



Miia Kosonen

KNOWLEDGE SHARING IN VIRTUAL COMMUNITIES

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ABSTRACT

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The Internet has transformed the scope, boundaries and dynamics of social and economic interactions. It is argued to have broadened the notion of the community from physical, co-located groups towards collectives that are able to transcend time and space, i.e. virtual communities. Even if virtual communities have been on the academic agenda for a couple of decades, there is still surprisingly little research on knowledge sharing within them. In addition, prior research has largely neglected the complex dynamics between Internet-based communication channels and the surrounding communities in which they are embedded.

This thesis aims at building a better understanding of knowledge sharing supported by conversational technologies in intra-organisational virtual communities and external virtual communities supporting relationships with customers. The focus is thus on knowledge sharing in types of virtual communities that seem to be of relevance to business organisations.

The study consists of two parts. The first part introduces the research topic and discusses the overall results. The second part comprises seven research publications. Qualitative research methods are used throughout the study.

The results of the study indicate that investigation of the processes of knowledge sharing in virtual communities requires a socio-technical perspective, combining the individual, social and technological levels, and understanding the interplay between them. It is claimed that collective knowledge in virtual communities creates the enabling structure for knowledge sharing, and forms the invisible structure of the community on the basis of which it operates. It consists of a shared context, social capital and a unique community culture. The Internet does not inevitably erode social interaction: it seems that supporting social relationships by means of communication technology is a matter of quantity rather than quality. In order to provide access to external knowledge and expertise, firms need to open themselves up to an array of Internet-based conversations, and to consider the relevance of virtual communities to their businesses.

Keywords: virtual community, knowledge sharing, social capital, computer-mediated communication

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A community is all about belonging - thank you for your presence!

Lappeenranta, November 2008

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PART II: PUBLICATIONS

1. Kosonen, Miia (forthcoming). **Knowledge sharing in virtual communities – A review of the empirical research**. Accepted for publication in the *International Journal of Web Based Communities* Special Issue on “Dynamic Virtual Communities in the Information Society: Technologies, Methodologies, and Tools”.
2. Kosonen, Miia and Kianto, Aino (2008). **Social computing for knowledge creation – The role of tacit knowledge**. Proceedings of the 8th International Conference on Organizational Learning, Knowledge and Capabilities (OLKC 2008), Copenhagen, Denmark 28-30 April, 2008.
3. Kianto, Aino and Kosonen, Miia (2007). **Information technology, social capital, and the generation of intellectual capital**. In L. Joia (Ed.), *Strategies for Information Technology and Intellectual Capital: Challenges and Opportunities*, pp. 126-147. Hershey, PA: Information Science Reference.
4. Kosonen, Miia, Henttonen, Kaisa and Ellonen, Hanna-Kaisa (2007). **Weblogs and internal communication in a corporate environment: A case from the ICT industry**. *International Journal of Knowledge and Learning*, 3(4/5), 437-449.
5. Kosonen, Miia and Kianto, Aino (2007). **Applying wikis to managing knowledge – A socio-technical approach**. In B. Martins and D. Rementyi, (Eds.), Proceedings of the European Conference on Knowledge Management (ECKM), pp. 541-546, Barcelona, Spain 6-7 September, 2007 (accepted for publication in *Knowledge and Process Management*).
6. Ellonen, Hanna-Kaisa and Kosonen, Miia (2006). **Exploring the business perspective of hostility in virtual communities**. In K.S. Soliman (Ed.), Proceedings of the 7th IBIMA Conference on Internet & Information Systems in the Digital Age: Challenges and Solutions, pp. 340-348, Brescia, Italy 14-16 December, 2006.

7. Kosonen, Miia and Ellonen, Hanna-Kaisa (2007). **Virtual customer communities: An innovative case from the media industry**. In L. Camarinha-Matos, H. Afsarmanesh, P. Novais and C. Analide (Eds.), *Establishing the Foundation of Collaborative Networks*, pp. 391-398. Springer Publishers.

The contribution of Miia Kosonen to the publications:

1. Sole author.
2. Made the research plan and coordinated the writing of the paper. Wrote most of the paper. Discussing and concluding the findings was a joint effort.
3. Wrote the sections on virtual context and virtual communities. Discussing and concluding the findings was a joint effort.
4. Made the research plan and coordinated the writing of the paper. Wrote most of the paper. Collected the case data. Data analysis and interpretation of the empirical results was a joint effort with Kaisa Henttonen. The theoretical chapter on internal communication was written by Hanna-Kaisa Ellonen.
5. Made the research plan and coordinated the writing of the paper. Collected and analysed the case data. Reflecting the findings was a joint effort.
6. Wrote the theoretical chapter on virtual communities. Data analysis and interpretation of the empirical results was a joint effort.
7. Made the research plan and coordinated the writing of the paper. Collected and analysed the case data. Reflecting the findings was a joint effort.

PART I: OVERVIEW OF THE DISSERTATION

1. INTRODUCTION

"Digitalization cannot be a substitute for socialization" (Tsoukas 2005, p. 137)

"What we do know is that the technology of virtuality, with its power both to separate people and draw them together, calls out for examination from a social capital point of view." (Cohen & Prusak, 2001, p. 21)

1.1 Research background

The need for organisations to learn and to innovate rapidly is a consistent theme in approaches to novel organisational forms (Fulk & DeSanctis, 1995). It seems that hierarchies are being replaced by communication and influence relationships (Reich, 1991), resulting in more flexible organisational forms that rely on peer-to-peer collaboration in achieving their objectives. In addition to fostering firm-internal relationships, open models of innovation may benefit firms in that the innovation sources come from outside (von Hippel, 1988; Thomke & von Hippel, 2002; Chesbrough, 2003). The open-innovation paradigm thus implies that firms need to open themselves up to the array of resources available beyond their boundaries, and to apply both internal and external knowledge. According to Foray (2004), collaboration among users and doers represents one outstanding model of innovation. Businesses either create organisational systems through which users are able to develop and modify products, or organise user cooperation in the form of *communities* in which individual users voluntarily develop the product and share the knowledge.

The development of such open systems is mediated by the Internet, which has transformed the scope, boundaries and dynamics of social and economic interactions (Sproull et al., 2007). In particular, it has affected the emergence of networks as the dominant form of social organisation. People are increasingly organised not just in social networks, but also in online networks. Indeed, 'networked individualism' is labelled the dominant form of sociability today (Castells, 2001, p. 131).

In line with the rise of online networks, the Internet is argued to have broadened the notion of the community from physical, co-located groups towards collectives that are able to transcend time and space (Jones, 1997; Castells, 2001). It has shaped both community boundaries and the modes of communication between people. In general, communities could be understood as “*self-organizing groups of individuals organized around a perceived need to satisfy a shared interest or set of interests by cooperating*” (Baker & Ward, 2002, p. 211). In order to capture the mediated nature of interactions, Internet-based communities are most commonly referred to as *virtual communities* (VCs), in which closeness is based more on shared interest than shared social characteristics such as socio-economic status or gender (Wellman & Gulia, 1999, p. 186). Thereby they allow individual members to find others sharing similar concerns or areas of expertise, and to engage in discussions with them. Today, VCs are a widespread phenomenon spanning a multitude of fields. They cover interests such as social relationships, building identities, conducting transactions, elaborating ideas and insights, and developing products in collaboration with customers (Hagel & Armstrong, 1997; Wasko & Faraj, 2000; Nambisan, 2002).

In business terms, virtual communities could be seen as solutions to specific challenges related to developing corporate communications, enhancing product support and building customer relationships, for example. At the same time, businesses are increasingly aiming at hosting VCs in order to make their collaboration and communication more effective, and to open up avenues for knowledge sharing outside traditional organisational boundaries, which is in line with the open-innovation paradigm. VCs offer businesses various benefits, as their members demonstrate high levels of know-how about and interest in a certain subject, and provide a source of ideas and insights (Sawhney et al., 2005; Füller et al., 2006; Wiertz & de Ruyter, 2007). However, their practical value fundamentally depends on the levels of member participation in the knowledge-sharing activities, as the community would not exist without such involvement (Hsu et al., 2007).

VCs typically rely on Internet-based communication channels to sustain social interaction - in other words, communicating meanings among human beings who have an effect upon each other. No community, neither online nor offline, operates in a social vacuum. On the contrary, they all fully depend on getting connected to other people sharing the same interest, and stay attuned in

order to hear their story: this implies the importance of social capital within a collective. Social capital refers to the relational resources embedded in networks of relationships, manifested as collective ability and a willingness to engage in processes of exchange among community members (Coleman, 1988; Nahapiet & Ghoshal, 1998; Wasko & Faraj, 2005). While Internet communication enables people to overcome spatial and temporal barriers (Hendriks, 1999; Baker & Ward, 2002), it simultaneously involves certain challenges such as a lack of social cues, a lack of familiarity, and disparities in communicative skills (Daft & Lengel, 1986; Fayard & DeSanctis, 2005; Kock, 2005). Hence, it is of particular importance to investigate how knowledge sharing in VCs is enabled, and what is the role of social capital.

1.2 Research gaps and objectives

Even if virtual communities have been on the academic agenda for a couple of decades, there is still surprisingly little research on knowledge sharing within them (Wasko & Faraj, 2005). Prior studies have approached VCs from several perspectives. Complementing the conceptual and analytical work (e.g., Jones, 1997; Romm et al., 1997; Wellman & Gulia, 1999; Porter, 2004; Fuchs, 2007), current researchers have investigated the individual-level socio-psychological mechanisms influencing community participation (Bagozzi & Dholakia, 2002), the motivation to participate (Kollock, 1999; Wang & Fesenmaier, 2003; Daugherty et al. 2005; Jeppesen & Frederiksen, 2006), and the development of a psychological sense of community (Blanchard & Markus, 2004; Ellonen et al., 2007). Further, VCs have been approached from the perspectives of relationship marketing (Kozinets, 1999; Antikainen, 2007) and new-product development (Nambisan, 2002; Füller et al., 2006, 2007), for example, while efforts have also been put into identifying business models (Lechner & Hummel, 2002) and measuring community success (Preece, 2001; Leimeister et al., 2004).

However, the fundamental question still remains whether human-bound knowledge can be shared and leveraged purposefully with the support of Internet-based communication channels, and if so, what the role of virtual communities is. The lack of academic work related to this topic may be due to the relative novelty of VCs as objects of study. Meanwhile, current research is scattered

across different disciplines, including computing and information systems, social psychology, management, e-commerce and marketing (Balasubramanian & Mahajan, 2001). It logically follows that the theoretical understanding is fragmented and fuzzy. In order to form a more solid conceptual basis it is necessary to critically evaluate **the notion of the virtual community, particularly from the knowledge-sharing perspective.**

According to the knowledge-based view of the firm (KBV), knowledge is its most important resource (Grant & Baden-Fuller, 1995). Competitive advantage is based on the firm's ability to create new knowledge (Von Krogh & Grand, 2002). The key task within its network relationships is to create and manage knowledge that is valuable and non-imitable (Spender, 1996). In a sense, knowledge cannot be 'managed' in the same way as other types of resources; its management rather refers to creating *enabling conditions* for sharing and creation, and leveraging the created knowledge (ibid.). Consequently, researchers should pay attention to **what enables knowledge sharing in virtual communities.**

Within any setting, VCs are first and foremost about communicating and sharing between people. Yet Internet communication also poses certain challenges in terms of establishing communities, and deserves more investigation. Here the social-capital approach seems to be particularly useful (Wasko & Faraj, 2005). Various authors have stressed the importance of social capital in terms of knowledge sharing, emphasising the role of social networks, a sense of membership, commitment, and mutual trust (Wenger, 1998; Nahapiet & Ghoshal, 1998; Lesser, 2000; Huysman & Wulf, 2006). However, apart from the seminal work by Blanchard & Horan (1998), in the context of virtual communities social capital has only recently attracted research attention (Wasko & Faraj, 2005; von Wartburg et al., 2006; Chiu et al., 2006; Wiertz & de Ruyter, 2007). It is thus of relevance to further examine **how social capital is manifested in virtual communities.**

Recent advances in Internet communication have facilitated the emergence of informal Web 2.0 channels such as wikis and weblogs that breed and support social communities. *Informality* here refers to communication that is occasional, interactive, rich in content and informal in language, as distinct from scheduled, well-structured and one-way formal communication (Vartiainen et al.,

2004). Given the novelty of the topic, academic research is as yet scarce. It is generally argued that Web 2.0 carries certain advantages over earlier generations (e.g., Röll, 2004; Fuchs, 2007). These channels are openly accessible and offer flexibility, they inherently adjust to the needs of the surrounding community, and they support a multitude of ‘knowledge work’ processes simultaneously, such as organising information and ideas, sense-making, negotiating meanings, and maintaining social networks. Yet much of the common debate around Web 2.0 seems to carry a deterministic mark: if a set of tools or channels is available, it is inevitably assumed that people *will* adopt them in building their communities. For instance, Schwartz (2007) notes in the Editorial section of *Internet Research* (17: 2): “As the ease of online participation and richness of experience continue to grow there is no question that new realms of social interaction along with new forms of community will evolve.” This fallacy may date back to the strong emphasis on technology over social relations. Zack & McKenney (1995) refer to a *technological imperative* (Markus & Robey, 1988), characterised by a belief that implementing external technologies results in desirable changes in communication processes and patterns. In practice, technologies play a role only to the extent that they respond to the social context in which they are embedded, and to its needs (Zack & McKenney, 1995; Brown & Duguid, 1998). Thus it is necessary to advance theoretical and managerial understanding of **Web 2.0 in relation to the social communities in which it is embedded**. The key idea behind the so-called socio-technical approach is the recognition of interaction between people and technologies. The acceptance and use of any technology is thus dependent on the surrounding social context (e.g., Cherns, 1976, 1987).

In particular, research on VCs may provide insightful perspectives for understanding Web 2.0 and its applications. This combination of streams remains an understudied area in the current literature. Given the informal, non-fixed and less controllable nature of Web 2.0 channels, it is reasonable to assume that both the micro-level interactions and the surrounding social context (e.g., norms of communication, power, control, and management philosophy, see Zack & McKenney, 1995) play a focal role in their organisational implementation and use. In other words, open-ended technologies need to be adapted to the context – and vice versa (Weick, 1990; Orlikowski et al., 1995). Unless the technology reflects the contextual conditions it will be utilised inappropriately or ineffectively.

Indeed, the overall potential of any communication technology to facilitate knowledge sharing may be threatened if its effect on organisational structures, relations and behavioural patterns is not investigated critically, and particularly when its role in developing social capital among communities is dismissed (Zack & McKenney, 1995; Huysman & Wulf, 2006). In line with these notions, this study also aims at advancing practical and managerial understanding by identifying **how knowledge sharing in virtual communities could be facilitated**.

In sum, communication and knowledge sharing are crucial in building and maintaining a virtual community, and deserve more focus by researchers working in this field. With the transformation of social communities and recent advances in communication technology as its point of departure, this thesis aims at building a better understanding of the conditions of knowledge sharing supported by conversational technologies in intra-organisational VCs on the one hand and VCs supporting external relationships with customers on the other. The focus is thus on knowledge sharing in types of virtual communities that seem to be of high relevance to business organisations. The level of analysis is that of a community formed by individual members or groups of individuals.

Hence, this study addresses the question of **how knowledge sharing in virtual communities is enabled**. In order to find answers, the following three sub-questions were formulated:

- What are virtual communities and how could they be conceptually outlined from the knowledge-sharing perspective?
- How is social capital manifested in virtual communities?
- How could knowledge sharing in virtual communities be facilitated?

1.3 Scope

As mentioned, this study aims at furthering understanding of how knowledge sharing in virtual communities is enabled, and provides a holistic socio-technical framework of the enabling factors with a view to preparing the ground for further research. The second objective is to conduct a critical investigation of the notion of the VC in order to clarify the concept, and the third objective is to examine social capital in VCs.

However, there are several limitations that should be discussed explicitly at this point. While the study refers to virtual communities as informal entities formed to support knowledge sharing, it does not measure the actual *outcomes* of such processes. Developing knowledge-sharing measures and testing them empirically in the VC context remains an important area for further research.

The field of interest also incorporates a variety of issues that could be addressed within VC research, but which have been excluded from this study. These include processes of learning and longitudinal investigations on how VCs evolve and develop over time. Hence, the main focus is on understanding how communities of a mediated nature might foster communication and collaboration, i.e. *create the enabling conditions* for active knowledge-sharing VCs to emerge. Similarly, patterns of computer-mediated communication (CMC) and network analyses of the actual communication structures in VCs are excluded.

Generally, communication technology could be understood as an ‘umbrella’ concept covering a variety of communication channels, such as e-mail and the telephone (Sivunen, 2007). This study focuses on three Internet-based channels: wikis, weblogs, and discussion forums. In other words, it involves types of *conversational technologies* that inherently provide support for community-level interaction. As in Wagner & Bolloju (2005), the term ‘conversational’ here reflects the processes of discussion, storytelling and collaborative editing within a larger collective. Channels aimed primarily at one-to-one conversations, such as Instant Messaging (IM) systems, are therefore excluded. It is recognised, however, that the organisational use of IM is attracting

increasing interest among researchers (Cameron & Webster, 2005; Quan-Haase et al., 2005; Garrett & Danziger, 2007), and that these discussion-types of exchange provide an important area of investigation in terms of online knowledge sharing and creation.

The data for the study was collected from Finnish companies and their native representatives, and the virtual communities involved are aimed at Finnish users. Thus cultural differences and their effect on the use of conversational technologies and knowledge sharing in VCs are beyond its scope (see Ardichvili et al., 2006). Finally, the empirical study does not cover every type of VC that could support business activities; internal communities and customer communities are used as illustrative examples in order to provide insight into a phenomenon that is not yet well understood in a theoretical sense (Siggelkow, 2007; Eisenhardt & Graebner, 2007). These two types of use – internal and within the customer interface – would nevertheless seem to be of particular importance for businesses. For instance, the McKinsey global survey (2007) highlighted how Web 2.0 was applied mostly to managing collaboration internally (75%) in terms of knowledge management and product development, and within the interface with customers (70%) in terms of finding new customers from existing markets, supporting customer services, and collecting customer-to-business feedback.

1.4 Key concepts

A virtual community is a specific organisational form, an online social network in which people who share an interest in a certain subject interact repeatedly inside certain boundaries, and which relies on communication technologies at least to a certain degree (Wasko & Faraj, 2000; Porter, 2004; Chiu et al., 2006). Over time, members may develop affective bonds and express a sense of belonging to the community, particularly in smaller subgroups that emerge within a larger collective (Blanchard & Markus, 2004; Ellonen et al., 2007). Whereas prior studies have mainly adopted the concept of virtual community, some scholars refer to online communities instead (e.g., Preece, 2000; Madanmohan & Navelkar, 2004). For the purposes of this thesis, the terms ‘virtual’ and ‘online’ are seen as synonymous modifiers of any social community in which interaction is mediated by communication technology.

A virtual customer community is an online group allowing consumers to engage in dialogue with manufacturers of products and services with the support of communication technology (O'Callaghan 2004, p. 7). They represent high levels of product-related know-how and serve as a source of product innovation (Prahalad & Ramaswamy, 2000; Sawhney et al., 2005).

Conversational technology is defined as a set of Internet-based channels enabling discussion-types of communication within a large base of users (see also Wagner & Bolloju, 2005). Such channels allow the open exchange of ideas and information by those interested in the subject, and support feedback, responding and commenting across the surrounding collective. Hence, they represent the so-called Web 2.0 generation of Internet communication, enabling people to interact and generate content themselves instead of being passive receivers of information. The focus here is on three different types of channels: wikis for collaborative work and documentation; weblogs for reflective-type writing, providing information and elaborating ideas; and discussion forums for jointly debating relevant topics.

