its distinctions between tacitness vs explicitness, system-quality vs stand-alone, teachability vs non-teachability, and complexity vs non-complexity. The Winter distinctions have been the basis for significant subsequent empirical work (Kogut and Zander 1993; Birkinshaw, Nobel and Ridderstråle 2002).

As indicated, we think of knowledge processes as distinct business processes, mainly taking the form of willed — and usually somehow centrally initiated and directed — attempts to increase the sharing and creation of knowledge in firms. We do not deny that knowledge sharing and knowledge creation may be partly unintended by-products of more conventional business processes, as in learning-by-doing. Also, some management activity may be needed to steer such partly spontaneous processes. However, to a large extent creation and sharing of knowledge that arise in this way has the flavor of a routine activity, reflecting the routine nature of most productive activities (Nelson and Winter 1982; Holmström 1989).

In contrast, willed and partly directed knowledge processes have a number of salient features that set them apart from such routine processes (Osterloh and Frey 2000).[9] It is these features that make it justified to raise the issue of the governance of such processes as a distinct problem in organizational theory. Thus, as an admittedly crude approximation, it is arguable that knowledge processes are *more prone than routines processes* to be characterized by

[9] This is not to say that knowledge processes are *qualitatively* different from more traditional business processes. Also, processes of transferring, sharing and creating knowledge are different processes, and have different characteristics.

…… *the emergence of "novelties" in the process* (unanticipated events, aspects, qualities…). This follows from the basic insight that knowledge cannot be perfectly predicted, because if it could, it would be held already (Popper 1956).

- … *significant elements of "team production"* (Alchian and Demsetz 1972; Lindenberg 2003), that is, it is hard (costly) to measure the marginal product of each participant in the relevant knowledge process. In other words, "input uncertainty" is considerable.
- … *difficulties of ascertaining the outcome*. Thus, if knowledge is dispersed in an organization, it is hard for management to have any precise idea about the benefits of knowledge processes, exactly because dispersed knowledge implies that management will be ignorant about many knowledge elements (Foss 1999). In other words, output uncertainty is high.
- … particularly *high levels of "impacted knowledge"* (Williamson 1975), that is, problems of asymmetric information are particularly severe because so much of the relevant knowledge is tacit. The organizational implication is that it may be particularly hard to design mechanisms for eliciting such knowledge.
- … *problems of specification*. Thus, because of impacted knowledge and high input and output uncertainty, detailed contingent plans for knowledge processes may be extremely costly to draft (Holmström 1989).
- … *non-routine tasks and problem-solving*. Because of the above characteristics, knowledge processes are hard to formalize and routinize, although some knowledge processes (e.g., knowledge sharing) may be less prone to this than other knowledge processes (e.g., knowledge creation).
- … *coordination problems*. Problems of making actions that relate to knowledge processes fit into a coherent plan are more severe than for other business processes. This, too, follows from the above characteristics.

In sum, while the above characteristics may characterize *all* business processes, they are *more strongly present* in knowledge processes. Per implication knowledge processes need particular ways of organizing and governing that can accommodate the peculiar informational, cognitive and motivational aspects of knowledge processes (Osterloh and Frey 2000; Grandori 2001; Lindenberg 2003).

Governance

It is fundamental to the approach developed here that managers can in fact shape formal organization structure and organization forms and can influence the more informal organizational practices in order to foster knowledge transfer, sharing, integration, and creation. One aspect of this is deploying administrative apparatuses that mitigate costs of creating and sharing knowledge owing to the above characteristics of knowledge (Heiman and Nickerson 2002: 98).

This kind of organizational control is what we call "governance."[10] "Governing knowledge processes" therefore means choosing governance structures (e.g. markets, hybrids, hierarchies) and governance and coordination mechanisms (e.g. contracts, directives, reward schemes, incentive, trust, management styles, organizational culture, etc.), so as to favorably influence processes of transferring, sharing and creating knowledge. These structures are important because they define the incentives and coordinate the actions of organizational members in knowledge processes (Foss and Mahnke 2002). An important way in which organizational members' incentives and actions are influenced is through influencing the cognitive categories that organizational members possess.[11] In economic terms, a specific mode of knowledge governance implies a certain constellation of costs and benefits associated with the relevant knowledge processes being governed (Buckley and Carter 1996). Management seeks to choose the mode of knowledge governance that maximizes the created net value associated with these processes.

