Virtual communities of practice: investigating motivations and constraints in the processes of knowledge creation and transfer [1]

Ana Maria R. Correia[1,2], Alice Paulos[3] and Anabela Mesquita[4]

[1] ISEGI - Instituto Superior de Estatística e Gestão de Informação, UNL - Universidade Nova de Lisboa, Campus de Campolide, Lisboa, Portugal
[2] IAPMEI - Instituto de Apoio às Pequenas e Médias Empresas e à Inovação, I. P., Portugal
[3] ISEG – Instituto Superior de Economia e Gestão, Lisboa, Portugal
[4] ISCAP / IPP – R. Dr. Jaime Lopes de Amorim and Universidade do Minho (Centro Algoritmi), Portugal
ana.correia@ineti.pt / acorreia@isegi.unl.pt
alicepaulos@sapo.pt
abmesquita@sapo.pt / sarmento@iscap.ipp.pt

Abstract: With accelerated market volatility, faster response times and increased globalization, business environments are going through a major transformation and firms have intensified their search for strategies which can give them competitive advantage. This requires that companies continuously innovate, to think of new ideas that can be transformed or implemented as products, processes or services, generating value for the firm. Innovative solutions and processes are usually developed by a group of people, working together. A grouping of people that share and create new knowledge can be considered as a Community of Practice (CoP). CoP's are places which provide a sound basis for organizational learning and encourage knowledge creation and acquisition. Virtual Communities of Practice (VCoP's) can perform a central role in promoting communication and collaboration between members who are dispersed in both time and space. Nevertheless, it is known that not all CoP's and VCoP's share the same levels of performance or produce the same results. This means that there are factors that enable or constrain the process of knowledge creation. With this in mind, we developed a case study in order to identify both the motivations and the constraints that members of an organization experience when taking part in the knowledge creating processes of VCoP's.

Results show that organizational culture and professional and personal development play an important role in these processes. No interviewee referred to direct financial rewards as a motivation factor for participation in VCoPs. Most identified the difficulty in aligning objectives established by the management with justification for the time spent in the VCoP. The interviewees also said that technology is not a constraint.

Keywords: Virtual Communities of Practice, Communities of Practice, knowledge creation, knowledge transfer, Innovation.

1. Introduction

With accelerated market volatility, faster response times and increased globalization, business environments are going through a major transformation and firms have intensified their search for strategies which can give them competitive advantage. This requires that companies and employees continuously improve their processes and knowledge.

With such a demand for knowledge, it is often the case that no individual can satisfy this demand alone. So, often, individuals when performing knowledge intensive tasks or faced with new problems, rely on informal relationships and engage in interactions to reduce uncertainty, generate ideas and create and use new knowledge. These informally established groups of self-organized individuals, working on similar problems, help each other to broaden their knowledge base and share perspectives about their work practices; this often results in the learning and innovation environment that has been labeled as a Community of Practice (CoP). In the context of this paper, we are

---

[1] Correia, Ana Maria; Paulos, Alice; Mesquita, Anabela (2009). Virtual communities of practice: Investigating motivations and constraints in the processes of knowledge creation and transfer Paper presented at the *ECKM09 - European Conference on Knowledge* Management, 3-4th, Sep., Università Degli Studi Di Padova, Vicenza, Italy.

concerned with Virtual Communities of Practice (VCoP), which are those where their members use ICT as their primary mode of interaction (Dubé *et al.* 2006, p. 147).

This paper is organized as follows: the next section, drawing on a literature review, synthesises both the motivations and the constraints that members of an organization experience, when taking part in the knowledge creating processes of the VCoP's to which they belong; the third section describes an ongoing case study, taking place in Portugal, in order to identify these experiences. It details the methodology used and presents the results of interviews with members of VCoPs in three multinationals. Results are also discussed. Finally, some conclusions of this research are given.