- *Wikis* are server-based systems of interlinked Web pages that allow users to easily create and edit the content. They represent an open-source technology for information content, focusing on incremental creation and enhancement by a variety of contributors. In particular, wikis allow people to engage in the processes of exchange through collaborative editing. (Leuf & Cunningham, 2001; Wagner & Bolloju, 2005)
- *Weblogs*, or blogs, refer to Web pages that incorporate regular posts about a particular topic, current events, or the expression of personal thoughts. Typically they are maintained by an individual, but also allow multi-person updates when necessary. Weblogs incorporate two different modes of communication: one with the weblog audience through the posting of comments, and the other with the weblog author via email, for example. (Herring et al., 2004)
- *Discussion forums* are asynchronous discussion boards on the Web. They allow users to post messages under a certain topic for others to read and comment on. They are typically organised in a variety of different topic-based categories. (Preece, 2000)

Social capital could be defined as relational (actual and potential) resources embedded within, available through, and derived from the network relationships possessed by an individual or social unit (Coleman, 1988; Burt, 1997; Nahapiet & Ghoshal, 1998). It is manifested as collective abilities and the willingness to engage in the processes of exchange.

Knowledge sharing presumes a two-way relation between at least two subjects capable of knowing, of which one communicates knowledge either consciously or not, and the other should be able to perceive knowledge expressions and make sense of them (Hendriks, 1999). Knowledge sharing thus involves *interpretation*. The way in which codified information is interpreted (i.e. turned into knowledge as a human characteristic) is further dependent upon both the social context and the individual backgrounds and experiences (Tsoukas, 1994, 1996). In this sense, the individual and social levels of knowledge continuously and iteratively interact with each other (Ancori et al., 2000).

Figure 1 summarises the key concepts of the study.

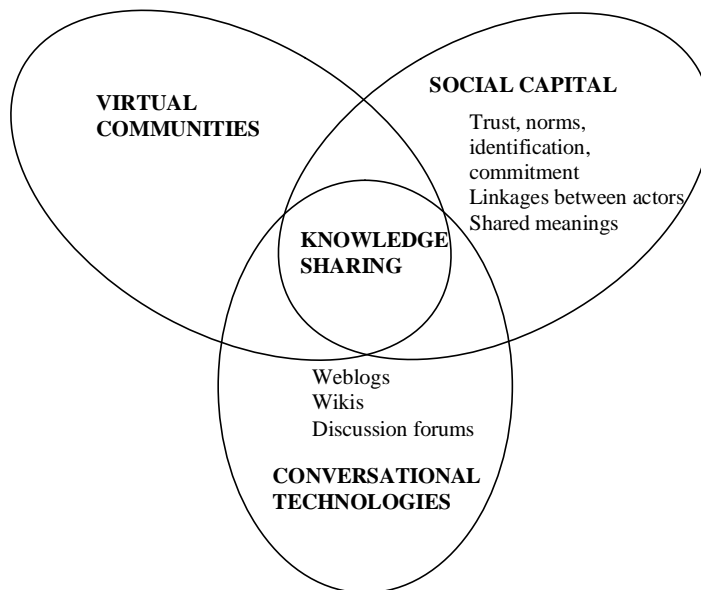


Figure 1. The key concepts and the focus of the study

1.5 Outline of the study

This thesis consists of two parts. The first part comprises five chapters, the first of which gives the research background, sets out the objectives and introduces the research process. Chapter 2 provides a broader theoretical and conceptual background covering the knowledge-based view of the firm, social exchange and social capital, and virtual communities. The research design, methodology and data are presented in Chapter 3. Finally, Chapter 4 reviews the findings of the study, and Chapter 5 identifies its theoretical and managerial contributions and gives suggestions for further research. The second part of the thesis comprises seven research papers addressing the research questions presented on page 22.

Figure 2 illustrates the relationships between the seven research papers (Part II of the thesis) and Part I of the thesis in relation to the research questions. Publication 1 contributes to the discussion on all three sub-questions, while publications 2 and 3 examine social capital in VCs. Finally, the empirical research papers (Publications 4-7) primarily contribute to the identification of knowledge-sharing facilitators.

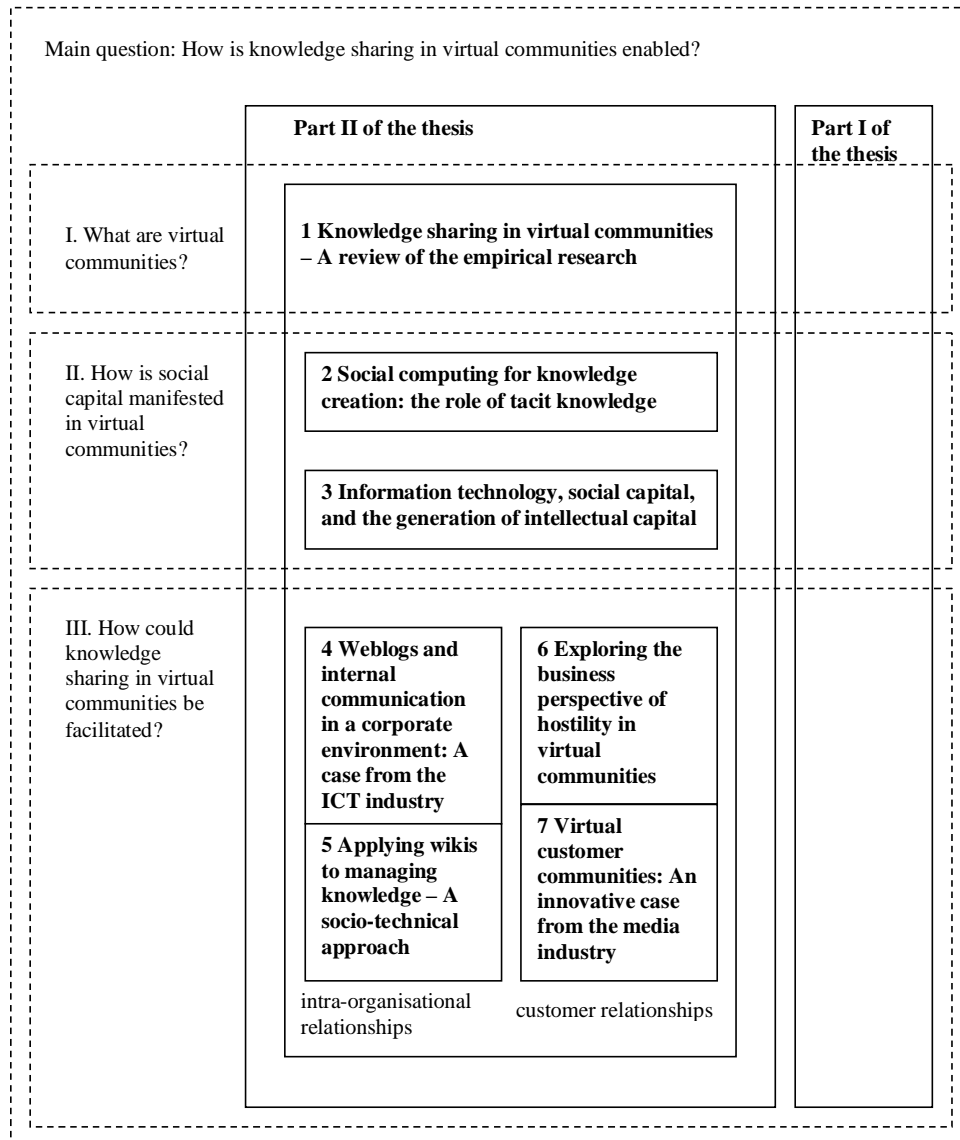


Figure 2. An outline of the study and the original research papers

1.6 The research process

My interest in VCs emerged when I was involved in a research project aimed at developing networked and mobile services for the Finnish youth. Due to my strong interest in information technology and telecommunication studies, together with a major in knowledge management, the combination of human-to-human interaction and communication technology provided a fascinating area of study. After completing my Master's thesis on virtual communities and their life cycle, I returned to the knowledge-management research group at Lappeenranta University of Technology, and became involved in the InnoSpring Access project (2005-2007), the aim of which was to model the success factors of networked collaborative innovation.

The research focus was initially on sense of community and trust in VCs (in this dissertation, publication 6 in Part II represents this early stream), then it gradually shifted to the issue of how online interactions might support the processes of knowledge sharing. Publication 3, concerning VCs and social capital in the creation of intellectual capital, was written thereafter in order to provide an early analytical understanding of the subject. This was followed by a case study on the intra-organisational use of conversational technologies (publications 4 and 5), together with a case study on an innovative customer community aimed at supporting product development (publication 7). In order to deepen understanding of how to facilitate knowledge sharing within VCs, a review article (publication 1) was elaborated iteratively during a 14-month period. Finally, publication 2 represented a move forward in terms of gaining insight into knowledge creation and types of knowledge in VCs. Part I of the thesis discusses and summarises the key findings from the individual publications in to the light of the current literature.

Overall, during the dissertation process I published several refereed articles in journals, books and conferences, concerning VCs from the *individual* (psychological sense of virtual community), *social* (interpersonal and impersonal trust; social capital and VCs), *conversational-technology* (weblogs and wikis) and *business* (virtual communities and continuous product development) viewpoints. I also contributed to non-refereed book chapters, seminar presentations and managerial articles in connection with the research project. The publications reflect my various interests in the field of VCs, and they have had an important role in building

understanding about the field of the dissertation. The publications and the related data collected during earlier stages of VC research also served as secondary material for the study.

2. THEORETICAL BACKGROUND

The background literature for this study covers the knowledge-based view of the firm, the social exchange and social capital that underlie community formation, and virtual communities. In addition, the socio-technical perspective focusing on the interplay between social interaction and communication technology is introduced as an approach to exploring virtual communities and knowledge sharing.

2.1 The knowledge-based view of the firm

According to the knowledge-based view of the firm, a firm could be seen as a set of social communities specialising in the speedy and efficient creation and transfer of knowledge within an organisational context, relying on both individual and collective expertise (Kogut & Zander, 1996). Knowledge cannot be separated from its context (Huysman & de Wit, 2004; Tsoukas, 2005); we make and remake both our language and knowledge through action within communities of knowing (Boland & Tenkasi, 1995, p. 353). Hence, communities must have space for conversation, action and interaction in order to facilitate the creation of new intellectual capital (Nahapiet & Ghoshal, 1998). As Wenger (2000, p. 13) states, building a knowledge organisation requires managers to honour the self-organising nature of communities, while at the same time engaging them in negotiating how communities and organisations relate and contribute to each other.

Knowledge is the judgement of the significance of events and items in a particular context or theory (Bell, 1999; Tsoukas, 2005). Further, the ability to make such judgements is based on the ability to draw distinctions, and on being located within a collectively generated and sustained practice. In this sense, 'knowing' is fundamentally a social act. *Knowledge sharing* presumes a

relation between at least two parties (i.e., knowing subjects), of which the first communicates knowledge consciously or not, and the other should be able to perceive knowledge expressions and to *make sense* of them (Hendriks, 1999). According to Starbuck & Milliken (1988, p. 51), sense making involves “placing stimuli into some kind of framework”. It can be approached from the individual perspective, meaning that individuals develop cognitive maps of their environment, or from the collective perspective, according to which shared mental models are developed within the group in order to coordinate action. However, the two levels are intertwined in that individual interpretations are shaped by the social environment (Weick, 1995, p. 39): “Conduct is contingent on the conduct of others, whether those others are imagined or physically present”.

A similar typology characterises knowledge. According to Spender (1996), on the *individual* level knowledge may be conscious (explicit facts, concepts and memorable frameworks) or automatic (tacit or implicit perceptions, mental models, values and skills). On the *social* level, it may be objectified (shared codified knowledge) or collective (social practice that resides in shared tacit experiences and enactment). Tsoukas (2005), in turn, discusses two forms of knowledge: *propositional*, which refers to systematic, formalised knowledge regardless of the medium, and *narrative*, which is manifested in examples, anecdotes and stories that build a specific domain of action, often referred to as a practice.

More specifically, a practice can be understood as “any coherent and complex form of socially established cooperative human activity through which goods internal to that form of activity are realized”, and in which those involved strive to achieve standards of excellence related to the domain (MacIntyre, 1985, p. 187). Internal goods as referred to above are realised through participation in the practice concerned, such as analytical skills in chess playing, the thrill of conducting research, or satisfaction from curing patients. *Participating* in a practice means sharing the narratives a community of practitioners employs (Tsoukas, 2005, p. 82); narration facilitates social interaction, preserves a community’s collective memory, and enhances a group’s sense of shared identity within a shared practice (Brown & Duguid, 1991). Finally, every practice has its history of changes and skills (MacIntyre, 1985).

Since Nonaka & Takeuchi (1995) published their influential model of knowledge creation, a multitude of studies within this field has absorbed the concept of tacit knowledge, referring to ‘knowledge-not-yet-articulated’ (Tsoukas, 2005): in the context of information systems this means ‘knowledge that is to become explicit’ (i.e., information). Wilson (2002) notes how such previously unexpressed but expressible knowledge could, more accurately, be labelled *implicit* knowledge. Indeed, knowledge is always bound to human beings, their values, beliefs and action, and as such cannot become fully digitalised or codified (Davenport & Prusak, 1998; Brown & Duguid, 2000; Tsoukas, 2005). All knowledge necessarily contains a tacit coefficient (Polanyi, 1966).

Four different perspectives on knowledge extracted from the literature enhance our understanding of the relationship between knowledge and communication technologies. These are summarised in Table 1.

Table 1. Perspectives on knowledge

Perspective	Definition	Basic assumptions	Source of knowledge	Main focus
Information (also referred to as knowledge as an 'object')	Codified data carrying a meaning (e.g., Alavi & Leidner, 1991; Constant et al., 1994; Järvenpää & Staples, 2000; Kankanhalli et al, 2005; Cabrera et al., 2006)	Information can be relatively easily managed, stored and retrieved	Systems	Managing information, e.g., databases
Knowledge as human property	Expertise embedded in the mind of an individual characterised by certain insights, beliefs, values and experiences, and bound to human action (e.g., Nonaka & Takeuchi, 1995; Kogut & Zander, 1996; Wilson, 2002; Rafaeli & Raban, 2005; Chiu et al., 2006)	Knowledge is subjective, sticky and difficult to share; all knowing necessarily involves a tacit dimension	Individuals	Extracting knowledge, transformation from tacit knowledge to explicit knowledge, e.g., expert systems
Knowledge as collective property	Public good (i.e. goods that anyone may benefit from regardless of whether they have contributed to their production) freely available to a collective (e.g., Kollock, 1999; Wasko & Faraj, 2000)	Knowledge is a jointly produced package-type of resource	A collective of individuals	"Wisdom of crowds"; individuals who produce a valuable outcome by accumulating bases of information
Knowledge as collective action	The practice of knowing (e.g., Spender, 1996; Orlikowski, 2002)	Knowledge is inter-subjective and exists among community members engaged in a specific domain of action	Social interaction	Collective social practices such as shared language, experiences and routines

Information refers to analysed and/or contextualised data, it carries a message and makes a difference as perceived by the receiver (Constant et al., 1994; Järvenpää & Staples, 2000). Information has also been referred to as a codifiable object, 'know-that', which can be fairly easily managed, stored and retrieved in technical systems (Kankanhalli et al., 2005; Cabrera et al., 2006). The second perspective either explicitly or implicitly assumes that the sense-maker is involved in the knowledge processes, i.e. a human subject who is capable of giving both *meaning* and *value* to the knowledge (Hendriks, 1999; Wasko & Faraj, 2000). Knowledge is often interpreted as expertise or know-how, a human quality that builds on data and information together with experience, values and insights (Kogut & Zander, 1996; Rafaeli and Raban, 2005). Knowledge sharing occurs between individuals who "possess" knowledge (Wasko and Faraj,

2000). Thirdly, knowledge may be situated within a social collective that jointly owns it, thereby making contributions to a public good or collective property (ibid.; Kollock, 1999). Finally, knowing can be manifested as collective action, expressed in the form of shared language, experiences and routines. It is thus inter-subjective in nature: in order to act purposefully and understand a certain domain of activity, one has to communicate with others engaged in such a context (Spender, 1996).

Having identified various knowledge types and perspectives from the current literature, I will now move on the socio-technical approach, which illustrates the interplay between the social interaction underlying knowledge sharing, and the use of communication technology. In this sense, a socio-technical approach is required if we are to understand how knowledge-sharing communities emerge and develop online.

2.2 The socio-technical approach

The key idea behind the so-called socio-technical approach is the recognition of interaction between people and technologies. The acceptance and use of any technology is thus dependent on the surrounding social context (e.g., Chems, 1976, 1987).

Adaptive Structuration Theory (AST, DeSanctis & Poole, 1994) explains the relationship between technology use and social interaction in an organisational context in creating group-level outcomes. According to AST, the structural characteristics related to the technology shape the interaction patterns within groups but they do not determine the nature of the interaction in a definitive way. The theory originates from *Structuration theory* and the work of Giddens (1979). It posits that understanding social interaction requires explanation of both the structure of relationships and their dynamics (or processes). It thus adds a dynamic perspective in terms of investigating the interplay between the social context and interaction (ibid.; Zack & McKenney, 1995). The structure of relationships is twofold in that the structural properties of a social system are both the medium and the outcome of the practices they recursively organise: in other words, human actions and social structures produce each other mutually (Giddens, 1984, p. 25; Fuchs,

2007). Structuration theory proposes three modalities through which interaction is influenced by the social context: interpretive schemes for meaningful communication, the application of power, and normative schemes for the legitimisation of action (Poole et al., 1985).

DeSanctis & Poole (1994) discuss the two schools of thought on the use of advanced technology (including electronic messaging, collaborative systems, and group-decision support systems) and its impact on organisational change. Firstly, the *decision-making* school relies on the positivist research tradition, which emphasises cognitive processes and “system rationalism” (Rice, 1984). Research is grounded in “either hard-line determinism, the belief that certain effects inevitably follow from the introduction of technology, or the more moderate contingency view, which argues that situational factors interact with technology to cause outcomes” (DeSanctis & Poole, 1994, 123; see also Gutek et al., 1984). However, according to DeSanctis & Poole (1994), research has demonstrated no consensus on how advanced technologies eventually affect people and organisations, or how they should best be designed.

The *institutional* school, in turn, emphasises the role of technology as an opportunity for change, rather than its causal agent (Kling, 1980; Perrow, 1986). According to this view, the techno-centric assumption of the power of technology leads to “gadgetphilia” and under-emphasis on the social practices involved in its use (Markus & Robey, 1988). Instead of taking a deterministic view, people appear to generate social constructions using resources, interpretive schemes and norms within a context in which meanings are given to the use of technology. Theoretically, the institutional school is rooted in *social-information-processing theory* encompassing how meanings are socially constructed (Fulk et al., 1987; Walther, 1992), and *symbolic interactionism* (Blumer, 1969), according to which the way people act towards things is guided by the meanings given to such things, which in turn are derived from and modified by social interaction. Hence, symbolic interactionism focuses on the role of communication in the creation of social practices such as norms, values and roles (Reichers, 1987; DeSanctis & Poole, 1994).

