Knowledge and Organization

-On knowledge bureaucracies, communities and collectivities

by

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Paper for the OKLC conference

Athens, 5-6 April, 2002

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Abstract

Increasingly, both practitioners and theorists put forward ”knowledge” as a deux ex machina for achieving competitiveness. Obviously, in a general sense, all firms or organizations may be said to operate on knowledge in developing their strategies, deciding on a division of labour, etc. (Blackler, 1995). This is true about mechanistic bureaucracies as well as more organic or flexible organisations. In the paper a basic epistemological framework is used in order to track and distinguish between different types of knowledge organizations. In the analysis we identify what are the knowledge relevant characteristics of the ideal typical bureaucracy, as well as of two other ideal type organizations. Among these we first discuss the conception of the organization as a ”knowledge communities”, resonating the ideas of Lave & Venger (1991), Brown & Duguid (1991; 1998), Boland & Tenkasi (1995), Dougherty (2001). Inspired by empirical studies of project-based firms, we then suggest that firms might also take on the character of ”knowledge collectivities”. In our view, these two lastmentioned types are often mixed together in the literature and we argue that separating them as ideal types would benefit analysis.

Introduction

Increasingly, both practitioners and theorists put forward ”knowledge” as a deux ex machina for achieving competitiveness. Obviously, in a general sense, all firms or organizations may be said to operate on knowledge in developing their strategies, deciding on a division of labour, etc. (Blackler, 1995). This is true about mechanistic bureaucracies as well as more organic or flexible organisations. Despite its repeatedly recogniced shortcomings the bureaucracy however still constitute the dominating image among managers (Dougherty, 2001). Moreover, so far ”theorists have failed to articulate an alternative to this archetype in its own terms” (ibid, p 612). Certainly there are many promising attempts as noticed by Child & McGrath (2001), e.g. the notion of ”the network organization” (Nohria & Eccles, 1992), ”the knowledge-creating company” (Nonaka & Takeuchi, 1995), ”the flexible firm” (Volberda, 1998), etc. But still theory appears to be lagging, especially in considering the rapid pace of change in practice.

> Notwithstanding this variety, there is a widespread sense of a gap between the rapid development of new organizational forms in practice and the capacity of existing perspectives to account for them in theory. (Child & McGrath, 2001, p 1135)

Below we will continue this search for alternatives to the apparantly very resilient bureaucratic form. In this venture we start in epistemology and suggest a basic model of knowledge, within which we locate the different knowledge-related concept that we use in order to track and distinguish between different types of knowledge organizations.

In the analysis we identify what are the knowledge relevant characteristics of the ideal typical bureaucracy, as well as of two other ideal type organizations. Among these we first discuss the conception of the organization as a ”community”, resonating the ideas of Lave & Venger (1991), Brown & Duguid (1991; 1998), Boland & Tenkasi (1995), Dougherty (2001). Inspired by empirical studies of project-based firms, we then suggest that firms might also take on the character of ”collectivities”. Project-based organizations previlege the project dimension relative to functional departmentalization (Allen, 1996). As illustrated in our case studies most activities are carried out in projects that are highly autonomous within limits and goals set. As projects are rather short-lived and each new project is typically comprised of a unique mix of specialists with different competences, it is difficult to establish a common knowledge base. Instead such organizations must be able to operate on the basis of distributed knowledge.

In our view, these two lastmentioned types are often mixed together in the literature and we believe that separating them as ideal types might benefit analysis. We thus below suggest a three-fold typology of ”knowledge bureaucracies”, ”knowledge communities” and ”knowledge collectivities”.

Below we start by presenting the epistemological framework and central concepts to be used in differentiating between the various kinds of knowledge organizations. Following that we shortly discuss and characterize the knowledge bureaucracy. We then at greater length scrutinize what we might possible mean by a knowledge community. Illustrated by material from our own case studies of three project-based firms, we outline the third member of the knowledge organization typology, i.e. the knowledge collectivity.

The knowledge and organization framework

A basic model on knowledge

Like animals, individuals learn in interaction with their environments. Like animals they sometimes have to pay for lessons learned with their life, recognicing all too late that they were entering a failing course of action. Unlike animals they however, due to their access to a language and argumentative skills, also have the possibility to engage in less fatal experimentation, i.e. they may reflect and learn from consciously designed, exosomatic experiments (Popper, 1999). Individuals as well as organizations more or less continuously engage in trial-and-error processes in order to solve problems, testing different ideas of how to achieve success within their environments.

In such a popperian framing of an evolutionary epistemology ”all life is problem-solving”. In solving our problems we exploit the "knowledge" we already have and retain the new knowledge generated as we carry on with our problem-solving activities in the ever-changing real life settings, in dealing with competitors and other obstacles or dangers. At the level of organization this may be seen as a process of organizing, mirroring the dynamic interplay between "subjective interaction" and "generic subjectivity" as framed by Weick (1995). In the course of real-life problem-solving interaction, lessons are learnt and such retained outcome or "knowledge", e.g constituted as new strategies or rules, will then guide the next cycle of subjective interaction processes, etc.

Moreover, evolutionary processes in social settings are necessary related to agency, i.e. to individual or organizational intention. Put somewhat differently, we constantly learn in a dynamic interplay with environment in trying to pursue individual desires,

organizational goals, or solve problems related to those. Such human knowledge generation and learning is thus to a great extent driven "from within" by the agents' aprioric aims and understandings (Popper, 1992) or enacted (Weick, 1995), and not only by environmental selection, as in purely biologistic versions of evolutionary processes. As phrazed by Lovas & Ghoshal (2000) it this is a matter of ”guided evolution”. Like March (1994) we thus recognice that our intentions often drive our ”evolutionary engineering” efforts, but we should also notice his observation that the chances of actual changes will be the disired ones are often slim.

Problem-solving processes, according to such a view, may be characterized as goal-directed trial-and-error learning (Lindkvist, 2001). This also means that knowledge progression is not a matter of "blind variation" (Campbell, 1974). Through successive trial-and-error processes more truth-like theories of how to solve the problem at hand will be put forward, as errors are eliminated and based on that better propositions are made posssible. By making sense of surprises, i.e. deviations between projections and actual outcome, a converging learning process that eventually brings about a solution that solves the problem, is established.

