

INTRODUCTION

The Role of Information Technology in Building and Sustaining the Relational Base of Communities

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The popularity of the concept of communities is growing, and so are ideas on how to support these communities with technologies. We see this especially in the field of management and organization studies where communities are increasingly seen as a solution for the problems of rigid, hierarchical and conservative bureaucratic structures. According to some scholars, communities are the latest wave in an ongoing evolution of organizational structures (Ackerman et al., 2003a; Prusak & Davenport, 1998; Cohen & Prusak, 2002; Huysman & De Wit, 2002; Lesser, 2000; Wenger, 1998; Brown & Duguid, 1991).

In the decades after World War II, especially in the 1970s, the multidivisional organization was seen as the answer to the problems faced by the ever-expanding functional organization. A decade later, the project-based organization became the preferred configuration. Since the mid-1990s, knowledge-based organizations, which are built around communities instead of teams, have become popular. Communities differ notably from conventional units of organization, such as teams or work groups. Groups in an organization are canonical, bounded entities that are sanctioned and organized by that organization and its tasks (Hackman, 1990). In contrast, communities are “often non-canonical and not recognized by the organization” (Brown & Duguid, 1991). Their greatest strength is

that they facilitate informal sharing of knowledge among people.

Although in the first generation of knowledge management (KM), information technology (IT) tools such as repository systems and Intranets were considered the means by which knowledge was transferred, in the second generation expectations were centered around the possibilities communities offered for sharing knowledge, especially tacit knowledge, and IT was seen as helping people get and stay connected. Accordingly, more attention was given to systems that play a role in building and sustaining the relational base of communities than to ones that contain and distribute “knowledge.” Many researchers as well as consultants came to realize that in case of repository systems, knowledge cannot be stored in systems, and in case of Intranets and other groupware tools, people will not use technologies simply because they exist. At the same time, we cannot push IT aside that easily because people are more often than not distributed by time and space, and new organizational forms emerge based on infrastructures offered by the Internet. Therefore, the focus shifted from collecting knowledge to connecting people (Davenport & Prusak, 1998).

Most of the literature on communities and IT is focused on designing IT applications to support knowledge-sharing communities (e.g., Ackerman & Halverson, 2004), on analyzing the level of participation and the different roles people can play in communities (e.g., Butler, 2001; Preece, 2000), or on the motivation of individuals in contributing to these (distributed) communities (e.g., Wasko & Faraj, 2000). These analyses often overlook the more

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fundamental dynamics that connect communities and technologies. The danger of this is that the current popularity of the concept of community might soon be seen as “the next fad that forgot people,” just as what has happened to KM (Scarborough & Swan, 1998). In order to cut out the hype, we needed to include more relational theories on the nature, development, and impact of collective knowledge, shared practice, and social networks in our discussions on technology supported communities. By addressing in more detail how people relate to one another, how shared practices emerge, and how communities evolve, we will be able to understand better if, when, how, and why such communities use or do not use technologies. This special issue emphasizes this relational base of communities supported by information technology.

Two of the articles in this special issue look at these issues, one from a critical perspective (Duguid) and the other from a practice theory perspective (Osterlund & Carlile). Both offer analytical tools that help us find our way through the cluttered literature on communities. Duguid goes back to epistemological differences and difficulties in the debate about communities. According to Duguid, the economic paradigm perceives knowledge as something that can be transferred from one unit to the other. Social scientists, especially practice-based theorists, look at knowledge as independent of its environment and community in which it is created. Thus there is a tendency among economists to decontextualize knowledge and to look at sharing of “know that” within and across communities. Duguid shows us that this could be a highly problematic viewpoint, as “know that” only becomes actionable through “know how,” and it is within communities that “know how” is created. Osterlund and Carlile’s article also emphasizes social practice theories for a better understanding of the concept of communities. It provides a helpful framework that serves as a guide to scholars seriously interested in communities and communities of practice (CoPs) in particular. They use the three most often cited studies on CoPs—Lave and Wenger (1991), Wenger (1998), and Brown and Duguid (1991, 2001)—to identify differences in their conception of CoPs. Osterlund and Carlile provide keen insights into the theory-based literature on communities in general and technology-supported communities in specific.

The other three articles provide empirical analyses of how IT can help support the relational base of communities. Technologies can support this relational base of communities in two ways: (1) We can use IT to better understand the structure of existing but often hidden communities, and (2) IT can be used to support existing communities as well as to facilitate the emergence of communities. As an example of the first case, Tyler, Wilkinson, and Huberman analyze e-mail traffic to identify CoPs within an organization. In case of the latter, we refer to groups of

people who find each other with the help of IT or whose social ties get strengthened by means of IT. The article by Kavanaugh, Reese, Carroll, and Rosson focuses on IT support for existing communities, while Ulrika Josefsson looks at the emergence of communities as a result of IT. The former found that the use of the Internet indeed increases social capital of a local community. The latter describes the social aspects of patient online communities in Sweden.