1.1. VCoPs: What are these?
In the literature, there is not yet an agreed definition of a CoP. There is even some degree of contradiction, especially in relation to CoPs supported by ICT (VCoPs). This difficulty is due to the fact that CoPs are more than a concept, they are a learning process (Kirschner and Lai 2007, p.128).
The term Community of Practice was used for the first time by Lave and Wenger (1991) to characterize,

> "(…) a system of relationships between people, activities and the "world", developing with time and in relation with other tangential and overlapping communities of practice" (*op. cit.*, p.98).

Since this first definition, others have been advanced, taking into consideration the organizational context. One of these definitions is proposed by Hara (2009), who states that CoP are:

> "collaborative informal networks that support professional practicioners in their efforts to develop shared understandings and engage in work- relevant knowledge building (Hara 2009, p.118).

In the scope of this study, a CoP must be understood as:

> A self-organized group of people who want to be motivated by common interests related to their daily practice; this group of people is self- organized with the objective of developing their knowledge and improving their performance, by interaction with others in the group.

As for the identification of a VCoP, since the means of communication is not important, when defining a CoP, (Wenger, *et. al.* 2002) we will consider that the VCoP is similar to a CoP but communication is usually by electronic means.

1.2. VCoPs: What is their role in organizations?

VCoPs have an important role in the creation of organizational knowledge. VCoPs provide the following benefits for organizations:

Table 1: Benefits of CoP

Benefits	Authors
• They facilitate organizational learning and promote the organizational memory (they provide fora for sharing experiences, information and knowledge and for knowledge creation; • they preserve tacit knowledge; • they facilitate communication, and • accelerate collaboration between the members;	(Tarmizi and Zigurs 2006, p.8) (Ardichvili *et al.* 2002, p.3) (Wenger *et al.* 2002)
• They increase efficiency of knowledge utilization	(Saint-Onge ans Wallace 2003, p.68)
• They increase the quality of processes thus improving competitive advantage	

Benefits	Authors
• They contribute to innovation – knowledge, experience and ideas are exchanged and debated; these are critical elements for innovation; • VCoPs can be described as virtual spaces where learning takes place. However, learning and innovating are closely related to practice; since learning is required for innovation to take place, these VCoP structures are ideally suited for the development of innovation activities, incremental innovation.	(Coakes and Smith 2007, p.76)

1.3. VCoPs: Motivations and Constraints in The Knowledge Creation Process

Knowledge creation in VCoPs is conditioned by several factors that can motivate or constrain this process. In the literature we identified several factors, as explained in the following paragraphs:

- Intrinsic factors (Soft) – members get involved in acts of knowledge creation, motivated by factors related to their personality and the satisfaction they feel when sharing their knowledge with others (Krogh and Grand 2002);
- Extrinsic factors (Hard) – financial rewards, direct or indirect, for sharing or creating knowledge (Hall and Graham 2004);
- Organizational factors – these relate to the environment in which the group operates. In the group being studied, we identified the following factors:
  - ✓ Trust, in the shared environment, as a facilitator of communication (Sharratt and Usoro 2003, p.190) and collaboration (Newell *et al.* 2007);
  - ✓ Moral obligation – members feel the moral obligation to repay what they have gained from the organizational CoP (Ardichvili et al. 2002, p.11). Another factor often referred to in the literature is access to information and to specialists in a certain field (Wasko and Faraj 2000, p.169);
  - ✓ Organizational culture - the involvement of workers in the process of knowledge development is conditioned by cultural factors, a culture that motivates and rewards knowledge sharing creates advantageous conditions for the development of knowledge creation.
- Technological factors – among the constraint factors associated with technology, the values related with non-verbal language (*e.g.* cues, rituals) so essential to tacit knowledge sharing, is lost to a VCoP (Krogh and Grand 2002). Technology should therefore allow members to socialize, be user-friendly and offer an assessment of the "health" of the community (*e.g.,* number of registered members, number of active members, number of knowledge artifacts and their production dates) (Preece and Maloney-Krichmar 2003, p.25).