> There is basically no substitute for trial and error in dealing with surprise.
> (Weick, 1996, p. 54)

The "knowledge" produced and retained during such processes is inherently uncertain and changing. It is a matter of fallible knowledge (Popper, 1972a), representing what for the moment is "held to be true", by the individual or the organization. This is in sharp contrast to true knowledge in the Aristotelian "episteme" sense, where ”scientific knowledge is judgement about things that are universal and necessary” (Aristotle, 1961, p 144). Such eternally true knowledge is about what will always be in a certain way and cannot be otherwise. It relies basically in the ability of man to establish a ”certain” point of departure, through ” intuitive reason”, from which scientific knowledge may be shown to be true by demonstration. As remarked by Popper (1998), the ”intuitive inductionist view” of Aristotle, involves the procedure of leading the pupil to a place, or outlook, from which he can see the ”essence” of the object of interest.

> Aristotle's method of induction is similar to the social initiation of a young man:
> it is the procedure of getting an outlook from which you can actually see the essence
> of adult life (Popper, 1998, p 3)

But reaching such eternally true insights are however (possibly) the prerogative of gods, says Popper; for mortals, knowledge development is a matter of guessing and improving, an exercise in dealing with opionion, or "doxa", rather than "episteme". Instead of knowledge it would thus be more correct to talk about hypotheses,

provisional or so-far-best theories. Having made the above qualifications we however below continue to use the term "knowledge" to signify such fallible outcome of real life problem-solving processes. Such retained knowledge may be possessed by individuals, groups, or organizations or reside in artifacts. It may thus refer to the individual's cognitive repertoar, the organization's stock or knowledge, or to what is written in scientific text books, etc. Moreover, as extensively discussed in the literature, individual as well as organizational knowledge is often not consciously recogniced.

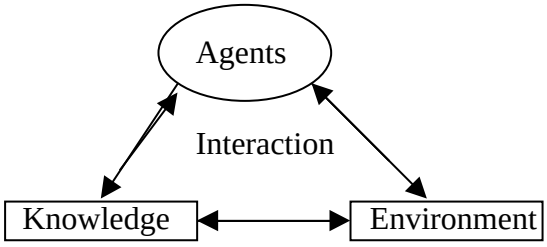

Figure 1. Knowledge in an 'interaction' perspective

Knowledge and competent agency

In this general evolutionary framing knowledge is constituted as the outcome of real-life interaction processes where organizations or individuals try to solve their problems, fulful their goals or visions, etc. In most cases that is not done in a very benign environment; usually competitors and other troubles turn up and make things difficult. In order to survive and be successful, possessing knowledge may not be enough. Knowledge, as framed above, is rather like a thing, or a tool that may be used without much commitment, care or skill. To be a "competent" person or organization the agent must make clever and timely decisions on how to use knowledge in actual problem-solving processes, adapting to situational demands and the actions of competitors.

> There is no incompatibility between being well-informed and being silly. … A soldier does not become a shrewd general merely by endorsing the strategic principles of Clausewitz; he must also be competent to apply them. (Ryle, 1949, p 26, 32)

In such a view competence is clearly a relational concepts, connected to the actual ability to "know-how" and perform, compared to the abilities of others. We thus draw a clear distinction between knowledge and competence, between what is "held to be true" and the actual capacity to perform well.

The image of the competent individual agent might be further elaborated taking a point of departure in Ryle's (1949) distinction between individual "knowing that" and

"knowing how". In his seminal book the main argument is that skillful performance or knowing how is possible without being guided or preceded by propositional or knowing that knowledge. In his own words: ”Intelligent practice is not a step-child of theory” (ibid, p 27). For him competence or "knowing how" is a dispositional quality. Ascribing a dispositional quality to a thing, he explains, has much but not all, in common with a statement subsuming the thing under a law.

> To possess a dispositional property is not to be in a particular state, or to undergo a particular change; it is to be bound or liable to in a particular state, or undergo a particular change, when a particular condition is realized. (Ryle, 1949, p. 43)

Dispositions, however, refer not only to single-track dispositions, as with habitual smoking, the actualizations of which are nearly uniform. Instead Ryle maintains that this concept refer to dispositions with a wide variety of exercises. Moreover dispositions are not like habits, which are achieved through repetition and drill, but rather a kind of "intelligent practice", where ”the agent is still learning” (ibid, p 42.). The agent is thus learning at the same time that the activity is carried out, a notion similar to reflection-in-action, as discussed by Schon (1983).

Ryle’s way or relating "knowing how" to the dispositional qualities of man apparently has a behaviorist flavor. In doing that he is throwing much light on the unconscious self as noticed by Popper (1977).

> the unconscious self that is indeed largely dispositional … It consists of dispositions to act, and of dispositions to expect: on unconscious expectations. Our unconscious knowledge can well be described as a set of dispositions to act, to behave, or to expect (ibid, p 130)

Such dispositional intelligence is no doubt highly significant in explaining human behaviour and metaphoricly speaking it may well represent the under water part of the iceberg, leaving only the top of it to conscious thinking. Our dispositional competencies may also become retrospectively conscious, Popper continues, for example when the expectations they contain are contradicted, when unexpected problems appear, etc. But still such adaptive processes do not fully appreciate the capacity of human mind. We are also able to think ahead, to set up action plans and to recall abstract knowledge and relevant experiences at will. The distinguishing mark of human mind is its active character, its ability to carry out conscious, mental operations in solving problems, trying to reach goals, etc.

Unlike Ryle (1949) who forcefully argues against dualistic body-mind ideas and the ”dogma” of the "ghost in the machine", Popper (1977) explicitly acclaims the value of such images, in saying ”there is a pilot and a ship”. In conclusion, we believe is it fruitful to recognice that we do have a self-conscious self, although we are probably

often even more driven by our psychological dispositions and our unconscious states. Being capable of agency, we are mindfully shaping reality, in interaction with both the material world and the world of our fallible theories or "knowledge" as framed above.