In the rest of this introductory essay, we discuss the concept of “social capital” as a topic that is often referred to when discussing the relational base of communities but is seldom made explicit. In short, social capital is considered as a necessary “ingredient” that binds communities over time (Huysman & Wulf, 2004a). Although communities may see the light of the day as a result of IT (particular in case of online communities), whether people will continue to use the technology to stay connected will depend on the social capital that is being generated over time. Insight into the social capital of communities will provide better understanding concerning IT adoption and use by communities than the more traditional analysis of technological requirements, knowledge requirements, and structural aspects of the community.

THE CONCEPT OF “SOCIAL CAPITAL”

Social capital, just like the concept of communities, has recently gained importance in a variety of different research fields. Originally introduced by sociologists and political scientists, the concept has now been embraced by organization and management researchers.¹ Social capital refers to networked ties of goodwill, mutual support, shared language, shared norms, social trust, and a sense of mutual obligation that people can derive value from. Social capital then is about value gained from being a member of a network. These resources include access to important people, insider information, and career opportunities. In general, social capital is often seen as the glue that brings and holds communities together (Cohen & Prusak, 2001).

Although the concept of social capital has been around for quite some time (cf. Hanifan, 1916), it is only in the last two decades that it has assumed prominence. It grew in political science and sociology as a counterpoint to the narrow analytic perspective on economic activities that is immanent in the neoclassical school of economics (e.g., Bourdieu, 1986; Granovetter, 1985; Uzzi, 1997). The neoclassical economists see the economy as an increasingly separate sphere in modern society where economic transactions are no longer determined by social or kinship obligations but by rational calculations of individual gains. Industrial societies are considered to be distinct from preindustrial societies because the social dimensions of economic activities are subordinated under

atomic market transactions. Social capital is a concept that challenges such a reductionist understanding of economic activities. Drawing on the capital metaphor, it allows us to analyze social aspects of economic activities. While not using the term “social capital” explicitly, Granovetter (1985) developed the concept of embeddedness of social action. He argues that “the anonymous market of neoclassical models is virtually nonexistent in economic life and that transactions of all kinds are rife with the social connections described” (p. 495). He criticizes the limited analytic perspective of institutional economists, especially Williamson (1975). Granovetter (1985) shows how personal relations and networks of such relations generate trust and discourage malfeasance, undermine formal organizational structures, and shape interorganizational transactions. The notion of embeddedness of social action offers a different explanation for economic activities in industrial societies.

There are also many case studies that show the importance of social networks in economic activity. Loury (1977) shows how racial income differences lead to different levels of connection to the labor market and of access to relevant information. Portes and Sensenbrenner (1993) investigate the effect community participation has on the economic condition of Puerto Ricans in New York and Latin American minorities in Miami. Uzzi (1997) shows how social networks shape interorganizational cooperation in the New York textile industry.

On a theoretical level, Coleman (1988), Burt (1992), and Portes (1998) provide important contributions to the discussion on social capital. Coleman (1988) defines social capital rather vaguely as a “variety of entities with two elements in common: They all consist of some aspect of social structure, and they facilitate certain action of actors—whether persons or cooperated actors—within this structure” (p. S98). Burt (1992) understands social capital as “friends, colleagues, and more general contacts through whom you receive opportunities to use your financial and human capital” (p. 9). While differing in the scope of their definitions, both of these authors highlight the close relationship between social and human capital.

While the analysis so far has been grounded on the relationship between individual actors or between an individual actor and a social entity, Putnam (1993, 2000) equates social capital with the level of civic engagement. He applies the concept of social capital to cities, regions, and whole nations. He understands social capital as a set of properties of a social entity (e.g., norms, level of trust, or social networks) that enables joint activities and cooperation for mutual benefit. Although the ideas related to social capital can be traced back to either the Marxist or the communitarian tradition, the recent organizational and managerial interest in the concept of social capital seems to ignore these divergent philosophical traditions.

The French sociologist Pierre Bourdieu (1986) articulates the Marxist conception of social capital. The communitarian perspective is provided by American social scientists such as Etzioni (1993, 1995) and Putnam (1993, 2000).

