KNOWLEDGE COMMUNITIES AND KNOWLEDGE COLLECTIVITIES

-DIFFERENT NOTIONS OF GROUP LEVEL EPISTEMOLOGY

Theme: The Social Processes of OL and KM

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Abstract

The notion of a "community of practice" (CoP) has become an influential way of conceptualizing how decentralized sub-units or groups within firms operate. CoPs refer to "tightly knit groups", "practicing together long enough" to develop into a community with shared understandings, a shared worldview, etc. In the paper the notion of "knowledge communities" is put forward in capturing their basic epistemological features. The notion of a knowledge community, however, does not fit squarely with how temporary organizations or project organizations operate on knowledge. Typically such groups comprise a mix of individuals with specialized competences, making it difficult to establish a communal knowledge base. Resonating with their greater reliance on individual knowledge, agency and interaction, the notion of a "knowledge collectivity" is suggested.

Introduction

Increasingly, both practitioners and theorists recognize "knowledge" as a *deus 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 division of labor, etc. (Blackler, 1995). This is true about mechanistic, as well as more organic or flexible forms of organization (Burns and Stalker, 1961). Bureaucracies, for instance, typically rely on a "centred" and unitary knowledge base. But apparently, today most firms or organizations must operate in a much more decentralized manner, involving a stronger dependence and reliance on sub-units, groups or individuals.

In recent years, the notion of "communities of practice" (CoP) has been put forward as a way of conceptualizing how such decentralized units or groups operate (Lave and Wenger, 1991; Brown and Duguid, 1991, 1998; Dougherty 2001). CoPs here refer to "tightly knit" groups that have been "practicing together long enough" to develop into a community with shared understandings, a shared worldview, etc. Starting from the discussion in Boland and Tenkasi (1995) about knowing in such communities, one first ambition below is to continue by making a detailed account of how such communities operate on knowledge. The resulting epistemological notion connected to CoPs, is designated the "knowledge community".

As it seems, however, the notion of knowledge community does not fit squarely with how temporary organizations (Goodman and Goodman, 1976; Meyerson et al., 1996) or project organizations (Lindkvist et al., 1998) operate on knowledge. Typically such temporary organizations or project groups within firms consist of people, most of whom have not met before, who have to solve a problem or carry out a pre-specified task within set limits as to time and costs. Moreover, they comprise a mix of individuals with highly specialized competences, making it difficult to establish shared understandings, a common knowledge base, etc. Instead they have to operate on the basis of "distributed knowledge" (Hayek, 1945; Tsoukas, 1996). Such transient groups, I contend, rely on a different kind of knowledge base and have to engage in other types of knowledge processes than those associated with the knowledge community. It is suggested below that they should instead be conceived of as "knowledge collectivities".

Taking as a datum that temporary organizations are commonplace today and that many firms are strongly "projectified" (Midler, 1995), the "knowledge collectivity" would seem like a useful notion of group level epistemology for the apprehension of what kind of knowledge bases and processes are involved in these contexts. This is not to say that it is the only conception needed. In real life project-based firms, as well as in firms or organizations with other dominant characteristics, sub-units operating as knowledge communities as well as knowledge collectivities, are likely to be present and complementary.

Discussion outline

In trying to clearly differentiate the knowledge collectivity from the knowledge community a way of comparing them along a number of knowledge relevant dimensions is needed. A first section below introduces the dimensions used, noticing their origin and how they are interconnected. In the next section the literature on CoPs is penetrated in order to identify what basic epistemological assumptions may be associated with such communities. Here I first acknowledge the general inspiration from the Boland and Tenkasi (1995) discussion on "communities of knowing". I then turn to some highly influential, early and more recent accounts of what goes on in "communities of practice". Focusing on its knowledge relevant characteristics I discuss the notion of a "knowledge community" as a way of capturing its basic epistemological features.

In the "knowledge collectivity" section I start by identifying the facets of temporary organizations and projects that are typical in many, but not all, such empirical contexts. In order to show more specifically what kind of temporary setting has inspired the suggested knowledge collectivity notion, I also refer to own experience of project work gained during earlier case studies of project-based firms. After that brief empirical digression, serving to illustrate how a "project practice" may differ from a "community practice", I return to the conceptual investigation issue of identifying knowledge bases and knowledge processes in such project practices. In the analysis I conclude that the notion of the knowledge community does not seem to mirror very well what goes on in such transient groups. Instead, it is suggested that the notion of a knowledge collectivity would benefit analysis. A summary table 1 also presents major differences between the knowledge community and the knowledge collectivity as identified in the discussion. Finally, the discussion is summarized in a concluding section.

Logic of analysis: dimensions of knowledge in organizations

The general idea that all organizations are knowledge-based suggests that organizational processes are seen as closely linked to processes of knowledge generation, containment, utilization, etc. In the view of organizational evolution by Weick (1995) such links are established using the notion of organizing. For him the process of organizing is mirroring the dynamic interplay between "intersubjective interaction" and "generic subjectivity". 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. In pursuing their goals, organizations thus operate on a generic knowledge base that for some time has to be reasonably stable in order to bring about coherent action. Moreover, as knowledge is being exploited, there are also concurrent processes of learning and new knowledge generation going on. Organizational knowledge may thus be seen as a kind of retained outcome of ongoing processes of problem-solving, referring basically to what for the moment is "held to be true" (Popper, 1999).