Returning to the level of the organization, the concept of "competence" is clearly close to much literature on core competence or core capabilities. As suggested in Nelson (1991) it may here denote what the organization is able to "do well". While it is fairly easy to formulate explicit strategies and set up a formal organizational structure, he maintains, such "do well" capabilities require repetition, learning and a long time to develop. As a result of such processes, routines will tend to emerge, i.e. patterns of action that are not easily appreciated or identified, and ”performed in a relatively automatic fashion” (Winter, 1986). In the evolutionary theory version by Nelson and Winter (1982), the emphasis is clearly on tacit and only partly known knowledge, embedded in organizational routines, that underlie organizational capabilities.

But the concept of core competence has also been much used in the strategy literature, especially in the so called resource-based theories of the firm. Again the emphasis is very much on the hard to nail down competences, that are difficult to identify, imitate and transfer, thus creating a sustained competetive advantage (Grant, 1991). However as remarked by Lovas & Ghoshal (2000), rather than refering to routines, today many also think of organizational competences as residing in human and social capital, or ”simply” in the individuals. While recognicing the difficulties involved in explicating and operationalizing what are the core competences of an organization, some authors are more optimistic of the possibilities of identifying the major ones (see e.g. Prahalad & Hamel, 1990).

From the above discussion we conclude, that we have to acknowledge that individual as well as organizational competences may constitute consciously recogniced intelligence or unconsciously operating dispositional "intelligent practice" or routines. Such abilities to act or "knowing how" may be developed either through deliberate trial-and-error processes or processes of a behavioural probing character. This also means that we adhere to the popperian image of the individual as a pilot or ghost capable not only of acquiring dispositions to act, but also of active, intentional problem-solving. This implies the ability to carry out conscious, mental operations and to develop a sense of self-awareness and identity in interaction with others. Such a pilot "knows" it is an activity center.

We similarly assume that organizations are characterized by agency and centrality. Unlike in markets, consisting of completely autonomous units, there is a central

function, constituting it as a hierarchy, bringing about coordination and cooperation. The obvious candidate for this job is the top managers and below for convenience we use this term in refering to this function. In doing that we also acknowledge the view of Lovas & Ghoshal (2000) who maintain that the definition and articulation of the organization's strategic intent is "ultimately the responsibility of top management". This is not to deny that many others or "lower levels" may be more important to achieving progress. Adhering to our view of the organisation as a hierarchy, we below signify such important lower level reliance as "decentralization" endeavors.

Types of knowledge in organizations

The reason d'aitre for organizations may be concieved in terms of the synergies achieved through communal effort. Compared to market contracting between autonomous actors, organizations or hierarchies, might reduce transaction costs, production costs or achieve a kind of knowledge generation that is impossible within market relations (Williamson, 1985; Grant, 1996; Cook & Brown, 1999). But although they are hierarchies, still there are individuals in organizations and part of the knowledge they possess, is relevant to reaching the goals of the organization. Admittedly, due to the complexities normally involved in industrial operation, what is useful individual knowledge is of course not so easy to specify, before the event, and often not even afterwards (Levinthal & March, 1993).

Both individuals and organisations may thus possess knowledge. Since those individuals that work in the organization are a part of it, we could obviously count what is possessed by these individuals as organizational. As discussed in Argyris & Schön (1996) we may however well think of situations where the individuals know less than the organization, e.g. when they do not realize fully the wise division of labour that is inherent in the present organization structure. Or they may know more as when the dominant philosophy upheld in the firm, is way out of tune with the preference of customer demand, and this is known by those working close to the market. We thus need to differentiate between situations where important knowledge is held by individuals and those where the most relevant knowledge is better conceived as an organizational possession. Instead of collapsing the two forms into a 'weak version' of organizational knowledge, we thus prefer the 'strong form' formulation, as suggested by Tsoukas & Vladimirou (2001).

What then should count as "organizational knowledge", i.e. what are the kind of hypotheses or theories, that assumedly contribute to successful problem solving and firm survival? Generally we may here include all kinds of "rules" (Tsoukas & Vladimirou, 2001) or "generic subjectivity" (Weick, 1995) that for the moment are "held to be true" and useful in bringing about enough coherence or unity to yield a

sufficiently good performance. As argued by Tsoukas and Vladimirou (2001) whenever the individuals act upon such rules or prescriptive statements, produced by the organization, they rely on organizational knowledge. Moreover, they continue, ”organizing implies generalization”, and as a result, an organization may be seen as a theory. Rules thus express the generic feature of all organizations, to transcend the particular and situational, to provide order in the face of a never-ending stream of disordering events, threatening to dissolve the firm into a chaotic mode.

Organizational knowledge as "rules" makes it an inclusive concept and a comprehensive treatment is not possible here. In order to discriminate between different kinds of knowledge organizations we need however to differentiate between explicitly stated rules and whose less so. Among the first-mentioned type of rules we identify explicitly stated market and technology strategies and visions of the firm, the preferred organisation structure, the specific performance measures used, etc. But, as long recogniced in organization theory, there are also more "invisible" rules involved, that defy articulation and attempts to write them down clearly. Instead these rules have to be learnt through participation and socialization. Such background knowledge, e.g. in the form of a strong organizational culture, according to Spender (1996) may even be seen as constitutive of the firm. As discussed in Grant (1996) there are however many other possibilities for establishing such knowledge, e.g. a common language and signifying system, shared meanings, communality of specialized knowledge, recognition of individual knowledge domains, etc. In short all clearly formulated "rules" and those operating in a background fashion, i.e. both explicitly stated and more implicit theories, that are more or less consciously held as true and helpful for the firm, make up its organisational knowledge.

Organizational competence – a complex construct

The goal of an organization is however not to become a knowledgeable organization, but to become a competent one, able to compete successfully with others, in its selected or enacted environment. In order to be that an organisation will certainly try to use organizational knowledge as defined above, but today many firms with much specialized labour, must also to a great extent rely on knowledge that is only possessed by its individuals. Such idiosyncratic knowledge, relevant for the survival and success of the organization, possessed by the individual, may have been acquired during formal education or during actual problem-solving after entering the firm. Some of that knowledge may be in a fairly explicit form while other parts may be largely tacit. In order to enable competent action, some kind of mixture of both individual and organizational knowledge is thus needed.