Bourdieu (1980, 1986) perceives social capital as a specific form of capital. It has to be studied in relation to economic and cultural forms of capital. Bourdieu (1986) defines social capital to be “the aggregate of actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationship of more or mutual acquaintance and recognition” (p. 248). Like all forms of capital, social capital is accumulated labor. It has its own capitalists who accumulate it in the form of relationships, networks, contacts: “The network of relationship is the product of investment strategies, individual or collective, consciously or unconsciously aimed at establishing or reproducing social relationships which are directly usable in the short or long term” (p. 249). Bourdieu (1986) is specifically interested in the way the different forms of capital shape the social world, especially the aspects of class struggle and class nature. Although the members of upper class takes their high level of social capital for granted, lower classes usually are aware of their scarce resources, such as lack of collective bargaining power or lack of access to career jobs.

Against this conflict perspective stands the tradition of American communitarianism. In this tradition, social capital is community centered. Communities in turn are seen as a voluntaristic social units that stimulate development of organizations and society as a whole. The community concept was studied not just from an “objective” sociological perspective but also to provide the society—in practice, mainly American—with a normative, organizational vehicle for revitalizing democracy. Advocates of this community view, known as the communitarians, bemoan the decline of social trust and the loss of civic engagement, and seek to shore up the moral, social, and political foundations of society (Etzioni, 1995). This emphasis on unity and collectivism is in line with the communitarian perspective associated with the CoP concept (Lave & Wenger, 1991; Wenger, 1998). From a communitarian perspective, it is the community and not the individual or organization that structures action and provides the key frame of reference. This perspective takes the position that we know what we know through our relationships with others in the community. The communitarian perspective also stresses the need to take social responsibility to support the community instead of striving to satisfy individual needs only. Communitarians are critical about the “under-socialized conception of man,” pointing to the dominant individual-oriented rational economic or utilitarian presumptions that underly neo-classical and transaction cost economics. Influenced by various sociological theories, such as the ideas from Durkheim, Tonnies, Granovetter,

and Mead, Etzioni argues that human behavior, including economics, can only be understood in terms of the individual in relation to the social group. He summarizes this view as "The I's need a We to be" (Etzioni, 1988).²

SOCIAL CAPITAL AND KNOWLEDGE MANAGEMENT

The introduction of the concept of social capital in combination with the concept of CoP has led to a fundamental shift in the thinking on KM (cf. Ackerman et al., 2003b). While the notion of human capital (as individual expertise) formed the core ingredient of the first wave of KM, social capital can be seen as the core ingredient of the second wave (Huysman & De Wit, 2002). The first wave of KM mainly centered on how to support the exchange of individual expertise and avoid unnecessary knowledge redundancy and also how to fill knowledge gaps generated by mobility, globalization, and distributed work. The first wave of KM overlooked the importance of the community (more than the individual) as the main knowledge producer and consumer.

As is usual with the introduction of a new combination of ideas, such as social capital for KM purposes, the literature typically has an optimistic flavor (Abrahamson & Fairchild, 1999). In the broad field of "KM," social capital is introduced as the necessary ingredient for informal sharing of tacit knowledge that most typically takes place in CoPs. Communities are seen as generating a sense of membership and thereby mutuality and trust that make people feel at home in organizations and committed to each other (Lesser, 2000). This enhanced level of comfort and security allows people to freely share and generate new ideas. Lately, this highly romantic and optimistic image of communities has been criticized for ignoring political processes, conflicts, and negotiation that are inherent to communities (e.g., Contu & Willmot, 2003).³ We take the position that without addressing social capital as the "invisible glue" (Adler & Kwon, 2002), communities portrayed as harmonic entities are no more than managerial constructs.

IT TO FOSTER SOCIAL CAPITAL

While the concept of social capital has been widely adopted by various academic disciplines, it has not gained comparable attention from IT researchers. The notable exceptions include Huysman and Wulf (2004a), Lesser and Cothrel (2001), Preece (2002), and Resnick (2001). Cross-fertilization across disciplines is still limited even though computer scientists and IT researchers have become more open to social science research. This limited interest is strange because informal working relationships are vital in today's much-celebrated network organizations.

Although we agree with Cohen and Prusak (2001) that it is not so much the technology that brings people together as the existing social capital, we do not wish to see the relation between the technology and the social system as a one-way relationship. Several interesting case studies on online communities show that often people need a technology (the Internet) to get connected to like-minded people whom they would have never gotten to know in the first place without the technology. In the case of patient online communities described by Ulrika Josefsson in this special issue, communities emerge over time as people help one another by sharing their own experience with a particular disease and create trust and a feeling of belonging. In such cases it is the technology that helps create communities and as a result increases the social capital of its members.