2. The case study

2.1. Methodological approach
The research design uses a case study approach (Yin 2003); to increase the scientific rigour, a multiple case study was developed for three organizations, each one with several "case units", *i.e* in each organization two or three VCoPs are analysed (Yin 2003). In such circumstances, it is possible to obtain enough data to promote intra and inter organizational analysis and in this way increase the study's relevance.

This is an exploratory study; its aim is to explore the concepts, causes and facts, which determine people's attitudes. It takes a qualitative approach to the collection and analysis of data (Flick 2005, p.271). The process of gathering data occurred in two phases:

- Phase A - comprised the non-structured interviews (Flick 2005) involving the leaders of VCoPs, with the objective of refining the theoretical model developed from the literature review, by application of a questionnaire. This also served to characterize the VCoP under study (Dubé et al. 2006);
- Phase B - comprised the semi-structured interviews (Flick 2005). Its framework was developed using the theoretical model of the previous phase and involved the members of a VCoP. Its

objective was to verify the framework, as it related to the motivations and constraints felt by the members.

2.2. Data analysis and discussion of results

Data was gathered in three multinationals of the IT sector, operating in Portugal. These organizations were chosen because they are knowledge-based organizations.

In Phase A, interviews were conducted via e-mail, since we were not able to arrange interviews face-to-face; according to the literature, this does not compromise the results of the study (Jansen *et al.* 2007). Seven people were interviewed in this phase.

Data from Phase B was gathered by both face-to-face interviews and through instant messaging. The first method was preferred because it allowed personal contact. The second was necessary to accommodate the timetables of the interviewees; again, according to (Fontes and O'Mahony 2008, p. 2 4) this is an adequate method to collect data without jeopardizing the validity of the study.

2.2.1. Motivating factors

Throughout the interviews we identified the same influencing factors. Direct extrinsic factors, such as financial rewards, were never referred to as an issue to encourage people to actively participate in the VCoP. However, a factor that all interviewees referred to as vital for their participation and involvement in VCoP is access to the necessary knowledge to perform their daily tasks; this explains why the closer the domain of the VCoP is to their professional tasks, the greater will be their involvement within that VCoP, as these informants pointed out:

> *"....interest in the same knowledge, in a group which share similar interests and information. Common learning interests and above all in the practical application of what is learned; whenever interests are similar* [VCoP] *helps us a lot in our day-to-day routines, in taking the best decisions and the* [VCoP] *helps us in knowledge creation and in learning; as one never knows everything, the VCoP allows us, apart from the information and knowledge sharing, to learn always more even if it is only in providing new perspectives we never thought of before*" (interview 2C).

Another example of this proximity relation between the domain of the VCoP and the professional tasks of the participants is the comparison made by another interviewee between the types of activity performed in two different VCoPs. This informant claims that:

> "*in the two VCoPs I use daily, the activities I perform for the first VCoP are to:*
> > *i) obtain information*
> > *ii) exchange ideas*
> > *iii) contribute with information for the VCoP*
> *as for the other VCoP, I only use it to obtain information*" (interview 2A).

There is also a generalized tendency to consider that success and even professional survival depends on membership of these communities. Individuals are also motivated by the fact that the VCoP allows access to a huge amount of information and knowledge, which might be denied in other circumstances. This information and/or knowledge might be the key for the success of the individual or organization.

Another factor, also considered as an important advantage of VCoP and which works both as a strong motivator towards participation in VCoP, is access to knowledge, experts and to business techniques and practices which one cannot obtain through day-to-day experience, as illustrated by the following quote:

> "*we are the only ones in Portugal who can provide these solutions, so it is necessary and natural that we should go abroad to look for responses to our questions* [..], *to obtain knowledge which is not available here* [...], *to access experts, people who have experience in the domain*" (interview 2B).