However the mere existence of individual and organizational knowledge or "rules" does not by itself constitute competence. Competent knowledge generation or problem-solving is also a matter of agency and interaction as discussed earlier. Organizational competence is the outcome of the interaction between the agents involved, the content of their theories, and the situational circumstances. As discussed in Cook & Brown (1999) and Tsoukas & Vladimirou (2001) following a rule is never an entirely automatic endeavor. Rules function as analogies, requiring the good judgement of real people to make decisions on whether and how to apply the rule. The discussion in Nightingale (1998) also indicates that human decision making is also intrinsically interlinked with our emotional memory. Moreover, as individuals interact during problemsolving in hightly uncertain and changing situations, such processes always to some extent tend to take on a trajectory of its own. In conclusion, to succeed in a competitive struggle, requires not only individual and organisational knowledge, but also the abilities of the actual cooperating individuals involved and, as a consequence of the indeterministic chance element, a bit of luck.

The analytical framework – a summary

In the interaction perspective suggested above, agents, knowledge and enviroment are depicted as separate categories. Moreover, we suggest that intentional actors are centrally implicated in these trial-and-error based, problem-solving processes. As framed here the agents interact not only with their environments, but also with theories or knowledge, that are tool-like and have a kind of autonomy of its own. Although man-made they may become detached from their creators, and thus constitute "objective knowledge" as conceived by Popper (1972b). The same kind of argument is assumed to apply at the firm or organizational level as well.

We also acknowledge that knowledge, that what is held to be true, may be possessed by individuals as well as organisations, whether consciously recogniced or not. Obviously, in the context of dispositional or subconscious knowings, it may sometimes be fruitful to think of knowledge as something that is inseparable from a person or an organisation. In such cases however, it appears less relevant to talk about interaction processes. In addition we have operationalized organizational knowledge as consisting of both the classic explicit mechanisms of strategy formulation, organization design, etc and the less explicit mechanisms of organizational culture, etc. We also distinguish between organizational knowledge and organizational competence and suggest how the latter and more encompassing of these two concepts may be analytically partitioned into its different knowledge bases, the agents involved and situational indeterminateness.

Our analytical framework is thereby completed, resonating the idea that ”all life is problem-solving” or knowledge-generation and that all organizations are knowledge organisations. In this general framework we have thus identified what we believe, to a varying extent, is common to *all* organizations. But we now want to take one step further and use our framework to try to differentiate between different types of knowledge organisations. Now since organizations are most often both large and complex entities, consisting on many layers and sub-units, there is a need to simplify in order to be able to present ideal types in a stylized manner. Our choice here is to adopt a two-level notion of the firm, identifying a "center" and "lower levels", that allows us to include the interaction between these levels in the analysis.

Below we thus enter our discussion of possible ideal type knowledge organizations using the various dimensions specified in our general framework. After a starting shorter analysis of what to mean by the knowledge bureaucracy, we discuss at greater lenght how to specify the fundamentals of the knowledge community and those of its not so close relative, the knowledge collectivity.

Conceptualising knowledge organizations

The knowledge bureaucracy

In the ideal type bureaucracy explicit rules contain the knowledge needed to carry out operations. Moreover, it is then a top management responsibility to formulate these rules and role instructions for these to form a coherent body of responses to the various contingencies that may appear. Such rules of course come in many kinds, like e.g. strategies, central plans displaying action sequences and division of labour, they inhere in formalised control systems, etc. Coordination based on explicit rules thus takes care of interdependencies inherent in the production, and there is little need for additional interactive communication. This is an inexpensive form of coordination as noticed by Grant (1996). People can work alone, adhering to prevailing rules, plans and roles. They need not know or like their fellow workers, know the same thing as they know or know what they know. Both value creation and the images of work held in such a firm thus take on a specific character.

> Value creation overall is envisaged only by very top managers, and then is differentiated into independent steps that are assigned to separate departments or “offices”. …With this archetype, people imagine their role and their unit’s obligations *apart from* those of others in the organization, and *apart from* the situated complexitities of a particular task. (Dougherty, 2001, p 615)

More generally we may characterize the knowledge bureucracy as relying on “centred knowledge”. The top managers contruct the rules and systems that constitute organizational knowledge that need to be coherent and encoded; only then can it be safely transmitted to the employees for them to act upon. This knowledge is framed as explicit and instructive rules, and there is less need to establish common background knowledge, such as a guiding corporate culture, to erect any link between the identity of members and that of the organization, or similar.

Following explicit and unambigous rules would apparently require limited amounts of reflective activity or sophisticated “knowing how” dispositions of organisational members. You do as you are told and if there are doubts about what to do, you may look it up in the "manual". Individual members may well have some specialist knowledge, but top managers know enough about that in order to bring about coordination and coherence by a central system of rules and allocation of roles. Idiosyncratic individual knowledge, acquired through practice or formal education, inhibiting central planning is unthinkable in the bureaucracy.

Intelligence resides and learning takes place only within the center. As top level competences or abilities develop, consequential changes in rules must follow. Now the top managers may of course also learn from its employees, but new ideas or experiences must first be certified by the center before they are integrated in the central rule system. For the employees, organizational knowledge thus takes on the character of cookbook knowledge, that is true in the Aristotelian episteme sense, i.e. what cannot be otherwise. Local learning, as when employees interact with the environment using organizational and individual knowledge is thus not encouraged. Moreover there is then no interactive learning taking place between higher and lower levels of the organization.

The knowledge community

A long time ago Hayek recogniced the impossibility of a centrally planned economy and showed how markets could achieve coordination despite its lacking an overseeing mind. But also large organization tend to be too big a bite for any individual or top management team to govern based on ‘centred knowledge’. In a similar vein Boland & Tenkasi (1995) recognice that the diversity of environments and technologies makes them “too complex for one person to understand in its entirety” (Brehmer, 1991). Resonating the concept of “community of practice” by Lave & Wenger (1991), Brown and Duguid (1991) and Orr (1990) they suggest, due to their “focus on knowledge-intensive firms”, that such organizations may be concieved as “communities of knowing”.

