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Against Hierarchy and Chaos

Knowledge *Co*production in Nets of Experts[1]

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Abstract: Communities of Practice (CoPs) are among the most promising concepts to promote the genesis, evolution and exchange of knowledge in organizations. However, there is a gap between CoP theories and their implementation in companies. Our case studies of four attempts to introduce CoP-related structures show that the different underlying management principles can systematically be analyzed in at least two dimensions, technology "vs." the social and exchange "vs." production. We argue that the choice is not contingent, but that emphasis on the social and the creative production of new knowledge leads to more productive structures in the area and in the sense of knowledge intensive services. For the conception of such approaches we show that it is useful to think in terms of another structure between "teams" and "communities", which we call "nets of experts".

Keywords: Communities of Practice, Nets of Experts, Case Study, Siemens, Volkswagen, Deutsche Telekom, WiKo
Categories: K.4.3, K.6.1

1 Introduction

It is now business folklore that any "management" of knowledge has to take into account the social and cultural aspects of the genesis, evolution and exchange of knowledge, and that in business life Communities of Practice (CoPs) are among the most promising concepts for achieving that. However, there is a gap between theory and practice of CoPs, or, in other words, between discourse and implementation. Actually, at least four levels of dealing with CoPs can be distinguished: the research community, decision makers in organizations, the level of technical implementation, and every day use by members of the organization. Concentrating on the scientific point of view it becomes apparent that neither axiomatic theories, which postulate abstract properties for CoPs, nor synthetic theories characterizing CoPs by their basic elements can explain the variety in a systematic way. Only an analysis of the different approaches taken in organizations under the "CoP" maxim will help bridging the gap.

[1] A short version of this article was presented at the I'KNOW '03 (Graz, Austria, July 2-4, 2003).

And special attention must be paid to the different environments knowledge production takes place in. Knowledge and sharing take on a different meaning depending on the branch. Sometimes privacy is considered more valuable than creativity, and quite often effectiveness more than both. If thoroughly considered, this can help to bring light to the theory instead of confusion.

This paper investigates the gap between theories and implementations by extracting implicit strategies from the approaches taken (see chapter 4) via case studies of four CoP-related approaches in major German companies (see chapter 3). Based on a sketch of the field of CoP theories as a blueprint to set up the level of analysis (chapter 2), we try to map back the analysis of two dimensions of the implicit strategies to the structure of the organizations. This allows us to draw links to the characteristics of different fields of application, thus narrowing the mentioned gap (chapter 4). It even yields the possibility to evaluate which strategy fulfils best the requirements of the knowledge intensive services sector (chapter 5).

In chapter 6, we provide an outlook to a project conducted at the Fraunhofer ISST in Berlin which tries to learn from these results, followed by a short conclusion (chapter 7).

2 Theories of CoPs

Following the general perception during the second half of the Nineties that there is no such thing as "the" knowledge management system for a given company or organization, let alone all of them, there has been a shift towards the concept of Communities of Practice. The term itself, coined by anthropologist Lave and IT consultant Wenger (see [Lave, 1991]), stems from learning theory. The definition is built upon the participation in a system of action with shared identity and motivation, learning being "legitimate peripheral participation", a sociological concept. The characteristics of a CoP can be stated clearly: a common interest in the area of knowledge, emphasis on exchange and creation of knowledge, voluntary participation, and self organization [see Wenger, 1998a].

One major early source for CoP theory was XEROX's Parc institute (see [Brown, 1989]), stressing common work from a CSCW perspective with axiomatic role models and community structure blueprints (see [Brown, 1998]). We call these the *"idealistic" or "axiomatic" theories*, because they construct the notion of a CoP on axioms abstract from practice, like in *"A CoP defines itself along 3 dimensions: (1) its joint enterprise as understood and continually renegotiated by its members, (2) the relationships of mutual engagement that bind members together into a social entity, (3) the shared repertoire of communal resources [...] that members have developed over time."* (see [Wenger 1998a]).