As Zack & McKenney (1995) aptly note, potential micro-level interactions between individual users of communication technology may not become realised due to the limits of the *learned repertoire* of interactions. Actors have tacit knowledge of how to participate in group interaction,

which results in their overlooking the interaction choices that do not belong to the legitimate repertoire (Poole et al., 1985). Secondly, technology may provide the ability but the context eventually provides the *willingness* to interact. Thus both levels must be investigated and understood in research on the effects of communication technology within organisations.

Prior research illustrates the bias towards over-emphasising the role of technology within knowledge management, too. On the basis of an analysis of 78 articles published in the 1990s in six Information Systems (IS) journals, Schultze & Leidner (2002) investigated the underlying scientific discourses in the research on knowledge management. They used as their point of departure Deetz's (1996) taxonomy, which consists of four discourses that characterise organisational science:

- *Normative discourse*, concerning issues such as rationalisation and control; seeking generalisations and law-like relationships
- *Interpretive discourse*, emphasising social activity in organisations and viewing people as active sense-makers, participants, and creators of organisational life
- *Critical discourse*, viewing organisations as sites of continuous conflict and political struggle, aiming at identifying and resolving conflicts
- *Dialogic discourse*, unpacking social realities that are taken for granted, treating power and domination as situational

They found that the vast majority of knowledge-management studies represented normative discourse and a minority represented interpretive discourse, whereas there were hardly any examples of critical or dialogic discourse. Hence, the research was found to be strongly biased towards consensus-types of discourse that do not critically investigate the value and meaning of knowledge or the structures related to its appropriation. Normative discourse is rather associated with problem-solving type of research, looking for technology-based solutions to specific knowledge-management problems, while interpretive discourse aims at understanding the implications of such technology within its social environment. (Schultze & Leidner, 2002, p. 230). The socio-technical approach, on the other hand, would call not only for interpretive research but also for investigation of the conflicts, values and power differences that characterise the social environments within which technologies are embedded.

Overall, the key argument derived from the socio-technical approach in terms of this study is that the adoption and use of online networks is also fundamentally determined by the degree to which social practices and the context are taken into account. Various authors stress the importance of understanding the ‘info-culture’: precursory knowledge underlying our actions and embedded in social relationships involving different cultures, norms, and levels of trust (Ciborra, 1996; Pan & Scarborough, 1998; Choo et al., 2000). This switches the main focus to organisational social capital, and particularly its relational dimension within which the info-culture forms the analysis layer (Huysman & Wulf, 2006). Social capital is discussed in more detail in the following section, which begins with a brief introduction of social exchange as a constitutive approach to community-mediated exchange relationships.

2.3 Social exchange and social capital

Social exchange theory (Homans, 1958) accounts for the social and individual cost and benefit factors that are inherent in community relationships. Costs are negative outcomes or resources that are given away during exchange, while benefits refer to positive outcomes or received resources. The theory suggests that sharing personal expertise is motivated by status, respect, compliance and obligation. Homans (1958) further posits that individuals may engage in situations of exchange even when no material reward is involved, due to intrinsic motivation (i.e. valued for its own sake and directly fulfilling one’s needs). Extrinsic motivation refers to satisfying needs indirectly, typically through external rewards (e.g., Deci, 1975). Community relationships and association within the collective yet reach beyond the simplistic assumption of rational profit-seeking in social exchange (Blau, 1964; Balasubramanian & Mahajan, 2001). In other words, social and personal commitment to a community may rule out the pursuit of outside alternatives that are considered more profitable in rational terms.

Blau (1964) argues that social exchange is anchored by three elements within the relationship: trust and commitment, norms of fairness and power. Theories of *collective action* explain why individuals share valuable resources instead of choosing to free ride: it is a consequence of

collectively-owned and maintained social capital - norms, obligations and trust (Coleman, 1990; Putnam, 1993).

The fundamental tenet of social capital is that networks of relationships constitute a valuable resource in the conduct of social and economic affairs. It could thus be understood as the relational resources of individuals and organisations (Bourdieu, 1986; Coleman, 1988; Putnam, 1995; Burt, 1997). Adler & Kwon (2002, p. 23) define it as “the goodwill available to individuals or groups”, deriving from the structure and content of the actor’s social relations. Social capital is thus the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or a social unit (Nahapiet & Ghoshal, 1998). It is an “additional ingredient to the already well-known economic conditions or elements that make up organizational capital: physical capital, financial capital and human capital” (Huysman & Wulf, 2006, p. 44). While human capital refers to individual ability, social capital is derived from social networks and manifested as collective abilities. It increases the efficiency of action (Burt, 1992), diminishes the probability of opportunism, and reduces the need for monitoring (Putnam, 1993). However, it is not always beneficial, and may lead to collective blindness and in-group behaviour (Coleman, 1990).

In general, social capital is created and sustained through exchange, while it simultaneously facilitates such exchange. Communities that are rich in social capital have members who tend to help each other, spend time together and contribute to the common good. The driving forces of knowledge sharing within communities are not only the shared interest, but also mutual trust, norms and obligations, i.e. social capital (Lesser & Prusak, 2000; Preece, 2004; Huysman & Wulf, 2006).

The dimensions of social capital are discussed in more detail in the following. According to Putnam (1995), social capital consists of networks of civic engagement, norms of reciprocity, and trust. Nahapiet & Ghoshal (1998) identify three interrelated dimensions, the structural, the relational and the cognitive. *The structural* dimension refers to the set of linkages and connections between actors (people or units) and its facets include the presence/absence of network ties, the network configuration, and appropriable organisation. *The relational* dimension,

in turn, describes personal relationships developed among people through a history of interaction, and the key facets include trust and trustworthiness, norms, obligations and expectations, and identity and identification. Thirdly, the *cognitive* dimension refers to resources providing shared representations and systems of meaning (Cicourel, 1973; Nahapiet & Ghoshal, 1998). These three dimensions are highly interrelated. The structural dimension represents the *opportunity* to benefit from other actors' resources and to act together, thus representing one source of social capital (Adler & Kwon, 2002). The relational dimension, on the other hand, represents relation-based *motivations* for explaining such behaviour: such motivations facilitate materialisation of the benefits of social capital, norms and trust being its sources (Putnam, 1993; Adler & Kwon, 2002). Finally, the cognitive dimension refers to the *ability* of the collective to become embedded in such exchange and its content. Similarly, Lesser (2000) defines social capital as consisting of the relationship structure, interpersonal dynamics, and a common context and language.

Trust is considered one of the primary relational features of social capital (Putnam, 1993, 1995; Nahapiet & Ghoshal, 1998). Putnam (1993) sees it as one of its *sources*, whereas Coleman (1988) refers to it as a *form* of social capital. Finally, social capital and trust are sometimes equated (Fukuyama, 1995). Trust could be defined as the willingness to be vulnerable to another party based on the belief that the other is reliable, open and honest, concerned about the well-being of the trusting subject, and competent (Mishra, 1996). According to Mayer et al. (1995, p. 712), trust is “the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party”. For trust to exist, there has to be dependence on the other party, meaning that the interests of one party are furthered only by reliance upon the other one (Mayer et al., 1995; Kipnis, 1996). According to Blau (1964), two factors initially account for the basis of trust: relationships have a repetitive character, and achievements increase in importance in the course of time. Trust is situation-specific, and the context may change both its level and its role (Kramer, 1999; Järvenpää et al., 2004). The most common approach to trust is on the interpersonal level, while on the impersonal level it refers to indirect relationships in which it is not based on personal contact but is mediated by a social organisation or structure based on third parties, institutional standards and norms, or social categories, for example (Kramer et al., 1996; Pixley, 1999).

Risk precedes the existence of trust, which is not needed if there is complete certainty about the results of actions (Lewis & Weigert, 1985). Hence, trust is a solution to specific problems of risk, and is manifested in the willingness to carry certain risks, whether economic or social in nature (Gambetta, 1988; Luhmann, 1988; Blomqvist, 1997). The term “risk” is used widely to refer to various threats, hazards or dangers, but related to trust it is a more specific concept. It suggests a future-oriented, unwelcome and threatening state of the world: it is impossible to prevent, at least to some extent, and involves consequences that result from human decisions. It is thus activated by our actions. Placing trust means suspending the risk, acting as if it were non-existent. (Luhmann, 1979; Sztompka, 1999)

In sum, trust is based on an individual’s expectations of how another party will perform on some future occasion involving risk to the trustor, and involves commitment through action. Confident, positive expectations, commitment and positioning oneself in situations of vulnerability are the key elements in various definitions of the concept.

Norms represent a degree of consensus and reflect the values of the community (Coleman, 1990). They are learned through experience. According to Fukuyama (1999), not any set of norms constitutes social capital: they lead to cooperation in groups and therefore are related to values such as honesty, openness, the keeping of commitments and reciprocity. Communities are created and sustained through reciprocal interaction, such as sharing knowledge and emotional support (Wasko & Faraj, 2000); whatever is given ought to be repaid (Wellman & Gulia, 1999).

At this point, it should be noted that the relational facets of social capital are also interrelated. For instance, norms of reciprocity become realised through trust: norms have relevance only if a member of a collective is justified in believing that others will follow them. Thus in a risky situation, any collective convention has an effect on human action only when a person can trust other people not to violate it (Castelfranchi & Tan, 2002, p. 59).

Obligation refers to the commitment to undertake some activity in the future (Nahapiet & Ghoshal, 1998). It differs from generalised norms in terms of having developed in a particular

relationship (Coleman, 1990). It is described in various terms: the willingness to invest in and to maintain the group or community, exchanging with one another, the willingness to work together for a common purpose, habituation to the moral norms of the community, and the willingness to achieve more as a member (Cummings et al., 2003).

Finally, *identification* refers to a process whereby individuals see themselves as at one with another person or a social group (Nahapiet & Ghoshal, 1998). Identification with a social category reduces uncertainty and facilitates self-enhancement through reliance on the perceived similarities with the in-group, in contrast to other categories (Turner, 1987). Hence, the values or standards of such a group serve as a comparative frame of reference (Merton, 1968). According to Lewicki & Bunker (1996), salient group identification may both increase the opportunities for exchange and enhance the frequency of cooperation. Distinct group identities, in turn, may constitute a significant barrier to knowledge sharing and creation (Nahapiet & Ghoshal, 1998).

In sum, the knowledge-based view emphasises the establishment of conditions for creating and leveraging organisational knowledge. Social communities are considered the context in which knowledge processes take place. Communities combine individual motivations, networks of relationships, shared cognitive patterns and relational dynamics into an organised structure. Hence, researchers examining the impact of communication technologies in organisations should adopt a socio-technical view encompassing the interplay between the technology and the surrounding social context. Having presented the background theories and approaches underlying communities and knowledge sharing, I will proceed in the next section to review the current literature on virtual communities in some detail.

2.4 Virtual communities

A virtual community is a widely accepted concept for describing on-going social interaction and relationships within online networks. The term ‘virtual’ here refers to an artefact being ideally real, i.e. existing but not concrete (Shields, 2003). Interestingly, the misinterpretation of virtual as something that does not really exist has induced some researchers to adopt the notion ‘online’ to

refer to the same phenomenon (de Vries & Kommers, 2004, p. 117). Despite such concerns, virtual community seems to be a widespread notion in a variety of academic studies (Jones, 1997; Wellman & Gulia, 1999; Nambisan, 2002; Blanchard & Markus, 2004; Porter, 2004; Chiu et al., 2006; de Valck et al., 2007).

The virtual community as a concept was popularised by Rheingold (1993), who described such communities as “social aggregations that emerge from the Net when enough people carry on those public discussions long enough, with sufficient human feeling, to form webs of personal relationships in cyberspace”. His work was followed by a set of analytical and empirical studies in the late 1990s (Fernback & Thompson, 1995; Baym, 1997; Jones, 1997; Romm et al., 1997; Blanchard & Horan, 1998; Wellman & Gulia, 1999). Lee et al. (2003, p. 51) review various definitions of the VC and compile a generic working definition, according to which it is a “cyberspace supported by computer-based information technology, centered upon the communication and interaction of participants to generate member-driven contents, resulting in relationships being built up.” Ridings et al. (2002, p. 273) see virtual communities as groups of people sharing common interests or practices and communicating regularly over the Internet through a common location or mechanism. By location or mechanism the authors mean the application used by the members of the community, be it a chat room, a discussion forum or a mailing list, for example.

According to Preece (2000, p. 10), an online community has the following characteristics: it consists of people interacting socially, having a shared purpose that provides a reason for the community to exist; it has policies such as tacit assumptions, rituals and rules that guide people’s interaction; and finally, it has access to computer systems that provide a platform for social interaction. Communities may also develop a strong sense of having clear boundaries and being safe from intruders (Slevin, 2000, p. 93). Fernback & Thompson (1995) see VCs as sets of relationships that emerge through repeated interaction inside a specific boundary. Finally, Porter (2004, p. 2) defines a virtual community as “an aggregation of individuals or business partners who interact around a shared interest, where the interaction is at least partially supported and/or mediated by technology and guided by some protocols or norms”. She thus adds the business view to the working definition (see also Hagel & Armstrong, 1997; Lechner & Hummel, 2002).

All in all, the key facets of VCs are the shared interest coupling people together and the informal, volunteer-based nature of the interaction – anyone willing to engage in conversation may do so within the community boundaries. Unlike virtual teams, VCs are not organised in order to achieve a given temporal goal, neither is their membership determined by formal positions. However, organisational hierarchies may affect participation, as the study on firm-hosted virtual communities of practice conducted by Ardichvili et al. (2006) reported.

Interactions in virtual communities happen with the support of communication technology, at least to a certain degree. They most commonly rely on channels of *computer-mediated communication* (CMC), which could be defined as synchronous or asynchronous communication between the sender and one or more receivers, relying on computer-mediated communication channels on both sides (Fischer & Manstead, 2004). Traditionally, these included email systems, discussion boards and group support systems, but since the early days of CMC so-called Web 2.0 applications such as weblogs and wikis have evolved that enable the more flexible generation of content. Virtual communities may also fall within the broader concept of social media, consisting of *content*, *communities* and a set of communication *technologies*. In general, this concept refers to applications that are based on user-generated content, or in which such content plays a focal role in adding value to the use of the application or service. (Kangas et al., 2007)

In summary of the discussion so far, a virtual community is generally understood as a specific form of social organising, an online network in which people who share an interest in a certain subject interact repeatedly inside certain boundaries, and which relies on communication technologies at least to a certain degree (Preece, 2000; Wasko & Faraj, 2000; Porter, 2004; Chiu et al., 2006). Members may also develop affective bonds and express a sense of belonging to the collective (Blanchard & Markus, 2004). As noted earlier, there are various types of VCs depending on the underlying interest and the roles of the members. These types are briefly discussed in the following in terms of their relevance to business organisations.

Types of virtual communities

Virtual customer communities (VCCs) are online groups allowing consumers to engage in dialogue with manufacturers of products and services with the support of communication technology (O'Callaghan, 2004, p. 7). They represent high levels of product-related know-how and serve as a source of product innovation (Prahalad & Ramaswamy, 2000; Sawhney et al., 2005). They benefit firms in that their members show high product interest and typically are strongly present on the Internet. Through iterative communication patterns, VCCs also provide information shared on the social level that would be difficult or impossible to obtain using research tools (Prandelli et al., 2006). Moreover, businesses may host VCCs to support product development (Nambisan, 2002), brand building (McWilliam, 2000) and the collection of feedback (Williams & Cothrel, 2000), and to provide product support (Fahey et al., 2007; Wiertz & de Ruyter, 2007). Members share ideas and opinions, offer solutions, and elaborate on and test them (Füller et al., 2007). While some VCCs offer customers a direct opportunity to develop the product further (e.g., Füller et al., 2006), others incorporate discussion-types of interaction around the product and the underlying concern (e.g., Kosonen & Ellonen, 2008). Much of the research focuses on information products such as software, although Füller et al. (2007) also provide findings on how companies could apply VCCs in developing physical products.

A related concept is the virtual community of consumption (Kozinets, 1999), which serves interests that are consumption-related. More specifically, they are “affiliative groups whose online interactions are based upon shared enthusiasm for, and knowledge of, a specific consumption activity or related group of activities” (Kozinets, 1999, p. 254).

Online user communities (OUCs) are organised by users of a certain product, either commercial or non-commercial, in order to develop it further and to provide mutual assistance and support. However, as distinct from the above types, not every OUC tolerates commercial influence. Most importantly, users are not inevitably customers: on the contrary, they often aim at developing solutions that are superior to the commercial offerings (von Hippel, 1988). In general, a user community could be defined as distributed groups of individuals who engage in solving a general problem or developing a new solution supported by computer-mediated communication

(Dahlander & Wallin, 2006). The development of open source software (OSS), a prevalent and well-known type of virtual-community activity (e.g., Ljungberg, 2001; Thomke & von Hippel, 2002; Hertel et al., 2003; Bagozzi & Dholakia, 2006; Kuk et al., 2006), also falls within this category.

VCoPs, in turn, are communities of practice that offer an online communication environment to its members (e.g., Ardichvili et al., 2006; Fahey et al., 2007; Usoro et al., 2007). Wasko & Faraj (2000) refer to Usenet newsgroups as electronic networks of practice, but do not explain in more detail how they would conceptualise a VCoP. According to Preece (2004), in turn, communities of practice may be physically located, locally networked (e.g., within a company), virtual, or a combination of these. Lave & Wenger (1991) describe a community of practice as an activity system about which participants share an understanding concerning what they are doing and what that means in their lives and for their community; these groups share a concern, a set of problems or a passion, and deepen their knowledge on an ongoing basis (Wenger, 1998).

Finally, some authors adopt the term virtual community of interest (VCI) to refer to any type of online interaction organised around a shared enthusiasm for a specific activity or group of activities (De Valck et al., 2007). Blanchard & Horan (1998) even label any online-originated community a VCI, as distinct from physically based VCs, which are traditional communities that offer their citizens electronic resources. VCI, however, is a very broad and non-exclusive concept, as every VC must share certain interest(s) in order to exist. Furthermore, not every interest represents a systematic practice within which knowledge is shared and deepened. Thus it would be more accurate to refer to online groups or networks rather than VCs. Sharing photographs on a website and kicking a ball are not practices: photography and football are (on defining a practice, see MacIntyre, 1985; Tsoukas, 2005).

All in all, the above types of community interaction could be labelled VCs. When an online network 'stabilises its practice' it may build a virtual community, which is different from a physical community but not necessarily less intense in terms of binding and mobilising its citizens (Castells, 2001, p. 131). The following section reviews the current literature on social capital and virtual communities in order to increase understanding of knowledge sharing in VCs.

Virtual communities and social capital

Apart from the seminal work by Blanchard & Horan (1998), social capital in virtual communities has only recently attracted research attention (Wasko & Faraj, 2005; von Wartburg et al., 2006; Chiu et al., 2006; Wiertz & de Ruyter, 2007). There is a stream of research considering the effect of overall Internet use on social capital (Nie, 2001; Wellman et al., 2001; Quan-Haase et al., 2002; Best & Krueger, 2006), focusing on how the Internet may destroy, increase or supplement social capital depending on how it is used. In addition, the earlier debate on VCs assessed their potential effect on the societal level (Blanchard & Horan, 1998). However, from the knowledge-sharing perspective, the issue of how social capital may motivate action within and between communities remains more of a concern - and how social capital is built and manifested *within* VCs.