While computer science has not yet embraced the social capital concept, there are many computer applications that have the potential to augment social capital of its users by supporting and/or visualizing relationships in communities. Among the systems that bridge spatial and temporal boundaries, topic- and member-centered communication spaces are classic examples. The member-centered communication spaces, such as the Bubble or Loops systems presented by Ackerman and Halverson (2004), foster social ties in an already well-defined community. The topic-centered communication spaces, such as newsgroups, allow people who are not necessarily well known to each other to exchange ideas or find solutions to problems. An important motivation for participating in topic-centered communication spaces seems to be the enhancement of personal reputation. System design has to take this factor into account. Beyond pure communication, applications may foster social capital by offering virtual spaces that allow the creation, development, and storage of topic-centered materials. These repositories of materials are typically augmented with communication and annotation functionality (cf. Buckingham Shum, 1997; Pipek & Won, 2000; Stahl, 2004). Editing tools support the development of materials and may have additional functionality for distilling content out of communication spaces (Ackerman et al., 2003a). The Answer Garden (cf. Ackerman & Malone, 1990; Ackerman, 1998) is one of the most influential approaches for integrating shared repositories with communication spaces. It was primarily built to encourage learning within organizations. While the general functionality of these systems may be similar, their concrete implementation is specific to the topic they deal with and the application domain they use (e.g., Chapman, 2004).

The systems discussed so far offer places in the virtual space where human actors can strengthen existing social ties or build up new ones. In another class of applications, the system takes a more active role in suggesting

actors to establish or to refresh relations. Such applications require personal data on different human actors and domain-specific algorithms to match actors appropriately. Several recommender systems have been designed to support the identification of human actors (cf. Yiman-Seid & Kobsa, 2003). Systems like Who Knows (Streeter & Lochman, 1988), the Referral Web (Kautz et al., 1997a, 1997b), Yenta (Foner, 1997), MII Expert Finder, and Xper-Net (Maybury et al., 2002) extract personal data about human interests automatically from documents created by the actors. Vivacque and Lieberman (2000) have developed a system that extracts personal data concerning a programmer's skill from the Java code the programmer has produced. Based on these types of personal data, the recommender systems match actors. Hitherto each system has dealt with specific matching algorithms for one type of personal data. Becks et al. (2004) have developed a framework that allows matching human actors based on a variety of different types of personal data.

While recommender systems apply personal data for automatic matchmaking, awareness features capture selected activities of individual actors and make them visible to the collaborators. Awareness features are typically built for groups that contain a high level of social capital and cooperate intensively. However, awareness data and the resulting histories of interaction can also be applied to match people who are not yet well know to each other. For instance, the Social Web Cockpit provides awareness data that inform users about the presence of other users at a site of interest. Moreover, it allows for collaborative content rating and recommendation functionalities (Gräther & Prinz, 2001). Won and Pipek (2003) collect data about those computer-supported activities of users that are indications for their personal expertise. Their Expertise Awareness mechanism supports finding of human actors who possess a required skill profile that is dynamically updated.

While the applications mentioned before are based on ordinary input and output devices, large-screen displays and augmented reality applications offer another interesting approach to foster social capital. Churchill (2003) and Divitini and Farshchian (2004) argue that applications based on large-screen display can serve an important community-building function. Located in public places, these screens advertise services, events, and people's interests, and invite community members to communicate, participate, and interact. Fischer et al. (2004) present the Envisionment and Discovery Collaboratory (EDC), an environment in which participants collaboratively solve problems of mutual interest. The EDC supports face-to-face problem-solving activities by bringing together individuals who share a common problem. The problem is discussed and explored by providing participants with a shared construction space in which they interact with

physical objects that are used to represent the situation currently being discussed. As users manipulate physical objects, a corresponding computational representation is updated by using technologies that recognize the placement and manipulation of physical objects. Computer-generated information is projected back on to the horizontal physical construction area, creating an augmented reality environment. The authors argue that such an application fosters social capital by putting owners of problems in charge and encourage the recognition and awareness of other participants.

Beyond this research work there are many mundane computer applications that can have a strong impact on social capital. Address-book applications and systems of customer relationship management (CRM) are intended to strengthen existing social ties. Many other types of computer applications also can have an impact on the development of social capital. For instance, Syrjänen and Kuttu (2004) present a case study where the introduction of a database with a www interface changed the social relations among the members of a Finish dog-breeding community.

ANALYSIS OF SOCIAL CAPITAL

The applications discussed so far are helpful for supporting the social capital of communities, either by connecting people or by gaining information about the degree and nature of the relationship. However, implementing such IT systems does not guarantee that people will stay connected. As mentioned earlier, although it might be the technology that helps to connect people, it is the social capital that helps them stay connected. This has implications for decisions to implement IT to support communities.