Understanding Knowledge Governance

How should we theoretically approach knowledge governance? Notice that in commenting upon the two cases, we noted that both "soft" and "hard" aspects were intimately involved. No approach in contemporary organizational theory appears to be able to uniquely address knowledge governance. For example, organizational economics neglect too many "soft" aspects, such as culture, psychological contracts, and intrinsic motivation, that we have reason to believe are important to understanding efficient governance of knowledge processes (Osterloh and Frey 2000; Mudambi et al. 2003). While organizational behaviour and organization theory approaches deal with these aspects, they lack the relatively unambiguous efficiency criterion (i.e., value maximization), discriminating alignment framework (i.e., transactions with certain characteristics are aligned in a discriminating manner to governance structures and mechanisms with certain capabilities for handling such transactions) and clear predictions of organizational economics. While organizational behavior in particular certainly has implications for understanding employee performance, the link from this to specific predictions for which organizational forms, formal structure and reward systems should be chosen is much less clear. Since we argue that managers can govern knowledge processes by means of such choices, we cannot do with organizational behavior alone. We need insights from both perspectives. Before we can do that we need to spend some time on characterizing the perspectives, explain why they alone are insufficient as theoretical foundations for knowledge governance, and discuss their relations.

III. Organizational Theory for Knowledge Governance

[10] Thus, it goes beyond the more narrow concept of "governance structure" in transaction cost economics.

[11] For a particularly sophisticated analysis of how management may accomplish this by means of "relational signalling," see Lindenberg (2003).

In this section, we discuss the implications of various bodies of organizational theory, notably organizational economics and organizational behaviour, for the understanding of the governance of knowledge processes.

Governing Knowledge Processes: Organizational Economics[12]

Like organizational theory in general, organizational economics looks inside the firm by examining the tasks of motivating and coordinating human activity. In particular, organizational economics has directed attention to the coordination and incentive problems that are caused by the pathologies that unavoidably accompany an internal division of labor in a firm, such as asymmetric information, diluted performance incentives, measurement difficulties, bargaining problems, moral hazard, duplicative (redundant) efforts, etc. In turn, organizational economists have explained how a host of real-world organizational arrangements, such as various kinds of authority, payment schemes, delegation of decision rights, etc., serve to alleviate the severity of such problems. They assessment of how well this is done is performed in terms of economic efficiency. Efficiency is understood in the sense of maximizing the joint surplus from productive activities, including processes of transferring, sharing and creating knowledge. A basic proposition is that the costs and the benefits of productive activities — and therefore joint surplus — is influenced by the incentives, property rights, and ways of disseminating and processing information that structure productive activities.

There is comparatively little analysis of intra-firm knowledge processes from the perspective of organizational economics, although the importance of and need for this has often been stressed (Holmström and Roberts 1998; Williamson 1999; Foss 2002).[14] To be sure, quite a number of recent papers deal with governance issues that relate to knowledge processes between firms (e.g., Mowery, Oxley, and Silverman 1996; Holmström and Roberts 1998; Heimann and Nickerson 2002). However, few authors carry the organizational economics apparatus inside the firm in order to address the governance of knowledge processes (but see Zenger and Hesterly 1997; Foss 2003).

On the one hand, this is surely surprising. Thus, those characteristics of knowledge processes that we identified earlier (e.g., team-production, high input and output uncertainty, problems of specification, etc.) are well-known causes of transactional

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[12] By "organizational economics" we mean contract theory (Holmström and Milgrom 1991; Hart 1995), transaction cost economics (Coase 1937; Williamson 1996), nexus of contracts theory theory (Alchian and Demsetz 1972), and work on bargaining and influence costs in organizations (Milgrom 1988). An expansive (perhaps too expansive) notion of the term may also include, for example, the evolutionary theory of the firm (Nelson and Winter 1982) and the resource-based view (Barney 1991).