VCoPs also provide support towards decision making, as highlighted by the following two quotations,

"*I feel supported in the decisions I take*" (interview 2C);

"*helps a lot in the decisions taken on a daily basis* [within the professional activity]" (interview 2C).

The respondents also reported collective benefits as motivation for the involvement in VCoP, such as an increase in service quality and development of skills of all members of the organization.

"*increase in the service quality and skills of all members.*" (interview 1.A.).

"*knowing how it is done abroad, the effects it can produce and how it is done here*" [performance improvement] (interview 2.A.).

A worldwide VCoP (as in one of the VCoPs we studied) enables access to knowledge of the different circumstances that collaborators experience daily. This allows them to be better prepared for a situation that might occur in the future or that is similar to one identified previously in the community.

"*the knowledge gained from other experiences, contact with other realities*"; "*access to knowledge that in Portugal could not be obtained because they are different realities*" (interview 2.B.).

More,

"*(…) because knowledge creation comes from information exchange between different realities. This factor will also help me to improve my knowledge of people that participate in the community*" (interview 2.A.).

"*possibility of joining with persons from different geographical places, with the necessary skills, in a simple and quick way*" (interview 1.A.).

Another respondent refers clearly to the importance and role of culture, in particular the organizational environment in the operation of a VCoP, when he states that "*the* [name of the enterprise] *has this spirit of help*".

The involvement in problem solving and knowledge sharing through VCoP is a natural act that does not depend on any specific factor, except that it is a feeling of belonging in the organization:

"*I see it as natural because similar projects sometimes generate the same kind of problems*" (interview 2.D.).

Another respondent also agrees that the organization has a crucial role in motivating collaborators to get involved with this kind of structure, placing the role of management as vital in recognizing and valuing the contributions of each collaborator for organizational problem solving and for the development of the existing VCoPs repository of knowledge:

"*yes, because it is necessary to value the participation of other members in the hierarchy. Otherwise, the time spent in the activities of knowledge sharing would be seen as a waste of production time. This is achieved by recognition down the hierarchical chain, so that each member can participate and communicate with others about their problems or the way they could have been solved*" (interview 1.B.).

Management therefore plays an important role in motivation for involvement in these communities in two ways: through publicity of VCoPs and through the recognition of value of those collaborators who contribute most for these communities, as one of the respondents said:

"*through
i)   regular information about new things and discussion foruns in the VCoP,
ii) reward for those who contribute most and best,
iii) international recognition for the same*" (interview 2.A.).

As for the relationship between innovation and the VCoP, the interviewees do not seem to establish a direct connection between this kind of community and innovation in products and services. Of course one must recognise that, for these interviewees, innovation means the creation of new products or services. It does not concern the incremental innovation that might occur in these communities and that allows for improvement in the way people perform their daily tasks. Some of the interviewees say that innovation might happen in face to face meetings and not in the technological platform that supports the CoP.

> "*No, in the VCoP there is no innovation. When there are new ideas or new problems in the community we discuss it in the face to face meetings that we have monthly. Sometimes, there is innovation*"

When we tried to clarify the reason for that answer, the interviewee replied:

> "*Innovation is a process that demands time, concentration in that specific activity as well as direct contact, which is not possible in the VCoP*"

Another interviewee, in phase A, also thought that, although innovation is the objective, it does not happen very often.

> "*But the true value comes from adapting what's available and using it to really innovate. This is not the most common use of these resources but I think it is the one that makes a difference. By doing this, individuals can make the most of what the community has to offer*" (interview D).

From these interviews, it emerges that rewarding factors are only symbolic in nature; information dissemination about the existence of the VCoP, its activity and recognition of its merit, in particular the emphasis on international recognition, is sufficient. These results confirm previous research (Hall 2001; Wasko e Faraj 2000).

