

DOI: 10.5700/rege507

ARTIGO – TECNOLOGIA DA INFORMAÇÃO

Kaytson Hartung

Mestre pela Escola de Administração da Pontifícia Universidade Católica do Rio Grande do Sul (PUC-RS) – Porto Alegre-RS, Brasil
Consultor de desenvolvimento de *software* da Dell Computadores do Brasil
E-mail: kaytson@gmail.com

Recebido em: 13/1/2012

Aprovado em: 10/7/2013

Mirian Oliveira

Professora e pesquisadora da Pontifícia Universidade Católica do Rio Grande do Sul (PUC-RS) – Porto Alegre-RS, Brasil
Doutora pela Escola de Administração da Universidade Federal do Rio Grande do Sul (UFRGS)
E-mail: miriano@puers.br

ABSTRACT

This study aims to analyze the strategies adopted by Communities of Practice (CoPs) in relation to the creation and sharing of knowledge. For this purpose, a multiple case study method was adopted. Data were collected through interviews, document analysis and observation. The CoP strategies were found to be predominantly focused on knowledge sharing rather than knowledge creation, which may directly influence the company's capacity for CoP-based innovation. In the analyzed CoPs, the lack of appreciation of the CoPs shown by the company and the predominantly individually-based motivation for participating in the CoPs are both potential reasons for the emphasis given to knowledge sharing instead of knowledge creation. Based on the analysis of the CoPs, the following aspects were identified: The support of the company influences the focus of the CoP on knowledge creation and/or sharing; the support of the company influences the choice of activities in the CoP and the factors that motivate participation; the motivation of the participants influences the focus of the CoP on the knowledge creation and/or sharing; the activities of the CoP influence the focus on knowledge creation and/or sharing; the trust among the CoP members influences the focus on knowledge creation and/or sharing.

Key words: *Communities of Practice, Knowledge Sharing, Knowledge Creation.*

COMUNIDADES DE PRÁTICA: CRIAÇÃO E COMPARTILHAMENTO DO CONHECIMENTO

RESUMO

Este artigo tem como objetivo analisar as estratégias adotadas pelas Comunidades de Prática (CoP) para criar e compartilhar o conhecimento. O método utilizado foi o estudo de caso múltiplo. Os dados foram coletados por meio de entrevistas, análise de documentos e observação. As estratégias adotadas pelas CoPs são predominantemente focadas no compartilhamento do conhecimento e não na criação de conhecimento, o que pode influenciar diretamente na capacidade da empresa de inovar com base nas CoPs. Nas CoPs analisadas, a falta de suporte da empresa às CoPs e a motivação predominantemente individual dos participantes são potenciais razões para a ênfase dada ao compartilhamento do conhecimento e não à criação de conhecimento. Com base na análise das CoPs, identificou-se que: o suporte da empresa influencia na ênfase, pela CoP, na criação ou no compartilhamento do conhecimento; o suporte da empresa influencia no

tipo das atividades desenvolvidas pela CoP e nos fatores que motivam os funcionários a participar delas; a motivação dos participantes influencia no foco pela CoP, em criar ou compartilhar conhecimento; as atividades da CoP bem como a confiança entre os membros da CoP influenciam no foco na criação ou no compartilhamento do conhecimento.

Palavras-chave: Comunidades de Prática, Criação do Conhecimento, Compartilhamento do Conhecimento.

COMUNIDADES DE PRÁCTICA: CREACIÓN Y ACCIÓN DE COMPARTIR EL CONOCIMIENTO

RESUMEN

Este artículo tiene como objetivo analizar las estrategias adoptadas por las Comunidades de Práctica (CoP) para crear y compartir el conocimiento. El método utilizado fue el estudio de caso múltiple. Los datos fueron recolectados mediante entrevistas, análisis de documentos y observación. Las estrategias adoptadas por las CoPs son predominantemente enfocadas en la acción de compartir conocimiento y no en la creación del conocimiento, lo que puede influenciar directamente en la capacidad de la empresa de innovar con base en las CoPs. En las CoPs analizadas, la falta de soporte de la empresa en relación a las CoPs y la motivación predominantemente individual de los participantes son potenciales razones para el énfasis dado a la acción de compartir el conocimiento y no a la creación del conocimiento. Basándose en el análisis de las CoPs, se identificó que: el soporte de la empresa influye en el énfasis, por la CoP, en la creación o en la acción de compartir el conocimiento; el soporte de la empresa ejerce influencia en el tipo de actividades desarrolladas por la CoP y en los factores que motivan a los funcionarios a participar de ellas; la motivación de los participantes influye en el foco de la CoP, en crear o compartir conocimiento; las actividades de la CoP tal como la confianza entre los miembros de la CoP influyen en el foco en la creación o en la acción de compartir el conocimiento.

Palabras-clave: Comunidades de Práctica, Creación del Conocimiento, Acción de Compartir el Conocimiento.

1. INTRODUCTION

When facing a highly competitive and unstable market due to the constant economic fluctuations, it is increasingly important for companies to focus on results and increase efficiency and productivity (MACHADO, 2006). In this context, knowledge plays a decisive role, and a number of companies are now seeking to capitalize on this fact (WENGER; SNYDER, 2000; LÓPEZ-NICOLÁS; MEROÑO-CERDÁN, 2011). The knowledge that companies seek in the market (from consultants, for example) can often be found within the company itself.