Blanchard & Horan (1998) discuss the relationship between VCs and the three aspects of social capital as identified by Putnam (1995): networks, norms and trust. In terms of networks, both physically based and geographically dispersed VCs ease access to previously unknown others sharing the same interest. However, physical distance may lead to less dense networks, whereas physically based communities are able to increase density and overlap with face-to-face networks. In terms of norms of exchange, both types of communities manifest strong reciprocity in that others are helped in return and a single act of helping is relatively easy to produce (Constant et al., 1996; Wellman & Gulia, 1999). Both socio-emotional support and information are exchanged. Finally, flaming and deception may deteriorate trust, particularly in geographically dispersed VCs. When the community allows the creation of multiple identities or is based on anonymity, there is less reason, and less need, for interpersonal trust to develop (Ellonen et al., 2007). In other words, one's personal position is not at risk due to anonymity, and impersonal forms of trust such as trust in the community or the hosting organisation may be enough to mobilise interaction. Interpersonal trust is not an oddity in a VC either, however, although it may take a longer time to develop than in face-to-face settings (Feng et al., 2004, see also Walther, 1996).

Taking the three dimensions of social capital (Nahapiet & Ghoshal, 1998) as a theoretical point of departure, prior studies on knowledge sharing and VCs emphasise both the role of structural social capital and social-interaction ties (Wasko & Faraj, 2005; Chiu et al., 2006), and relational social capital such as commitment (Wiertz & de Ruyter, 2007), identification, and norms of reciprocity, in enhancing the quantity of knowledge sharing (Chiu et al., 2006). Trust, in turn, positively affects both the quality (ibid.) and quantity of sharing within VCs (Ridings et al., 2002; Usoro et al., 2007). Wiertz & de Ruyter (2007) found an indirect effect between norms of reciprocity and the quantity of sharing in that reciprocity increased the propensity to engage in online interactions. Finally, cognitive social capital such as shared language is also concerned with the quality of sharing (Chiu et al., 2006).

Cramton (2001) notes how building mutual knowledge, i.e. common ground, remains a particular challenge for geographically dispersed forms of collaboration. Mutual knowledge is “knowledge that the communicating parties share in common and know they share” (Krauss & Fussell, 1990). Such common ground is considered essential to the coordination of actions and the avoidance of misunderstanding (e.g., Clark, 1996). Three mechanisms support the establishing of mutual knowledge (Krauss & Fussell, 1990): *direct knowledge*, i.e. first-hand experience and observation of other people sharing the same physical settings, *interactional dynamics*, and *category membership*.

Of these, dispersed forms of collaboration allow no opportunity for direct knowledge, while interactional dynamics may suffer from a lack of nonverbal cues and immediate feedback. As a result, it takes more time and effort to establish a common ground – in a similar manner as in building interpersonal trust in VCs (Feng et al., 2004). However, people also make assumptions about what others know based on social categories: in dispersed settings, mutual knowledge may be assumed on account of shared professional status or organisational membership, for example (Cramton, 2001). This is of particular relevance to VCs. According to social-identity and de-individuation theory (SIDE), computer-mediated communication arouses feelings of anonymity and de-individuation, which leads to the over-attribution of the available social cues (Lea & Spears, 1991, 1992). Hence, people assign others to social categories that are used as a basis of social identification (Tajfel & Turner, 1979). Similarity with in-group members positively affects

the willingness to cooperate and also the ability of the collective to understand each other - in other words, to establish a common ground. Thus, social identification has been found to play a focal role in virtual communities (Bagozzi & Dholakia, 2002, 2006; see also McKenna & Green, 2002) in terms of providing the conditions for developing a common ground and norms that regulate interactions (Watt et al., 2002).

Evaluations and critiques of virtual communities

It is clear from the above discussion that VCs have various definitions derived from a variety of disciplines, and that there is no consensus about the concept. Researchers sometimes have a tendency to reinvent the wheel when trying to understand how communities evolve: Rothaermel & Sugiyama (2001), for instance, point out that the existing theory on VCs is not well developed, while, at the same time, altogether ignoring the earlier research on communities.

The need to dive into a new stream of VC theory has induced researchers to grasp at extreme viewpoints on what communities are about. Wellman & Gulia (1999) note that it is particularly the early debate that could be described as Manichean: the Internet was seen either to create 'brave new Net worlds', or to destroy the community altogether, and further: "Their statements of enthusiasm or criticism leave little room for the moderate, mixed situations that may be the reality" (Wellman & Gulia, 1999, p. 167).

In a similar vein, Keleman & Smith (2001) criticise the 'cyberlibertarian rhetoric' surrounding the debate around VCs encompassing the power of *technology* and the power of the *individual*, resulting in new forms of community and identity that do not rest on traditional forms of life (Gupta & Ferguson, 1992). Such rhetoric is manifested in two traditions, the *radical* view (according to which the Internet was created by individuals for individuals, free from any intervention by dominant institutions and corporations) and the *laissez-faire* view (according to which no encounters are necessary: the virtual 'community' is only an objectified instrument for achieving individual ends). Both views ignore the premise that the existence of any human association is socially embedded, dependent on mundane experiences shaping both the emotions and thoughts of human beings (Shilling & Mellor, 1998). According to Keleman & Smith (2001,

p. 377), cyberlibertarian rhetoric thus “draws on an abstract, disembodied concept of the individual that is far removed from the concrete day-to-day practices which make individuality and forms of togetherness possible in the first place”. Human expressions are not entirely private to the individual: they are constructed through language, shaped by culture, and expressed with respect to their immediate circumstances and the wider context (ibid.).

Further, virtual communities of practice (VCoPs) have been criticised for being ‘quasi-communities’ due to their focus on learning-about, not learning *to be* (e.g., Hung & Nichani, 2002; Hung & Chen, 2002). However, these critics seem to misunderstand the nature of the Internet in general, and more specifically of VCs: the claim that all Internet-based communication is reduced to simple question-and-answer type of information providing and rating (Hung & Nichani, 2002) implies a strong goal-orientation and a simple need for ‘ego boosting’ at the expense of other needs fulfilled through participation in VCs, such as engaging in reciprocal interaction for its own sake and mutual support giving (Wellman & Gulia, 1999; Wasko & Faraj, 2000; Blanchard & Markus, 2004; Porter, 2004). Online interaction also incorporates more sophisticated forms than declarative and procedural information exchange (i.e., questions and answers), such as transactive learning (knowledge about who knows what) and developing shared mental models through processes of sense making (see DeSanctis et al., 2003). In terms of the above-mentioned early cyberlibertarian rhetoric, ego boosting thus represents the *laissez-faire* view according to which interactions over the Internet are conducted solely to achieve personal ends and goals.

Critics of VCoPs also emphasise *concrete action*, which – software programming being the only notable exception – is impossible in conditions in which physical proximity is lacking: “You cannot learn to operate on a human eye on the Internet” (Hung & Nichani, 2002, p. 24). Participants in online forums, in turn, gain recognition via writing and discourse rather than through the practice of performing skills and actions that are inherent in the performances of a real community of practice. While the above is certainly valid in terms of the limitations Internet communication sets on forms of collaboration that in principle could be organised as VCs (Kollock, 1999), there is no reason to assume that written language – traditionally the dominant form of such communication – is both *separate from the practice* it reflects and *incapable of*

affecting human perceptions, values and understanding through interpretation (see Weick & Roberts, 1993). Through providing linkages to both the ‘known’ and the ‘unknown’, virtual-community conversations may shape how we perceive things and locate ourselves within the specific domain of action in which we are embedded, be it scientific research, medical practice, programming or parenting. In other words, the Internet *complements* existing communities and their interactions.

In general, the heated debate around the VC concept derives from its roots, the community. According to Etzioni & Etzioni (1999), the term “community” is sometimes used to refer to tightly knit social groups, and on other occasions to signify aggregates of people who hardly know one another; sometimes it is even used to describe mere geographical places. Wellman (2001) defines communities as networks of interpersonal ties that provide sociability, support, information, a sense of belonging, and social identity. Rheingold (1993) referred in his seminal book on virtual communities to the “sufficient human feeling” to form webs of personal relationships among members. In general, what seems to differentiate VCs from more loosely-coupled online networks is that members develop affective bonds and express at least certain levels of belonging (e.g., Jones, 1997; Blanchard & Markus, 2004; Wasko & Faraj, 2005). Moreover, according to Kling (1996), not every collective of humans shares mutual interest and commitment: communities refer to groups of people sharing certain values, expressing mutual obligation, and trusting each other.

Hence it would seem that it is basically the members’ emotions and affective bonds that help us to identify a virtual community when we see one. However, applying such measures also poses certain challenges, as the scant research on sense of community (SOC) in VCs illustrates (see Ellonen et al., 2007). Keleman & Smith (2001, p. 373) aptly note how the debate around ‘community’ is fraught with difficulties, and it remains an elusive and slippery concept; 94 varying definitions have been identified, within which the only common denominator seems to be ‘people’ (Hillery, 1955). As Wilbur (1997, p. 47) remarks, the roots of the community concept are sunk deep into rather abstract terrain. Sense of community, in turn, remains a complex construct. For instance, researchers disagree on whether it is a definition of the community, or an outcome of its activities (McMillan & Chavis, 1986; García et al., 1999). No two communities

are the same, and the subjective quality of a sense of belonging and obligation may also be unique to each member (Sarason, 1974): it evolves constantly over time, and the “sufficient human feeling” mentioned by Rheingold is an imprecise measure and full of assumptions about what is human and what emotions can be counted as feelings (Wilbur, 1997).

According to Keleman & Smith (2001), individuals belong to numerous and diverse neo-tribes that forge a plurality of partial identities. Such neo-tribes (Maffesoli, 1996) are ephemeral, ill-defined and changeable human groups to which we belong at various points in time, ensuring and reflecting the continuity of social life. Like any other neo-tribe, the virtual community “is a contingent achievement reproduced and sustained through members’ constantly negotiating and contesting their ‘identity’, rather than a fixed entity that includes and excludes on the basis on some pre-given essence” (Keleman & Smith, 2001, p. 374). Fuchs (2007, p. 37) refers to virtual communities as a form of social self-organisation, which is “a process where a system reproduces itself with the help of its own logic and components, that is, the system produces itself based on an internal logic; self-organising systems are their own reason and cause, they produce themselves”. A self-organisation is formed when actors have the capacity to act and make choices (agency), which creates social structures that enable and constrain action. Social structures and practices are dynamically related and form an evolving dialectical unity (Giddens, 1984).

All in all, it is perhaps most useful to accept the VC as an umbrella concept with fuzzy boundaries, most appropriately defined by its own social structure and membership, i.e. by noting the similarities and differences between members and comparing them with the characteristics of those who are regarded as being within the community (Preece & Maloney-Krichmar, 2005). According to Preece & Maloney-Krichmar, this is a simplified view, but it may help researchers to concentrate on substantive issues such as how VCs emerge or cease to exist.

In sum, *social exchange* concerns individual motivations to engage in community-mediated exchange relationships, while *social capital* describes the relationships underlying community-level interactions and the surrounding info-culture. *Virtual communities* represent socio-technical systems in which the supporting technology provides space for interaction, but does not determine its outcomes. The *socio-technical approach*, on the other hand, emphasises the role of

communication in that meanings are socially constructed and derived from social interaction within the shared context. Further, VCs as self-organising social systems interact with the broader social context, such as organisational norms of communication.

3. RESEARCH DESIGN AND METHODOLOGY

3.1 Research design

The research design represents the logic that links the data to be collected to the conclusions and back to the initial research questions, thus ensuring coherence. It could also be seen as an ‘action plan’ for getting from the questions to the conclusions, involving defining the research questions, appreciating how to establish validity, and selecting a research strategy. (Rowley, 2002)

In order to gain insight into and new perspectives on a phenomenon that is not yet well understood in a theoretical sense, I chose a *descriptive research strategy* (Snow & Thomas, 1994). Description contributes to understanding in that it identifies the concepts or constructs that are needed for the theory building (Dubin, 1978). Christensen (2006) discusses how theory building requires a *descriptive stage* before causalities can be empirically tested. Firstly, the phenomena are observed and carefully described, and secondly they are placed in categories. This process “simplifies and organizes the world in ways that highlight possibly consequential relationships between the phenomena and the outcomes of interest” (Christensen, 2006, p. 40), thus producing frameworks or typologies.

This is also the overall objective of this study, given that knowledge sharing in virtual communities has only recently attracted the attention of researchers (Wasko & Faraj, 2005; Chiu et al., 2006; Wiertz & de Ruyter, 2007) and remains an understudied issue. Current work does not yet provide a comprehensive framework due to the focus on investigating the effect of specific constructs (such as trust, commitment, or network centrality) on individual knowledge-sharing behaviour. In addressing the research question of how to enable knowledge sharing in virtual

communities this study provides a combination of pertinent analysis of the research literature and empirical illustration.

Of the four knowledge-management discourses (Schultze & Leidner, 2002) presented in Chapter 2.2, this study represents the interpretive type. In other words, the focus is not on knowledge as such, but rather on the role of technology in terms of knowledge sharing within (virtual) communities. Knowledge is seen as socially constructed and shared among the participants in an organisational culture or shared practice, thereby highlighting its dynamic and situated nature. Methodologically, hermeneutic research methods grounded in social practices are indicative of interpretive discourse (Schultze & Leidner, 2002). In particular, qualitative methods are used to establish a context and meaning for what people do in order to form a comprehensive picture of the “whole” of the studied phenomenon (Patton, 2002).

For the empirical part of the study I adopted a case-study approach in order to tackle the phenomenon in real-life organisational contexts. In particular, the cases concern how knowledge sharing could be facilitated, a question that is of high relevance to organisations maintaining and cultivating VCs. Siggelkow (2007) points out that a case study “cannot just stand on its descriptive feet, but also has to provide conceptual insight”. With regard to the quality of the reports, Siggelkow further notes that even if the reader were only to read the conceptual parts, he or she would still need to be convinced of the internal logic of the argument. Free-standing theory suggests three important uses for case studies: motivation, inspiration and illustration. I therefore sought cases that suited the purposes of this study - to provide *illustrations* of VCs as knowledge-sharing communities. Presenting examples of constructs that are employed in conceptual arguments makes it easier to perceive how the argument could be applied to one or more empirical settings. In other words, the theory “should stand on its own feet”, and cases should be used as additional justification for the argument. (Siggelkow, 2007)

Generally, case studies are observations of real-life events that are not controlled, the aim being to understand current and complex social phenomena through the posing of ‘How’ and ‘Why’ questions (Yin, 2003). They employ a mix of evidence to gather understanding of a specific phenomenon and its context (Cavaye, 1996). They are well suited to exploratory types of

research, particularly in areas in which existing studies do not address the question at all, or do so in an inadequate fashion (Eisenhardt, 1989; Eisenhardt & Graebner, 2007). According to van der Blonk (2003), the purpose of the case study could be to illuminate a certain notable happening, or to describe a phenomenon or process that is not yet well understood in a theoretical sense. A related advantage is that case studies may help people to understand a certain theoretical viewpoint, thus *adding depth and dimension to theoretical understanding* (Donmoyer, 2000). In the field of communication technology they are generally considered well suited to furthering understanding of the complex interactions between technology-related innovations and the surrounding social contexts (Darke et al., 1998).

The empirical papers comprising this study all represent *single-case studies*. According to Yin (2003), single cases are appropriate under five conditions: when the case is critical, extreme/unique, representative/typical, revelatory, or longitudinal. The lack of academic work on the organisational use of Web 2.0 was identified above as a research gap. According to Yin (2003, p. 42), a *revelatory* case refers to analysing a phenomenon that has been inaccessible to scientific investigation. The cases investigated in this study could be considered revelatory because the organisational use of conversational technologies within virtual communities is a relatively *novel phenomenon*: it is not easy to gain access to such communities, despite their being of growing importance and interest in business organisations (Porter, 2004). The same holds with virtual customer communities (Nambisan, 2002), which are becoming increasingly common but are not often investigated in terms of social interaction. Single-case studies are prevalent in existing VC research, in which the goal is to understand and interpret a novel phenomenon – where ‘novelty’ may refer to establishing VCs in different contexts or areas of interest, for example, or understanding the specific patterns of behaviour that sustain them. Every VC is unique to a certain degree (Lin, 2007). Hence, investigating a virtual community specifically requires understanding it in its own context. Prior studies have used single cases to illustrate, among other things, the processes through which a sense of virtual community develops (Blanchard & Markus, 2004; Ellonen et al., 2007), the language games that shape the social order within an online forum (Fayard & DeSanctis, 2005), the effect of the community website’s social and technical design on member commitment (Ley, 2007), motivations to contribute (Jeppesen & Frederiksen, 2006), the effect of rewards on knowledge-sharing behaviour (Fahey et al., 2007),

and the community-level characteristics that may lead to commercial success in transaction communities (Rothaermel & Sugiyama, 2001).

I applied the logic of *purposeful sampling* in this study, and more specifically the intensity sample. According to this logic, cases are selected for study because they are “information rich and illuminative, that is, they offer useful manifestations of the phenomenon of interest” (Patton, 2002, p. 40). Purposeful sampling was chosen to provide insight about the phenomenon. Intensity samples typically consist of cases manifesting the phenomenon intensely but not highly unusually; it thus requires some prior information and judgment (Patton, 2002).

The ICT and the media industries were considered appropriate for the sampling of case communities in this study. Firstly, the virtual-community-based mode of operation is distinctive within software development, particularly bearing in mind the history of open-source software (Lee & Cole, 2003). The ICT company was selected because it is considered one of the most successful in the field, and is seen globally as a forerunner in terms of developing new communication technologies. It also represented a fruitful breeding ground for applying conversational technologies to support the community: as one interviewee within the company put it, engineers by their very nature want to experiment with novel solutions. Secondly, the focus in the media is on producing information content that is of interest to customers: here virtual communities provide complementary spaces in which to engage in content production in close connection with customers and the readers themselves. The media company was selected because it has demonstrated a high interest in extending traditional print publishing in the direction of online services and virtual communities, and could also be considered a forerunner in establishing them in terms of viability and level of member activities.

All in all, the selected cases could be considered *revelatory*. Secondly, this study incorporates wikis, weblogs, and discussion forums, hence providing illustrations of *different types of conversational technologies* that communities might apply. Finally, the cases were selected to reflect how virtual communities have specific relevance in terms of both *internal* and *external* (customer) knowledge sharing (see also the McKinsey global survey 2007 on how businesses use Web 2.0 applications).

The following section discusses the research methods used and the data in more detail, from the collation of prior academic work to the collection of the case data.

3.2 The data-collection process

3.2.1 The selection of prior research articles

In this study, **Publications 1-3** represent analyses of prior academic research. Regarding **Publication 1**, the articles included in the review were screened from the international journal databases ABI and EBSCOHost. The terms used in the search were 'knowledge sharing', 'information sharing', 'contribution' and 'participation', combined with virtual/online/electronic community. Conference papers and working papers were not included. The specific purpose of the review was to investigate research papers providing empirical evidence in order to gain an understanding about the "true realm" of knowledge sharing in virtual communities. Thus purely theoretical and tentative work was excluded. Secondly, only studies published in the 2000s were eligible. This fixed period of time was chosen in order to gain an up-to-date view of current research, and a reasonable number of studies could thus be included. On the evidence of previous searches and the gathering of a variety of articles in the earlier stages of the research process it seemed that studies published before the 2000s tended to lack the virtual-community perspective. **Publication 1** particularly focuses on knowledge sharing in virtual communities, and not simply on information sharing using electronic media, which is a common stream in the literature on knowledge management and computer-mediated communication (see Järvenpää & Staples, 2000). A total of 14 articles were identified for further review. The reviewed articles were published in *Organization Science*, *Organization Studies*, *MIS Quarterly*, *Decision Support Systems*, the *Journal of Strategic Information Systems*, the *Journal of Knowledge Management*, *Knowledge Management Research and Practice*, the *Journal of Global Information Management*, *Electronic Markets*, the *International Journal of Human-Computer Studies* and *Internet Research*. The selected articles were thus published in journals that provide a wealth of complementary perspectives (organisation studies, knowledge management, marketing,

computer-mediated communication) leading to a more comprehensive understanding of knowledge sharing in virtual communities.