[7] These include organizational culture (Cray and Mallory 1998; Martin 1993; Parker 2000), psychological contracts (Robinson and Rousseau 1994), leadership (Bryman 1996; Fiedler and Garcia 1987; Hickson, Hinings, Lee, Schneck and Pennings 1971), group dynamics (Gersick 1988; Gibson 1999), and organizational communication (Alvesson 1996; Corman and Poole 2000; Putnam, Phillips and Chapman 1996; Taylor and Van Every, 2000).

[14] Compared, that is, to the enormous amount of empirical studies of more traditional production activities; for a survey, see Shelanski and Klein (1995.

difficulties in organizational economics; the governance of knowledge processes should be corresponding susceptible to analysis in terms of organizational economics.

On the other hand, there are also good reasons why organizational economics may be a quite blunt instrument with which to attack issues of knowledge governance. First, although not formally committed to this, organizational economics assumes that all motivation fall in the extrinsic category. However, it may often be very difficult to provide explicit, monetary incentives for individual efforts in knowledge processes. Moreover, doing so may crowd out intrinsic motivation which may be crucial to knowledge processes (Osterloh and Frey 2000). Second, although again not formally committed to this, organizational economics assumes that all motives are entirely selfish. This flies in the face of casual observation as well as experimental evidence (Fehr and Gächter 2000). An implication is that organizational economics may give the wrong picture of the actual amount of, for example, "altruistic" knowledge sharing in organizations. Third, because of its assumption of cognitive homogeneity, organizational economics has a hard time handling many cognitive issues (Lindenberg 2003), particularly when different cognitive categories are involved, as is likely the case in knowledge processes. Fourth, organizational economics has difficulties handling "soft" organizational issues, such as culture, organizational justice, psychological contracts, and the like. Thus, while this body of theory provides an interesting framing of many of the basic reasons why knowledge processes may pose particular governance problems (cf. the characteristics of knowledge processes we identified earlier), it does not tell us much concrete about actual governance solutions to those problems. It is also likely to give us a lopsided picture of the incidence of knowledge processes in actual firms.

Governing Knowledge Processes: Organizational Behavior

The second body of knowledge that we take as an essential input for studying knowledge governance is *organizational behavior*. Organizational behavior is a large, easily recognizable, more than one hundred years old and rather heterogeneous theoretical discipline. Its heterogeneity is due to the fact that it a) steps on a number of disciplines, such as psychology, sociology, anthropology, economics, and ethics and b) reflects the diversity of organizational phenomena that are treated as an effort to grasp main aspects and features of human behavior and interaction of people in organizations. The ways people behave in organizations and the impact organizations have on people's behavior are two sides of organizational behavior. Understanding both sides is essential to the creation and functioning of effective organizations. Organizational design, organizational cultures, groups and teams, communication, leadership, motivation to work, conflict, power and authority, and organizational change are among the conventional central topics in the organizational behavior field.

The organizational behavior body of knowledge is characterized by a few distinguished features. The first is that organizational behavior writings acknowledge the existence of important hidden parts in organizations and organizational life as well as in individual organizational members. These covered parts could, for instance, be informal structures, informal communication channels, informal leaders, etc. At the individual level, such hidden features could be the employees' external commitments, engagement in

external social and/or work-related obligations, personal problems, etc. Often the "baggage" that is not included in the formal organizational elements/formal personal credentials are exactly those that especially matter in terms of organizational behavior and pose a major challenge to managerial actions.

The second feature that is characteristic for the organizational behavior body of knowledge is the emphasis on complexity of individual actors and of organizational life (Jackson and Carter 2000). Human activity in organizational settings is highly multifaceted and behavior is unique to every person and in every instance of its occurrence. Organizational behavior is therefore inherently associated with what Knights and Willmott (1989) call the subjectivity within the workplace. Additionally, people, as well as organizations, are embedded in their specific economic, social, political, and cultural contexts. Taking seriously contextual embeddedness, and consequently making signification context-dependent, as well as appreciating individual and organizational uniqueness is characteristic for the organizational behavior body of knowledge.