Another category of theories give "instructions" for community building, e.g. the approach of "building blocks for Knowledge Management" (see [Probst, 1997]) or Wenger's "types of communities" (see [Wenger, 1998a]) or "types of leadership" (see [Wenger, 1998b]). Theories of this kind seem to be more concrete, superficially. But since they are by no means related to the organization's history and culture, they also represent an idealized view on atomic units social entities are said to consist of. We will call this kind of theories *"pseudo-concrete" or "synthetic"*.

What is missing from the theoretical perspective is an analytical approach to the CoP phenomenon drawing insight from analyzing the variety of grown social structures: In practice, organizations have their unique history, and therefore culture, encompassing organizational and social properties (see [Ackermann, 2003]). From this it becomes evident why in practice very different approaches are taken. The Archimedean point is the self-contradiction of "voluntary self-organization as a steering concept". If, by definition, CoPs cannot be enforced, three possibilities remain: just motivate, build onto existing grass root structures, or use force at start up only. Put the other way around, this implies that different realizations of the CoP concept in practice should lead to a better understanding of social interaction. Variety does not necessarily blur theory, but can help to enrich it.

3 The Case Studies

For taking a closer look at the gap between theory and practice, we conducted four case studies among three major German companies in the knowledge intensive services sector. The choice was random insofar as virtually all major companies have in one form or the other tried CoP approaches until today. It is not contingent as far as from this set a distinction according to two dimensions can be drawn: on the one hand, the dialectics between technology and the social, and on the other hand the balance between exchange of knowledge and creation of new knowledge.

3.1 Siemens KN

Relatively early, in 1997, Siemens networks division ICN created its "Knowledge Networking" (KN) department for the 8,800 employees of German Sales and Service. Based on simple technological means like browsers and database, KN encompasses a multitude of functionalities like extensive yellow pages with communication aid, a database of competitors, consulting and controlling around networking issues, e.g. the calculation of the "KN indicator" of employees, off-the-shelf processes for the systematic collection of field workers' knowledge, the integration of job specifications und management instruments, as well as its own editorial board to coordinate and condense information.

To start KN, a big effort was necessary: a special PR department for slogans, logos and events, a heavyweight system of incentives like travels, musicals and jewelry vouchers, questioning of employees and in some cases the obligation to enter data. By these means, participation could be highly increased in the beginning, at least in the Service area, but in Sales the intrinsic logic of incentives hindered a march through success. All in all, a heavy burn-out could be observed, and new knowledge was hardly ever created. Today KN goes on working, while ShareNet (see 3.3) has long ago become company standard.

3.2 Volkswagen ww.deck

In 1998, the in-house consultant firm of the Human Resources Department VW Coaching in collaboration with VW's IT section K-DO was assigned the task to introduce the concept of Communities of Practice to 330,000 employees worldwide.

In "world wide development and exchange of corporate knowledge", experts from around the globe are linked in so-called expert rooms for about 50 "job families" like "varnishing" or "smell". Experts and moderators are chosen by their superiors, as is the structure of expert room content, but then the experts are left to themselves. The constitution of the community is encouraged by trust building measures like start-up workshops. Motivation only works on a social basis, by being appointed as an expert in the expert room and in daily work surroundings.

The technological part of ww.deck stresses usability over features: yellow pages, bulletin boards, versioning, encryption and a document management system for project reports, information and best practices were implemented. Reportedly crucial to the success is the possibility of offline work, because work in ww.deck is not paid as such. Apart from that there are additional projects for "knowledge transfer" to new employees and, promoted by the German Ministry of Research, "knowledge balance" on the evaluation and management of knowledge.

On the one hand, ww.deck has been considerably enlarged since its foundation, on the other hand, it is still restricted to R&D and Production, as it is not an explicit goal to incorporate more than about 10% of the employees. A special problem is said to be the company's standard language English that cannot be strictly enforced, so that techniques of automatic translation are being evaluated.