Knowledge management (KM) is defined as the process by which an organization creates, captures, acquires and uses knowledge to support and improve its performance (KINNEY, 1998; LEE; YANG, 2000). KM represents one way of meeting the need to increase productivity and is essential for long-term organizational efficiency, as it improves the flow of information and knowledge (HARRIS, 2005; LÓPEZ-NICOLÁS; MEROÑO-CERDÁN, 2011). According to Kratzer, Zboralski and Leenders (2009), a growing number of companies have applied KM systems in order to improve the effectiveness and efficiency of the use of knowledge, and several have adopted Communities of Practice as a means of implementing those systems.

Communities of Practice (CoPs) are “groups of people informally bound together by shared expertise and passion for a joint enterprise” (WENGER; SNYDER, 2000, p. 139). These are informal groups that go beyond organizational, geographical or communication boundaries and may belong to several organizations in various countries. According to Teigland (2000) and Kim, Hong and Suh (2012), CoPs play a key role in providing an organization with competitive advantage, thus adding value to it in various ways. CoPs help guide the strategy, begin new lines of business, solve problems faster, disseminate best practices, develop professional skills and help recruit and retain talent (WENGER; SNYDER, 2000). Additionally, CoPs have an impact on various aspects of the organization, such as collaboration, coordination, synergy, learning curve, productivity, efficiency and innovation (FONTAINE; MILLEN, 2004; LEE; SUH;

HONG, 2010; KIM; HONG; SUH, 2012). In the literature, CoPs are associated with both the creation and sharing of knowledge. Thus, this study aims to contribute towards the knowledge available in this field by analyzing the strategies adopted by CoPs in relation to the creation and sharing of knowledge and, thus, identify the aspects that influence these phenomena.

The remainder of this paper is structured as follows: section 2 presents a literature review focused on the characteristics of CoPs and their relationship with the creation and sharing of knowledge; section 3 describes the methodological steps adopted; in section 4, there is a discussion of the results; and section 5 contains the conclusions and ideas for further research.

2. COMMUNITIES OF PRACTICE AND THE CREATION AND SHARING OF KNOWLEDGE

Communities of Practice (CoPs) have existed ever since humans began to interact socially. Wenger, McDermott and Snyder (2002) provide examples, such as prehistoric hunters who debated the best ways to kill their prey, medieval knights who were trained for combat, writers who exchange ideas about their work, artists who get together to discuss a new technique or style of painting, gang members learning how to survive and mothers that join their children in games and discuss parenting tips with each other. The term “Community of Practice” was introduced by Lave and Wenger (1991) in the 1990s when they were studying situational learning and ways of sharing knowledge.

CoPs can be defined as “groups of people who share a concern, a set of problems, or passion about a topic, and who deepen their knowledge and expertise on this topic by interacting on an ongoing basis” (WENGER; MCDERMOTT; SNYDER, 2002, p. 4). CoPs provide multiple points of view and thus increase and improve the interpretation of knowledge (BHATT, 2001; LEE; SUH; HONG, 2010). In the perception of these authors, CoPs are associated with both the idea of sharing and of creating knowledge.

Generally, CoPs arise spontaneously,

independently and are self-managed, allowing anyone to participate (WENGER, 1998b), yet managers have difficulty understanding how to implement these communities, their structure, or how they function (BISHOP et al., 2008). CoPs are entities that are constantly changing and are not stable or static (ROBERTS, 2006; DU PLESSIS, 2008). They change as members join and leave, with changes in organizational culture and especially when the organization's business strategy changes (DU PLESSIS, 2008).

While the management team cannot form CoPs, they can, however, facilitate the spontaneous emergence of CoPs and support those who wish to develop them (ROBERTS, 2006; DU PLESSIS, 2008). CoPs are self-managing social entities that choose their own leaders and the rules by which they operate (DU PLESSIS, 2008). The manager's role is to support the development of CoPs and perhaps try to structure their spontaneity, encouraging the alignment of changes in practices between communities and helping to transfer knowledge within the organization (BROWN; DUGUID, 2001).

According to Wenger, McDermott and Snyder (2002) and Kingston (2012), the structure of CoPs can vary according to the following aspects:

- Size - small, involving only a few specialists, or large involving hundreds of people;
- Time - short shelf life, such as a COBOL developer community, or can last for centuries such as a group of craft workers;
- Location - distributed across different countries, in which case interaction may occur only by phone or e-mail, or local, with weekly meetings;
- Composition - can be homogeneous, composed only of people from a single discipline, or heterogeneous, composed of people from different disciplines and backgrounds;
- Limits – may include members exclusively from within an organization or may include members from within and from outside an organization;
- Origin - may be spontaneous, beginning without any effort or intervention on the part of the organization, where members come together spontaneously, or they may be intentional, where the organization intentionally introduces them in order to develop some specific skills;
- Recognition - institutionalized or unrecognized

by the organization, depending on the type of relationship they cultivate with the organization, they may be in a variety of intermediate states such as informal, legitimate, and supported.