The third, and related, feature that motivates our choice of organizational behavior as one of the theoretical foundations for studying knowledge governance is the ability of organizational behavior to interpret and explain experience from different paradigms[15] and angles. As such, organizational behavior studies offer a framework with a strong explanatory power, one that is able to offer different, often competing, explanations of the phenomena under study rather than trying to suggest a solution to a problem.

We now take as examples two central organizational behavior themes, namely power, control and authority and organizational culture and, on their basis, identify how organizational behavior insights can supply important approaches to understanding knowledge governance processes.

Power, control and authority have for long time occupied organizational behavior theorists' attention. The focus has been not merely on how to organize control activities in order to achieve organizational objectives, but rather how to control individuals so that organizational objectives are met without serious resistance from members who often prefer to act autonomously and with a high level of empowerment and self-control. An important issue here, both theoretically and in terms of managerial actions, is the balance between control and commitment and, equally importantly, the sustainability of such balance. To our knowledge, there are no serious conceptualizations and/or empirical findings on how the control-autonomy dilemma is exercised in knowledge governing processes. We argue that organizational behavior based models and findings can provide a useful angle in studying power-related phenomena in knowledge governance. As a next step, we reverse the link and argue that studying knowledge governance mechanisms can naturally extend the old-time debate on power, control, and commitment. The need for such conceptualization is motivated by the fact that the number of organizations

[15] Burrell and Morgan's (1979) synchronic model of four knowledge paradigms, i.e. functionalism, interpretivism, radical structuralism, and radical humanism, is the best known one in the field of organizational behavior. On the basis of two dimensions, the view about the nature of the world and the view about the role of science, each paradigm presents a fundamentally different way of understanding, for instance, organizations and how we can now about them. The paradigms coexist simultaneously.

employing "knowledge workers" (embodied in a number of different professions) is growing. As pointed out by Chumer, Hull, and Prichard (2000), the way in which knowledge management recasts the work of programmers, lawyers, doctors, architects, engineers, to mention but a few, as "knowledge flows", "stocks of knowledge" or "codified and embodied knowledge" might be seen as an important chapter in a very long-running saga over the power and interests that produce professional knowledge work.

Organizational culture is another theme that has not merely been central to organizational behavior theorists, but which was dominating in occupying both their and the practitioners' attention in the 1980s and the 1990s. Knowledge governance relies heavily upon social and cultural patterns, practices and processes in organizations. Consequently, knowledge governance processes are in a close (although often not explicitly admitted) relationship with organizational cultural features. Organizations, as well as groups within organizations, tend to develop their own identity and specific language, they develop shared beliefs that guide their members' identification, selection and interpretation of organizational events. Consequently, they shape organizational members' assumptions about what knowledge is and which knowledge is worth sharing and utilizing as well as how new knowledge is created and legitimated. Additionally, organizational cultures and subcultures are the immediate mediators of the relationships between individual and organizational knowledge. They create the context for social interaction that determines how effectively knowledge is created, transferred and utilized. Organizational cultures are increasingly recognized as a major barrier to leveraging knowledge assets (De Long and Fahey 2000). Empirical evidence provided in relation to inhibitors to knowledge sharing tends to stress the importance of behavioral and cultural factors (Skyrme and Amidon 1997; De Long and Fahey 2000). At the same time, Argote and Ingram (2000: 156) point out that to the extent there has been progress in studying knowledge as the basis of competitive advantage, "it has been at the level of identifying consistencies in organizations' knowledge development paths and almost never at the level of human interactions that are the primary source of knowledge and knowledge transfer." The research on organizational culture is sizable and it can provide intriguing angles into studying knowledge governance processes in directions pointed out above. Some of the questions that still wait for serious conceptualization are related to, among others, the mechanisms through which organizational culture can support or undermine effective knowledge governance as well as how can organizational cultures and subcultures be aligned with knowledge knowledge-governance processes.