For the purpose of differentiating between various kinds of knowledge organizations, we however need to identify a more fine-grained set of dimensions pointing at possible varieties of ways in which organizations may operate on knowledge. Below a number of basic dichotomies, regarding organizational/individual knowledge, explicit/ tacit knowledge, and foreground/background knowledge, underlying part of the analysis, are shortly introduced.

In discussing knowledge and knowledge processes in firms or organizations, it is first of all essential to distinguish between individual and social or organizational knowledge. Obviously individuals may be knowledgeable and as noticed by Argyris and Schön (1996) they sometimes know more than their organizations, e.g. when the dominant philosophy upheld in the firm is way out of tune with preferences or customer demand, or when individuals use the idiosyncratic knowledge learnt during their work or through prior experience elsewhere. They may also know less, e.g. when they do not fully realize the wise division of labor that is built into the prevailing organization structure or routines. As succinctly stated by Kogut and Zander (1992), "knowledge is held by individuals, but is also expressed in regularities by which members cooperate … resting in the organizing of human resources" (pp. 383, 386). Individuals may thus act upon their own idiosyncratic knowledge or on knowledge that is somehow socially constituted. This latter type of knowledge, to be found in groups or organizational settings, is often referred to as organizational knowledge.

Organizations may consequently rely on both individual and organizational knowledge. Moreover, as discussed in the extensive literature on tacit/explicit knowledge (cf. Nonaka & Takeuchi, 1995; Baumard, 1999), individual as well as organizational knowledge may be more or less easy to articulate (Polanyi, 1966). As a result organizational knowledge will sometimes be stated explicitly, e.g. as market and technology strategies, as a belief in a certain organization structure or the usefulness of specific performance measures, etc. But also less salient organizational knowledge, that defy articulation and codification may also be involved. As exemplified by Grant (1996) a common language and signifying system, shared meanings, communality of specialized knowledge, recognition of individual knowledge domains, etc constitute organizational background knowledge. Typically, such knowledge has to be acquired through participation and socialization. Similarly, resonating with the idea of idiosyncratic individual knowledge, we may think of individual knowledge that is possible to use in quite a conscious manner as well as individual knowledge guiding work in a more background manner.

In the analysis, these basic and quite well-established distinctions will be used as a means to establish a multi-dimensional account of the differences between various kinds of knowledge organizations. As shown in a summary fashion in table 1 below, several of the dimensions used in picturing the knowledge community and the knowledge collectivity as resting on different epistemologies, are rather directly connected to the above distinctions. Especially this is so regarding the three first dimensions, where the relative importance of individual and organizational knowledge is the important underlying issue. More specifically, the first of these dimensions provides with a summary characteristic of what constitutes the knowledge base and type of memory of the organization. The second and third dimensions add more detail as to containment and integration of this knowledge base. Similarly the individual/organizational and the tacit/explicit distinctions are linked to dimensions four and five, focusing on how individuals acquire knowledge and the degree of individual knowledge base similarity.

However, these dimensions are not used merely as yes/no categories, an ambition that would add little flesh to the bones. Instead I try to develop them by adding a number of related aspects growing important in the analysis. As will be shown in the analysis this applies not only to the above-mentioned five dimensions, but also even more so to the final dimensions six to eight. Rather than being related in a straightforward manner to the initial distinctions discussed above, these dimensions arose out of the analysis of the two different group-level constructs as portrayed in the literature. The origin of these thus mirrors both the kind of epistemological issues addressed in the literature and more constructive efforts geared at providing with additional clarifying epistemological distinctions. To achieve this it became necessary to make reference also to the writings of Ryle, Popper and Hayek and others. As a consequence of these discussions the resulting dimensions include one referring to what type of knowledge is mainly focused on in each of the two knowledge organizations as well as dimensions related to what basic type of knowledge process is involved and "epistemological maxim" adhered to.

The ambition is to present the "knowledge collectivity" as a different and complementary notion of group level epistemology to that of the "knowledge community". The conceptual work of apprehending and formulating the latter of these notions rests on a detailed analysis of the CoP literature. To a considerable extent this is to engage in interpretative work, trying to justify conclusions with quotes, but also in a portion of more imaginative analysis. Certainly this is also the case in the attempt at generating a comparable account of the "knowledge collectivity". Finally, by using the set of knowledge-related dimensions, the ambition is to give a reasonably coherent picture of each of two possible group level epistemologies. At the same time they should constitute dimensions along which the two types would appear to differ significantly.

Equipped with the above distinctions and a readiness to develop these further, I first approach the literature on "communities of practice" and "communities of knowing" trying to single out the main knowledge relevant characteristics of the "knowledge community". I then turn to temporary organizations or project organizations and inspired by "what goes on" in such settings elaborate on a notion of "knowledge collectivities".