In order to function, a CoP requires the support of a set of virtual and non-virtual resources, such as a place to meet, a repository of ideas and record of the activities, a list of the members and their interests, means of communication between members and ways of sharing tacit knowledge (COAKES, 2006). CoPs may make use of technologically advanced tools with content management systems, or may be just a group of people debating a particular problem, with the tools used for their support ranging between these two extreme possibilities (DU PLESSIS, 2008). Coakes (2006) mentions video conferencing, instant messaging applications and e-mail as examples of tools that promote communication between members.

In order to facilitate interaction between members in different geographic locations and time zones, Wenger et al. (2005) mention asynchronous communication tools such as blogs, wikis, e-mail, mailing lists, forums, RSS (really simple syndication) and the use of integrated tools such as portals and other proprietary software. These authors also argue that the technological tools available to a CoP must be easy to use and learn, evolve over time, be easily accessible and designed with the end-user's perspective in mind.

A lack of, or limited access to technological tools may make it difficult for the individuals in an organization to find the knowledge they seek (DU PLESSIS, 2008). KM systems must enable integration and be sufficiently flexible to facilitate the transformation of different types of knowledge (DAVIS; SUBRAHMANIAN; WESTEMBERG, 2005).

The learning potential of organizations is structured by the CoPs through the knowledge they develop at their core and the interactions they provide within their limits, with people who are not members or with other CoPs (WENGER, 1998a). In order for CoPs to develop the ability to create and retain knowledge, they need to have suitable technological and organizational infrastructures (WENGER, 1998a).

Knowledge is specific to the context (time,

space and relationship) and is created in localized actions (HAYEK, 1945; SUCHMAN, 2007; NONAKA; TOYAMA, 2008). According to Nonaka and Toyama (2008, p. 99), “knowledge cannot be created in a vacuum, and needs a context where information is given meaning through interpretation to become knowledge”. The same authors introduce the “*ba*” as a shared, dynamic context, in which knowledge is created, shared and consumed, thus providing the energy, the quality and the spaces to foster the knowledge spiral. The authors also point out that the *ba* should not be understood as a physical space, but as interactions that occur at specific times and places.

According to Wenger, McDermott and Snyder (2002), knowledge conversion processes require the interaction and informality provided by a CoP. To share tacit knowledge, processes such as storytelling, encouraging debate, coaching and learning take place within a CoP, and, in order to be applied, explicit knowledge requires tacit knowledge (WENGER; MCDERMOTT; SNYDER, 2002).

Therefore, to analyze the strategies adopted by CoPs in relation to the creation and sharing of

knowledge, the structure (size, time, location, composition, limits, origin and recognition), and non-virtual and virtual resources (e.g., wiki meetings, among others) will be considered.

3. METHOD

To achieve the proposed objective, a qualitative approach has been adopted together with the case study method, since the latter is considered appropriate when the subject under investigation is a contemporary phenomenon within a real life context (YIN, 2005).

The unit of analysis, according to Yin (2005), is directly related to the structure of the research question. Thus, the unit of analysis in this research is a CoP in a large multinational company. Given that five CoPs were analyzed within a single software development company, this is a multiple case study. Table 1 summarizes the profiles of the analyzed CoPs, and the data collection activities. The primary data for the study were obtained using interviews, observation and documents. The documents were stored in the document repositories of the SharePoint portal of each CoP.

Table 1 – Summary of the CoPs

CoP	Size	Collected documents	Observation sessions	Interviews
Agile Methods	5 to 30	19	3	2
Project Management	5 to 300	344	2	4
Java	5 to 60	192	0	2
Microsoft	10 to 90	154	0	2
Testers	8 to 35	235	1	4
Requirements	51	599	1	2

In addition to members of the CoPs, three managers and a specialist in knowledge management who were not directly involved in the CoPs were interviewed. Table 2 shows the

interviewees' profiles. For the managers and the specialist the questions were generalized in order to cover all the CoPs.

Table 2 – Profile of the Interviewees

CoP	Interviewees	Years with the company
Agile Methods	Interviewee 1	Between 5 and 10 years
	Interviewee 2	Between 5 and 10 years
Project Management	Interviewee 3	Between 5 and 10 years
	Interviewee 4	Between 5 and 10 years
	Interviewee 5	Between 5 and 10 years
	Interviewee 6	Between 5 and 10 years
Java	Interviewee 7	Between 5 and 10 years
	Interviewee 8	Between 5 and 10 years
Microsoft	Interviewee 9	Between 5 and 10 years
	Interviewee 10	Between 3 and 5 years
Testers	Interviewee 11	Between 5 and 10 years
	Interviewee 12	Between 5 and 10 years
	Interviewee 13	Between 3 and 5 years
	Interviewee 14	Between 3 and 5 years
Requirements	Interviewee 15	Between 5 and 10 years
	Interviewee 16	Between 3 and 5 years
Managers	Manager 1	Between 10 and 15 years
	Manager 2	Between 10 and 15 years
	Manager 3	Between 10 and 15 years
KM specialist	Specialist 1	Between 5 and 10 years

The CoPs chosen for this study are within a company that was founded in 1980s and is now one of the leading computer companies in the world, with about 100,000 employees and operations in several countries, with revenues of tens of billions of dollars (FORBES, 2008). Part of the company is focused on software

development through centers distributed around the world. The company was selected because it has several CoPs with different features, areas of operations and degrees of maturity. All the CoPs will be considered in this study.