While requirement analyses are typically framed by formal organizational structures and focus on the work tasks to be supported, in case of CoPs knowledge sharing and creation is internally motivated by a feeling of social identity, a shared understanding, and shared practices (Østerlund & Carlile, this special issue). One important implication is that evaluating and/or designing tools to support communities requires a thorough analysis of the existing social capital of a target group that cannot be deduced easily from structures of formal organization.

The need for such sociotechnical requirement analysis has recently been related to the concept of "info-culture analysis" (Bressand & Distler, 1995). Some researchers have argued that the disappointing results of technologies such as Intranets are due to the fact that designers traditionally analyze the *infrastructure* (relating to the hardware/software that enables the physical/communicational contact between network members) and *infostructure* (formal rules governing the exchange between actors in the

network), but neglect the underlying *infoculture* (relating to background knowledge actors take for granted and is embedded in the social relationships surrounding work group processes) (Choo et al., 2000; Newell et al., 2001; Ciborra, 1996; Kumar et al., 1998).⁴

The concept of social capital in relation to knowledge sharing (Nahapiet & Ghoshal, 1998; Adler & Kwon, 2002) lends itself nicely to the analysis of the various layers of IT-supported communities (see also Lesser, 2000; Newell et al., 2001; Huysman, 2004). Nahapiet and Ghoshal (1998) introduce three dimensions of social capital: a structural dimension (network ties, network configurations, and organization), a cognitive dimension (shared codes and language, shared understanding), and a relational dimension (trust, norms, obligations, identification). Studying the degree of social capital requires the analysis of the existing social networks and the corresponding ties (a structural analysis), the analysis of the existing shared language, frames of meaning, and stories (a cognitive analysis), and an analysis of the existing level of trust and reciprocity (a relational analysis).

A *structural* analysis looks at “who” shares knowledge and “how” they do that. This dimension of social capital focuses mainly on the density of networks and on bridging structural holes (Wasserman & Faust, 1994; Burt, 1992). These aspects relate to the infrastructure of a community. *Density* of a network refers to the extent to which actors of a network are interconnected. The structural opportunity dimension takes the analysis beyond who communicates to how they communicate. Connecting people in order to share knowledge brings an instrumental perspective to the fore. As discussed earlier, different network tools exist that support people’s opportunity to connect with each other. Also, various applications exist to analyze and map structural dimension of knowledge sharing (see, e.g., the contribution of Tyler, Wilkinson, & Huberman in this special issue). Although this “who” and “how” analysis forms an important part in surfacing IT requirements, analyzing the structural opportunity dimension only informs us about the structural embeddedness of the system.

A *cognitive* analysis looks at “what” is shared and relates to the ability to cognitively connect with each other in order to communicate effectively. To be more precise, the cognitive dimension refers to the collective “know how” of a community, which Paul Duguid in this special issue describes as the fundamental principle of communities. Analyzing this dimension provides information about the infostructural dimension of a community. The higher a social group’s shared cognition is, the more the members are able to share (tacit) knowledge. Shared cognition can be analyzed by focusing on shared stories, language, communication regimes, etc. (Orlikowski & Yates, 1994). Examples of cognitive barriers to knowledge sharing in-

clude the difficulty to bridge the distance between expert and novice and the difficulty to express the tacit dimension of knowledge (Hinds & Pfeffer, 2003). For more in-depth analysis of the cognitive dimension, the situated tacit knowledge or the collective know how (Paul Duguid in this special issue) needs to be taken into account. Methodologies used within cultural studies such as ethnography, narrative methods, pattern recognition, and matching, support such “reflectivity,” which brings hidden assumptions and tacit knowledge to the surface, of the CoP (Lanzara, 1983).

The relational analysis looks at “why” people share knowledge. It is concerned with the motivation to share knowledge based on socially attributed characteristics of the relationship, such as trust, mutual respect, and generalized reciprocity (Putnam, 2000). Analysis of this dimension provides more insight into the info culture of a community. In contrast to the structural aspects of networks that address the density of ties, the relational dimension refers to the “strength of ties” (Granovetter, 1985) and offers insight into the strategies people employ to share knowledge (Hansen, 1999). Strong ties are important for the exchange of tacit knowledge while weak ties are important for the sharing of explicit knowledge. Ethnomethodological studies of shared practices are best suited to reveal the motivations of people to contribute to the relationship.