The knowledge community

As mentioned initially a Weberian type bureaucracy operates on "centred" knowledge. More specifically top managers provide with explicit organizational knowledge in the form of instructive rules for the employees to use in carrying out their tasks and dealing with the contingencies that appear. Only a minimum amount of tacit background knowledge, e.g. a communal language, is required. Nor is there any great reliance on individualized knowledge; the individual knows less than the organization (Lam, 2000). With such a "unitary" knowledge base, integration is in principle easily and cheaply achieved. Rather than rely on communication and interaction, people work separated from each other, silently and alone (Lindkvist and Llewellyn, 2003). Basically a bureaucracy operates according to the epistemological maxim that "we can tell what we know".

But today large firms or organizations cannot be governed solely on the basis of "centred" knowledge. As argued by Boland and Tenkasi (1995) the diversity of environments and technologies makes them too complex for one person to understand in their entirety (Brehmer, 1991). Resonating with the concept of "community of practice" (CoP) by Lave and Wenger (1991), Brown and Duguid (1991) and Orr (1990) they suggest, due to their "focus on knowledge-intensive firms", that such organizations may be conceived of as "communities of knowing". In this section I will instead use the concept of "knowledge community" in order to match the systematic of the framework suggested, but like Boland and Tenkasi (1995) I take it that the CoP literature provides with core material for this notion. While the CoP ideas are certainly still evolving, I yet think it is possible to identify some basic characteristics of knowledge processes associated with this view of group level organization.

Before entering the CoP discussion I would like to underline the fact that there is not only a "knowledge" aspect involved, but also a social structural aspect signified by the term "community". Starting with the "knowledge" aspect, a general feature of a knowledge community is its ability to bring about a unique social and cognitive repertoire guiding its members' interpretations of the world (Boland and Tenkasi, 1995:351). Such a view is not very far from the ideas in Spender (1996), identifying a tacit communal, coherent body of knowledge, powerfully influencing the identity of organizational members, as constitutive of the firm. Moreover there are strong similarities to the corporate culture literature emphasis on socialization processes, establishing shared meanings, communal ways of making sense, etc, as guiding frames (cf. Wilkins and Ouchi, 1983).

As to the "social-structural" aspect, we should recognize first that the "community" idea has long historical roots. As argued by Clark (1973) in communitarian groups, individuals experience both a sense of solidarity and a sense of significance. Together with solidarity conceived of in terms of togetherness, trust, sympathy, etc, individual significance and interactive involvement in constituting the community is thus a distinguishing feature.

> Within community, the individual is positively significant if the foundation upon which community rests can remain firm through the interaction of individuals as responsible human beings. (Simpson 1937, quoted in Clark 1973)

Similar connotations related to the social structure of communities 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. Apparently the clan form of organization (Ouchi, 1980) also resonates with social-structural notions of solidarity originating in the conceptions of "organic solidarity" by Durkheim (1984/1933). In my view, however, communities differ from clans by their emphasis on being upheld by the group itself, through a communicative, interactive process, where the significance of individual participants is clearly recognized. Such recognition of individual voices is not a characteristic of clans. As suggested by Alvesson and Lindkvist (1993) we may distinguish economic-cooperative, social-integrative and blood relationship clans without such a basis and with far less respect for the individuals involved.

This introduction underlines that there is both a knowledge and a social-structural aspect connected to such communities. Furthermore, unlike clans, they refer to groups generating order, knowledge, etc, predominantly in direct, close and extended interaction. With this as a general background I turn to the more specific and highly influential ideas of "communities of practice" of Lave and Wenger (1991) and others.

Communities-of-practice

As argued by Lave and Wenger (1991) in order to become a skillful performer in a community of practice, the individual typically starts as an apprentice, enjoying a legitimate peripheral participation (LPP). Through their participation in actual practice individuals gradually approach a status of full membership or mastery status.

> It crucially involves participation as a way of learning – of both absorbing and being absorbed in – the "culture of praxis". (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 the context has to be to grasped in its entirety, including traditions and history that are still alive. In this framing 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 "decentred" 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* (my italics) 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. (p. 94)

As noticed by Brown and Duguid (1991) learning from the viewpoint of LPP is essentially a matter of becoming an "insider". Here learners do not receive 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 emphasize 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 and Duguid, 1991:69)

Turning to the more recent writings of Brown and 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 worldview, etc. With reference to Wenger (1998), 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 midwives (Lave and Wenger, 1991), photocopier repair technicians (Orr, 1990), flute makers (Cook and Yanow, 1996), technicians (Barley, 1996). Typically then CoPs are a matter of "tightly knit groups" (Brown and Duguid, 1998) working in a local context allowing for face-to-face interaction. As discussed in Brown and Duguid (2001) we may 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 calling them "networks of practice". Naturally CoPs operating within a firm may often be connected to such wider "outside" professional networks.

Apparently CoPs convey the notion of group members knowing approximately the same things, experiencing things similarly, having a common worldview, etc. Apart from aptly describing how local professional or occupational groups develop a high degree of cognitive and emotional unity, CoPs also nicely capture 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 shown by Dougherty (1992) functional units, however, easily become separate "thought worlds" with different "interpretive schemes", creating barriers between them and severing product innovation.