The Oslo Manual (OECD, 2005) contains guidelines for collecting and interpreting data on

technological innovation. Pursuant to this document, companies are classified according to their size (based on number of employees) and type of institution, with regard to their nationality. Companies in which more than 50% of the control is foreign are considered multinationals according to the guidelines in the Frascati Manual (OECD, 1994). Therefore, pursuant to this classification, the company where this research took place is a private multinational company with over 5000 employees.

The construct validity and reliability were considered to ensure their quality. In order to validate the construct, multiple sources of evidence were used including observation of the CoPs' meetings, collection of documents from the CoPs' websites and the preparation of a script to be used in the semi-structured interviews, which was subsequently validated by two experts, one from the IT area and another from the Knowledge Management area. For reliability, all the procedures will be documented, thus creating a case study protocol and a database to store the necessary data.

The data collected from the interviews, observations and documents were submitted to content analysis, which is a set of techniques used to systematically describe the form and content of written or spoken material (BARDIN, 2008) and that can be used in an exploratory or confirmatory manner.

The interviews were categorized and analyzed with the help of MAXQDA 10[®] software. This software facilitated the encoding process while improving the reliability of the analytical process.

Because it is a cross-sectional study, all the data concerning the origin and history of the development of the CoPs are retrospective. As some of the CoPs have been in existence for more than five years, there have been changes in the people who participate and in the activities. Thus, some of the current participants are not fully aware of the origin of the CoP and its development, while others may currently express a different attitude from that demonstrated at that time. It is therefore conceivable that the reports obtained during the present study might be different from those that would have been obtained if the interviews had occurred at the time the CoPs were originally established, when they could have reported the events more vividly and accurately. In order to mitigate this limitation, the collection includes more than one interviewee from each of the CoPs.

4. KNOWLEDGE CREATION AND SHARING IN THE COPS

According to the members of the CoPs that were interviewed, 4 CoPs (Project Management, Java, Microsoft and Testers) originated out of a Knowledge Management initiative which began in 2005. Later, two other CoPs emerged (Agile Methods and Requirements). The more recent CoPs (Agile Methods and Requirements) were formed about three years ago, when the original CoPs were well attended and highly active, which may indicate that the success of one CoP may contribute to the emergence of another. Table 3 summarizes the characteristics of analyzed CoPs.

Table 3 – Characteristics of the Analyzed CoPs

CoPs	Size	Age	Location	Participation
Agile Methods	4 people in the core team, 30 peripheral members	2 to 3.5 years	Local	Only the core team participate
Project management	6 people in the core team, 20 to 50 peripheral members	5 years	Local	Only the core team participate
Java	8 people in the core team, 60 peripheral members	5 years	Local	The core team mainly participate, with the occasional participation of peripheral members
Microsoft	12 people in the core team, approximately 100 peripheral members	5 years	Local	The core team mainly participate, with the occasional participation of peripheral members
Testers	8 people in the core team, 35 peripheral members	5 years	Global	The core team mainly participate, with frequent participation of peripheral members in the events
Requirements	51 members	3 years	Global	Monthly meeting via teleconference and Live Meeting

According to interviewees, the Java CoP is the only one that does not have regular activities, except for localized training, given by former members of the CoP’s core team. This can be explained by the lack of appreciation shown by the company and members who do not see the CoP as something that provides them with value.

All the reports show the approval, though limited, of the company, as it allows staff to take the time to participate and use the resources existing in the company, such as teleconferencing, a portal, newsletters, video conferencing, a private micro blogging network and the corporate blog. The reports also show that the CoP members believe that the CoPs are not recognized and valued by the company, and that there is too little time available to participate. The Testers CoP is in a peculiar situation: it has limited support, since several people who were in the CoP’s core team have been promoted to managerial positions. These people, besides believing in the idea of the

CoP, encourage and try to remove barriers to its development, actively participating in the day to day activities.

Managers 1 and 2 claim that the company recognizes the value of the CoPs, but fails to value them as much as it should, since there is no budget for awards or training programs provided by the CoPs. According to the expert in KM, the CoPs lost support and appreciation within the senior management when the director who had sponsored them left the company.

There is a common pattern to the profile of participation in CoPs: a core team that focuses solely or largely on the interactions in the CoP and peripheral members who have a more passive role in such activities. As pointed out by Wenger (1998b), the two profiles, active and peripheral members, are expected to be found in any one CoP. There is also expected to be an increase in participation over the course of time, an equalization of knowledge and the creation of a

common context (WENGER; MCDERMOTT; SNYDER, 2002), which was not observed in the analyzed CoPs. Manager 1 said that one explanation for the lack of development seen in the CoPs is that not all the experts are participating.