A similar approach is followed by the food company Unilever with its "Knowledge Mapping and Structuring Unit" (see [Andriessen, 2001]).

3.3 Siemens ShareNet

In the aftermath of a study of the Boston Consulting Group, which had criticized the centralistic organization of the transnational company, Siemens ShareNet was kicked off in the beginning of 1999. Started in the ICN and ICM divisions (networks and mobile) for the sake of decentralizing the world wide exchange of knowledge, today ShareNet has become the standard system for all knowledge management activities in all Siemens divisions. ShareNet was first introduced for Sales and Service, not so much for R&D, where up to this day a strong centralization is prevalent.

ShareNet is a personalized, world wide, English language intranet open to all employees, where on the one hand codified knowledge called "knowledge objects" (projects, customers, markets, competitors or solutions) can be stored, and on the other hand personalized knowledge like bulletin boards, news, chat and ads are communicated. The most favorite channel within ShareNet is Urgent Requests with a medium answer time just below 13 hours. On the technical side, ShareNet abounds in features: filters, universal comments, alerts and other pushing techniques, an archive for everything that was not updated following a reminder, and a complex recommender system. The latter also serves as the basis for the initially considerable incentive system (travels, mobile phones). The major problem besides distortions caused by the incentive system is the lack of workflow control. There is a "global editor", but only a formal check is performed, while no examination of content by authoritative departments takes place. Of course, over the years a threatening heap of "dead knowledge" has piled up, which is probably one of the worst problems ShareNet is facing today. ShareNet's priceless advantage is that due to the international aspect of the exchange competitive struggles in Sales and Services are practically avoided.

Communities at the petroleum multi Shell work similarly, but with a strategic clustering of small communities in bigger groups (see [Andriessen, 2001]).

3.4 Deutsche Telekom "virtual forms of labor"

It is a long time goal of Europe's biggest telecommunications company to introduce new forms of communication to its divisions. With "MyTeamNet", the Deutsche Telekom does have an elaborate intranet, but its two main characteristics are still top-down structure and information overkill (>1000 servers, >4 million pages). Under the label "virtual forms of labor", the corporate part of Telekom tries to modernize company culture from the top by offering technology and organizational concepts to "grass root" initiatives.

The offer encompasses virtual rooms for special goal-oriented projects or less streamlined teams with topical orientation. Technology is supplied and adapted to needs, organizational concepts, coaching and facilitation are provided, while the teams and projects have to develop in their departments, either initiated by a sponsor or out of employee initiative. The structures in store range from definitions of roles for coordinators, moderators, administrators and back officers together with the specification of respective access rights, to phase plans of a community cycle: initiation (choice of participants), kick-off (determination of goal, roles, schedule, rules, structure of topic), work phase (moderation, virtual and conventional methods, techniques of coordination like collection, debate, voting) and conclusion (result, feedback, lessons learned, presentation). The technology is supposed to require no special resources for development, but is integrated into the general restructuring of the intranet. Today there is not even yet a single place where all communities are registered. In the international context, anything alike has failed so far due to diverse "problems of compatibility".

A similar approach of cultural sponsorship of Communities of Practice is practiced, e.g., by the petroleum company BP Amoco (see [Andriessen, 2001]).

4 Implicit Strategies

These approaches provide a good comprehensive overview over the bandwidth of the CoP concept: Generally, our case studies show that not only the introduction of CoP-related structures into organizations starts in some substructure, rendering ways of speaking like “Knowledge Management @ Siemens” highly inaccurate, but also that in complex organizations usually different approaches compete for budgets in such a way that there is little transparency, making “If Siemens knew what Siemens knows” “If Siemens at least knew what knowledge management activities Siemens is pursuing”. From outside, visibility is even worse. Apart from a handful of success stories, hard figures are hard to find out.