Knowledge in communities

In conclusion, we are here confronted with a kind of embodied knowledge or competence to behave. Lave and Wenger (1991:47) do not want to draw a sharp line between the inside and the outside, between the body and the mind. Neither the master nor the apprentice is conceived of as self-conscious and knowledgeable agents. Instead knowledge inheres situatedly in practice and creeps into and occupies the community members when they work together. Such a process has a strong

inductionist flavour, similar to that of the "intuitive inductionist view" of Aristotle as interpreted by Popper (1998:3), i.e. involving 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.

The tendency to emphasize what is learned is embodied, points in the direction that it is dispositional, i.e. relatively automatic, abilities to act that are of interest. In Brown and 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 and Duguid 1998:95)

According to Ryle (1949:43) ascribing a dispositional quality to a thing has much 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 be in a particular state, or undergo a particular change, when a particular condition is realized.

Dispositions, however, here refer not only to single-track dispositions, e.g. a smoking disposition, the actualizations of which are nearly uniform. Instead Ryle maintains that this concept refers 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" (p. 42). The agent is thus learning at the same time that the activity is carried out, a notion seemingly closer to reflection-in-action than reflection-on-action (Schön, 1983). Ryle thus leaves at least some room for reflection in his notion of "intelligent practice". In Lave and Wenger such a discussion is conspicuously lacking or heavily downplayed.

Ryle's way of 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 in Popper and Eccles (1977:130).

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

Such dispositional intelligence is no doubt highly significant in explaining human behavior and metaphorically speaking it may well represent the underwater part of the iceberg, leaving only the top of it to conscious thinking. As noticed by Popper such subconscious processes and memories would seem to be highly significant in providing continuity and unity of the self (Popper and Eccles, 1977:130-131). Our dispositional competences may also become retrospectively conscious, e.g. when the expectations they contain are contradicted, when unexpected problems appear, etc. But still such adaptive processes do not fully appreciate the capacity of the human mind, Popper continues. We are also able to think ahead, to set up action plans and to

recall abstract knowledge and relevant experiences at will. A distinguishing mark of the human mind is its active character, its ability to carry out conscious, mental operations in solving problems, trying to reach goals, etc.

From the above discussion it seems as if these knowledge related characteristics of CoPs have a great potential in explaining how various groups as parts of the organization, by working close together, develop shared knowledge. Such mainly experience-based knowledge, although it is only limitedly explicated, may well form a reasonable coherent knowledge system that inheres in the practice of the community. This kind of knowledge will reveal itself only during practice, and practicing together is the way newcomers may learn the tricks of the trade. Many behavioral abilities in the form of dispositions are established in such a socialization fashion, without much conscious reflection. Especially newcomers tend to rely on imitation, simply trusting that others do the right thing, that prevailing routines are efficient, etc.

Further comments

In sum, it is suggested that a "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 organizational knowledge that dominates while individuals, masters as well as apprentices, are conceived of as some kind of situated personas. Rather than depicting them as reflective individuals with abilities to interact with their own knowledge or that of their organization, they are seen as subordinated to the system, where they are slowly socialized and acquire dispositional or behavioral qualities. A basic epistemological maxim is thus that we can "know more than we can tell" (Polanyi, 1966). Moreover, the message is that the fundamental problem of knowledge tacitness and embeddedness could not be approached by trying to make knowledge or theories exosomatic and explicit. Assuming such a strong unity between the individual/community and knowledge also makes it hard to think of individuals as engaged in a process of critical reflective activity vis-à-vis their own hypotheses and theories as well as those of others.

Knowledge thus resides in practice. But at the same time it obviously 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.

The knowledge of a community may be likened to a scientific "paradigm" as discussed by Kuhn (1970a). Paradigm here refers to the shared understandings,

shared exemplars, standards, etc, that are guiding research in a scientific field. Large parts of it may inhere in less readily accessible forms such as stories, routinized procedures, artifacts and not be consciously recognized by its members. By studying textbooks, taking part in laboratory exercises the members of the community will eventually be able to work within the paradigm. Those working within a paradigm are unable to rationally criticize it and they should not try to. Kuhn (1970b) even maintains, "it is precisely the abandonment of critical discourse that marks the transition to a science" (p. 273). Instead they should engage in "normal science" in accordance with the conceptions, exemplars, etc, that are dominant in the scientific community to which they belong. Within normal science the members engage in "puzzle-solving", which means that it is the individuals rather than the theories which are tested (Kuhn 1970b:271).

> In short, though tests occur frequently in normal science, these tests are of a peculiar sort, for in the final analysis it is the individual scientist rather than current theory, which is tested.

As argued by Agassi (2002:407), Kuhn looked upon science as a "language game" and "intrinsically a community activity" where trust is placed in the authority of the scientific community. In such a situation, where what is "true" is certified socially rather than empirically, a kind of "oracular philosophy" prevails in the terminology of Popper (1974).