The motivation for people to participate in the CoPs is identified as being voluntary in all the reports, that is, people do not feel obliged by their managers or the company, which in part highlights the company's limited support for CoPs. One motivation that appears in several reports is visibility, where the participants see participation in the CoP as an opportunity to demonstrate their work to others in the company. Other motivations that appear in the reports are the exchange of knowledge, the learning and the networking. In more than one CoP, a distinctive profile of people who do not perform a given role, and want to learn how to perform that role through the knowledge shared in the CoPs was found. Networking enables people to quickly solve problems, facilitating everyday activities. The people seem motivated only on the individual level, no company-focused motivation for participating was perceived.

Both the CoPs' participants and the managers take the view that people participate in CoPs because of the visibility and the knowledge sharing. These motivations may be associated with detachment of the management team from the CoPs.

In terms of size, the CoPs have between 20 and 100 members. There are three categories of participants: the core team; peripheral members; and occasional participants. The core team consists of 2 to 12 people, and facilitates the CoPs' activities. In some cases, such as the project management CoP, the core team is the only one in which there is frequent interaction. The peripheral members are those individuals formally enrolled in the CoP, whose participation can be identified in the collected documents. Occasional participants are those who have participated in events, or who have at some time enrolled in the CoP, but as there is no formal record of their participation, are not considered members.

According to the reports, all CoPs interact through meetings. In some of the CoPs (Agile Methods, Microsoft and Project Management), the

meetings are usually attended only by the core team. The Agile Methods, Project Management and Java CoPs have also given frequent training courses for employees, which is a way to interact with new, usually, less experienced members. The Agile Methods and Testers CoPs are using the private micro-blogging network to interact not only with other members, but also with people who do not participate in the CoP. The Testers and Requirements CoPs, which have members in other regions, also make use of teleconferencing with presentations, using *Live Meeting* for their interactions. The same occurs with the Project Management CoP, which, though being local, plans events in which people from other regions participate. The types of tools and forms of interaction adopted by the CoPs are related to the location of the participants. For example, the members of the Testers CoP, which is global, use teleconferencing and the private micro-blogging network to interact, while the Microsoft CoP just holds face-to-face meetings attended by the core team. The types of tools and forms of interaction are also associated with the CoP's activities. An example of this is the Project Management CoP, where the main activity is training. In this case, the CoP's website is used to disseminate knowledge related to training events, and only the more experienced core team members, who plan the training program, attend the meetings.

The CoPs hold meetings on a weekly, biweekly or monthly basis, depending on the CoP. It was only possible to confirm the regularity of the Requirements CoP's monthly meeting because it produces a record of each meeting which is available on its website. The Java CoP is not having meetings, and there has been no interaction in the last year, except for training sessions. This may be due to the fact the CoPs now give greater emphasis to activities related to knowledge creation.

According to the reports, with the exception of the Requirements CoP, there is trust among the members of the CoP core teams, which tends to facilitate communication and knowledge creation according to Zboralski (2009). In the interviews it was noted that in the Java and Microsoft CoPs the members do not feel sufficiently confident to ask questions and expose themselves. This may be due to the fact that these two CoPs are more technically orientated and are formed only by

software developers. The fact that developers are the majority in the company also intensifies the competition among them. The identity formed by the CoPs can also mean that other accepted lines of thought are rejected, so that people with alternative ways of proceeding may stop participating because their ideas are not accepted.

Below, there is a table comparing the COPs and the tools they employ. One can see that e-mail, Microsoft SharePoint and teleconferencing are used by all the CoPs.

Table 4 – Tools used by the CoPs

Tools	CoP	Agile Methods	Project Management	Java	Microsoft	Testers	Requirements
CoP Blog		X	X				
Corporative Blog						X	
Company newsletter			X	X			
<i>E-mail</i>		X	X	X	X	X	X
Forum			X	X			
<i>e-mails</i> list			X	X			
<i>Live Meeting</i>							X
Instant messaging		X	X				
<i>Microsoft SharePoint</i>		X	X	X	X	X	X
Teleconferencing		X	X	X	X	X	X
Videoconferencing		X	X				
Private micro blogging network		X	X			X	

Each of the CoPs has a site on the Microsoft SharePoint Portal, provided by the company to facilitate interaction. The portal has ready-to-use tools such as ads, blog, forums, document repository and calendaring. When collecting documents from this portal, it was noted that currently the site is little used and that the majority of files, forum posts and documents dates from the period 2007-2008. The Testers and Project Management CoPs also publish occasional

news or calls for publications in the company’s weekly newsletter that is sent to the employees in Brazil. In addition, the Testers CoP also publishes reports in the official company blog, which can be accessed by employees around the world. So, there appears to be an emphasis on interactions related to tacit knowledge.

The passivity of the majority of the members is a problem identified in several CoPs. In the

Testers CoP, although the members do not often participate in meetings, their presence is notable at the events organized by the CoP. Again it is necessary to show its target audience the value provided by the CoP. It is also important to try to recruit the best specialists, because it can motivate people to participate in the CoP.

Below, Table 5 presents the positioning of the resources of the virtual and non-virtual resources of the CoPs in relation to knowledge creation and sharing, based on data from the interviews, observations and documents. The low level of knowledge creation is evident in all the CoPs.