Starting with the "knowing" aspect, the central feature of such a community is its ability to bring about a unique social and cognitive repertoir guiding its members' interpretations of the world (Boland & Tenkasi, 1995, p. 351). Such a conception is not very far from the ideas in Spender (1996) where he identifies a tacit communal, coherent body of knowledge, representing the core competence of the firm and powerfully influencing the identity of organizational members. Moreover there are strong similarities to the corporate culture literature emphasis on socialization processes, establishing shared meanings, communal way of making sense, etc as guiding frames (see e.g Wilkins & Ouchi, 1983).

But also the idea of a "community" apparently has a long history. According to McGrath & Robertson (2000), reintroducing the community concept into organizational analysis would serve to incorporate "that what is good (trust, open participation, dialogue and truly shared values) and severing that which is undesirable (elitism, exclusion, discrimination)". Similar connotations about social structure are displayed in Kanter's (1972) discussion on utopian communities, where she points out that a cooperatively reached, self-created and self-selected order is central to most definitions. As argued by Clark (1973) in communitarian groups individuals experience both a sense of solidarity and a sense of significance.

The Boland & Tenkasi (1995) "community of knowing" concept thus have very long roots in the organization theory literature and more generally in social science. But more specifically, as stated above, it is highly inspired by the more recent and highly influential ideas of "communities of practice" (CoP) of Lave & Wenger (1991) and others. Before returning to our conclusions on how to characterize a "knowledge community" we below make a digression into this CoP world.

-Communities-of-practice

As argued by Lave & Wenger (1991) in order to become a skillful performer in a community of practice, the individual typically starts as an apprentice, enjoying a legimitate peripheral participation (LPP). Through their participation in actual practice individuals gradually approach a status of full membership or mastery status. Participation, working together, it is emphasised, provides with more than an "observational" look out post.

> It crucially involves participation as a way of learning – of both absorbing and being absorbed in – the "culture of praxis". (ibid, p 95)

This process seems similar in kind to conventional conceptions of socialization processes, where you have to learn the uncodifiable messages and meanings that

metaphorically speaking inhere in the walls. It is a matter of situated learning, where you have to grasp the context in its entirety, including traditions and history that are still alive. In this view the individual learner is not at center stage, nor is actually the master. Relevant knowledge resides in practice, not in the master. In such a view, it is misleading to say that knowledge is transferred from the master to the apprentice, nor is it any better to say that the apprentice learns from the master.

> To take a decentred view of the master-apprentice relations leads to an understanding that mastery resides not in the master but in the organization of the community of practice of which the master is a part. The master as the locus of authority (in several senses) is, after all, as much a product of the conventional centred theory of learning as is the individual learner. (ibid, p 94)

As noticed by Brown & Duguid (1991) learning from the viewpoint of LPP is essentially a matter of becoming an "insider". Here learners do not recieve or construct abstract "objective" individual knowledge, they continue. Instead they learn how to function in a community. This they do by acquiring that particular community's subjective viewpoint and learn to speak its language. With reference to Orr's (1990) often cited studies of photo-copy repair technicians they emphasise the importance of acquiring an ability to understand and tell the community-appropriate stories and in doing that discovering the narrative-based resources of the community. As a result the members are being enculturated (Brown et al, 1989) rather than educated.

> Learners are acquiring not explicit, formal "expert knowledge", but the embodied ability to behave as community members. (Brown & Duguid, 1991, p 69)

Obviously we are here confronted with embodied competence or intelligence to behave. Like Ryle (1949) as discussed earlier, Lave & Wenger (1991, p 47) do not want to draw a sharp line between the inside and the outside, between the body and the mind. Neither the master or the apprentice should be conceived as self-conscious and knowledgeable pilots. Instead knowledge inhere situatedly in practice and creeps into and occupies the community members when they work together. As it seems such learning processes tends to be invisible to the actors involved and occur at a subconscious level. The tendency to emphasise that what is learned is embodied, points in the direction that it is dispositional, i.e. relatively automatic, abilities to act that are of interest. Such a focus is also found in Ryle's conception of "knowing how". But Ryle also leave some room for reflection in his notion of "intelligent practice". In Lave & Wenger such a discussion is conspiciously lacking or heavily downplayed. For Popper there exists three worlds, the material world, the subjective world of the agents and the world of objective knowledge. For Lave & Wenger (1991) this would certainly appear to be far too many worlds. To recognice the active,

reflective self and its relatively autonomous knowledge products represent ideas that are in contrast to theirs.

Certainly in many firms we may identify processes going on that would seem to mirror their conceptions. Much individual learning no doubt happens without conscious reflection. Especially newcomers tend to rely on imitation, simply trusting that others do the right thing, that prevailing routines are efficient, etc. Much behavioural abilities in the form of dispositions are certainly established in a socialization fashion. As noticed by Popper such a subconsious memory would seem to be highly significant in providing continuity and unity of the self (Popper, 1977, p 130-131). And we may of course think of "behavioural learning" as taking place through action-selection sequences without much conscious learning efforts involved.

As argued by Lave & Wenger (1991), knowledge resides in practice. But at the same time it obviously also has a strong holistic character. People should look inwards, look back, learn the relevant narratives, etc. Thus, there is an underlying notion of a coherent, communal frame of reference and value system that has to be acquired by the individual in order to become a full member. Certainly this is not a matter of encodable knowledge as in the bureaucratic organization. Instead, we are confronted with highly complex and ambiguous knowledge that can only be decoded through a lengthy period of actual practicing. In a sense this still promotes the image of a kind of a common “blackboard memory”, a very vast blackboard where all stories, legends, historical events, etc are written without apparent systematics. It takes time to ‘read’ but there is an underlying order.

-What is a knowledge community?

But how does these early conceptions of CoPs fit into and inform our current understanding of organizations and the relation between knowledge and organization? Focusing on the recent attempts of Brown & Duguid (1998, 2001) and Dougherty (2001) we may first notice that the original idea is still there. By practicing together long enough, people develop into a community with shared understandings, a shared world view, etc. In the definition suggested by Brown & Duguid (1998) this is qualified with reference to Ryle (1949) by noticing that CoPs rely on “dispositional know-how” created out of practice and held by the community as a whole.