The problem of face-to-face meetings was also pointed out and is an important motivation issue regarding involvement in participation in the VCoP. As an example, one of the interviewees answering the question, "*Does the organization encourage you to participate in the VCoP?*" replied, "*Yes, completely*" and indicated ways of in which the company encouraged its staff with face to face meetings:

> "*On the last Friday of each month, we have a meeting with all the collaborators of the [name of the organization] called [name of the meeting], where we share any information that we might think is useful.*" (interview 2.C.).

We also found in the statements of the interviewees the mention of reciprocity as a motivating factor, to participate in collaborating acts in VCoP.

> "*I know what it feels like to need help and so I answer*" [he is referring to questions placed by the community by other members]. *I also obtain answers. It is cultural.*" (interview 2.B.).

2.2.2. Constraining factors
The most important factors designated as barriers to active participation in the community, are lack of time for these activities and the difficulty to reconcile them with the daily professional stress situation. These barriers are more evident in activities that imply longer time such as knowledge sharing and creation. This factor has been referred to by all respondents in the phase B.

> "*sometimes we receive the email and we even know the answer but we do not have time*" (interview 2.B.).

> "*we cannot have an attitude of intensive sharing due to time* [constraints]" (interview 2.D.).

> "*availability (of time) to condense, transform and reuse knowledge* " (interview 1.B.).

In this last quote, another barrier to knowledge sharing is said to be information confidentiality.

> "*this is the difficulty of presenting information in a comprehensive way, without revealing the context in which it has been applied*" (interview 1.B.).

One of the interviewees in phase A also highlighted the fear of losing his / her job and the position he / she occupies in the hierarchy as a key issue preventing members from sharing what they know. However, this person also said that this feeling belongs more to the past than to the present. This means that something in the organization is changing; this might be generated in the VCoPs or even in the way people now see the importance of knowledge sharing to the survival of the organization.

> "*the only thing that I can think of is protecting one's position by retaining knowledge in a particular aspect. In fact, I think I never experienced such a position from any of the people I work with, but I have seen it a couple of times in a distant past. Could be part of a normal chang- resisting process that has now ended.*" (interview A.D).

Some constraints have also been identified, in aspects related with culture and organizational issues, which limit the sharing, reuse and creation of knowledge in the communities. One of those concerns the lack of recognition, by the management, when sharing and making available information and knowledge. Another constraint relates to the lack of knowledge concerning the existence of a VCoP in the organization.

Yet another is the fact that, when members of the community have nothing new (and nothing of value) to contribute, they are reluctant to participate in knowledge sharing
Organizational culture may be responsible for the reuse of existing artifacts, rather than welcoming new ways of doing things:

> "*Individuals are strongly encouraged to reuse all kinds of work artifacts, maybe even more than they are encouraged to contribute.*" (interview A.D)

Another inhibiting factor is the lack of opportunity to participate, because there might be no one asking for help in the area in which members work. Knowledge creation and sharing depends, mostly, on the requests for help or clarification from a third party.

> "*the reason is that, when we have consultations, we are clearly looking for the resolution of technical problems for which there is a direct answer. The exchange of ideas is rare because it concerns more conceptual problems and these situations are even rarer. Communities also do not give that kind of answer in the same direct way as is given in the first case. That is why there is a tendency to have a consultation; in the second case, this consultation is not so frequent*" (interview 2.A).

Some cultural differences and literacy difficulties, due to the fact that all members do not have the same mother language, have also been pointed out.

In terms of intangible factors, interviewees said that there is a natural human tendency to use existing knowledge artifacts since "using" new ones takes extra time and effort. This point only emerged in data gathered from the interviewees; it does not appear in the literature.

> "*There's a natural tendency for just using what's available, to transform it; innovation takes time and additional effort*" (interview D).

Another barrier relates to the characteristics of each member; readiness to learn will vary from person to person, as this quotation illustrates:

> "*It takes time to learn, and not everybody will be able to achieve the same level.*" (interview D).