Table 5 – Knowledge Creation and Sharing

CoP	Means and Participants	Knowledge
Agile Methods	E-mail, Instant messaging: core team	Low creation
	Meetings: core team	Low sharing
	Training: core team and peripheral members	Low creation
	Private micro-blogging network: core team, peripheral members and employees	High sharing
	Meetings (problem solving): core team and employees	
-		High creation Low sharing
-		High creation High sharing
Project Management	E-mail, Instant messaging: core team	Low creation
	Meetings: core team	Low sharing
	Training: core team and peripheral members	Low creation
	Lessons learned: core team, peripheral members and employees	High sharing
	Meetings: core team and external	
-		High creation Low sharing
-		High creation High sharing
Java	E-mail, Instant messaging: core team	Low creation
	Meetings: core team	Low sharing
	Training: core team, peripheral members and employees	Low creation
	Meetings: core team and peripheral members	High sharing
	Company newsletter: core team, peripheral members and employees	

	-	High creation Low sharing
	-	High creation High sharing
Microsoft	E-mail, Instant messaging: core team Meetings: core team	Low creation Low sharing
	-	Low creation High sharing
	-	High creation Low sharing
	Brainstorming sessions: core team	High creation High sharing
Testers	Meetings: core team and peripheral members E-mail, Instant messaging: core team	Low creation Low sharing
	Corporate blog, Private micro-blogging network, Company newsletter: core team, members and employees Events: core team, peripheral members and employees	Low creation High sharing
	-	High creation Low sharing
	-	High creation High sharing
Requirements	Meetings: core team and members	Low creation Low sharing
	-	Low creation High sharing
	-	High creation Low sharing
	-	High creation High sharing

Table 5 clearly shows that knowledge sharing is the main focus of the activities in the all the CoPs. The CoP's activities should be

characterized by a balance between creation and sharing, something which is not found in any of the analyzed CoPs. This imbalance indicates that

the CoPs may not be achieving knowledge maturity, which can be explained by them having a high membership turnover or because the main motivating factor of the people tends to be individually based. The Microsoft CoP seems to be the only one with a creation initiative, although this activity is concentrated mainly in the core team. This imbalance also shows the stagnation of the development of the CoPs, which may explain the difficulty in reaching knowledge maturity in any particular domain.

The company approves the existence of the CoPs, but does not provide financial resources for their operation, which the members of the CoPs tend to perceive as a lack of support. Moreover, the company's management believes that it should not interfere with the functioning of the CoPs and uses this argument to justify the low level of support provided. The lack of interest and support of the company contribute towards the individual-based motivation for participation in the CoPs. Being unsure of their value, the company does not direct the CoPs, neither closing them nor directly supporting them. By supporting the CoPs the company could get more benefits and utilize their potential to create knowledge and innovate products and services. Despite the lack of support and recognition, the CoPs have existed for several years within the company, which may be due to the company's steady growth in number of employees, which feeds a constant need for knowledge sharing among the employees.

A relationship can be seen between the focus on sharing tacit knowledge, the individualist motivation for people to participate in the CoP and the tools used for interaction. Although the CoPs' websites include forums, document repository, blogs and other tools designed to facilitate the exchange of explicit knowledge, they are little used, probably because the involvement of members of the CoPs tends not to focus on the company, but on the individual. Thus, the knowledge created in the CoPs is not externalized, so limiting the number of people who could benefit. The CoPs use tools which emphasize explicit knowledge to recruit new members, but, once recruited, the new members focus on tacit knowledge, following their own motivations, so that there is a concern to externalize knowledge, which remains restricted to a few people.

Based on the analysis of the CoPs, the following propositions (illustrated in Figure 1) were developed: The support of the company influences the focus of the CoP in knowledge creation and/or sharing; the support of the company influences the choice of activities in the CoP and the factors that motivate participation; the motivation of the participants influences the focus of the CoP on the knowledge creation and/or sharing; the activities of the CoP influence the focus on knowledge creation and/or sharing; the trust among members of the CoP influences the focus on knowledge creation and/or sharing. These propositions will be the subject of future investigations.