> Such dispositional knowledge is not only revealed in practice. It is also created out of practice. That is, know-how is to a great extent the product of experience and the tacit insights experience provides (Brown & Duguid, 1998, p 95)

It thus does not refer neither to individual “know-that” nor to knowledge that is more explicit or consciously recogniced at the individual or the community level. With

reference to Wenger (1998) also Dougherty (2001) stresses that a CoP is a group of people that have “learned together” long enough to constitute a social entity. As noticed by this author the connotations evoked by the terms community and practice, are “profession” and “occupation”. Empirical examples provided include butchers and mid-wifes (Lave & Wenger, 1991), photocopier repair technicians (Orr, 1990; Brown & Duguid), flute makers (Cook & Yanow, 1996), technicians (Barley, 1996). Typically then CoPs are a matter of “tightly knit groups” (Brown & Duguid, 1998) working in a local context allowing for face-to-face interaction. As discussed in Brown & Duguid (2001) we may however also think of academic disciplines, professional networks, etc. able to communicate globally, as a kind of knowledge communities. To differentiate these loose epistemic groups from CoPs they suggest to call them “networks of practice”. Obviously CoPs operating within a firm may often be connected to such wider "outside" professional networks.

Apparently CoPs conveys the notion of groups knowing approximately the same things, experiencing things similarly, having a common world view, etc. Apart from aptly describing how local professional or occupational groups develop a high degree of cognitive and emotional unity, CoPs also nicely captures what happens in firms where functional departmentalization is predominant. Such functional units tend to be important in developing and retaining specialized knowledge and in doing that they may also contain much of the core knowledge and competences of the firm. As discussed by Dougherty (1992) the various functional units easily become separate “thought worlds” with different “interpretive schemes”, creating barriers between them and severing product innovation.

From the above discussion it seems like the CoP concept no doubt has great potential in catching how various groups as parts of the organization, by working close together, develop communal knowledge. Such mainly experience-based knowledge, although it is only limitedly explicated, may well form a reasonable coherent knowledge system that inhere in the practice of the community. Such knowledge will reveal itself only during practice, and practicing together is thus the only way newcomers may learn the tricks of the trade.

But if CoPs refer to local level phenomena, how do we account for them in the organization as a whole? What inspiration for top managers may be gained from the CoPs notions, in their endeavor to lead and control the firm in its entirety? Obviously we cannot simply treat the organization as a whole as one big community. As discussed by Brown & Duguid (2001) we should take care not to take the cultural unity of the firm for granted. While accepting that firms provide some common culture for their members, they wonder how much a CEO and a technician really have in common. More generally they recognice that “the appeal of *community* has tended

to obscure the important of practice" and accordingly a redirection of attention is needed. While still keeping the community as a core conceptual category, they finish by noticing that we have to know more about intercommunal behaviour and intercommunal negotiation. But these notions are left largely as a general inspiration for the future challenge of fitting CoPs ideas into a more comprehensive view of the firm.

Also Dougherty (2001) is struggling with fitting the CoPs idea into a more comprehensive view of organizations. As a way of resolving this isue she suggests that the firm may be seen as consisting of four different communities of practice: 1) the strategic practice, 2) the new product development practice, 3) the business management practice, 4) the competency management practice. While it is not hard to think of these as complementary problem areas, it is less clear why and how they should be conceived as CoPs, as discussed above. In many firms at least it is not the case that these have had a chance to "learn together" long enough to form a communal tacit body of knowlegde, a common world view, sub-culture or similar. Out of the four practices, she notices, that it "is perhaps easiest to understand how product development work evolves into a community of practice" (ibid, p 625). This might be so in the context of very long product development projects, but as will be discussed in relation to the "knowledge collectivity" below, in firms with an emphasis on shorter, customer focused projects, the preconditions for developing CoPs hardly seem to prevail. Like Brown & Duguid (2001), also Dougherty (2001) passes the question of how to understand and conceptualize the integration of the four differentiated CoPs on to future research.

More generally we may say that the knowledge community relies on 'decentred' knowledge. Knowledge resides in practice, in the system of activities and the tacit, communal background knowledge, contained in narratives, etc., of the community. It is thus organizational knowledge that dominates while individuals, masters as well as apprentices, are conceived of some kind of situated personas. Rather them depicting them as reflective individuals with abilities to interact with their own knowledge or that of their organization, they are seen are subordinated to the system, where they are slowly socialized and acquire dispositional or behavioural qualities. Assuming such unity between the individual/ community and knowledge/competence precludes interactional analysis. If there are no agents or pilots they cannot interact intentionally and consciously with their theories, i.e. that which for the moment is held to be true.

The knowledge of a community may the likened to that of a Kuhnian paradigm. It is largely tacit or unknown to the members. Those working within a paradigm are unable to rationally ciritices it and they should not try to. Changes is such a paradigm happens in a similar fashions as mutations or by some unexpected external event. This

is how animals learn, says Popper, and as a result they may face exstinction while learning. In a less provocative terminology we may notice that knowledge development is not seen as a matter of goal-oriented trial-and-error processes and rational critism.

Finally, so far the concept of the knowlegde community, appear to apply mainly to local communities within firms. Transposing the general CoP idea to the level of the entire organization is not a straightforward undertaking. As often recogniced we might identify many CoPs within a firm and many of them also have strong connections to “networks of practice” outside the borders of the formal organization (Brown & Duguid, 2001). In keeping with general ideas of CoPs they also suggest that the unresolved issue of the integration of the firm as a whole might be seen through the conceptual lense of “intercommunal negotiation”.

The knowledge collectivity

As argued above the knowledge bureaucracy operates on a *centred*, top management led system of "rules" or knowledge system that in an aprioric fashion resolves problems due to uncertainty and task related interdependencies. Given limited uncertainty, change and complexity such a knowledge strategy may work well. As the knowledge basis gets more complex and hard to comprehend for a top management team, decentralization may be acheived by establishing knowledge communities. In communities knowledge is both communal and *decentred*. It resides instead in practice, in the activities, narratives, etc., i.e in media that allow for retaining its complexity.