The technological aspects have been widely referred to in the literature as constraints preventing an active involvement in the communities. Within this category there are the problems related to the difficulty of access to the community. This manifests itself in slow response times, poor web design,

the lack of tools to extract information efficiently and tools that are difficult to use and not adequate for the knowledge sharing process. These factors are so important that one of the interviewees considers that technological limitations are the only constraint to knowledge sharing:

> "*For me, at a personal level in terms of willing to share, there are no barriers, just lack of tools / systems allowing the keeping and gathering of knowledge in an easy way while ensuring that it is always updated (the personal contact with other members is not always possible, efficient and effective)*" (interview F).

3. Conclusions and recommendations

The aim of this study was to contribute towards the identification and analysis of factors motivating and constraining knowledge creation and sharing in organizational VCoPs, from the perspective of professionals who work in Portugal.

We find that, according to the respondents, the most important factor for people's involvement in VCoP is organizational culture, namely, the recognition which the organization gives to contributions made by collaborators and the guidance provided, in the sense that people should help each other in order to solve day-to-day problems.

This study also discovered that there is a greater predisposition of the members to obtain or even make available information rather than being involved in a) knowledge creation activities, b) collaboration or c) innovation.

Interviewees see these communities mostly as a means to obtain the necessary information and knowledge to solve daily problems. Collaboration is also present but they consider that as of lower importance; they do not have enough time and / or experience to contribute their knowledge to the community.

As for innovation, the interviewees do not consider that this happens within the community to which they belong, because they see their CoP's as more operational. Besides, they consider the process of innovation as something complex and demanding more interaction between people, aims that can only be attained by face to face meetings.

Another important result is the fact that no interviewee said that extrinsic or direct rewards, such as salary increases or monetary prizes were necessary inducements to get involved in the VCoP.

As for the influence of technology, maybe because the enterprises under study were all from the IT sector, none of the interviewees referred to this factor as motivating or constraining, although one commented on the lack of user-friendly ICT.

4. Suggestions for further investigation

In order to obtain results that can be generalized, it will be necessary to perform other studies with similar objectives within companies of different economic sectors, develop more cases and eventually use other methods for data collection, apart from interviews (*e.g.* questionnaires and observations).

It has been possible to identify in the literature review and in the interaction with the enterprises under study, the following areas of interest to be further researched in the domain of the VCoP, taking into account the role performed by VCoP in improving organizational performance, namely:

i) How to motivate or enhance the awareness of members of VCoP, concerning the innovation process, in order to improve the value of these structures;

ii) How to use existing knowledge in the VCoP, to enhance organizational memory and improve the process of making decisions and generation of competitive advantages.

iii) How to recognize and implement a VCoP in a top down approach. CoPs and VCops can be found in most organizations but in some cases managers do not know of their existence;

iv) How to profit from the existing knowledge in a VCoP, in order to maximize investment in these structures;

v) Development of reliable metrics to assess the profitability of time spent by each member's involvement in a particular VCoP; this would enable organizations to recognise and account for such time as profit-making instead of cost-incurring;

vi) Knowing the motivations and constraints that exist in the creation and sharing processes as well as in the innovation activities, in the context of the professional inter-organizational VCoP.

Note: Space limitations meant that the full results of the literature review could not be included; they are available separately (Correia *et al.*, 2009).

References

Ardichvili, A., Page, V. and Wentling, T. (2002) "Motivation and Barries to Participation in Virtual Knowledge-Sharing Communities of Practice', Paper read at 3rd European Conference on Organizational Knowledge, Learning and Capabilities (OKLC), Athens, Greece, 5-6 April.

Coakes, E. and Smith, P. (2007) "Developing Communities of Innovation by Identifying Innovation Champions", *Journal of Knowledge and Organizational Learning Management Decision,* Vol. 14, No.1, pp 74-85.