But the Kuhnian notion of paradigm may also be applied to an organizational level analysis as discussed in Pfeffer (1982) and Weick (1995). As concluded by Pfeffer (1982) two points from the organization-as-paradigm perspective deserve emphasis. First, acknowledging that paradigms are typically long lasting, and replaced *in toto*, in a "revolutionary" fashion, the perspective stresses the "relatively closed-system, non-adaptive nature of organizations" (p. 233). Second, he continues, due to the focus on solving small problems (or rather puzzles in the terminology of Kuhn, see above) the perspective emphasizes the unfolding, processual nature of change. From the viewpoint of sense making, Weick (1995) suggests that paradigms may be defined as "sets of recurrent and quasi-standard illustrations that show how theories of action are applied conceptually, observationally, and instrumentally to representative organizational problems" (p. 120). Such collections of illustrations or stories, held together by a theory of action, however, allow for considerably ambiguity. As a result, he continues, there may in practice actually be less agreement on the "the theories of action" than on the illustrations of exemplars themselves.

The knowledge collectivity

A group organization alternative, typically adhered to by adhocracies and project-based firms, is to rely on temporary organization or projects. Such transient groups display a number of distinct knowledge relevant characteristics. A temporary system as defined by Goodman and Goodman (1976:494) is a "set of diversely skilled people working together on a complex task over a limited period of time". Moreover most of them have never met or expect to meet again, yet they have to solve a task that is less well understood. Often definitions of projects are quite similar and the one presented already by Gaddis (1959:89) is reproduced over and over again with only small alterations in most literature on project management.

A project is an organization unit dedicated to the attainment of a goal – generally the successful completion of a developmental product on time, within budget, and in conformance with predetermined performance specifications.

Below I will use temporary organization and project as interchangeable concepts, referring broadly to groups, comprising a mix of different specialist competences, which have to achieve a certain goal or carry out a specific task of less than negligible complexity within limits set as to costs and time. Often such group organization is used in order to achieve time compression in product development, to adapt to changing technological requirements or to changing customer demands and as a result time limits are typically very demanding. How coordination and cooperation are brought about in such circumstances are puzzling issues, as noticed by Meyerson et al (1996). Focusing mainly on the second of these, they notice (p. 167) that people in such groups have to socialize quickly and build trust swiftly.

As an organizational form temporary groups turn upside down traditional notions of organizing. Temporary groups work on tasks with a high degree of complexity, yet they lack the formal structures that facilitates coordination. …. Moreover there isn't time to engage in the usual form of confidence-building activities that contribute to development and maintenance of trust in more traditional, enduring forms of organization.

As discussed by Mintzberg (1979) the use of "temporary market-based" groups is a characteristic of organizations with an adhocratic design, i.e. with a highly organic structure, with little formalization of behavior, flexible allocation of work, etc, along the lines suggested by Burns and Stalker (1961). The adhocracy also tends to use the functional and market bases for grouping concurrently, in a matrix structure and employ liaison devices to a great extent, according to Mintzberg. Instead of relying on standardization of work processes, output or skills, the key coordination mechanism, he continues, is mutual adjustment.

There is also a growing literature on project-based firms, mirroring the fact that many technology-based firms organize both their operational and their development activities in projects. (DeFillippi and Arthur, 1998; Gann and Salter, 1998; Hobday, 2000). Typically, such firms display a matrix structure of projects and a departmental structure organized along functional specialties. (Wheelright and Clark, 1992). After project completion the individuals 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 product development activities are strongly interdependent, the emphasis should rather be on the project dimension of the matrix. In such cases, there is a need for a variety of novel ways of dealing with the problems of knowledge containment and coherence of the firm (Prencipe and Tell, 2001).

As witnessed in this literature, project groups or temporary groups are heavily relied upon in a great variety of contexts. However, definitions of what is a project organization and temporary organization are very broad and a large number of quite different empirical practices would qualify. As a remedy to this problem, I specify below what kind of empirical setting that was inspiring the creation of the

"knowledge collectivity" notion. In achieving this I refer in the next section briefly to analyses of project work originating from case studies of project-based firms, in which I have participated.

Type of projects considered: A case study illustration

The firms included in the case studies represent a category of project-based firms that is often encountered. They carried out most of development activities within projects and projects in these firms were typically somehow attached to specific customers or identified customer needs. While what to achieve was thus often reasonably clear, the actual product development process was a matter of a complex collaborative engineering effort. Certainly, these firms were also engaged, to a greater or lesser extent, in highly open-ended basic technological research. However, in this article, the subsequent discussion of knowledge collectivities, takes an empirical point of departure in the less exploratory context of customer-attached product development projects, involving incremental rather than radical innovation. (see appendix 1)

Certainly project groups and project work were not uniform in our three case study firms, but they shared some important characteristics. One was that projects were highly autonomous within goals set, in terms of time, money and outcome qualities. While "what" to achieve was typically well specified a priori, "how" the project should be run was up to the project leader and the project team to decide. It was a matter of "freedom with responsibility" as often emphasized by those involved. Another characteristic was that projects comprised members representing different specialties. They thus belong to different functional "thought worlds" (Dougherty, 1992) with different knowledge bases and ways of interpreting experiences. Since many were engineers, however, they no doubt shared certain general values and attitudes. A third characteristic was that in these firms projects were fairly short, often lasting about one year, with a new mix of members for each new project. As a rule projects were also subject to very tight deadlines.