A third alternative, typically adhered to by project-based firms, we suggest, is to rely on the idea of “knowledge collectivities”. Such organizations are able to operate on *distributed* knowledge, to a great extent carried by the individuals. Below we try to spell out and illustrate this idea with reference to case studies of three project-based firms, described in more detail elsewhere (Lindkvist, 2000; 2001; Lindkvist et al, 2002). All belong to well known globally operating companies. One is a unit within Tetra Pak, engaged in developing converting technologies, a second is a leading company in the electrical power transmission industry belonging to ABB, the third one is a software development company within Ericsson. Like in the above section on knowledge communites, we first focus on the lower level significance of knowledge collectivies, i.e. how it applies to individual projects, and we then turn to the issue of organization level integration.

Project level integration

Today many technology-based or knowledge-based firms organize their operational and development activities in projects. Typically such firms display a matrix structure of projects and a departmental structure organized along functional specialisms. (Wheelright & Clark, 1992). After project completion theindividuals may return to her/his base unit and feed back lessons learnt to their fellow specialists. If the emphasis of the matrix is on the functional dimension such units may then constitute vital "knowledge containers". But as discussed by Allen (1996) in the context of high degrees of change in markets and when activities are strongly interdependent, the emphasis should rather be on the project dimension of the matrix. The three case study firms all have such a strong emphasis on the project dimension. Customer focus is very strong and almost all their activities are carried out in projects. If the project work is successfully conducted the whole firm is doing well.

Certainly projects are not uniform in our three case study firms, but broadly they share some important characteristics. One is that they are highly autonomous within project goals set, in terms of time, money and outcome qualities. While "what" to achieve is typically well specified apriori, "how" the project is run is up to the project leader and the project team to decide. It is a matter of "freedom with responsibility" as often emphasised by those involved. Another characteristic is that project are comprised of members representing different specialties. They thus belong to different functional "thought worlds" (Dougherty, 1992) with different knowledge bases and ways of interpreting experiences. Thirdly, in these firms projects are fairly short, often lasting about one year, with a new mix of members for each new project. In such projects there is thus a very limited overlap of knowledge bases, nor is there time to erect that during the life-time of a project. Instead they must coordinate their activities without any strong communal specialist knowledge basis. Since many of them are engineers, they however share some general background notions and attitudes. Moreover in such projects time is too short for the team to develop into a more mature group with common understandings and strong emotional bonds. Instead people have to socialize quickly and build trust swiftly (Meyersson et al, 1996).

As discussed in Lindkvist (2000) such a project team with a distributed knowledge structure (Tsoukas, 1996) must learn to coordinate their activities without much communality of individual cognitions and emotions. In explaining how such coordination is possible the explicitly stated, specific projects goals are of paramount importance, enabling a intentional trial-and-error process, where milestones, practical tests, etc may generate deviations, that trigger sense-making and reflective thinking (Lindkvist et al, 1998). Such rational problem-solving obviously bear a popperian mark, as discussed intially.

In addition it is suggested that the Weick & Roberts (1993) idea of "undeveloped group with developed mind" has explanatory power. Although project teams are not very well developed groups in the traditional sense, they may have a well-functioning "collective mind", they argue, if only their members act heedfully, i.e. "construct their actions (contributions), understanding that the system consists of connected actions by themselves and others (representation), and interrelate their action within the system (subordination)". The concept of heedful action is here borrowed from Ryle (1949), and it thus refers to dispositional abilities The quality of collective mind here depends crucially on interaction, on the ability to adapt to each other in a mutual adjustment fashion. Developing such cooperative abilities would seem to require that people train together and in line with the slightly behaviourist flavor of the approach we suggest that such a collective mind or competence would tend to become routinized (Nelson & Winter, 1982).

Project work is thus a matter of self-organising within limits set, requiring "rational thinking" as well as "dispositional" abilities of its individuals. Having a clear and specific goal or task to subordinate to and to have good representations of what the others know, constitutes vital points of departure for coordination. In such a context both routinized interrelating and rational method in combination creates the conditions for self-organization. Coordination here depends crucially of individual knowledge bases and competences. Similarly experiences and lessons learned tend to stay individualised, as explicitly recogniced or as individual background knowledge. Moreover, the knowledge management strategy in these project-based firms is to let is stay in place, but to enable the development of a "network memory" infrastructure (Lindkvist et al, 2002). Instead of collecting and systematizing knowledge, the strategy is to let it stay in place and let people learn how to search for relevant knowledge. As it seems people are good at finding the paths in these somewhat djungle-like organizations. With the help of informal or formally appointed guides the main thing is often just to know where to start the search process. Knowledge is thus transferred at the same time as it is needed. Similarly, people are allocated to projects due to the need for their specific competences, carrying with them their knowledge.

As a result it appears less natural to think of project level coordination in terms of "knowledge communities". The highly individualized task-relevant knowledge bases involved, display a very limited over-lap, there is hardly time to learn together long enough, and neither do project team tend to be tightly knit groups or communities in a social structural sense. Certainly socialization processes are important and people do learn from other skillful persons. But the fact that a person has been there for a long time is no guarantee for relevant knowing. Often newcomers may know more than oldtimers, and may quickly learn what these know. For many of these organisations, individuals with good scholastic or "theoretical skills" may be at least as important as

many of their oldtimers, with a long time of experiential learning. Much theoretical as well as practical knowledge soon gets obsolete and sometimes old foxes have learned little and are mere foxes.

At the project level, we would argue, another organizational logic i.e. the “knowledge collectivity” form, prevails. The projects however do not exist in a vacuum. In all three firms, although this dimension is intentionally downplayed, there are some kind of provision for long term knowledge containment and development. On of the case study firms actually deciding to abandon their functional line organization in order to be more customer focused and flexible, but maintained so called “competence networks” covering core technical subject areas. In the two other firms, a more traditional functional structure is in place. Apart from having a responsibility for competence development within their areas, in our case study firms such functional groupings are also important in establishing a comprehensive “network memory”, i.e. a well-connected pattern of individualized knowings of "who knows what", extending beyond individual projects (Lindkvist, 2000).