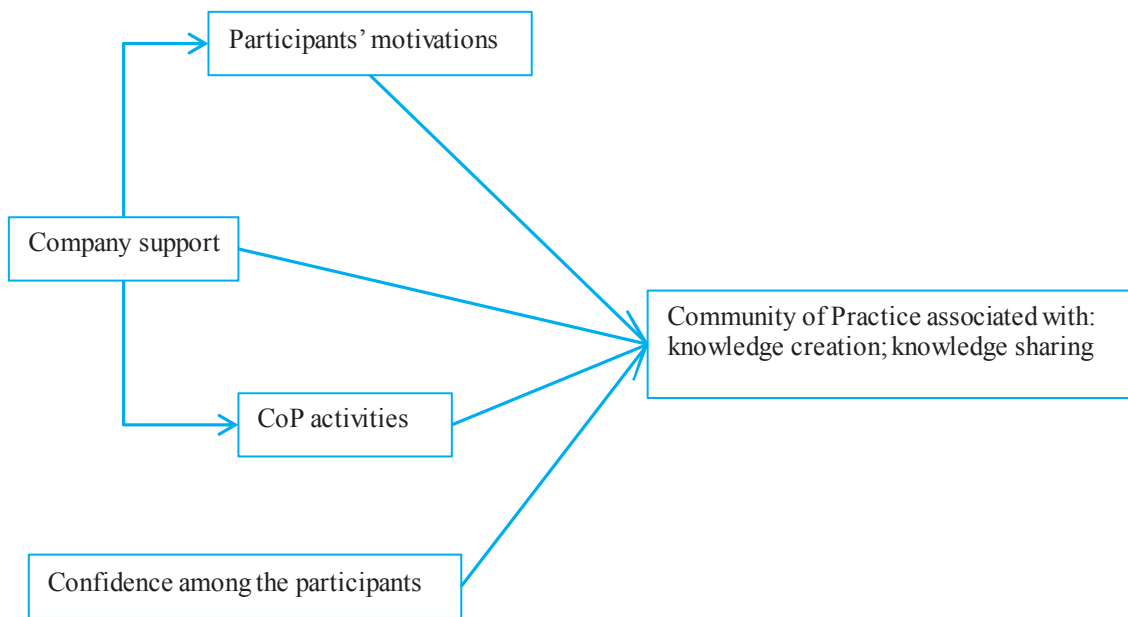


Figure 1 – Focus of the CoP on Knowledge Creation and/or Sharing

5. CONCLUSIONS

The strategies adopted by the CoPs were found to be predominantly focused on knowledge sharing rather than knowledge creation, which can directly influence the company’s capacity to innovate based on the CoPs. The stagnated development of the CoPs and their respective knowledge domains prevent them from reaching their full potential, which could bring more benefits to the individuals and the company.

The motivation for people to participate in CoPs is related more to learning than to actually developing knowledge. Apparently, people participate when they identify a gap in the knowledge they need to acquire, but do not continue to participate once that knowledge has been mastered. The failure of the company to value the CoPs, the activities of the CoPs, the lack of confidence and the predominantly individual nature of the motivation to participate, mean that the CoPs are unable to invest in developing new fields of knowledge, and thus, fail to reach their potential or provide the company with greater long-term benefits.

The stage at which each CoP finds itself seems to have a determinant role in terms of their performance in developing a new field of knowledge and potentially the development of

innovations. All the analyzed CoPs have similar characteristics: individual motivation for participation, polarization of activities, lack of confidence of some members and lack of formal support and value attributed by the company and by the employees. These factors seem to account for non-development of the CoPs and of knowledge creation. On the other hand, the tools, as well as the diversity of knowledge domains, seem to have a secondary role in the development of the CoPs.

In the analyzed CoPs it was found that: the level of support from the company influences the motivation of the participants, the activities and the focus on knowledge sharing; the motivations of the participants, the activities and the level of trust among participants influence the strategy of the CoP (priority given to sharing knowledge rather than to the creation of new knowledge). These relationships will be the subject of future research.

6. REFERENCES

BARDIN, L. *Análise de Conteúdo*. Lisboa: Edições 70, 2008.

BHATT, G. D. Knowledge management in organizations: examining the interaction between