For **Publication 2** studies that explicitly concerned online knowledge creation through social computing or in virtual communities (online or electronic communities) were screened for analysis. As there were only very few journal articles available in the international ABI and EBSCOHost databases, a complementary search via Google Scholar was conducted in order to find conference papers on the topic. Again, the search was limited to work published in the 2000s, bearing in mind the relatively rapid development of forms of Internet communication: the idea was to obtain an up-to-date understanding of online knowledge creation. This resulted in a set of six articles, which were empirical studies published in *Organization Science* (Lee & Cole, 2003), *European Management Journal* (DeSanctis et al., 2003), the *Journal of Business Research* (Füller et al., 2007), the *Proceedings of the 41st Hawaii International Conference on System Sciences* (HICSS) (Chou & Chang, 2008; Vaccaro et al., 2008), and the *Proceedings of the European Conference on Organizational Learning, Knowledge, and Capabilities* (OLKC) (Hemetsberger & Reinhardt, 2004).

For the purposes of **Publication 3**, studies that dealt with social capital in virtual communities (online or electronic communities) were screened from the international ABI and EBSCOHost databases. It is worth noting that **Publication 3** was written in early 2006, when there were only a few studies that explicitly concerned social capital (Blanchard & Horan, 1998; Daniel et al., 2003) and trust (Abdul-Rahman & Hailes, 2000; Ridings et al., 2002) in virtual communities. In order to produce a more comprehensive picture of online social capital other work related to online trust was also included (Kollock, 1999; Ba, 2001; Bos et al., 2002; Feng et al., 2004), together with studies on a sense of virtual community (Koh & Kim, 2003; Blanchard & Markus, 2004) and knowledge contributions to VCs (Wasko & Faraj, 2000; Hall & Graham, 2004): only work published after the seminal study conducted by Blanchard & Horan (1998) was included. A complementary search on Google Scholar was also conducted. Twelve articles were selected as key texts for further analysis, including both theoretical and empirical work published in *Social Science Computer Review* (Blanchard & Horan, 1998), the *International Journal of Electronic Commerce* (Koh & Kim, 2003), the *Canadian Journal of Learning and Technology* (Daniel et al.,

2003), *Advances in Group Processes* (Kollock, 1999), *Decision Support Systems* (Ba, 2001), the *Journal of Strategic Information Systems* (Wasko & Faraj, 2000; Ridings et al., 2002), the *International Journal of Information Management* (Hall & Graham, 2004), the *DATA BASE for Advances in Information Systems* (Blanchard & Markus, 2004), *Behavior and Information Technology* (Feng et al., 2004), *CHI Letters* (Bos et al., 2002), and the *Proceedings of the 33rd Hawaii International Conference on System Sciences* (Abdul-Rahman & Hailes, 2000).

3.2.2 *The collection of the empirical data for the case studies*

In order to complement the analysis of prior research work on virtual communities this study also incorporates a set of empirical data, which is described in detail below. Interviews, observation, and written narratives were used in the collection process. The aim of research investigating social constructions such as communities is to provide a better understanding of the beliefs, meanings and value systems participants assign to them (e.g., Orlikowski & Baroudi, 1991) and to the surrounding context. This implies the need for data-collection methods that enable participants to 'tell their story' and reflect on experiences related to the phenomenon (Auerbach & Silverstein, 2003). Interpretive research is typically based on observation and/or theme interviewing (Snow & Thomas, 1994; Yin, 2003), and on additional sources of information. Interviews are structured around certain themes but in a manner that allows their content and order to evolve flexibly. The interviews conducted for this study represented a realist approach (e.g., King, 2004) in that the interviewees' accounts were assumed to provide insight into their organisational lives outside of the interview situation. Overall, the goal in any qualitative research interview is to see the topic of the research from the perspective of the interviewee (ibid.).

Group interviews are well suited to research settings in which the primary goal is to further understanding and gain insights (Syrjälä & Numminen, 1988). They allow the respondents to recall events over a period of time, and the related shared experiences (Fontana & Frey, 2000). They carry several advantages over individual interviews: they are efficient in terms of both time and the amount of data, the role of the interviewer is less salient, and the group members may stimulate, support and control each other (Eskola & Suoranta, 1998, p. 97).

Finally, Kendall (1999) notes that research on online behaviour should always include *observation*. Researchers who spend time within the community and get to know its norms are better able to interpret the members' interactions, and to identify performances and meanings in a similar way as the members themselves do. However, observing interactions also raises an ethical issue: sensitive data may be emotionally harmful to VC members. I followed the ethical principles suggested by Mann & Stewart (2000), according to which data should only be collected for a specific, legitimate purpose, not applied elsewhere, and reasonably protected from loss and misuse. Furthermore, anonymity was ensured for both the observatory data and the member narratives thorough the analysis and reporting, and thus confidentiality of the online identities was fully respected.

The data collection is described in more detail below. Table 2 introduces the virtual communities that were selected as cases.

Table 2. The case communities introduced

Virtual community	Purpose/goal	Participants	Conversational technologies	Launch
VCoP (Virtual community of practice), hosted by an ICT company	Internal communication and collaboration, supporting product development and documenting	Employees	Wikis, weblogs	Wikis 2003, weblogs 2005
BAP (Baby and pregnancy community), hosted by a baby magazine within a media company	Providing support for discussions among mothers-to-be and mothers of young children	Customers	Discussions forums	1998
DC (Dieting community), hosted by a media company	Providing support for discussions among customers interested in dieting and losing weight	Customers, company (hosting team), external experts	Discussion forums	2006

The data was collected from two companies, one operating within the ICT industry and the other within the media industry. As the single cases included in this study are reported as individual research articles, which allow only a limited space for research methodology, this section gives a

more detailed description of the data. The data analysis is reported in section 3.3. Table 3 below summarises the cases and publications, the related methodology, and the data.

Table 3. The case studies, the related methodology and the data

Case and publications	Methods	Data
VCoP (Pub. 4): Weblogs and internal communication in a corporate environment: A case from the ICT industry	Group interview	Two group interviews, textual dataset of 41 pages
VCoP (Pub. 5): Applying wikis to managing knowledge: A socio-technical approach	Group interview	Two group interviews, textual dataset of 41 pages
BAP (Pub. 6): Exploring the business perspective of hostility in virtual communities	Interview	Five interviews, textual dataset of 25 pages
	Written narratives	Eleven narratives, textual dataset of 24 pages
	Observation	Textual dataset of 80 pages consisting of observations and messages (field diary)
DC (Pub. 7): Virtual customer communities: An innovative case from the media industry	Interview	One interview, textual dataset of 8 pages
	Observation	Textual dataset of 72 pages consisting of observations and messages (field diary)

The main data-collection method used for *Publications 4* and *5* (VCoP case) was the *group interview*: the groups comprised key persons responsible for adopting, implementing and maintaining conversational-technology applications in the company. Group interviews were conducted in this study both to allow the participants to reflect on their shared experiences in a safe environment in which the researcher had less control over the situation, and to make participation easier for the company informants in terms of scheduling.

I conducted two semi-structured group interviews in the ICT company, the first in March 2006 and the second in October 2006. Four interviewees participated in the first interview round, which was organised as a telephone conference, and three in the second, which was conducted face-to-face. Table 4 lists the people chosen to be interviewed, identified as corporate champions (Day, 1994) related to the implementation and use of weblogs and wikis inside the company.

Table 4. The semi-structured interview sample, Publications 4 and 5, the VCoP case

Interviewee	Title	Role	Interview 1	Interview 2
1	Researcher	Early implementation and maintenance	x	x
2	New-media specialist	Development of corporate communications	x	
3	Technology specialist	Active blogger, first internal customer	x	x
4	Project manager	Active blogger both internally and externally	x	x

The research strategy adopted in both interviews involved the development of an initial set of themes, although the interviewees led the discussion. They were allowed to talk about their own experiences and to choose the most important incidents or themes. Complementary questions were also asked. The interviews were informal in tone: the interviewees were encouraged to talk freely without intervention, and they stimulated the discussion by giving comments and questioning each other. The themes for interview 1 are listed below.

- Please introduce yourself and tell me how you became involved in using weblogs and wikis within this company.
- How and when did your company start using them?
- How did they become more widespread? How many users are there now (approximately)?
- For what purposes does your company use them?
- In your opinion, what are the factors that facilitate their use within the company?
- What are the factors that hinder their use within the company?
- What is the role of the company in supporting their use?
- What do you think about further development regarding their use inside the company?

The main themes in the second interview were roughly similar, but the questions were adjusted to give a more detailed picture of the use of weblogs and wikis. For instance, whereas in the first interview I asked about the factors that facilitated their company-internal use, which resulted in a set of main themes, now it was possible to discuss these themes in more detail because I was familiar with the initial set of interview data.

The interviews lasted approximately 90 and 120 minutes. They were tape-recorded with the interviewees' permission, and transcribed. In addition, company-internal presentation materials were used as a secondary source of information concerning the role of Web 2.0 applications in general, their use within the company, the organisational challenges related to their development and use, and their role in supporting organisational communication.

The data for *Publications 6* and *7* (BAP and DC cases) was collected in individual *interviews* with the key persons hosting and building virtual customer communities in the media company, and a set of member *narratives* was used as a source of evidence in *Publication 6*. Narratives are closely linked to members' experiences and provide a means for learning about experiences in all their complexity, both positive and negative (Gabriel & Griffiths, 2004; Riessman, 2004).

In the media company, five semi-structured interviews were conducted with the magazine staff responsible for the development and hosting of the BAP (Baby and pregnancy community)¹, and one semi-structured interview with the person responsible for the development and hosting of the DC (Dieting community), (see Table 5).

Table 5. The semi-structured interview sample, Publications 6 and 7, the BAP and DC cases

Interviewee	Title	Case
1	Marketing director	BAP
2	Current editor-in-chief	BAP
3	Former editor-in-chief	BAP
4	Chief editor of the community site	BAP
5	Planning manager, advertising sales	BAP
6	Community producer	DC

Two of the BAP interviews were conducted by email, and all of the others were face-to-face. As before, an initial set of themes was developed, but the interviewees led the discussion and talked about their own experiences. In addition, complementary questions were asked. The interview themes in the BAP case are listed below.

¹ The researcher did not participate in the data-collection phase in the BAP case. However, she was involved in the analysis of the member narratives and the interview data, and in interpreting the results.

- Could you describe your role in the development of BAP?
- Could you name other important persons who have had an important role in its development?
- Could you describe the development of BAP from the beginning?
- What do you consider the most important phases of development? Why?
- What do you consider the most important crises in its development? Why?
- What are the main goals of BAP?
- How do you see the relationship between BAP and the print magazine?
- How do you see trust in BAP? Is it an important question? Why?
- How do you see the need for control in BAP?

The interview themes in the DC case are listed below.

- What is the history of the DC community? How was it developed?
- How has DC become more widespread?
- How have the members regarded DC?
- What has been the role of the members in the development of DC?
- In your opinion, what is special about DC? What is its value to its members?
- How do you see the sense of community within DC? What efforts have been put into promoting it?
- What do you think about further development needs in DC?
- Are there connections to other media products within the company?

The interviews in both the BAP and DC cases lasted between 60 and 90 minutes. They were tape-recorded with the interviewees' permission, and transcribed.

In the BAP case the main data comprised narratives written by the community members. With the agreement of the hosting magazine, a request for written narratives was posted on the website, asking members to describe how they experienced a sense of community and trust in the BAP. The length of the narratives varied from 0.5 to 2.5 pages, and they were sent in confidence to the

researcher by email. Eleven narratives were received in response, describing the experiences related to members' involvement in community interactions, particularly the sense of virtual community and trust. The narratives conveyed a highly personal and reflective tone, which the following citations illustrate:

"I need support for a situation I can't discuss with anyone else. When I talked to my parents about this they didn't understand that it really hurts. Here I got support and understanding, and I also try to support others. Sometimes these people feel even closer to me than so-called 'real' people." (N8)

"The main reason for being here is the need for a social support group: it provides support from peers and helps me to cope with my life choices. I also need information and want to ask questions about things that worry me. It's probably that my own background affects the amount of time I spend in the forums. I'm the kind of person who likes to express herself in writing, and that's why I've found the forums a very easy and comfortable way of communicating with others." (N1)

The BAP case community was observed for a 14-month period (November 2003 – December 2004) and the DC community for a six-week period (November 2006 – December 2006). In both cases a field diary was kept covering the researcher's observations. In the BAP case these observations focused on the content of the messages posted in the discussion forums, whereas in the DC case the focus was on the site functionality in general, the roles of the members in the community development, and the related discussions between the members and the community staff. The different focus reflects the varying objectives in the individual case publications: the main questions in the BAP case concerned what attracts members to the community and the role of hostile behaviour, whereas in the DC case the key issue was community development together with the customers, and the related interactions.

Overall, the field diaries incorporate observations on the BAP and DC communities, their culture and practices and the roles of the individual members, developing the community, the researcher's own interpretations and recorded ideas related to them. The following citations are provided as illustrations of the content of the field diaries.

"The same topics are discussed over and over again" (BAP, the researcher's own comment)

“The community teaches newcomers about the practices” (BAP, the researcher’s own comment)
“Difficult to get an understanding of the culture of the community, as there seem to be a lot of sub-communities and ‘clubs’ inside one large community” (BAP, the researcher’s own comment)
“Different sub-communities according to each one’s personal goals” (DC, the researcher’s own comment)
“Own sections for ‘letting go’ and then asking for emotional support from others, but also for success stories” (DC, the researcher’s own comment)
“In the early stages, an open forum for all feedback from users; when the community grew larger, the hosting staff organised its own section for questions and answers” (DC, the researcher’s own comment)

In addition, the field diaries provide a collection of authentic messages posted on the forums. The following citations are provided as illustrations of the content of messages.

“What irritates me is that people here answer even if they know nothing about the subject” (BAP, a quote from an authentic posting by a member)
“It would be more human if the weight-management programme also acknowledged minor decreases in weight” (DC, a quote from an authentic posting by a member)
“We have recruited a couple of club hostesses to make sure that everyone enjoys being here...” (DC, a quote from an authentic posting by the hosting team)

3.3 Analysis

3.3.1 An analysis of prior research articles

The prior research articles were subjected to content analysis, a technique for systematically describing the content of written documents (Tuomi & Sarajärvi, 2003). It is based on identifying the relevant parts of the data and reducing the phenomenon under study to individual utterances, which are then grouped into categories. Following further analysis these are then combined to form top-level categories, which form the basis for answering the research questions. Content analysis can be approached from two perspectives: *quantifying* the phenomenon of interest based on the selected documents, or verbally *describing* their content (ibid.). The latter (i.e. qualitative)

approach was chosen in this case in accordance with the research purpose and strategy: the study is descriptive in nature, the aim being to provide a holistic socio-technical framework of the phenomenon of interest, knowledge sharing in virtual communities. *Thematic analysis* was the chosen method: it involves coding schemes based on categories designed to capture the dominant themes within the texts, and building a story based on them (e.g., Franzosi, 2004).

The main analytical focus in *Publication 1*, was on capturing the factors that seemed to facilitate knowledge sharing in VCs. Each article was content-analysed in order to identify 1) the conceptualisation of the virtual community, 2) assumptions regarding the nature of knowledge and knowledge sharing, and 3) the facilitators of knowledge sharing. Common thematic elements were identified for each individual research question, which were then given an illustrative label (category). Table 6 provides an example of this in terms of the nature of knowledge sharing.

Table 6. An example of content analysis in Publication 1

Examples of textual content	Thematic elements	Category
<p>“Clearly, the biggest challenge in fostering a virtual community is the <u>supply</u> of knowledge, namely the <u>willingness</u> to share knowledge with other members. It’s then important to explain why <u>individuals</u> elect to share or not to share knowledge with other community members when they have a choice.” (Chiu et al., 2006, p. 1873)</p>	<p>Supplying one’s own knowledge</p> <p>Dependent on individual willingness</p>	<p>Supply (one-way)</p>
<p>“One of the problems with <u>accessing</u> knowledge from acquaintances and unknown others is that it requires depending upon the ‘kindness of strangers’ (Constant et al., 1996)...knowledge <u>seekers</u> have no control over who responds to their questions or the quality of the responses. Knowledge <u>contributors</u> have no assurances that those they are helping will ever return the favour” (Wasko & Faraj, 2005, pp. 36-37)</p> <p>“Knowledge can only exist in the mind of the <u>individual</u>... Knowledge sharing involves a process of <u>communication</u> whereby two or more parties are involved in the transfer of knowledge. This is a process that involves the <u>provision</u> of knowledge by a source, followed by the <u>interpretation</u> of the communication by one or more recipients.” (Usoro et al., 2007, pp. 200-201)</p>	<p>Contributing/provision of one’s own knowledge</p> <p>Seeking knowledge provided by others</p> <p>Interpreting knowledge</p> <p>Dependent on individual engagement in communicative processes</p>	<p>Supplying and seeking</p> <p>Provision and interpretation (two-way)</p>

The purpose of the article analysis in *Publication 2* was to capture the processes underlying knowledge creation online, and to identify the role of tacit knowledge. Particular attention was

thus paid to how the concept of tacit knowledge was applied in the texts, and to the types of interactions that are related to creating knowledge. In the first round the articles were grouped in two categories based on whether or not they had adopted the SECI model of knowledge creation (Nonaka, 1994; Nonaka & Takeuchi, 1995) as a theoretical framework. The SECI studies were then content-analysed based on its four conversions (*socialization*, *externalization*, *combination* and *internalization*) and their manifestations in online interactions. The other studies were analysed “bottom-up”, focusing on identifying elements that characterised online knowledge-creation processes. The first step was to identify the common thematic elements (such as ‘co-presence’, ‘familiarity’, ‘we-intentions’), and these were then classified into three main categories: ‘shared context’, ‘norms’ and ‘shared culture’. The key findings were considered in the light of the literature on knowledge management, learning and computer-mediated communication.

My contribution to the analysis reported in **Publication 3** focused on the question, “How does the virtual context affect social capital”? Firstly, I categorised the content of the selected research work based on the three dimensions of social capital (Nahapiet & Ghoshal, 1998), using the following questions as a point of departure:

- Structural dimension: what is written about *weak ties* and *strong ties* in VCs?
- Relational dimension: what is written about *trust*, *norms*, *commitment* and *identification* in VCs?
- Cognitive dimension: what is written about *shared language* and *shared narratives* in VCs?

These questions enabled me to capture the relevant parts of the texts in order to describe how social capital is defined and manifested in VCs. The findings were also considered in the light of the general literature on VCs (e.g., Preece, 2000). Finally, the type of social capital (bonding vs. bridging) was linked with the type of virtual community concerned (physically based or Internet based) in order to form a typology.

3.3.2 An analysis of the empirical data

This section illustrates how the empirical data used for Publications 4-7 was analysed. Table 7 below provides a summary in terms of the case studies and data analysis.