As noticed earlier however any kind of functional unit could also develop into a “knowledge community”, that might not only have positive consequences, but also become “barriers” to interfunctional communication. The idea behind stressing the project dimension in organizations is often exactly to counteract such problems.

Organization level integration

Turning to the level of top management or the entire organization, it is clear that a very strong emphasis on the project dimensions, means that the organization might become little more than a series of disconnected, highly autonomous projects. Moreover, the entire organization may take on the character of a loosely coupled, distributed knowledge system (Tsoukas, 1996) where the individuals know much more than leaders do. So there is a question of how firm integration is achieved, when most activities take place within a decentralized project structure. With reference to our case study firms we would then first mention that top managers have not abdicated. Like in most other firms they are no doubt responsible for the formulation of market and technology strategies. Moreover they are often centrally implicated in project goal setting and in considering whether the entire project portfolio matches strategic intentions. In a sense the projects that are chosen and carried out represent a kind of intentionally set experiments, that are testing the adequacy of prevailing strategies. In the firms there are formal and informal arenas where top managers and project leaders meet, supporting the interactional learning processes in interpreting deviations between strategic intentions and actual project level outcomes. The organizational knowledge or theories, as contained in strategies, here intersect with local knowledge generation as produced in project work. Another observation is that

top manager worry much about organizational issues and try to be very explicit about what are “the-rules-of-the-game” that apply. Considerable effort is thus dedicated to explaining the ideas guiding the choice of organization form, the ideas of freedom with responsibility, and information seeking and cooperative behaviour expectations.

What is however strikingly downplayed in the case study firms are efforts at establishing a reasonably strong guiding corporate culture or link between the identity of individuals and that of the organisation. This is not to say that such a tacit, communal background knowlegde could not be helpful. It may well be, but one problem is that, as with strong corporate cultures, when they are most badly needed it is most difficult to establish them (Alvesson & Lindkvist, 1993). To establish firm level guiding “communal knowledge” would require a much more stable environment, degree of isolation, etc than is usually possible for project-based firms. When circumstances change fastly, it is not a good idea to look inwards, to the communal history, etc. Instead people should be encouraged to look outwards at the task at hand and forward at what to achieve. Indeed in one of the firms strong organizational identities are seen as potentially counterproductive, since they may mean that “the employees might forget why they are here”, i.e. result in a reduced customer focus.

In summary, a “knowledge collectivity” is an organisation that is able to operate on “distributed” knowledge. In project-based firms this notion appears to mirror the way individual projects are being carried out. Here individual knowledge bases are highly significant, as well as the individuals’ competences to use their knowledge in a colloborative context. While some of their knowledges and competences may be explicitly recognicable, much will no doubt be “tacit”, like dispositions or completely subconscious abilities. Provided well specified project goals are in place and a well-connected “network memory” is kept alive, the individuals may achieve knowledge coordination in a self-organizing fashion. Both intentional rational problem-solving and interaction based on dispositional abilities are combined in such a process. At the level of the entire project-based firm, organizational knowledge are stated in explicit “rules-of-the-game” form, e.g. as generic strategies and ideas of organization, while tacit, communal background knowledge apparently play a minor role. Moreover, as interpreted above, the case study firms seem to have arenas for bringing about interactional learning by confronting and testing strategic and organizational intention using project level outcomes. Admittedly though, more research is needed in order to arrive at more clearly articulated notion of how to integrate, not only firms that rely on local CoPs, but also those that rely heavily on highly autonomous projects.

Conclusions

In the paper we suggest a three-fold terminology of "knowledge organizations" that we believe might benefit analysis. The first type identified, the “knowledge bureaucracy”, is a familiar one. Here organizational knowledge needed to carry out operations rests firmly within top management, expressed in strategies, rules, roles, control systems, etc. The knowledge basis of such an organization is "centred", relying on explicit and instructive ruling, rather than on tacit background knowledge. Similarly, organizational learning take place at the center and there is hardly any serious intent to enhance overall firm competence by relying on individual knowledge or the creative learning abilities of lower levels.

Certainly, in all firms top management has the the authority of formulating strategies, deciding on organisational design, etc. But it is also true about most firms that much problem-solving activities has to be decentralised to a great extent. One way this may be furthered is through “knowledge communities”. Contrary to the bureaucracy, organizational knowledge and competence is then "decentred", residing in the activities, the narratives, in the culture, or similar. The communal and coherent body of knowledge of such a community is thus typically dispersed and only limitedly explicable, making it necessary to acquire it by working together. Establishing such a community of practice, with a decentred, yet holistic knowledge system capable of guiding action, would seem to benefit from periods of stability and relative isolation For the individual this a socialization process, where s/he is being slowly "enculturated". While it is not hard to think of certain parts of an organization as a "knowledge community", it is less clear how top managers might interact many such communities in bringing about organization level integration.

Inspired by case studies of project-based firms, delegating most of its problem-solving activities to project teams, we identify the "knowledge collectivity" as a form of organization that is able to operated on distributed knowledge. While projects typically comprise members with different functional specialties, these are connected through a "network memory", signifying that each individual knows a lot about who knows what. Such knowledge may be activated swiftly when needed. Based on that and clearly specified project goals, project activities are coordinated in a self-organizing fashion. Great reliance is placed here on individualized knowledge. But also organizational knowledge is important in such firms. As discussed above, the top managers in the case study firms formulate not only strategic intentions and take an active part in decisions on project goals to be achieved, they also take great care in making explicit the organizational rules-of-the-game that apply. At least in our case study firms, explicit rules of the game are preferred, and there is little intention to engage in establishing common background knowledge, e.g. a strong organizational

culture or identity. In a more speculative vein it is also suggested that project-based firms may have arenas that promote interactive organizational learning, confronting strategic intentions and "experimental" project activity.

In conclusion, we suggest recognicing the "knowledge collectivity" as an organization archetype in its own right. Instead of staying firmly within a "community of practice" framework and redirect the analysis more to the "practice" aspect (Brown & Duguid, 2001; Dougherty, 2001) we would argue that recognicing two separate organization logics should benefit analysis and provide yet another fruitful path to enter in future research.

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