Speaking about the differences, two dimensions have proven to be useful to the analysis, the first concerning the degree of technology used to control the genesis and evolution of communities, and the other the probability that truly new knowledge is created rather than merely passed on (see Fig. 1):

Siemens Knowledge Networking is not really yet an actual CoP approach, but rather a previous step. The emphasis lies on codified knowledge, or even knowledge

as a trading good that can be managed contrarily to the interests of employees. Of the typical CoP characteristics at least one, self-organization, is violated. This accounts for the short-winded success, especially when related to the effort taken.

With Volkswagen ww.deck and Siemens ShareNet, we face two typical descendants of "second generation Knowledge Management": by supporting the natural phenomenon of knowledge communities, processes like internalization, externalization and socialization of knowledge are supposed to be promoted. The important difference is that ShareNet relies more on the set-up of technology, infrastructure and global steering through incentives, with the social element developing freely within this frame, while VW imposes social structures and topics locally, with technology, motivation and workflow being negotiated on the micro level. The former brings the disadvantage that unstructured content starts to grow without bounds so that "unnatural" means of control have to be taken, while the latter sacrifices the creative potential of free genesis, evolution and dissolution of CoPs to a higher stringency. Whereas ww.deck neglects the influence of the negative side of participation (exclusion), ShareNet preemptively discards the benefits achievable through (social) self-organization. This is reflected in the partial successes and failures of the approaches.

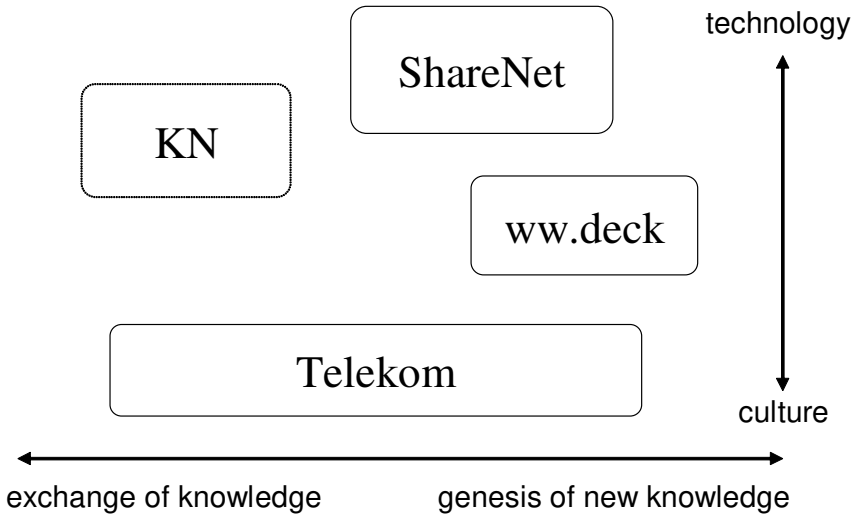

Figure 1: Dimensions of analysis

With some justification, the approach of the Deutsche Telekom could be labeled "second generation CoPs" (and with that, "third generation Knowledge Management", as it were). Here, neither communication and exchange are understood as ends in their own right, to be supported with maximum technological and economical driving

force, nor are communities seen as manageable entities that can be “bred”. Instead, organically evolving communities are given organizational, technological, structural, financial and - equally important - time and space resources to promote their development. But while as an idea this seems consequent, at the time when our study was conducted it was still questionable if this approach could (be) spread within an entire organization. Here, without neither a technical nor a managerial hierarchical apparatus, the paradox of management becomes especially critical. But in our opinion this only shows we are moving in the right direction.

5 Discussion

Taken for granted that communities – and in business life obviously most preferably CoPs – are the approach to introduce when knowledge is supposed to develop in a given organization, there is nonetheless no canonical way of mapping the abstract theoretical concept onto a certain company with its unique history, culture and physical body. But that does not necessarily mean that generalization is impossible. Rather, community approaches should be thought of in the dialectics of at least – as proposed here – two dimensions: technology “vs.” culture and exchange “vs.” production. Thus, strategies in this field are tightly linked to the historically grown culture of an organization, and to general principles of management.