Theoretical Relations

At first glance, the two bodies of theory that we consider here are very different in numerous dimensions (e.g., Lindenberg 2003) and may have correspondingly different implications for our understanding of the governance of knowledge processes. Are they therefore theoretical rivals? That this is need not be the case may be indicated by the following two quotations:

> … we initially expected that 'the economic way of thinking' and the 'Organizational Behavior way of thinking' would be substitutes for each other … We've found instead that the disciplines are complementary; each helps to fill in holes left by the other, thereby sharpening and clarifying what the other has to say (Baron and Kreps 1999: vii).
>
> …organizational economics is not alone in addressing …fundamental questions of organizational analysis. Both organizational behavior and organization theory are also concerned with understanding why organizations exist, the implications of interest conflicts among those associated with an organization, why some organizations outperform others, and how organizations can cooperate with one another. Given this overlapping set of interests, one might expect that these three literatures should build on each other, should inform work done in these different research streams ? ? in short, that a theoretical integration of organizational economics, organizational behavior, and organization theory should be emerging (Barney and Hesterly 1999: 135-136).

The specific approach taken by Baron and Kreps (1999) and Barney and Hesterly (1999) is to let organizational economics supply the overall picture and let organizational behavior theory — which is process-oriented and more oriented to psychological issues and other micro-analytic aspects — fill in the details, as it were. More specifically, while organizational economics offer insight into formal contracts and governance structures, organizational behavior theory address questions on how expectations in the employment relationship are formed, how goodwill is created, what changes psychological contracts, etc. (Lindenberg 2003). To put it in more simple terms, there is an interaction between organizational forms and formal organization structure (analyzed by organizational economics) and the more informal organization (i.e., relational "contracting") that exist place within and between organizations (Baker, Gibbons, and Murphy 2002). In the following, we try to be more explicit about the strategy, showing in the process how it may be applied to the issue of the governance of knowledge processes.

IV. Formal and Informal Aspects of the Governance of Knowledge Processes

Research Strategies

The governance of knowledge processes may be investigated in many different ways. One approach is to apply organizational economics, for example, transaction cost economics, in a straightforward manner by focusing on the characteristics of knowledge transactions, telling a story about how and why these impact transaction cost, and then arguing that certain governance structures economize with such costs and will be chose for this reason. Considerations of appropriability (Teece 1997) may also be invoked. This is the approach adopted by writers such as Oxley (1997) and Heimann and Nickerson (2002).

We see two main problems with it. First, as indicated, it risks losing sight of the aspects of knowledge governance. Second, the approach (like TCE in general) is taken up with the choice of discrete governance structures (markets, hybrids, hierarchies) that are understood as complementary constellations of organizational attributes (e.g. the strength of incentives, ownership concentration, the use of fiat, etc.; Williamson 1996). However, in dealing with knowledge governance, this approach may be much too heavy-handed. Thus, while it may be useful to be told that increasing the tacitness and complexity of knowledge transactions pulls towards hierarchical governance, it is certainly more useful to be also told which combination of *organizational (coordination, governance) mechanisms* secures the most efficient utilization of such knowledge inside the firm.

As Grandori (1997, 2001) forcefully argues, transactions may be governed by all sorts of organizational mechanisms, such as prices, voting, negotiation, communication, different hierarchical mechanisms, formal and informal rules and norms and procedures ("routines," "culture"), etc. Rather than *assume* that these are necessarily bundled in specific ways in discrete governance structures, it may be more productive to investigate *how* these mechanisms bundle in order to efficiently govern (knowledge) transactions. We concur. If we follow her suggestion that such an assessment should begin from assessing the applicability of organizational mechanisms, given specific knowledge characteristics, and use the knowledge characteristics mentioned earlier, we may get a result such as in Table 1 (compare Grandori 2001: 390).

XXXXXXXX Insert Table 1 Here XXXXXXXX

We shall refrain from commenting on the specific arguments in the table. Our aim is primarily to illustrate the kind of hypothesis that emerge from focusing on how organizational mechanisms, rather than aggregate governance structures, may govern knowledge processes. However, such a focus should not lead to a neglect of the important point that organizational mechanisms interact, for example, because they are complementary. We consider this next.