- technologies, techniques, and people. *Journal of Knowledge Management*, v. 5, n. 1, p. 68, 2001. <<http://dx.doi.org/10.1108/13673270110384419>>.
- BISHOP, J.; BOUCLAGHEM, D.; GLASS, J.; MATSUMOTO, I. Identifying and Implementing Management Best Practice for Communities of Practice. *Architectural Engineering and Design Management*, v. 4, p. 160-175, 2008. <<http://dx.doi.org/10.3763/aedm.2008.0080>>.
- BROWN, J. S.; DUGUID, P. Structure and spontaneity: knowledge and organization. In: NONAKA, I.; TEECE, D. (Ed.). *Managing Industrial Knowledge*. London: Sage, 2001. p. 44-67.
- COAKES, E. Communities of Practice and Technology Support. In: COAKES, E.; CLARKE, S. (Ed.). *Encyclopedia of communities of practice in information and knowledge management*. Hershey, PA: Idea Group Reference, 2006.
- DAVIS, J. G.; SUBRAHMANIAN, E.; WESTEMBERG, A. W. The "global" and the "local" in knowledge management. *Journal of Knowledge Management*, v. 9, n. 1, p. 101, 2005. <<http://dx.doi.org/10.1108/13673270510582992>>.
- DU PLESSIS, M. The strategic drivers and objectives of communities of practice as vehicles for knowledge management in small and medium enterprises. *International Journal of Information Management*, v. 28, n. 1, p. 61-67, 2008. <<http://dx.doi.org/10.1016/j.ijinfomgt.2007.05.002>>.
- FONTAINE, M. A.; MILLEN, D. R. Understanding the Benefits and Impact of Communities of Practice. In: HILDRETH, P. M.; KIMBLE, C. (Ed.). *Knowledge networks: innovation through communities of practice*. Hershey, PA: Idea Group Pub., 2004. 330p.
- FORBES. The Global 2000. 2008. Disponível em: <http://www.forbes.com/lists/2008/18/biz_2000global08_The-Global2000_Company_6.html>. Acesso em: 16 de jun. 2009.
- HARRIS, T. Improving the Deal with Knowledge Management. *KM World*, v. 14, n. 10, p. S4, 2005.
- HAYEK, F. A. The use of knowledge in society. *American Economic Review*, v. 35, n. 4, p. 519-530, 1945.
- KIM, S.-J.; HONG, J.-Y.; SUH, E.-H. A diagnosis framework for identifying the current knowledge sharing activity status in a community of practice. *Expert Systems with Applications*, v. 39, n. 18, p. 13093-13107, 2012. <<http://dx.doi.org/10.1016/j.eswa.2012.05.092>>.
- KINGSTON, J. Choosing a Knowledge Dissemination Approach. *Knowledge and Process Management*, v. 19, n. 3, p. 160-170, 2012. <<http://dx.doi.org/10.1002/kpm.1391>>.
- KINNEY, T. Knowledge Management, Intellectual Capital and Adult Learning. *Adult Learning*, v. 10, n. 2, p. 2-4, 1998.
- KRATZER, J.; ZBORALSKI, K.; LEENDERS, R. T. A. J. Interaction quality within communities of practice: contextual factors of utilising different communication media. *Int. J. Networking and Virtual Organisations*, v. 6, n. 2, p. 199-223, 2009. <<http://dx.doi.org/10.1504/IJNVO.2009.022975>>.
- LAVE, J.; WENGER, E. *Situated learning: legitimate peripheral participation*. Cambridge: Cambridge University Press, 1991. 138 p. <<http://dx.doi.org/10.1017/CBO9780511815355>>.
- LEE, C. C.; YANG, J. Knowledge value chain. *Journal of Management*, v. 19, n. 9, p. 783-793, 2000.
- LEE, J.; SUH, E.; HONG, J. A maturity model based CoP evaluation framework: A case study of strategic CoPs in a Korean company. *Expert Systems with Applications*, v. 31, n. 6, p. 502-509, 2010.
- LÓPEZ-NICOLÁS, C.; MEROÑO-CERDÁN, A. L. Strategic knowledge management, innovation and performance. *International Journal of Information Management*, v. 31, n. 6, p. 502-509, 2011. <<http://dx.doi.org/10.1016/j.ijinfomgt.2011.02.003>>.

- MACHADO, D. D. N. A dinâmica da criação e gestão do conhecimento: Um estudo de caso. *Revista Administração*, v. 5, n. 1, p. 56-71, 2006.
- NONAKA, I.; TOYAMA, R. Criação do Conhecimento como Processo Sintetizador. In: TAKEUCHI, H.; NONAKA, I. (Ed.). *Gestão do Conhecimento*. Porto Alegre: Bookman, 2008. 320 p.
- OECD. *The measurement of scientific and technological activities: proposed standard practice for surveys of research and experimental development: Frascati manual 1993*. Paris: Organisation for Economic Co-operation and Development: Statistical Office of the European Communities, 1994. 261 p.
- _____. *Guidelines for collecting and interpreting technological innovation data*. 3. ed. Paris: Organisation for Economic Co-operation and Development: Statistical Office of the European Communities, 2005. 162 p.
- ROBERTS, J. Limits to Communities of Practice. *Journal of Management Studies*, v. 43, n. 3, p. 623-639, 2006. <<http://dx.doi.org/10.1111/j.1467-6486.2006.00618.x>>.
- SUCHMAN, L. A. *Plans and situated actions: The problem of human-machine communication*. 2. ed. Cambridge: Cambridge University Press, 2007.
- TEIGLAND, R. Communities of practice at an Internet Firm: Netovation vs. on-time performance. In: LESSER, E. L.; FONTAINE, M. A.; SLUSHER, J. A. (Ed.). *Knowledge and communities*: Butterworth-Heinemann, 2000. 151-178. <<http://dx.doi.org/10.1016/B978-0-7506-7293-1.50013-5>>.
- WENGER, E. Communities of practice: Learning as a social system. *Systems thinker*, v. 9, n. 5, p. 1-5, 1998a.
- WENGER, E. Communities of practice: learning, meaning, and identity. Cambridge, U.K.: Cambridge University Press, 1998b. 318 p. <<http://dx.doi.org/10.1017/CBO9780511803932>>.
- WENGER, E.; MCDERMOTT, R. A.; SNYDER, W. *Cultivating communities of practice: a guide to managing knowledge*. Boston: Harvard Business School Press, 2002. 284 p.
- WENGER, E.; WHITE, N.; SMITH, J. D.; ROWE, K. Technology for communities. In: CEFRIO (Ed.). *Guide de mise en place et d'animation de communautés de pratique intentionnelle*. Québec: CEFRIO, 2005.
- WENGER, E. C.; SNYDER, W. M. Communities of practice: the organizational frontier. *Harvard Business Review*, v. 78, n. 1, p. 139-145, 2000.
- YIN, R. K. *Estudo de caso: planejamento e métodos*. 3. ed. Porto Alegre: Bookman, 2005.
- ZBORALSKI, K. Antecedents of knowledge sharing in communities of practice. *Journal of Knowledge Management*, v. 13, n. 3, p. 90-101, 2009. <<http://dx.doi.org/10.1108/13673270910962897>>.