CONCLUSION

One of the major problems with the debate on IT enabled communities is the overenthusiasm toward technological possibilities. The assumption that IT can positively support and improve knowledge sharing while ignoring the social conditions that trigger or hinder people in sharing knowledge is particularly problematic. As many scholars have already observed, the tendency to see IT as independent from the social environment of which it is a part has contributed to the lack of success of IT projects (e.g., Ciborra, 1996; McDermott, 1999). It is not the technology itself but the way people use it that influences whether or not and how IT gets actually used. Moreover, in case of CoP, it is not the technology itself but the motivation for people to relate to each other that connects people (Lesser, 2000).

While the current discussion on IT support has a strong focus on online communities, we believe that IT may play a role in face-to-face environments as well. Face-to-face occasions are often essential to build and maintain a certain level of social capital. Community life consists of phases of proximity and dislocation, and IT can support the transition between these phases in a seamless manner.

In general, research on the role of IT to support the relational base of communities is still in its infancy. In order to understand why, when, and how people use IT to relate to each other, we need a better understanding of the social dynamics of communities. For example, how do communities learn over time when members are dislocated? To what extent can we reapply the concept of legitimate peripheral participation introduced by Lave and Wenger (1989) to describe 19th-century collective work environments (Østerlund & Carlile, this special issue). To what extent can IT be used to support knowledge sharing in cross communal relations?

Furthermore, we postulate that social capital analysis of communities informs us better about the actual and potential use of IT. Based on the theory we proposed, the higher the level of social capital, the more members are stimulated to connect and share knowledge. This implies that communities with high social capital will be more inclined to use—or continue using—IT to share knowledge than ones with low social capital. Future research into the various dimensions of social capital will enhance our understanding of how technology can support communities. For example, it is expected that distributed communities with a shared frame of reference and shared purposes, but with a sparse network, will be in need of communication tools that over time will increase the density of ties (Brown & Duguid, 2001). Also, tools that are meant to support CoP's with strong ties, but that lack a shared cognitive framework, might need to pay extra attention to applications that stimulate discourses. Distributed communities with, for example, a limited willingness to share knowledge combined with a shared cognition might require extra attention in face-to-face meetings before tools are introduced. Furthermore, it is expected that the variance of these dimensions provide insight into possible IT support. For example, members who are individually motivated to contribute to the community will use reputation systems more than those members whose motivation is more collectively oriented.

While the KM discussion has focused so far on the positive outcomes of high levels of social capital, empirical research has revealed its dark sides as well. For a survey on the literature, see Huysman and Wulf (2004b). Taking these potential pitfalls into consideration, the designers of IT support need to reflect critically on their design rationales. Depending on the social dynamics of a community, support for bridging or bonding social capital maybe appropriate. Finally, analyses of the relational base of IT supported communities poses a serious challenge on the applied research methodologies. Since the boundaries of communities are not generated by a definition but by shared practices (Østerlund & Carlile, Duguid, this special issue), analyses of how shared practices create relations over time require in-depth process-based research,

which is quite different from the usual analysis of community's structure, individual motivations, and variations in community members' roles. Although the articles in this special issue do not provide the answer to all these questions, they show the importance of looking at the (limited) role of IT in building and supporting a relational base of communities.

NOTES

1. See also the *Proceedings of the International Conference on Communities and Technologies* (Huysman et al., 2003) and the edited book *Social Capital and Information Technology* (Huysman & Wulf, 2004a).

2. Of course, Etzioni's ideas were not at all new. Indeed, they are closely linked to the "substantivistic" school in anthropology that sees economic relationships as embedded in social relationships.

3. Those authors who introduced the notion of CoPs, Lave and Wenger (1989), did explicitly stress the power issues related to communities (see also the article of Østerlund & Carlile in this volume). This aspect has been ignored at later stages by many authors.

4. Including an analysis of the information culture or "info-culture" of a social group corresponds to what Kumar et al. (1998) refer to as "the third rationality of IT." Their research on the merchants of Prato inspired them to argue that traditional IT development approaches need to be augmented with additional strategies, which, as a precursor to development, examine the existing patterns of culture, relationships, and trust (or distrust) in the development situation and take them into account for devising a development and implementation strategy. This third rationality introduces trust, social capital, and collaborative relationships as the key concepts.