Hierarchical structures like KN or ww.deck where the respective lower levels in the hierarchy are directed from the top – tend to hinder creativity by being “contra-intuitive” or simply against local interests. Even if VW’s expert rooms are locally pseudo-self organized, the benefit is rather for collaboration requiring a limited amount of creativity (or a high degree of privacy, as in automobile research). On the other hand, Siemens’ anarchic approach wastes intelligence and natural social structure by arranging an uncontrollable flow of information according to simple “mechanical” rules. This giant machine can for a while yield surprising results, but mostly for standardized processes like in the telecom sales business. The most promising image is that of cultural sponsorship (backed by technical and structural support, of course), bundling, linking and promoting “natural” initiatives and so bringing together voluntary elements with the power of enforced structures. For knowledge intensive services this "cultural" approach seems to be the most appropriate one, but practical results will still have to show odds and ends.[2]

6 Implications for Practice

The WiKo (KNowledge COproduction) project of Fraunhofer ISST in cooperation with the Fraunhofer FIT and industry partners (see [Fuchs-Kittowski, 2003]) aims at overcoming the disadvantages of one-sided approaches.

In the course of our studies of work processes we found out that often dichotomized thinking in terms of *teams* for output-oriented work and *communities*

[2] In [Fuhr, 2003] we describe the structures visually as *octopus*, *net* and *root* for the hierarchical pyramid, the anarchic dynamic exchange and the grass root sponsorship approach, respectively.

for creative collaboration that is not aimed towards a common goal does not represent the real, let alone the optimal workflow. WiKo describes a structure termed *net* to be the missing link between the two: Individuals dynamically form a net with people *from different* communities *across* their standard teams to solve a problem. This way, the artificial and contra-productive separation between "experts" and "non-experts" is dissolved, and inputs from different professions can stimulate each other.

Property	**Team**	**Net of Experts**	**Community**
focus of interaction	task	task	interest
goal of interaction	creation of knowledge	creation of knowledge	exchange of knowledge
degree of interaction	close	close	loose
object of interaction	common objects	common objects	casual interaction
time of interaction	short	short	long
creation of group	formal	informal	informal
leadership	formally legitimized	informally legitimized	informally legitimized
membership	by assignment	voluntary	voluntary
fluctuation	fixed	variable	variable
expertise	heterogeneous	heterogeneous	homogeneous
size of group	small	small	big
members come from	organization	organization	anywhere
openness	closed	closed	open

Table 1: Types of Collaboration Groups

Besides this "social transparency" WiKo also takes care of the technical side by transparently integrating the different media used for collaboration by certain groups, like instant messaging, documents, mail, discussions, so that in the ideal case navigation is only by content instead of form. The whole platform is embedded into personal work processes to make use as natural and intuitive as possible. WiKo does not try to impose a new structure (of organization, of thinking) onto a social system but comes in from the bottom to technically lessen the gaps between different forms of cooperation.

Of course it is not easy to introduce such a profound change of workflow and even thinking into the everyday processes of an organization, but so far, at the beginning of the evaluation phase, officials indicate that the WiKo platform is successful in supporting the organization's knowledge intensive procedures.

7 Conclusion

We have shown how it is possible to depart from a purely axiomatic or synthetic level of theory of Communities of Practice by analyzing different contexts of intensive knowledge production. The "paradox of management" proves to be the Archimedean point apparently demanding a choice in two dimensions, between social and technical control and between exchange and production. And different areas of practice have different preferences according to their secondary interests (e.g., secrecy directly after productivity in R&D).

However, creativity can be nourished by a certain type of cultural approach. Therefore it can be necessary to introduce a new type of collaborative group, the so-called "net of experts", as we did in the Fraunhofer ISST project WiKo. In this case the intensive process of case studies – analysis – theory building – conception and implementation has been rewarding.

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