Table 7. The case studies, the related data and its analysis

Case and publications	Data	Analysis	Level of analysis
VCoP (Pub. 4): Weblogs and internal communication in a corporate environment: A case from the ICT industry	Two group interviews, textual dataset of 41 pages	Thematic analysis	Community
VCoP (Pub. 5): Applying wikis to managing knowledge: A socio-technical approach	Two group interviews, textual dataset of 41 pages	Thematic analysis	Community
BAP (Pub. 6): Exploring the business perspective of hostility in virtual communities	Five interviews, textual dataset of 25 pages Eleven narratives, textual dataset of 24 pages Textual dataset of 80 pages consisting of observations and messages	Thematic analysis	Community
DC (Pub. 7): Virtual customer communities: An innovative case from the media industry	One interview, textual dataset of 8 pages Textual dataset of 72 pages consisting of observations and messages	Thematic analysis	Product (the media product concept including the VCC)

The data for the individual case studies was analysed thematically, which involves organising it in specific themes under which the phenomenon is discussed. According to Auerbach & Silverstein (2003, p. 38), “a theme is an implicit topic that organizes a group of repeating ideas”. The next stage is to organise the themes under more abstract concepts (theoretical constructs) that describe their content (Auerbach & Silverstein, 2003, p. 67).

However, there were slight differences in how the analyses were conducted in the individual case studies, depending on the research question(s) under investigation. The main aim in *Publications 4-5* was to enhance understanding of the role of conversational technologies (weblogs and wikis) in the company, and the critical success factors related to their organisational use for knowledge-

sharing purposes: this is an under-investigated issue in prior research. Hence, a more inductive analysis strategy was adopted than in *Publications 6-7*, which investigated virtual customer communities using existing typologies as first-round coding frames. Concrete examples of forming first-level codes and second-level codes (to which Auerbach & Silverstein, 2003, refer to as theoretical constructs) from empirical data in terms of each publication are provided in Appendices 1-4.

In the VCoP case (*Publications 4 and 5*) the group interview data was first coded inductively and then sorted into categories based on regularities that occurred. In the first round the researcher formulated the themes bearing in mind the main research questions, in order to identify the relevant parts of the data for further analysis (Auerbach & Silverstein, 2003). In the second round the findings were reviewed in the light of existing theories. Appendices 1-2 provide examples of how the initial codes were formed from the data and developed further into second-level codes. In the BAP and DC cases (*Publications 6 and 7*) a thematic analysis was conducted in order to identify common thematic elements through a number of narratives, observatory data, and interviews. An elaborative coding technique was used, which takes the prior theoretical constructs as a point of departure (Auerbach & Silverstein, 2003). In the BAP case the researcher first coded the data in line with the needs typology developed by Hagele & Armstrong (1997), and the typology of hostile interactive behaviours compiled by Burnett (2000). Appendix 3 describes the coding in more detail. In the DC case it was theoretically based on the themes presented in Appendix 4, the customer-role typology developed by Nambisan (2002).

The Atlas/TI program was used as a supportive tool in all the analyses of the empirical data. It is software that is specially tailored to cope with qualitative data analysis, allowing a chain of evidence to be established.

3.4 Summary

In line with the illustrations given above and in Appendices 1-4, Table 8 summarises the second-level codes and shows how the individual publications contributed to identifying them. Further,

the codes are grouped into main categories representing three levels: the individual, the technological and the social.

Table 8. The second-level codes identified in the individual publications

THEORETICAL CONSTRUCT	PUBLICATION(S)	MAIN CATEGORY	LEVEL
perceived informational value	1	motivation, extrinsic	individual
information quality	1	motivation, extrinsic	individual
access to valuable resources	1	motivation, extrinsic	individual
vc-related outcome expectations	1	motivation, extrinsic	individual
recognition by the hosting firm	1, 7	motivation, extrinsic	individual
reputation and status	1, 4	motivation, extrinsic	individual
rewards, when appropriate	1	motivation, extrinsic	individual
self-efficacy	1, 4, 5	motivation, intrinsic	individual
personal outcome expectations	1	motivation, intrinsic	individual
moral obligation	1	motivation, intrinsic	individual
enjoyment of helping	1	motivation, intrinsic	individual
learning	1	motivation, intrinsic	individual
sense of community	1, 6, 7	motivation, intrinsic	individual
fulfilment of needs	1, 6, 7	motivation, intrinsic	individual
views knowledge as a public good	1	personal characteristics	individual
active	1	personal characteristics	individual
help-giving oriented	1	personal characteristics	individual
central position within network	1	personal characteristics	individual
sportsmanship	1	personal characteristics	individual
toleration of failure	1	personal characteristics	individual
experience of sharing	1	personal characteristics	individual
self-confidence	4	personal characteristics	individual
being comfortable with cmc	1, 4	personal characteristics	individual
cultural values that favour cmc	1	personal characteristics	individual
leading edginess	1	personal characteristics	individual
lower position in org. hierarchy	1	personal characteristics	individual
perceived usefulness	5	conversational technology attributes	technology
system quality	1	conversational technology attributes	technology
usability	1	conversational technology attributes	technology
ease of communication	1, 4	conversational technology attributes	technology
flexibility	1, 5, 7	conversational technology attributes	technology
aesthetic technology	5	conversational technology attributes	technology
privacy	1	conversational technology attributes	technology
site management	1, 5, 7	conversational technology attributes	technology
social-interaction ties	1, 4, 5, 6	social capital	social
trust	1, 3, 4, 5	social capital	social
commitment	1, 3, 7	social capital	social
norms	1, 2, 3	social capital	social
identification	1, 3, 6	social capital	social
shared language	1, 2, 3, 6	social capital	social
shared culture	2, 6	culture	social
shared context	2	context	social
supportive culture	4, 5	organisational culture	appropriate context

Following the above description of the research methodology, data and analysis, the discussion now moves on to the findings of the study.

4. RESULTS AND DISCUSSION

In the following, the findings derived from the individual publications comprising Part II are discussed and reflected upon in the light of prior research. The chapter is organised in line with the three sub-questions addressed in the study, concerning the conceptualisation of virtual communities, how social capital is manifested in them, and how knowledge sharing could be facilitated. The chapter ends with some concluding remarks on how knowledge sharing in VCs is enabled. By way of introduction, Table 9 below gives a summary of the publications.

Table 9. The seven publications

Title	Main goal	Main contribution
1: Knowledge sharing in virtual communities – A review of the empirical research	To identify the facilitators of knowledge sharing within VCs	Knowledge-sharing facilitators are identified and categorised as individual motivations, personal characteristics, technical attributes, and community-level social capital.
2: Social computing for knowledge creation: The role of tacit knowledge	To identify the processes underlying knowledge creation in online interactions	Establishing a shared context, norms, and a shared culture provide a structure for VCs that enables knowledge creation.
3: Information technology, social capital, and the generation of intellectual capital	To examine how different types of VCs could develop social capital and enable the generation of new intellectual capital	The ability of VCs to build social capital and intellectual capital may depend on the type of VC. Physically based VCs are related to the bonding type of social capital and incremental innovation, while Internet-based VCs are related to the bridging type of social capital and more radical innovation.
4: Weblogs and internal communication in a corporate environment: A case from the ICT industry	To explore the role and uses of weblogs in intra-organisational communications	In corporate use, weblogs are channels for formal communication and fostering informal interaction within company-internal communities of practice. This calls for a supportive organisational culture.
5: Applying wikis to managing knowledge – A socio-technical approach	To explore how wikis have been successfully taken into organisational use for knowledge-sharing purposes	Wikis interlink technology and the informal social organisation. Critical success factors include corporate champions, internal branding, aesthetic technology, and a supportive organisational culture.
6: Exploring the business perspective of hostility in virtual communities	To explore the factors that attract members, and the effect of hostile interactions	The community culture forms the core of participation and interaction within VCs.
7: Virtual customer communities: An innovative case from the media industry	To explore the integration of VC-based customer interactions and ongoing product development	VCs enable natural on-going interaction and knowledge sharing, both between customers and the firm, and among customers themselves, through a variety of customer roles.

The first three publications review the current literature on knowledge sharing and creation in virtual communities, and investigate how VCs build social capital and a shared structure for

interaction. Publications 4 and 5 concern a case study on a company-internal virtual community of practice applying conversational technologies (weblogs, wikis) for knowledge-sharing purposes. Finally, publications 6 and 7 provide illustrations of two virtual-customer communities hosted by a media company.

4.1 What are virtual communities and how could they be conceptually outlined from the knowledge-sharing perspective?

According to the review of a variety of operational definitions of virtual communities (*Publication 1*), it could be stated that VCs imply four general characteristics: *communication technology* supporting the community, *commonness* manifested as a need to engage in the processes of sharing, *social interaction* through which communities are maintained, and the *continuance* of such interactions (see also Yoo et al., 2002). Secondly, the existence of VCs is dependent upon a shared *practice* or concern giving form and structure to the community in terms of knowledge sharing and creation (*Publications 1* and *2*, see also Chapter 2.4).

Through engaging in ongoing conversations, members of the community share experiences and insights, and deepen their knowledge: again, participating in a practice means sharing the narratives the community employs. It is argued that such patterns of online interaction are best supported by conversational technologies allowing discussion-types of exchange, and not simply by any communication technology. Hence, the following extended definition of a virtual community is suggested:

A virtual community is an online network in which people with common needs interact around a shared practice on an on-going basis, and in which the interaction is at least partially supported by conversational technologies.

In particular, the common denominator in the evolution of VCs is the shared practice underlying the community. A set of individual needs and preferences, traditionally a defining characteristic, does not stand for a collective engaging in knowledge sharing. Members of VCs aim at

deepening understanding about a certain field or subject. The illustrative examples describe VC interactions around practices that may be professional, such as in the case of an engineering organisation applying conversational technologies in order to share ideas and insights, and to solve problems (*Publications 4* and *5*), or non-professional, as in the VCC cases in which customers interact around a shared concern (*Publications 6* and *7*). A practice, in turn, refers to a socially established cooperative human activity in which goods internal to it are realised (MacIntyre, 1985). For instance, internal goods could refer to the satisfaction gained from being a good engineer, or a good parent: each group of practitioners builds a shared identity and a set of narratives that facilitate social interaction. What is essential about practice here is how it sets the enabling frame within which VCs establish themselves and share knowledge. In this sense, VCs seem first and foremost to be extensions of existing social practices, not ‘brave new Net worlds’ as the early Manichean writers suggested (see Wellman & Gulia, 1999).

VCs are still categorised in *Publication 3* according to their origin (see Blanchard & Horan, 1998), either physically or Internet-based. However, this kind of typology may not represent the most fruitful approach to identifying different types of VCs. Instead of drawing strict lines between online and offline interactions, one could refer to the nature of social relationships as “both-and” because a decreasing number of ties are manifested only by locality and a physical presence. For instance, Hakkarainen et al. (2004, p. 3) note how people are increasingly involved in rapidly fluctuating communities, representing constantly evolving combinations of online and offline relationships. The Internet is not a separate social reality, it is rather an extension of other forms of life and another means of staying connected (Quan-Haase et al., 2002, p. 319): “We suspect that people not only have more relationships than in pre-Internet times, they are in more frequent contact with their relationships, and the strengthening of the bonds through more frequent contacts means that ties can be more readily mobilized for aid”. Hence, this study (see Chapter 2.4) categorises VCs based on *the focus of the knowledge sharing*. Table 10 summarises such types of VCs. It is noteworthy that, despite a slightly different focus, these types are not mutually exclusive: for instance, user communities dedicated to software programming are simultaneously VCoPs. In the latter case the community exists ‘for its own sake’ to exchange insights and deepen knowledge, whereas customer and user communities reflect a more utilitarian perspective: the main concern is with collectively producing valuable outcomes.

Table 10. Types of virtual communities

Type of VC	Main focus	Mode of operation
Virtual customer communities (VCCs)	Sharing knowledge about certain products or services, or about a shared concern related to them	Company-based Commercial
Virtual communities of consumption	Sharing knowledge of consumption-related activities	Company-based or volunteer-based Commercial
Online user communities (OUCs)	Sharing knowledge about certain products or services, or about a shared concern related to them	Company-based or volunteer-based Commercial or non-commercial
Virtual communities of practice (VCoPs)	Sharing knowledge about a certain practice or concern	Company-based or volunteer-based

Publications 1 and *2* stress how current research on VCoPs tends to reduce the community to online information exchange and, above all, to adopt the most typical fallacies within ‘knowledge management’, such as the widespread misunderstanding of Polanyi’s (1962) original concept of tacit knowledge. In other words, tacit and explicit knowledge are separate from each other (Nonaka & Takeuchi, 1995; Lee & Cole, 2003; Hemetsberger & Reinhardt, 2004; Preece, 2004), and explicit knowledge is thus treated as a resource that can be relatively easily managed (*Publication 2*). For instance, Hemetsberger & Reinhardt (2004, p. 4) emphasise how “it is necessary to distinguish between explicit and tacit knowledge” in order to understand the opportunities and challenges of online knowledge creation, and Vaccaro et al. (2008) express methodological concerns about *how* eventually to distinguish between tacit and explicit. Lee & Cole (2003, p. 646) present a model of VC-based knowledge creation using Linux kernel as an illustration. They point out how a computer source code is codified knowledge that can be explicitly documented, while it may be more difficult to create knowledge in conditions in which “the building blocks are tacit”.

All in all, prior VC research appears implicitly to treat knowledge as a static object (i.e., information) that can be extracted from individuals and stored to benefit others seeking it. In this sense, current studies provide a limited view of VCs as knowledge-sharing communities: their focus has mainly been on investigating *individual-level motivations* to contribute knowledge within a community. Less attention has been paid to what is actually being shared, or how the processes of knowledge sharing are manifested in practice. Again, this may reflect the *laissez-faire* view, according to which VCs represent an instrumental means for achieving personal goals (Keleman & Smith, 2001).

4.2 How is social capital manifested in virtual communities?

It appears from this study that social capital is a particularly important concept in terms of understanding how the Internet may shape social interaction. *Publications 2* and *3* investigate how VCs may *develop* a shared culture, language and norms of interaction, which form the invisible social structure of the collective. *Publication 1* argues that it is the collective social capital in particular that basically enables knowledge sharing in VCs. Castells (2001) also notes that not every online network ‘sharpens its practice’ to form a community. Virtual communities show *community-level relational, structural and cognitive patterns*, representing the three interrelated dimensions of social capital. A virtual community could thus be considered an umbrella concept for describing such a collective structure.

As posited in *Publication 2*, even when communication is text-based there is more in the text than simply the words it comprises: all information has to be de-coded or interpreted based on an awareness of the context (Weick & Roberts, 1993). Accordingly, online information exchange requires understanding about its context and expectations of its source. Shared language and narratives provide the interpretative frame within the virtual community, manifesting the cognitive dimension of social capital.

As noted in *Publication 3*, Internet-based community interactions may also build social capital and influence knowledge-sharing processes through its three dimensions. In structural terms, VCs provide members with networks of weak ties, allowing access to new knowledge and insight that could not be acquired in face-to-face networks. When VCs combine online and offline types of interaction the knowledge networks become denser (Blanchard & Horan, 1998). In relational terms, members of VCs identify with the collective and apply strong norms of reciprocity: what is given is repaid (Wasko & Faraj, 2000). Further, *Publication 3* suggests that it is particularly impersonal trust that is of special relevance to VCs, whereas interpersonal trust plays a role in more tightly knit subgroups and their offline interactions (see also Ellonen et al., 2007; Kosonen et al., 2008). Finally, each type of VC sustains shared narratives and manifests a common language that enables on-going interaction and knowledge sharing.

According to Resnick (2004, p. 400), the concept of socio-technical capital refers to productive resources that inhere in patterns of social relations *that are maintained with the support of information and communication technologies*. This study also affirmed how both social and technological levels must be investigated in order to understand knowledge sharing in VCs (*Publication 1*). Hence, the above conceptualisation of socio-technical capital could prove useful in further investigations.

4.3 How could knowledge sharing in virtual communities be facilitated?

Much of the prior research on knowledge sharing in VCs focuses on individual-level factors and behaviour (*Publication 1*, see also Kollock, 1999; Daugherty et al., 2005). In terms of facilitating knowledge sharing, these represent an important but insufficient set of factors. While many authors refer to VCs as “true” communities with certain boundaries, norms, shared language and common practices, they do not refer to community-level collective knowledge, which is paradoxical. It is argued that both levels should be incorporated into further research in order to better understand the dynamics of knowledge: while motivation may be enough to enable individual contributions, actual knowledge-sharing patterns rely on shared conversational practices, norms and language, manifesting how social capital is also of the essence in VCs.

Table 11 summarises the perceived knowledge-sharing facilitators from *Publication 1*.

Table 11. Facilitators of knowledge sharing in virtual communities

Category	Facilitators	Source
Individual motivations	Moral obligations Enjoyment of helping Learning Perceived informational value Information quality Access to valuable resources Recognition by the hosting firm Reputation enhancing, status Rewards (when appropriate) Self-efficacy Community-related outcome expectations Personal outcome expectations	Wasko & Faraj 2000 Wasko & Faraj 2000, Lee et al. 2006 Wasko & Faraj 2000 Wiertz & de Ruyter, 2007 Yoo et al. 2002 Wasko & Faraj 2000 Jeppesen & Fredriksen 2006 Wasko & Faraj 2005 Lee et al. 2003 Hsu et al. 2007 Chiu et al. 2006 Hsu et al. 2007
Personal characteristics	Viewing knowledge as a public good Active, help-giving orientated personality Central position within the network Sportsmanship, toleration of failures Experience of sharing Being comfortable with CMC Cultural values that favor CMC 'Leading edgeness' Lower position in the organizational hierarchy	Wasko & Faraj 2000 Wang & Fesenmaier 2003 Wasko & Faraj 2005 Wiertz & de Ruyter 2007 Wasko & Faraj 2005 Ardichvili et al. 2003 Ardichvili et al. 2006 Jeppesen & Fredriksen 2006 Ardichvili et al. 2006
Technical attributes	System quality Usability Ease of communication Privacy Site management	Yoo et al. 2002 Lee et al. 2006 Wang & Fesenmaier 2003 Lee et al. 2006 Yoo et al. 2002
Social capital	Social-interaction ties Prior knowledge about others Trust Commitment Norm of reciprocity Identification Shared language	Chiu et al. 2006 Ardichvili et al. 2003 Ridings et al. 2002, Usoro et al. 2007, Hsu et al. 2007 Wiertz & de Ruyter 2007 Wasko & Faraj 2000 Chiu et al. 2006 Chiu et al. 2006

The results reported in *Publications 4-7* are further discussed in order to complement the above findings. As noted in *Publication 4* concerning the use of weblogs in a corporate environment, Web 2.0 channels allow companies to enhance both formal communications (e.g., strategic goals), and establish and maintain informal knowledge-sharing relationships across the organisation, thus providing support for company-internal VCoPs. In this respect, a socio-technical perspective promotes understanding of how conversational technologies interact with the surrounding organisational context. Both *Publications 4* and *5* stress how it is particularly the organisational culture that facilitates knowledge sharing: as the community of employees basically determines both the structure and content of Web 2.0 applications, a *supportive culture* in which people are trusted and encouraged to contribute is called for. As the interviewees within

the ICT company pointed out, a key barrier to the use of weblogs and wikis is the lack of confidence: not all employees are comfortable with the idea of sharing knowledge openly. They may also be unable to identify the potential uses and roles of weblogs and wikis without practical guidance and internal training, even if they have unmet needs and could benefit from using them.

With regard to technology, **Publication 5** emphasises the role of the aesthetic dimension in terms of lowering the cognitive barriers of employees to collaborate and share knowledge using conversational technology: it is noteworthy that aestheticism here refers to making wikis look and feel like ‘our place’, and coherent, not incorporating a fancy appearance or a variety of features. According to the feedback and suggestions from the surrounding community, the conversational technology is constantly modified to better suit the needs of the users, thus facilitating interaction. In a similar vein, **Publication 7** points out how developing the community site fully relied on customer feedback and discussions within the VCC. All in all, knowledge sharing is thus facilitated by ongoing development and modification, which enhance the community’s ability to match the needs of members, referring to the *flexibility* of conversational technologies.