REFERENCES

- Abrahamson, E., and Fairchild, G. 1999. Management fashion: Life-cycles, triggers, and collective learning processes. *Administrative Science Quarterly* 44:708–740.
- Ackerman, M. S. 1998. Augmenting organizational memory: A field study of Answer Garden. *ACM Transactions on Information Systems* 16(3):203–224.
- Ackerman, M. S., and Halverson, C. 2004. Sharing expertise: The next step for knowledge management. In *Social capital and information technology*, eds. M. H. Huysman and V. Wulf, 273–299. Cambridge, MA: MIT Press.
- Ackerman, M. S., and Malone, T. W. 1990. Answer Garden: A tool for growing organizational memory. *Proceedings of the ACM conference on office information systems*, 31–39. New York: ACM Press.
- Ackerman, M. S., Swenson, A., Cotterill, S., and DeMaagd, C. 2003a. I-DIAG: From community discussion to knowledge distillation. In *Communities and technologies*, eds. M. Huysman, E. Wenger, and V. Wulf, 307–326. Dordrecht: Kluwer Academic.
- Ackerman, M. S., Pipek, V., and Wulf, V. eds. 2003b. *Beyond knowledge management: Sharing expertise*. Cambridge, MA: MIT Press.
- Adler, P. S., and Kwon, S. 2002. Social capital: Prospects for a new concept. *Academy of Management Review* 27(1):17–40.
- Becks, A. T. Reichling, and Wulf, V. 2004. Expert finding: Approaches to foster social capital. In *Social capital and IT*, eds. M. Huysman and V. Wulf, 333–354. Cambridge: MIT Press.
- Bourdieu, P. 1980. *The Logic of Practice*. Cambridge: Polity Press.

- Bourdieu, P. 1986. The forms of capital in *Handbook of theory and research for the sociology of education*, 241–258. New York: Greenwood.
- Bressand, A., and Distler, C. 1995. *La planete relationelle*. Paris: Flammarion.
- Brown, J. S., and Duguid, P. 1991. Organizational learning and communities of practice: Towards a unified view of working, learning and innovation. *Organization Science* 2/1.
- Brown, J. S., and Duguid, P. 2001. Knowledge and organization: A social practice perspective. *Organization Science* 12(2):198–213.
- Buckingham Shum, S. 1997. Negotiating the construction and reconstruction of organisational memories. *Journal of Universal Computer Science* (special issue on IT for knowledge management) 3(8):899–928.
- Burt, R. S. 1992. *Structural holes: The social structure of competition*. Cambridge, MA: Harvard Business School Press.
- Butler, B. S. 2001. Membership size, communication activity and sustainability: The internal dynamics of networked social structures, *Information Systems Research* 12:346–362.
- Chapman, R. 2004. Pearls of wisdom: Social capital building in informal learning environments. In *Social capital and information technology*, eds. M. H. Huysman and V. Wulf, 310–333. Cambridge, MA: MIT Press.
- Churchill, E. F., Nelson, L., Denoue, L. 2003. Multimedia fliers: Information sharing with digital community bulletin boards. In *Proceedings of the international conference on communities and technologies (C&T 2003)*, eds. M. Huysman, E. Wenger, and V. Wulf, 97–118, Dordrecht: Kluwer.
- Choo, C. W., Detlor, B., and Turnbull, D. 2000. *WebWork, Information seeking and knowledge work on the world wide web*. Dordrecht: Kluwer Academic.
- Ciborra, C. U., ed. 1996. *Groupware and teamwork*. New York: John Wiley and Sons.
- Cohen, D., and Prusak, L. 2001. *In good company: How social capital makes organizations work*. Boston: Harvard Business School Press.
- Coleman, J. S. 1988. Social capital in the creation of human capital. *American Journal of Sociology* 94:95–121.
- Contu, A., and Wilmott, H. 2003. Re-embedding situatedness, the importance of power relations in learning. *Organization Science* 14(3):283–296.
- Davenport, T. H., and Prusak, L. 1998. *Working knowledge: How organizations manage what they know*. Boston: Harvard Business School Press.
- Divitini, M., and Farshchian, B. A. 2004. Shared displays for promoting informal cooperation: An exploratory study. In *Proceedings of COOP 2004*, eds. F. Darses, R. Dieng, C. Simone, and M. Zacklad, 211–226. France: Hyeres Les Palmiers, May 11–14, IOS-Press 2004.
- Etzioni, A. 1988. *The moral dimension*. New York: The Free Press.
- Etzioni, A. 1993. *The spirit of community: the reinvention of American society*. New York: Touchstone.
- Etzioni, A. 1995. *New communitarian thinking. Persons, virtues, institutions, and communities*. Charlottesville: University Press of Virginia.
- Fischer, G., Scharff, E., and Ye, Y. 2004. Fostering Social Creativity by Increasing Social Capital. In *Social capital and information technology*, eds. M. Huysman and V. Wulf, 355–399. Cambridge, MA: MIT Press.
- Foner, L. N. 1997. Yenta: A multi-agent, referral-based matchmaking system. In *First international conference on autonomous agents (Agent'97)*, 301–307. New York: ACM Press.
- Granovetter, M. 1985. Economic action and social structure: The problem of embeddedness. *American Journal of Sociology* 91(3):481–510.
- Gräther, W., and Prinz, W. 2001. The Social Web Cockpit: Support for virtual communities. *Proceedings of the 2001 international ACM SIGGROUP conference on supporting group work*, Boulder, CO.
- Hackman, J. R. 1990. *Groups that work and those that don't. Creating conditions for effective teamwork*. San Francisco: Jossey-Bass.
- Hanifan, L. J. 1916. The rural school community center. *Annals of the American Academy of Political and Social Science* 67:130–138.
- Hansen, M. T. 1999. The search-transfer problem: The role of weak ties in sharing knowledge across organization sub-units. *Administrative Science Quarterly* 44(1):82–111.
- Hinds, P. J., and Pfeffer, J. 2003. Why organizations don't "know what they know," Cognitive and motivational factors affecting the transfer of expertise. In *Beyond knowledge management: Sharing expertise*, ed. M. Ackerman, V. Pipek, and V. Wulf, 3–26. Cambridge, MA: MIT Press.
- Huysman, M. H. 2004. Design requirements for knowledge sharing tools: A need for social capital analysis. In *Social capital and information technology*, eds. M. Huysman and V. Wulf. Cambridge: MIT Press.
- Huysman, M. H., and de Wit, D. 2002. *Knowledge sharing in practice*. Boston: Kluwer Academic.
- Huysman, M., and Wulf, V. eds. 2004a. *Social capital and information technology*. Cambridge, MA: MIT Press.
- Huysman, M., and Wulf, V. 2004b. Social capital and information technology: Current debates and research. In *Social capital and information technology*, eds. M. Huysman and V. Wulf, 1–15. Cambridge, MA: MIT Press.
- Huysman, M., Wenger, E., and Wulf, V. eds. 2003. *Proceedings of the international conference on communities and technologies (C&T 2003)*. Dordrecht: Kluwer Academic.
- Kautz, H. A., Selman, B., and Shak, M. 1997a. Referral web: Combining social networks and collaborative filtering. *Communications of the ACM* 40(3):63–65.
- Kautz, H. A., Selman, B., and Shak, M. 1997b. The hidden web. *AI Magazine* Summer:27–36.
- Kumar, K., van Dissel, H. G., and Bielli, P. 1988. The Merchant of Prato-Revisited: Toward a Third Rationality of Information Systems. *MIS Quarterly* 22(2):199–226.
- Kumar, K., van Dissel, H. G., and Bielli, P. 1998. The Merchant of Prato-Revisited: Toward a Third Rationality of Information Systems. *MIS Quarterly* 22(2):199–226.
- Lave, J., and Wenger, E. 1991. *Situated learning: Legitimate peripheral participation*. Cambridge: Cambridge University Press.
- Lanzara, G. F. 1983. The design process. Frames, metaphors and games. In *Systems design for, with and by the users*, eds. U. Briefs, C. Ciborra, and L. Schneider. Amsterdam: North-Holland.
- Lesser, E. L., ed. 2000. *Knowledge and social capital; Foundations and applications*. Boston: Butterworth Heinemann.
- Lesser, E., and Cothrel, J. 2001. Fast friends: Virtuality and social capital. *Knowledge Directions* Spring–Summer:66–79.
- Loury, G. C. 1977. A dynamic theory of racial income differences. In *Women, minorities, and employment discrimination*,