In the multi-disciplinary project context characteristic of our case studies there was thus a very limited overlap of knowledge bases, and hardly any time to erect communal knowledge during the lifetime of a project. Instead project members had to coordinate their activities without any strong, shared task-relevant knowledge basis. Due to the "systemic complexity" involved in such contexts, necessary activities could not be specified a priori and a traditional sequential project methodology was not a viable alternative; instead a more concurrent engineering approach was needed (Lindkvist et al, 1998). In this kind of uncertain situations, reliance needed to be placed on guesswork and experimentation, making it vital also to use frequent milestones, practical tests, etc, with a view to generating deviations, that should trigger reflection and critical inquiry regarding reorientation needed.

In enabling such coordination, the explicitly stated, specific project goals were of paramount importance. Project goals here had a role as a kind of "boundary objects" (Star, 1993) that were both "plastic" enough to adapt to local needs and constraints, yet "robust" enough to establish a common point of reference, for the various specialists to interact in a self-organizing fashion across functional areas, envision a

possible division of labor, negotiate on necessary compromises, etc, in order to meet deadlines. The specificity of project goals and sub-goals thus made possible goal-directed trial-and-error processes. (Lindkvist and Söderlund, 2002). Moreover, these firms also relied, more or less strongly, on a kind of largely informal "network memory" infrastructure (Lindkvist, 2003). Instead of trying to erect and codify a communal knowledge base, different members should thus remember their own part, but they were also required to know "who knows what". The knowledge management strategy was thus to let knowledge "stay in place" and let people learn how to search for relevant knowledge. With the help of a few facilitating means, such as "competence network" meetings used in one firm and special guides entitled "experience engines" used in another firm, the idea was to make possible knowing where to start the search process when problems turned up within projects. Knowledge was then activated and exchanged, in a market-like manner, only at the point of time it was needed.

What was strikingly downplayed in the case study firms were efforts at establishing communal background knowledge, e.g. a strong corporate culture, organizational identity or other kinds of shared understandings that could guide project work. This is not to say that such inarticulate, background knowledge could not be helpful. Unsurprisingly, many of the interviewed noticed that this would be beneficial in counteracting the fragmenting effects of carrying out work in highly autonomous and separated projects. However, as suggested regarding the creation of corporate cultures, when they are most badly needed it is most difficult to establish them (Alvesson & Lindkvist, 1993). To establish such guiding "communal knowledge" would seem to require a more stable environment, degree of isolation, less personnel turnover, etc, than is usually possible for project-based firms. Indeed in one of the firms strong organizational identities were even seen as potentially counterproductive, since they might mean that "the employees forget why they are here", i.e. result in a reduced customer focus. When circumstances change fast, people should not look too much inwards and backwards, to "our" identity and history, they argued. Instead they should look outwards, to what customers want, to the task at hand and forward at what might be achieved.

Individual learning in such contexts will to a great extent reflect the goal-directed problem-solving trajectory they engage in. Certainly socialization processes are important too, but the fact that others have been around for a long time is no guarantee for relevant knowing. Often newcomers may know more than old-timers, and quickly learn what these know. Individuals with good scholastic or "theoretical skills" may be as important as old-timers, with a long time of experiential learning. Much theoretical as well as practical knowledge soon becomes obsolete and, sometimes, as noticed by one interviewee, old foxes have learned little and are mere foxes.

Knowledge in collectivities

The above case study observations illustrate that individual knowledge bases as well as the individuals' abilities to use their knowledge in a collaborative context were seen as highly significant. While part of their knowledge and competences will no

doubt be "tacit", like dispositions or completely subconscious abilities, a great deal need to be possible to articulate. In the kind of trial-and-error-like processes of problem-solving observed, people have to be quite well aware of what they know themselves, what kind of additional knowledge is needed and how to start finding and generating such knowledge. As individuals they learn and accumulate experience in their efforts at solving specific problems. Relying on their knowledge of "who knows what", they approach others with their problems, ideas about possible solutions, etc, hoping that the experiences, knowledge, intuitions or criticism of others would help them change their thinking about the problem into a new, more promising direction. Certainly as time passes, much of what they learn will be only subconsciously known, but rather as individualized than as organizational background knowledge.

Furthermore, the Weick and Roberts (1993) notion of an "undeveloped group with developed mind" appear to capture the "social knowledge" aspect of such project groups. Although these groups, due to the limited time frame, will not be well developed groups in the traditional sense, with shared values, common understandings, etc, their members may be well-connected. Instead of relying on individual knowledge base similarity, the well-connectedness of individual knowledge bases becomes a crucial precondition for bringing about concerted action. Projects groups, with members that embrace a collective goal and have good representations of what the others know may thus, based on quite a minimalist base of social knowledge, develop a collective competence in a self-organizing fashion.