It is worth noting that even when VC participation is eventually driven by “me-intentions” instead of “we-intentions” (see **Publication 6**), there is a collective structure (shared culture) underlying the interactions. In other words, while members emphasised the fulfilment of their personal needs, they related how it was particularly the blunt and honest culture that attached them to this specific community and not to another: it formed the binding force, and invisible code, that gave form to the VC. In a similar vein, Franco et al. (2000) note that hostile behaviour could eventually help a virtual community to define its common values and thus strengthen the community structure. Again, VCs do not need to be harmonious to be communities: they are contingent achievements that are constantly evolving and producing themselves, and do not take some fixed or ideal form (Keleman & Smith, 2001; Fuchs, 2007, see also Chapter 2.4).

Finally, VCCs provide companies with an enticing opportunity to understand customer needs and preferences. The actual patterns of knowledge sharing are nevertheless driven by the different *roles* members take within the community (**Publication 7**), and it seems to be of specific

importance to allow customers more credit and responsibility as co-creators of the product. In other words, the level of member engagement in knowledge sharing is affected by how much they are able to influence the community, and respectively the company's actions. On the hosting company's side, nurturing participation requires an understanding about the community culture. For instance, Moon & Sproull (2001) note how rewards and 'tokens' encouraging member activities tend to be context-specific: hence, they only have meaning for a specific community.

In sum, knowledge sharing in VCs is facilitated by means of intrinsic and extrinsic motivation, personal characteristics, collective social capital, shared culture, and appropriate features of conversational technologies. Within the broader social context, company-hosted VCs benefit from an organisational culture that favours the open sharing of knowledge.

4.4 Summary: how is knowledge sharing in virtual communities enabled?

It could be claimed given the results of this study that there has been a tendency to approach knowledge sharing in VCs from the individual viewpoint. However, investigation of the processes requires a socio-technical perspective, combining the individual (motivations, personal characteristics), social and technological levels, and understanding the interplay between them. As informal entities of people engaged in shared practices, VCs may bridge the gap between personal knowledge and collective knowledge. Further, the broader organisational context interacts with VCs as self-organising systems.

Secondly, it is claimed that collective knowledge in VCs creates the enabling structure for knowledge sharing, and forms the invisible structure of the community on the basis of which it operates. It consists of a shared context, social capital and the community culture, which is unique to each community.

In this sense, the Internet does not inevitably erode social interaction, as the early work on CMC would indicate: it seems that supporting social relationships by means of communication technology is a matter of quantity rather than quality. It is argued here that optimal levels of

social capital and an appropriate culture foster online interaction both intra-organisationally and externally: social capital and a shared culture are both antecedents and outcomes of the existence of virtual communities.

When communication technology is analysed in *rational* terms, i.e. its bandwidth and information-processing capability, it is deemed less 'rich' than face-to-face interaction, implying lower levels of information richness and social presence (Short et al., 1976; Daft & Lengel, 1986; Sproull & Kiesler, 1986; Kock, 2005). The rational view thus equates technical efficacy with social efficacy (Watt et al., 2002). In contrast, the *social* view posits that the social context is decisive in the selection of the most appropriate communication channels and group performance (Fulk et al., 1987; Lea & Spears, 1992; Webster & Trevino, 1995; Walther, 1996). It is thus argued that conversational technologies should be understood not merely as a set of features, but also as being closely interrelated with the surrounding communities that give them shape and form. This kind of perspective may help researchers and practitioners to focus on substantive issues such as the patterns of social interaction and its outcomes. The rational view would suggest that Internet-based communication destroys social capital due to the low "social bandwidth", whereas the social view emphasises the community's ability to make the most appropriate media choices for each situation and, in particular, to find a balance between different modes of communication. To conclude, a virtual community may build social capital and a shared culture regardless of the rational features that characterise conversational technologies.

Figure 3 provides an overall framework of the findings of the study with regard to knowledge-sharing enablers. It is based on the main categories and levels identified in Table 8 (see page 70). On the individual level, social exchange in VCs is enabled by both extrinsic and intrinsic motivation, whereas members' personal characteristics also play a focal role in terms of knowledge sharing. On the technological level, knowledge sharing is enabled by appropriate conversational-technology attributes, while on the social level the key facets are community-level social capital, culture, and a shared context.

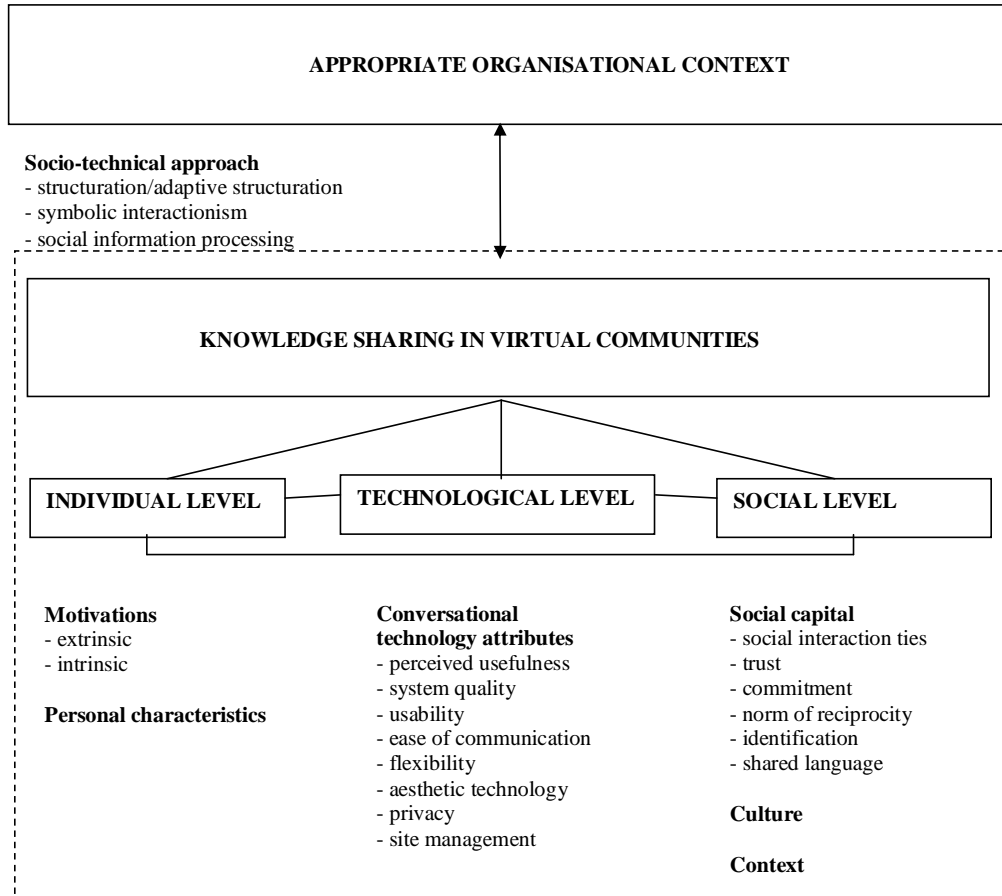


Figure 3. Enabling knowledge sharing in virtual communities – a socio-technical framework

Three important linkages between the levels depicted in Figure 3 can be identified and reflected upon in the light of prior research. Firstly, *individual*-level enablers of knowledge sharing should be investigated in line with the *technology*. Traditionally, many initiatives focusing on the uses of ICTs in organisations have aimed at improving productivity in terms of effective information management, thereby undermining the actual behaviour, motivations and roles of individual knowledge workers (Huysman & de Wit, 2004; Röhl, 2004). Tools that are meant to facilitate information sharing, storing and retrieval frequently do not become institutionalised in organisations. As Spender (2006, p. 248) notes, the need to explicate what human beings know

represents a core paradox within the knowledge-management (KM) literature: “Why would people give away what they see as the basis of their power?” Besides, employees are often reluctant to use KM systems, knowledge as such is sticky, it always carries a tacit dimension, and it does not flow easily (Szulanski, 1996; Huysman & Wulf, 2006). In virtual communities, in turn, individuals are willing to share knowledge in line with belonging to a collective engaged in a shared practice. In this sense they represent the “second wave of knowledge management” (Huysman & de Wit, 2004), in which the focus is no longer on the ability of technology to manage knowledge, but rather on empowering and encouraging individuals to engage in organisational knowledge-sharing activities. This calls for linking knowledge management with human capital and social capital (ibid.).

Secondly, VCs bridge the *individual* and *social* levels of knowledge sharing. The ‘information trap’ encompasses the generation, storing and retrieving of information with the support of communication technology. As Tsoukas (2005) aptly notes, the proliferation of information is likely eventually to cause less understanding. When communication is reduced to information-type exchange, it is more difficult to understand what is going on or to make sense of the surrounding world and the social environment within which we are embedded. According to Spender (2006), data on its own matters little: the key point is the meaning. Such meanings, in turn, are related to practice and the community: knowing is a social accomplishment rather than a static object or disposition of actors (Orlikowski, 2002). All individual-level knowledge derives its meaning from certain social systems, and treating the Internet as merely an information-processing system may be a restrictive view. Respectively, focusing on information sharing in VCs gives researchers a limited perspective in that any form of community interaction involves shared meanings and their connections to a certain practice. Instead, more attention should be given to identifying and supporting the practices each VC manifests.

Thirdly, there remains an important linkage between the *social* and *technological* levels in terms of knowledge sharing. Within the socio-technical approach, the ‘ICT trap’ has been labelled one of the typical fallacies in research on knowledge management (Zack, 1999; Huysman & Wulf, 2006) in that it emphasises the role of technology, its availability and capability at the expense of the social environment and communities within which it is embedded. As Brown & Duguid

(1991, p. 54) note, “information cannot be assumed to circulate freely just because the technology to support circulation is available”. For instance, even if there is the technological potential to support the exchange of stories that are inherent in sharing knowledge, such narratives are embedded in the social system within which they arise and are applied. Consequently, conversational technologies also play a role only to the extent to which they respond to the nature of the surrounding virtual community and its needs.

5. CONCLUSIONS

This chapter summarises the theoretical and practical contributions of the study, discusses the limitations, and gives some suggestions for future research. The study ends with some reflections on the research process.

5.1 Theoretical contribution

Knowledge-intensive firms could be considered sets of social communities (Kogut & Zander, 1996). However, the current literature often equates ‘community’ with business units, functions or teams (Boland & Tenkasi, 1995; Wenger, 2000). This study provides a different perspective: the underlying *shared interest* is a common denominator for the community to exist. Communities are thus not exclusively formed by knowledge workers specialising in a certain domain (ibid.), but increasingly involve contributions by leading users and hobbyists, customers and business partners. In order to provide access to external knowledge and expertise, firms also need to open themselves up to an array of Internet-based conversations, and to consider the relevance of virtual communities to their businesses. The core promise – and distinction – in virtual communities lies in their informal and voluntary nature. They empower those carrying expertise and increase transparency across traditional organisational boundaries.

Secondly, the study links knowledge sharing and virtual communities with *social capital*. There has been some preliminary work published in this field in recent years (Wasko & Faraj, 2005;

Chiu et al., 2006; Wiertz & de Ruyter, 2007), but despite the focus on social capital it mainly represents the individual view of knowledge and the related motivations to share. This study contributes to the current literature by establishing that both individual and collective knowledge types are inherent in virtual communities, and this should be investigated in further research on knowledge sharing. Conceptually, this study contributes to current research in terms of highlighting *impersonal trust*, referring to trust relationships that are not based on direct personal contact and are of particular importance in the early stages of virtual-community membership.

Thirdly, the study conjoins virtual communities with the *socio-technical perspective* on the use of communication technology. The latter sheds light on the interplay between the broader social context and the channels supporting interaction (Zack & McKenney, 1995; Orlikowski et al., 1995), and the role of social capital in their appropriation (Huysman & Wulf, 2006). A common mistake in prior research on knowledge sharing and communication technology has been an over-reliance on technical solutions, which is manifested in the tendency to de-contextualise knowledge as mere information and to perceive technology as independent from its social environment (Zack, 1999; Huysman & Wulf, 2006). In addition, the demand for high levels of explicitness and formality within technologies may disrupt the more productive informal relations within and across communities – limiting informality is likely to limit importance (Brown & Duguid, 1998). Belonging to a community and knowledge sharing inherently need and breed each other (Wenger, 1998; Huysman & Wulf, 2006). Hence, this study provides insights into how communication technology could support spaces for informal interactions through VCs oriented towards social relations among people engaged in the same practice. Perhaps due to its roots in the field of communication technology, research on VCs was also found to suffer slightly from the burden of technological determinism and over-emphasis on the availability of tools rather than on communities and the surrounding social context. In particular, incorporating Web 2.0 channels into organisational use requires a socio-technical perspective in which the technology and social context continuously and iteratively interact.

Fourthly, this study illustrates how much of the prior work investigating knowledge processes in virtual communities adopted the SECI model developed by Nonaka and his collaborators (Nonaka, 1991, 1994; Nonaka & Takeuchi, 1995; Nonaka & Konno, 1998). These studies treat

knowledge as if it were first necessary to distinguish the tacit from the explicit, and then members could share explicit knowledge online by simply relying on the ability of communication technology to bridge individual knowledge. This, it is argued here, is a misunderstanding: the question of what ‘explicit knowledge’ is without interpretation and tacit knowing prevails, and it remains unclear how the latter could even be extracted from the minds of those who are capable of knowing and interpreting simply by means of computerised tools. The tacit remains hidden (Gourlay, 2006). It is suggested that trying to separate types of knowledge may not be the best way to facilitate online knowledge sharing and creation: more attention should be given to the processes of establishing a shared context within which members interact, developing norms that provide structure for interactions, and manifesting a shared culture representing collective tacit knowledge acquired through on-going socialisation within the virtual community. As indicated in prior research, this is the key for bridging individual and collective knowledge.

All in all, the key role of virtual communities is to provide complementary spaces for conversation around a shared practice. According to Tsoukas (2005, p. 158), “we need not so much to operationalize tacit knowledge as to find new ways of talking, fresh forms of interacting, and novel ways of distinguishing and connecting”. In this, communication technologies with a special focus on supporting social relations may play a complementary role, and it is of particular interest to understand how to make our actions more conscious by engaging in the processes of sharing experiences and emotions with others engaged in the same practice both online and offline (see Wilson, 2002). On the basis of her seminal work on a virtual community of soap-opera fans, Baym (1997, 1998) notes how the *external subculture* – in this case the soap-opera fandom – is of fundamental importance to online interactions, providing members with a wealth of resources and practices that enable them to organise conversations.

Fifthly, the study contributes to the literature on virtual communities in reviewing different conceptualisations and categorising them based on the perspective of *knowledge sharing*. This differs from prior definitions in terms of emphasising the shared practice underlying community formation, and the role of conversational technology in supporting the social interaction that is essential for sharing knowledge. The categorisation provided may be worth further investigation

as it covers the most prominent business-related VC types: customer- and consumption-based, user-based, and those related to a specific practice.

Finally, the study broadens the theoretical understanding of virtual communities by identifying the overall levels of factors that affect the interactions and, consequently, knowledge sharing. These factors are categorised as individual, technological and social, complemented with the broader social context within which organisation-hosted VCs interact. The study also enhances understanding of how technology may mediate the existence of social communities by bridging VCs and the so-called Web 2.0 generation of conversational technologies.

In sum, it is argued in this study that virtual communities play a complementary role in promoting interaction and extending existing practices with the support of conversational technologies. These communities are inherently social in nature, and the results of the study suggest that a strong focus on the individual level may not be the most fruitful approach to understanding knowledge-sharing processes, even if it is a dominant perspective in prior research. VCs may enable knowledge sharing by providing a social structure with certain boundaries and norms, thus helping to overcome some pitfalls typically associated with CMC and the knowledge activities of distributed organisations in general.

5.2 Practical contribution

Managerially, this study and the individual publications attached to it carry several implications. They give insights into how virtual communities may provide companies with the means to understand customer needs and preferences, and to engage in ongoing conversations in which knowledge is shared between the company and its customers, and among the customers themselves. The level of member activity is affected by the roles customers may take: the most significant benefits may accrue from allowing them to become co-creators through on-going socialisation within the community.

From the business viewpoint, virtual communities carry instrumental value through leveraging product-related knowledge of customers, for instance. Virtual customer communities offer a source of feedback at a drastically lower cost than offline environments. Most importantly, however, they provide feedback on a *continuous and natural basis* as opposed to temporary, one-time settings in which customers eventually play a limited and passive role as an information resource (see also Nambisan, 2002). Again, a core dilemma remains. How much control can businesses assert over such communities (see Moon & Sproull, 2001)? VCs cannot be fully 'managed' in a traditional sense; they can only be bred properly, which requires involvement and understanding about the culture of each community from management's side. The community culture is the binding force that enables the VCC to exist. Members become engaged in knowledge-sharing activities if the community fulfils their needs, and provides an appropriate social context and structure facilitating on-going interactions around a shared concern.

The study also illustrates how conversational technology could support intra-organisational VCoPs in terms of knowledge sharing. This calls for a supportive organisational culture, which allows individual members to openly engage in informal discussions, influence their own work and the surrounding community, and make mistakes without having to worry about losing their position. As noted by Zack & McKenney (1995), organisations should diagnose their existing social context in order to determine whether 'the spirit of the technology' fits it. The results of this study reinforce this notion. Even if the critical role of the organisational culture seems intuitive in terms of knowledge sharing, it is often left fully undiagnosed – communication technologies are treated as 'silver bullets' that automatically eliminate communicative bottlenecks and provide solutions to problems. Yet the implementation and use of Web 2.0 technologies requires an organisational environment in which actors are empowered, trusted and explicitly rewarded for their efforts. Fundamental questions concerning achieving a balance between a trusting vs. a controlling and an open vs. a closed communication environment still remain in conditions in which not everything can be shared freely.

Nevertheless, organisations that are able to 'open themselves up' to an array of Internet-based conversations, at least to a certain degree, are better able to understand how VCs operate and how to apply them for the purposes of knowledge sharing and creation. What is of specific importance

is that organisations only learn to do this by participating and engaging in community conversations themselves. It is impossible to understand community cultures simply by monitoring them and relying on external information about Internet users and trends. Similarly, the existence of communities should not be equated with the existence of the Internet and the availability of Web 2.0 applications.

From the managerial point of view, it is essential to understand that building and maintaining VCs require hosting organisations to respect their unique nature. Relying on communication technology to bring physically dispersed individuals and groups together cannot guarantee the desired outcome. In order to facilitate the processes of knowledge sharing it is particularly important to breed relational facets such as shared norms that enable and sustain such activity. It is thus argued that *collective social capital* and the establishment of a community *culture* are the major enablers of knowledge sharing in VCs. Secondly, managers need to be aware of the contextual conditions that affect and are affected by virtual communities and the related use of conversational technology. All in all, the findings emphasise the importance of having active community managers dedicated to breeding membership and member contributions, thereby overturning their traditional roles of only giving technical support and moderating discussions. They need to take a more holistic approach to community development, such as by following and facilitating conversations, fostering public relations among key partners, training internal customers, and conducting community research.