Interaction Between Formal and Informal Organizational Mechanisms in Knowledge Processes

One way to approach towards an integration of organizational economics and organizational behavior insights is to think of the two bodies of theory as mainly (*not* exclusively) supplying analysis of formal and informal organization, respectively. That is, while organizational economics is mainly taken up with such formal organizational mechanisms as authority, prices (incentives), and ownership arrangements, organizational behavior is concerned with the softer mechanisms that are manifest in the "particular ways of conducting organizational functions that have evolved over time under the influence of an organization's history, people, interests, and actions and that have become institutionalized in the organization" (Kostova 1999: 309). Thus, organizational behavior scholars have drawn attention to the central role played by norms, cognitive categories, etc. that emerge in a more or less undesigned fashion and which

heavily influence the actions of organizational members.[17] Both types of mechanisms are crucial to the understanding of the governance of knowledge processes. The question is how these may interact (i.e., how they may be "combined") and how this interaction impacts knowledge processes.

It is generally recognized that informal organization(al mechanisms) is (are) influenced by formal organization(al mechanisms). An illustrative case is Homan's (1950) famous re-analysis of the bank-wiring room from the Hawthorne studies, demonstrating the existence of strong group norms with a significant element of enforcement. However, the background to those norms was General Electric's formal group piece-rate incentive system that was designed to increase productivity. This aspect of formal organization defined the parameters of interaction: The group piece-rate system did not directly *determine* behavior, but it fostered a need for norms that could curb shirking (*and* avoid Stakhanov-type work behavior). And these norms were more directly determinative of behavior.

We can see a similar dynamic in knowledge processes. Thus, the adoption of high-powered reward systems will ultimately erode some dysfunctional norms in knowledge processes, such as the resistance to knowledge sharing in firms in the former East Bloc countries (Michailova and Husted 2003). In relations between firms, long-term contracting may transform weak ties into strong, trust-based ties that promote knowledge transfer and sharing (Poppo and Zenger 2002). The allocation of ownership influences how much firm-specific investments employees will undertake (Hart 1995), including investments in knowledge-creation activities. It also influences knowledge sharing: There are some kinds of knowledge that employees of one firm cannot share with employees of another firm (without being heavily sanctioned), regardless of informal organizational practices (Holmström 1999).

While informal organization can be influenced by means of manipulating formal organization, there is no simple correspondence between the two and the lag-structure is not only complicated, but also long. Managers who wish to influence knowledge processes through manipulating formal organization must take ambiguity and inertia into account. When influencing knowledge processes through manipulating formal organization, managers should also recognize that formal organization may either *substitute* or *complement* informal organization (Poppo and Zenger 2002). For example, a strong corporate culture that stresses general sharing behavior (e.g., in the form of organizational citizenship behavior) may *substitute* (within certain ranges) for explicit incentive pay (and

[17] An important aspect of informal organization is "relational governance" between firms that, in a context of strongly incomplete contracts, activate norms of reciprocity and expectations of trust and thereby promote disclosure of information and ease adaptation (Zenger, Lazzarini and Poppo 2002). It has been argued that such relational governance is superior to more formal organizational arrangements with respect to organizing knowledge processes (Liebeskind et al. 1996), because it avoids both the hazards and need to engage in substantiel contractual specification associated with market exchange, and the costs of processing knowledge in a hierarchical organization. The advantages with respect to sharing and creating knowledge associated with "communities of practice" (Brown and Duguid 1996) and "epistemic communities," respectively, may be cast in these terms (cf. Powell 1996).

vice versa) in the coordination of knowledge sharing activities. In inter-firm relations, formal contracts may substitute for relational contracting over knowledge assset (and vice versa). Formal organization structure and organization form and informal organizational practices may be *complements* with respect to their impact on knowledge processes. For example, the effect of explicit incentives on knowledge creation may be increased by the presence of a culture that accepts substantial pay differences across employees. This reasoning is summed up in Figure 1.