The connotations of intimacy and endurance that is often associated with the notion of a "community" would thus seem to be less fitting in the context of such transient groups. Yet, we may still think of them as groups in accordance with the view of Asch (1952). For him, group forces and group action is (simply) a matter of group goals "held and cherished by individuals" (p. 258) and each participant having a "representation that includes the action of others and their relations" (p. 251). Similarly, as stated by Schön (1983), their interaction is dependent on "each person's image of the larger system" and in that sense "the organization exists in its members' heads" (p. 118). Within such a view, a group refers to *individuals* (my italics) acting "as if" they were a group as phrased by Weick and Roberts (1993). Resonating with the greater reliance in such groups on individual knowledge, agency and goal-directed interaction, they are designated "knowledge collectivities".

As a result, it appears less natural to think of this kind of transient groups in terms of communities or knowledge communities. The highly individualized task-relevant knowledge bases involved, display a very limited overlap, there is hardly time to "learn together long enough", and neither do project teams tend to be "tightly knit groups" or "communities" in a social-structural sense.

Further comments

In sum, a "knowledge collectivity" is an organization that is able to operate on "distributed" knowledge (Tsoukas, 1996), mirroring that work in temporary organizations and projects typically involves multidisciplinary cooperative effort.

Instead of being shared among community members, the knowledge base is highly dispersed and individualized. Rather than relying on "decentred" knowledge, project groups must be able to operate on knowledge that is radically dispersed, distributed or individualized, as identified in Hayek (1945), being impossible to gather or comprehend for any single mind. In a distributed knowledge system, coordination must come about in the absence of an "overseeing mind".

But what basic view of knowledge and epistemological maxim might be associated with such "knowledge collectivities? In my view, the problematic encountered in such contexts resembles that of how markets are able to create "spontaneous order" out of widely dispersed "uncommon knowledge" (Hayek, 1945). As argued by Hayek, compared to (central) planning endeavors, markets are better at making full use of such "uncommon knowledge", e.g. about specific opportunities, about the pay-off of timely efforts. Moreover, as pointed out in Bartley (1987:440) market competition not only makes the most of existing knowledge but also generates new knowledge.

> In their interaction, the various participants can bring to bear their dispersed, specialized, individual, and different knowledge on the unknown and unfathomable object-product, and in this process they may discover more of its potentialities and utilize it accordingly. Better understanding of existing objective knowledge results from this competitive interaction, which is itself a knowledge production process. That is the market process elicits or creates not-yet-existing knowledge about the already existing products, as well as creating new products.

Accordingly, we should not think of markets only in terms of exchange, but also as inhabiting a "discovery process", in which we give and receive criticism in order to "objectify and probe our ideas and products". In science and in intellectual life generally, he continues, this happens through what is often referred to as "the marketplace of ideas" (p. 438).

Continuing this line of thought, the problem-solving processes in projects may be thought of as taking place within the context of a "marketplace of ideas". Here people do not only use each other as "external memories", economizing on their own limited cognitive abilities (cf. Wegner et al., 1991; Griffith and Neale, 2001), but also as parties with whom they engage in purposeful exchange and co-evolution of knowledge. In trying to pursue their interests - or more fitting in the project context - in trying to solve their problems, they interact with others probing their ideas and getting feedback helping them to find out what are their strengths or what is wrong about them.

But those involved cannot know exactly what they then give away and how others interpret and use their knowledge. Having objectified and stated their ideas they lose control of them and to foresee how they will be transformed and combined with other knowledge will be impossible. Such a view of knowledge as "unfathomable", mirrors the notion of exosomatic or "objective knowledge" by Popper (1972), referring to knowledge that is separated from its creator, taking on something of a life of its own. Bartley (1987) says that what he learnt from Hayek and Popper was that "we never know what we are talking about or what we are doing". As an epistemological maxim for the knowledge collectivity, I suggest the slightly re-phrased version "we know less than we can tell".

Now, while interaction in ideal type markets takes place between autonomous actors with goals of their own, temporary organizations as well as project groups typically have a goal and involve hierarchy. As underlined above, projects often have quite specific goals as to what functionalities products should have, time and cost limits, etc. While "what" to achieve is typically pre-specified, what processes of problem-solving or knowledge development are needed are very much up to the project participants to find out. It is the issue of "how" this is done that I believe may be understood using a metaphor of the "market-place of ideas". Provided a collective goal and a collective "network memory" are in place, people are able to generate the knowledge needed to accomplish their task in quite a self-organizing fashion, having much in common with how "spontaneous order" is achieved in markets.

A summary table

As the knowledge basis of a firm gets more extensive, complex and hard to comprehend for a top management team, decentralization may be achieved by establishing local knowledge communities. In such communities knowledge is "decentred". It resides in practice, in the activities, narratives, etc, i.e. in media that allow for retaining rather than reducing its complexity. In contexts plagued by much hard-to-articulate knowledge, the knowledge community provides a mode with the potential of enabling collaborative effort. However, temporary organizations or projects represent organizational practices with characteristics making them less easily conceived of as knowledge communities. They operate on "distributed" knowledge and their way of enabling integrated collective action relies on the "well-connectedness" of knowledge bases. As suggested these are called "knowledge collectivities".