Finally, a significant concept in terms of management and change is the so-called generation of digital natives – roughly corresponding to what Shields (2003) refers to as the Joystick Generation – which fluently communicates through novel channels such as weblogs and IM. Even if these channels are most commonly used for maintaining networks outside office and work, they are already so prevalent that they fundamentally affect how people interact and maintain social relationships. Most importantly, life on the Internet affects organisational communicative and collaborative practices. As the technology manager of a global ICT company stated: “The issue is not how we get young people out of the Net; it cannot be achieved. The issue is that we increasingly should use wikis, weblogs and IM-types of tools in our work” (Koskinen, 2007). This implies the importance of understanding the roles and uses of conversational

technologies in organisational settings: the contribution of this study is in providing some preliminary findings.

As noted by Porter (2001), the Internet as such does not give competitive advantage: it is a set of enabling technologies that can be applied in almost any industry and as part of almost any strategy. Further, according to Moran & Ghoshal (1999), value creation follows not from resources *per se*, but from the ability to access, deploy, exchange and combine them. Hence, the key question concerns *how* Internet technologies are deployed, given that they have enabled forms of collaboration that were not previously possible (Porter, 2001; Nambisan, 2002). From the managerial perspective, achieving a better understanding of the logic and limits of virtual communities is thus of the essence.

5.3 Reflections on the research design and the quality of the results

The aim of this study was to explore how knowledge sharing is enabled in virtual communities. The quality of the research is not unambiguously evaluated in studies relying on qualitative data (Denzin & Lincoln, 2000), and Shank (2006) notes that there is no single set of policies for ensuring its accuracy. For instance, *validity* and *reliability* are complex issues within qualitative research. Reliability here refers to the consistency of the research process and the accuracy of the methods (*ibid.*). The classic criteria for validity evaluation (see e.g., Yin, 2003), in turn, derive from the field of quantitative studies, representing the post-positivist or systematic paradigm of qualitative research with a focus on establishing correct measures, causal relationships, and domains within which the results can be generalised (Denzin & Lincoln, 2000). Hence, alternative criteria have been proposed, focusing on dependability (roughly corresponding to the notion of reliability), credibility, confirmability, and transferability (Lincoln & Guba, 1985).

Dependability is concerned with providing a well-documented and traceable description of the research process. In this thesis, section 3 together with Appendices 1-4 describe the process of selecting the prior research work and case studies, the analysis of the textual and empirical data, and how the theoretical constructs were formed. This also concerns *credibility*: demonstrating

links between observations and categories. (Lincoln & Guba, 1985; Koskinen et al., 2005; Eriksson & Kovalainen, 2008)

Confirmability refers to the degree to which the findings could be confirmed or corroborated by others. As the empirical case studies were reported in publications written by several authors, joint efforts in analysing and interpreting the results thus increase confirmability. Finally, *transferability* roughly corresponds with generalising the results to other contexts or settings (Lincoln & Guba, 1985) and could be enhanced by providing rich descriptions of the phenomenon (Koskinen et al., 2005). Given the single-case-study approach and the uniqueness of each virtual community (e.g., Lin, 2007), the results of the empirical case studies cannot be generalised to other companies and communities. However, through the application of a rich set of prior theories and theoretical constructs together with the cases, this study provided a higher-level framework illustrating how knowledge sharing is enabled in VCs – every virtual community eventually builds its own social reality from the general ‘ingredients’ that characterise knowledge-sharing communities.

Patton (2002) suggests three categories of principles related to qualitative inquiry: design strategy, data-collection and fieldwork strategies, and analysis strategies. Table 12 summarises these principles and evaluates the current study in relation to them.

Table 12. Principles of qualitative inquiry (Patton, 2002)

Category	Principle	Evaluation of the study
Design strategy	Naturalistic inquiry: studying real-world situations as they unfold	Research design tied to real-world cases
	Emergent design flexibility, openness to change	Gradually building and enhancing understanding about the core phenomenon
	Purposeful sampling based on cases that are information-rich or illuminative	Intensity sampling, i.e. selecting information-rich cases that manifest the phenomenon intensively
Data-collection and field strategies	Using qualitative data	Multiple sources of data, capturing people's experiences
	Personal experience and engagement	Personal, on-going involvement in different types of VCs, long history of VC interactions
	Empathic neutrality and mindfulness	Allowing a non-fixed interview structure and observing the case VCCs
	Dynamic systems, i.e. attention to ongoing change	Observing the case VCCs over a period of time
Analysis strategies	Unique case orientation	Each case treated as an individual one
	Inductive analysis and creative synthesis	N/A
	Holistic perspective	Focus on VCs as complex systems implying various levels of factors that affect knowledge sharing
	Context sensitivity	Putting the findings in their context and avoiding generalisations across time and space
	Voice, perspective, and reflexivity	Being aware of one's own voice and perspective; being self-analytical and reflexive (explicitly stating background assumptions, reflecting on the research process)

A naturalistic approach was taken in the study design in order to illustrate the phenomenon in real-life organisational contexts. The empirical data and the findings from the individual publications were iteratively reflected upon in the light of prior research, thereby representing a flexible design that gradually increased understanding about the core phenomenon of knowledge sharing. Finally, the real-world cases and the people selected for interview were purposefully chosen with regard to the researcher's expectations about the information, experience and knowledge they would be able to bring to the study. (Patton, 2002)

In terms of data collection, multiple sources of evidence were used in order to increase the validity of the study, with a reliance on interviews, observation, written narratives, and secondary

data such as presentation materials. Thereby the qualitative data provided a means of capturing descriptions about people's personal experiences. Triangulation with regard to the qualitative data sources and the researchers (or, more broadly, the analysts) ensured the accuracy and value of the coding and the interpretations (Denzin & Lincoln, 2000; Patton, 2002). In both sets of cases, two authors coded the data individually and contributed to the key findings individually. The findings were double-checked and agreed upon jointly. Having the informants reviewing the findings gave another dimension of analytical triangulation, thus increasing the research credibility. Finally, given the aim of the study to provide a holistic perspective on knowledge sharing in VCs, each individual case was treated as unique.

The case studies comprising the empirical part of the study are built on a relatively small sample. However, as the logic of purposeful sampling was applied, the cases are used for illustrative purposes, complementing the analysis of prior research work. Within qualitative research, the quality is linked not to the amount of data but rather to the analysis and interpretations (Eskola & Suoranta, 1998). As Alasuutari (1999, p. 237) notes, qualitative studies tend to focus on phenomena in which the *generalisation* of results is not of specific concern: the goal of the researcher is rather to make the phenomenon more understandable. Typically, this requires continuous reflection and reiteration with prior research throughout the process, which allows the specific phenomenon to become tightly coupled with a larger context (Alasuutari, 1999, 245). In a similar vein, Siggelkow (2007) points out that the use of cases for illustrative purposes calls for an iterative approach, going back and forth between data and theory.

The core contribution of the study is in linking theories of collective action and socially constructed knowledge with virtual communities. According to Stake (1995), the object of case studies in terms of generalisation could be to contribute to building up general, if not necessarily generalisable, knowledge about a particular subject, and recognising it in new contexts.

5.4 Limitations and further research

Every study has its limitations. The limitations of this one are discussed in this section, and research topics warranting further investigation are mentioned. Further suggestions are given in the seven publications.

Certain limitations arise from the single-case-study approach, the aim of which is not to produce results that could be generalised, but rather to make the phenomenon more understandable (Alasuutari, 1999) and produce “good stories” (Dyer & Wilkins, 1991) about a subject that is not yet well understood in a theoretical sense. For example, the use of quantitative measure and large samples would facilitate further study of the identified knowledge-sharing facilitators in VCs. It would also be fruitful to gather rich qualitative evidence on how the collective structures (such as community-level social capital) are produced and maintained in order to enable knowledge sharing, based on longitudinal investigations.

The interviewee informants were key people involved in the development and maintenance of conversational technologies and the surrounding communities. Hence, there may have been some informant bias. The members of the VCC case communities were also given voice through the observation of discussions and reliance on member narratives, whereas the VCoP case relied solely on the perceptions of the interviewees. In order to avoid such bias, interviews could be carried out among different groups of people (e.g., developers, maintenance staff, and expert and novice users): this would produce different perspectives on and insights into VCs and the related processes of knowledge sharing. A further limitation was the lack of access to corporate weblogs and wikis.

It would also be useful to carry out further research on knowledge-sharing barriers. While this study identified certain challenges and barriers with regard to the use of conversational technologies, it did not systematically assess what hinders knowledge sharing. According to Lee et al. (2006), there are more varied reasons for not sharing knowledge in online forums than for so doing. For instance, the organisational use of conversational technologies is typically restricted

to a small group of active contributors, in other words a critical mass (e.g., Markus, 1987); focusing more on employees who only follow the discussions, or do not use these channels in their work at all, would give researchers more insight into the factors affecting knowledge-sharing processes, and particularly into the effect of the surrounding social context on the use of conversational technology. In this context, social-network analysis would give VC researchers significant insights into who shares knowledge with whom and to what extent (see Garton et al., 1999). The important question of how virtual communities should be designed to support interaction should also be further addressed, having recently attracted more attention (see Ley, 2007; Ren et al., 2007).

The focus in this study was on knowledge sharing *within* virtual communities. In terms of knowledge sharing and creation, major questions remain concerning the bridging of diverse online groups and networks. As Brown & Duguid (1991) note, news travels fast within communities. However, coping with inequality, and under conditions in which not everything can be exchanged freely on a natural basis, remains a major challenge.

Overall, this study pointed out the need to focus more on enabling and engaging in conversations with the support of conversational technologies. However, this requires a change of mindset among researchers in terms of what is considered important in scientific and managerial knowledge. Ancori et al. (2000, p. 256) note how “the rapid cumulative expansion of the codified knowledge-base of society is frequently presented as a key characteristic of the development of modern economies and has contributed to the legitimation of the approach whereby the analysis of knowledge is restricted to its codified form”. Thus the economic view of objectively measuring and assessing all knowledge has induced researchers to focus on information systems in the search for sustainable competitive advantage (see e.g., Johannessen et al., 2001), and thereby to ignore the much more complex processes of social interaction and informal communications and, consequently, knowledge sharing in virtual communities.

5.5 Reflections on my own learning process

My aim in this final section is to reflect on my own learning process during the four-and-a-half years I was working on my doctoral studies.

When I was doing my Master's thesis five years ago, and decided to start working on this dissertation, I had no idea how much I would still learn about virtual communities, online sociability, CMC and the related technologies, or about social capital, knowledge sharing and creation, and communities of practice. Trying to bridge the two worlds – the 'traditional' and the Internet-based one – has been a most rewarding lesson. Not every researcher is privileged to deal with topics that are of relative novelty and value, and at the same time constitute a genuinely interesting field of study. In virtual communities we may 'leave our bodies behind', as Rheingold (1993) put it. However, this research process has taught me that we certainly do not leave *ourselves* behind. When social interaction is extended towards its virtual-community-mediated forms, it is thoroughly embedded in and characterised by our existing social communities, values, experiences and know-how. As Tsoukas (2005) wrote, digitalisation should not – and cannot – become a substitute for socialisation; however, research on VCs has provided an insightful illustration of how the Internet has become its extension.

As I wrote in the Introduction, my interests in the field of virtual communities have been various, which obviously affected the content and contribution of this thesis both positively and negatively. The positive news is that I have developed the ability to cope with diverse viewpoints, while on the negative side I realise that researchers should "write a lot about one subject, not a couple of words about a variety of subjects" (Koskinen et al., 2005). Nevertheless, while the individual publications are diverse, they provide insightful perspectives on the different dimensions of the core question that guided my overall efforts as a researcher: What is virtual sociability, and how can it support the community?

During the process, my personal 'philosophy' about virtual communities has slightly changed direction from focusing on the promises of communication technologies towards a more human

point of view. Probably the most trifling question I heard was, “How could we fill up an empty community?” There is no virtual community unless people truly need and want to interact with each other, and in terms of knowledge sharing it is of particular importance *how* they interact. As a researcher I have thus become convinced about the relevance of qualitative inquiry: striving for a better understanding of the meanings members assign to virtual communities through listening to their stories and experiences. Whereas surviving a doctoral thesis may sometimes require methodological compromises that are far removed from one’s research ideals, in the future I hope to be able to engage in longitudinal, ethnographic studies on the virtual communities in which I am already personally involved. This kind of research setting would allow me to understand the complex processes of social interaction within the specific community, particularly its communication structures, shared norms and language, as put forward in this thesis.

I strongly believe that in order to be credible, researchers should live according to the principles they teach others. The most important lessons I learned about virtual communities and their social practices resulted from my *being* online since my early days at university, not from reading what others have written about VCs. For instance, writing personal weblog entries about whether to write a scientific article about weblogs has concretely showed me the benefits of this conversational technology. Reflecting on thoughts, getting feedback and ideas from others, and generating an openly accessible memory about different perspectives and insights nicely complements the efforts of a researcher. In addition, being involved in different and constantly evolving communicative cultures in various discussion forums challenges one’s own thinking, and is potentially an extremely valuable source of learning. I must thank all the identifiable and anonymous online personae out there for their emotional support, hard facts, openly shared ideas, genuine humour, provocative comments, and flame wars.

All in all, I have learned that conducting qualitative research and thereby combining different theoretical perspectives, empirical findings and common sense truly is an iterative process, and resembles travelling in a foreign city without a map. It may well take longer to find your way, but you also see and learn much more. I have also learned that the aim of my dissertation was not to produce answers, but was rather to find the right questions. No matter what I will be doing in the future, the online adventure will continue.

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APPENDIX 1

An illustration of the coding in Publication 4: the VCoP case

Examples from the interview data	Examples of first-level (inductive) coding	Examples of second-level coding
“People want to use systems that allow them to do what is needed without having to spend time and effort in learning how to use it.”	Principle of least effort	Self-efficacy
<p>“It requires a kind of courage or madness to put yourself there for the whole company to see.”</p> <p>“The mental leap into the openness that blogs represent is difficult for many employees. People come and ask ‘Can I publish this? Who could do that?’”</p>	Being confident about publishing content openly in weblogs	Self-confidence Being comfortable with CMC
“Blogging serves as a means of internal marketing: hey, I know about this subject, you can ask me.”	Offering employees the opportunity to demonstrate their expertise	Reputation
“Blogs can bring additional value when the company allows employees to openly write down their thoughts and share ideas.”	Employees are trusted in order to share what they think and know	Trust
<p>“Information is no longer held by ‘doormen’ and is available to anyone who is interested.”</p> <p>“Developers can interact with users without having to rely on formal channels.”</p>	Direct relationship with the party holding relevant information	Social-interaction ties
<p>“It does not suit all organisations, some are far too closed, managed from top to bottom. People fear engaging in discussions, the boss just preaches at a bi-annual meeting.”</p> <p>“It’s far different if managers also write their thoughts in a blog. It’s much more informal than in some corporate newsletter, you get to know them better.”</p>	Open sharing of ideas, engaging in informal communication	Supportive culture

APPENDIX 2

An illustration of the coding in Publication 5: the VCoP case

Examples from the interview data	Examples of first-level (inductive) coding	Examples of second-level coding
“We did nothing else but change the layout; what it looked like and how people felt about it, and suddenly it had much more credibility, people were attached to the system.”	Look and feel of the wiki system Internal branding and productisation	Aesthetic technology
“We [as customers] could just send an email that we would like to have this kind of feature, and in one hour it was all done. The system advanced during its use, and it was quite utopian how well it really worked.”	On-going adaptation of the wiki system based on user needs	Flexibility Site management
“It’s all about what users need from the system, and that they perceive it matches – then the use of wikis spreads organically”	Matching user needs	Perceived usefulness
“Only drug dealers and IT people have ‘users’... It’s difficult to attract people unless they see the concrete benefits, and feel that the system has true value. Then you don’t actually need to sell anything.” “These tools free people to do more productive work.”	Concretely seeing the direct benefits for one’s work Empowering people to do things more smoothly	Self-efficacy
“Wikis and weblogs are analogous to open source, where everything can be shared freely.”	Encouraging the open sharing of knowledge	Supportive culture

APPENDIX 3

An illustration of the coding in Publication 6: the BAP case

Examples of first-level (deductive) coding	Examples of narrative data	Examples of second-level coding
Needs: interest	<p>“These forums are a kind of place where issues of pregnancy and parenting are discussed at the grass-roots level, without unnecessary timidity...we don’t have to be friends but we keep contact because of a similar life phase” (N1)</p> <p>“You always get answers to the questions you have... many members share the same issues and problems” (N2)</p>	Fulfilment of needs - peer support
Needs: relationship	“I feel that some of the ‘regulars’ in our community are very close to me. I carry an image of them in my mind, and... well, it may be distorted, but anyhow.” (N6)	Sense of community
Needs: transaction	“You get good advice on the purchases you have to make” (N3)	Fulfilment of needs - getting advice
Hostile interaction behaviour: flaming	“I used to get upset by all the malicious comments and taunting you get here, but now I participate in it myself at full blast” (N7)	Shared culture
Examples of observation data		
Needs: fantasy	Multiple nicknames, changing identities; “I won’t reveal my previous nickname to you” (posting)	Fulfilment of needs - identity play
Hostile interaction behaviour: flaming	<p>“This forum is a battle-field of frustrated women” (posting)</p> <p>“I think poster number three is the original fanatic bitch, or at least her close relative”(posting)</p> <p>“You only get shit on you from here” (posting)</p> <p>“It’s you who is an ugly old bag” (posting)</p>	Fulfilment of needs - freedom of expression - openness
Hostile interaction behaviour: trolling	<p>Purposeful irritating of others and provocative messages, such as black-and-white discussions on breast feeding vs. bottle feeding</p> <p>Being suspicious about the true meanings of the messages</p>	Fulfilment of needs - freedom of expression - entertainment
Examples from the interview data		
Needs: interest	““Sense of community’ sounds like harmony. But this is not the whole truth. People are just like everywhere else, or even worse, in other words, they also mistreat others. What is important is having peers to interact with.” (I4)	Fulfilment of needs - peer support
Needs: relationship	“We [in the magazine] want to be genuine. The Net supports this effort: in the forums you can confess that you are not a perfect mother. These are true stories you can identify with, and reveal what is behind the mythical image of a mother.” (I3)	Shared culture

APPENDIX 4

An illustration of the coding in Publication 7: the DC case

Examples of first-level (deductive) coding	Examples from the interview data	Examples of second-level coding
Member roles: user	<p>“As users they [members] use the software, which gives them feedback on the quality of their diet and nutrition”</p> <p>“The discussion is open and supportive”</p>	Fulfilment of needs
Member roles: resource	<p>“One of these baits is that some members become ‘messengers’: they are mentioned in community newsletters and thus become testimonials for the product: this is something that truly works”</p> <p>“There have already been some inquiries from print magazines, they would like to find interviewees from our site, like ‘I succeeded in losing weight’”</p>	Recognition by the hosting firm
Member roles: co-creator	<p>“We know ‘our gang’ there, we can openly discuss with them and are able to handle their feedback”</p> <p>“We promote members’ feelings of belonging by hearing their stories and reacting to their ideas”</p>	Sense of community
Development	<p>“We engaged in an open mode, in other words we took users along to develop the site. It’s typically seen as something very negative in our business, but we’ve admitted that it will never be ready unless we listen to the customers and what they want to say”</p> <p>“The key strength in the development was our ability to react quickly to all feedback”</p>	Flexibility
Examples of observation data		
Member roles: user	People help each other on technical issues and are thus able to influence the community	Fulfilment of needs
Member roles: co-creator	Members contribute to the overall practices and features of the community (for example: personal diaries), not simply as users or information resources	
Development	In the early stages it was an open forum for all feedback from users; when the community grew larger, the hosting staff organised its own section for questions and answers	Site management