Correia, Ana Maria R., Paulos, Alice, Mesquita, Anabela (2008) "Comunidades de Prática: factores críticos de sucesso para a inovação e a partilha de conhecimento", Paper read at the 8th *Conferência da Associação Portuguesa de Sistemas de Informação – CAPSI*, Instituto Politécnico de Setúbal, Setúbal, Portugal, October 2008.

Dubé, L., Bourhis, A. and Jacob, R. (2006) "Towards a Typology of Virtual Communities of Practice", *Interdisciplinary Journal of Information, Knowledge, and Management,* Vol. 1, pp 69-93. Available at http://ijikm.org/Volume1/IJIKMv1p069-093Dube.pdf.

Flick, U. (2005) *Métodos Qualitativos na Investigação Científica*, Monitor, Lisboa.

Fontes, T. O. and O'Mahony, M. (2008) "In-depth Interviewing by Instant Messaging", *Social Research Update,* Spring, Vol. 53, pp 1-4. http://sru.soc.surrey.ac.uk/SRU53.pdf.

Hall, H. (2001) "Social Exchange for Knowledge Exchange", Paper read at *the Conference Managing Knowledge: Conversations and Critiques*, University of Leicester, 10-11 April, http://www.soc.napier.ac.uk/publication/op/getpublication/publicationid/321908.

Hall, H. and Graham, D. (2004) "Creation and Recreation: Motivating Collaboration to Generate Knowledge Capital in Online Communities", *International Journal of Information Management,* Vol. 24, pp 235-246.

Jansen, K. J., Corley, K. G. and Jansen, B. J. (2007) "*E-Survey Methodology"*, [online], http://www.igi-global.com/downloads/excerpts/reference/IGR2920_WGMaaAObRD.pdf.

Kirschner, P. A. and Lai, K.-W. (2007) "Online Communities of Practice in Education", *Technology, Pedagogy and Education,* Vol. 16, No.2, July, pp 127-131.

Krogh, G. V. and Grand, S. (2002) "From Economic Theory toward a Knowledge-Based Theory of the Firm" in Choo, C. W. e Bontis, N. (eds.), *The Strategic Management of Intellectual Capital and Organizational Knowledge,* Oxford University Press, New York, NY, pp 163-184.

Lave, J. and Wenger, E. (1991) *Situated learning: Legitimate Peripheral Participation*, Cambridge University Press, Cambridge, MA.

Newell, S., David, G. and Chand, D. (2007) "An Analysis of Trust Among Globally Distributed Work Teams in an Organizational Setting", *Knowledge and Process Management,* Vol. 14, No.3, pp 158-168.

Preece, J. e Maloney-Krichmar, D. (2003) "*Online Communities: Focusing on Sociability and Usability*", [online], http://socialcomputingresearch.net/articles/preece_onlinecommunities.pdf

Saint-Onge, H. and Wallace, D. (2003) *Leveraging Communities of Practice for Strategic Advantage*, Butterworth Heinemann, Boston, MA.

Sharratt, M. and Usoro, A. (2003) "Understanding Knowledge-Sharing in Online Communities of Practice", *Electronic Journal on Knowledge Management* , Vol. 1, No. 2, pp 187-196, http://www.ejkm.com/volume-1/volume1-issue-2/issue2-art18-sharratt.pdf.

Tarmizi, H. and Zigurs, G.-J. D. V. I. (2006) "Identifying Challenges for Facilitation in Communities of Practice", Paper read at *the 39th Hawaii International Conference on System Sciences,* Hawaii , 4-7 January.

Wasko, M. M. and Faraj, S. (2000) "It is What One Does: Why People Participate and Help Others in Electronic Communities of Practice", *Journal of Strategic Information Systems,* Vol. 9, pp 155-173.

Wenger, E., McDermott, R. e Snyder, W. M. (2002) '*Cultivating Communities of Practice',* Harvard Business School Press, Boston, MA.

Yin, R. K. (2003) *Case Study Research - Design and Methods* 3rd ed., Sage, London.