The above differences, as well as other ones discussed in the analysis, between the knowledge community and the knowledge collectivity are summarized in the table below. As stated initially the first three dimensions focus mainly on the relative importance of individual and organizational knowledge in the two types of knowledge organizations, by identifying what constitutes the knowledge base/type of memory of the organization, where knowledge is contained and how knowledge base integration is achieved. Dimensions four and five refer to how individuals acquire knowledge and the degree of individual knowledge base similarity. Finally dimensions six to eight try to frame the differences between the two knowledge organizations making reference to somewhat more fundamental or classical epistemological issues. Mirroring the general ability of knowledge communities to deal with hard-to-articulate or "tacit" knowledge, its focus on dispositional, embodied knowledge is acknowledged and compared to the deliberate exchange of and interaction with "objective" knowledge of the knowledge collectivity. Furthermore, the paradigmatic or "cultural" process features of the former type knowledge organization, is contrasted to the more "market-like" process characteristics of the latter. The last dimension, finally serves to point out that we may actually know either more or less than we can tell.

It might be added that the comparison made below refers to the knowledge communities and knowledge collectivities as epistemological notions. The idea is not

to say that these two ideal type conceptions have a one-to-one relationship to distinct empirical contexts. As empirical contexts, temporary organizations, project groups and communities of practice represent important settings *inspiring* the construction of the stylized notions below. But strictly speaking such notions or conceptual tools once developed will have a life of their own, and be more or less suited to illuminating different empirical contexts. Their survival value will be a matter of whether they provide additional insight into the course of future empirical investigation.

	The Knowledge Community	The Knowledge Collectivity
Organizational knowledge base	Decentred knowledge/ Blackboard memory	Distributed knowledge/ Network memory
Knowledge containment	Communal practices and narratives	Individual experiences and competences
Enabling knowledge integration	A certain degree of knowledge base similarity	The well-connectedness of Specialized knowledge bases
Individual knowledge bases	Over-lapping	Different
Individual learning	Socialization	Problem-solving
Type of knowledge mainly focused	Dispositional knowledge	Objective/unfathomable knowledge
Type of knowledge development process	Paradigm-driven/ Normal-science process	Goal-directed trial-and error/ Market-like process
Epistemological maxim	'we know more than we can tell'	'we know less than we can tell'

Table 1. Comparing the Knowledge Community and the Knowledge Collectivity:
Some important dimensions on which they differ.

Conclusions

Certainly, in all firms top management has the authority to formulate strategies, decide on organizational design, etc. But it is also true about most firms that many problem-solving activities have to be decentralized to a great extent. One way this may be furthered is through "knowledge communities". 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 only limitedly explicable, making it necessary to acquire it by working together. As a result of such learning processes members will be able to operate and cooperate on a basis of "similar" background knowledge. For the individual this is a socialization process, where s/he is being slowly "enculturated" into the prevailing paradigm. Apparently, in such a context there is little reliance upon idiosyncratic individual knowledge. Establishing such a knowledge community with a decentred, yet holistic knowledge system capable of guiding action, would seem to benefit from periods of stability and relative isolation. While it is not hard to think of certain parts of an organization as a "knowledge community", it is less clear how top managers could interact with many such communities in bringing about organization level integration.

Inspired by ideas of temporary organization and project organization I have identified the "knowledge collectivity" as a group level construct connected to distributed knowledge. Rather than resting on communal background knowledge "similarity", concerted action is here a matter of the "well-connectedness" of individual knowledge bases. Great reliance is thus placed on individualized knowledge, but also organizational or social knowledge is important. 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 market-like self-organizing fashion.

In conclusion, I suggest the "knowledge collectivity" represents a notion of a group level epistemology in its own right on a par with that of the "knowledge community". Recognizing these as two separate options should benefit analysis and provide yet another fruitful path to enter in future research. As noticed above, the inspirational context for the knowledge collectivity notion was rather short-lived development projects involving incremental rather than radical innovation. Empirical studies discriminating between the prevalence and efficiency of these different ways of operating on knowledge, in a variety of more and less exploratory settings, would be one interesting way to continue. Another would be to focus on how they might complement each other within a firm level analysis perspective.

Short description of case studies:

All case study firms belonged to well known globally operating companies. One was a firm within Tetra Pak, the second belonged to ABB, the third and fourth were two development firms within Ericsson. The case studies are described in more empirical detail elsewhere (Lindkvist et al, 1998; Lindkvist, 2001; Berggren & Lindkvist, 2001; Lindkvist, 2003). The study of an R&D firm within Tetra Pak covered the period 1997-2000 and included 18 interviews with managers, project leaders and project members. In addition meetings were attended and seminars were held with top managers. The second-mentioned study was carried out in 2000-2001, and included 17 interviews and one group discussion with top management. In the first Ericsson more than 30 interviews were conducted with managers, project leaders and project members between 1994-1996. In the other Ericsson case study 19 interviews were conducted between 1997 and 2001.

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