XXXXXXXX Insert Figure 1 here XXXXXXXX

V. Conclusion

About a decade ago, Argote et al. (1990) noted that knowledge transfer within organizations (in contrast to between organizations) was very much of a black box. However, at that time the "knowledge movement" was not yet in a takeoff stage, and quite a lot has happened since then. In particular, we have witnessed the emergence of a knowledge-based theory of the firm (e.g., Grant 1996), the knowledge management movement (e.g., Krogh, Ichijo and Nonaka 2000), and work in the international businessfield on the differentiated multinational corporation (e.g., Hedlund 1994). Still, it is fair to say the understanding of the link between organization and knowledge, and in particular how organizational controls may be used to foster knowledge sharing and creation, is very much in its infancy. The present paper is an attempt to lay down a foundation for a theoretical and empirical inquiry into efficient knowledge governance. While the specific take on this issue that we have developed — the interaction between formal and informal organization — surely is no new theme in organizational theory, its application to knowledge processes is. So is the attempt to develop such a research strategy relying on both organizational economics and organizational behavior.

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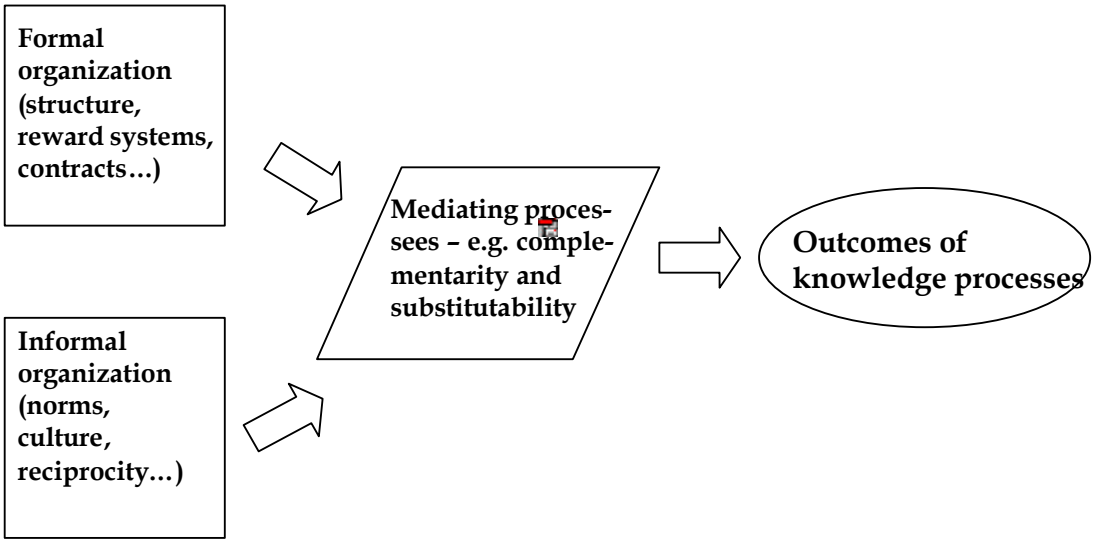
Table 1

Failing and Feasible Mechanisms in the Governance of Knowledge Processes

Antecedent (i.e. characteristics of knowledge (processes))	*Failing Mechanism*	*Feasible Mechanism*
Many novelties	Negotiation, standard procedures	Authority, guided communication
Team production important	Negotiation, communication	Authority, informal norms
Very difficult to measure outcomes	Incentives, prices	Authority, informal norms
Very difficult to measure inputs	Authority	Prices, incentives, ownership
High levels of "impacted knowledge"	Authority	Prices, incentives, ownership
Heavy problems of specification	Incentives	Informal norms
Non-routine problem-solving	Standard procedures	Communication, authority
The relevant knowledge being		
• Highly tacit	Communication	Authority, informal norms
• High complexity	Prices	
• Low teachability	Communication	Authority
• High system dependence	Prices	Authority, communication

Figure 1: Organizational determinants of knowledge practices



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