- eds. P. A. Wallace and A. M. La Mond, 153–186. Lexington, MA: Lexington Books.
- Maybury, M., D'Amore, R., and House, D. 2002. Automated discovery and mapping of expertise. In *Expertise sharing: Beyond knowledge management*, eds. M. Ackerman, V. Pipek, and V. Wulf, 359–382. Cambridge, MA: MIT Press.
- McDermott, R. 1999. Why information technology inspired but cannot deliver knowledge management. *California Management Review* 41:103–117.
- Nahapiet, J., and Ghoshal, S. 1998. Social capital, intellectual capital, and the organizational advantage. *Academy of Management Review* 23(2):242–266.
- Newell, S., Swan, J., and Scarbrough, H. 2001. Intranets and knowledge management: Complex processes and ironic outcomes. *British Journal of Management* 12(2):97–111.
- Orlikowski, W. J., and Yates, J. 1994. Genre repertoire: The structuring of communicative practices in organizations. *Administrative Science Quarterly* 39:541–574.
- Pipek, V., and Wulf, V. 1999. A groupware's life. In *Proceedings of the sixth European conference on computer supported cooperative work (ECSCW '99)*, 199–219. Dordrecht: Kluwer.
- Portes, A. 1998. Social capital: Its origin and application in modern sociology. *Annual Review of Sociology* 24:1–24.
- Portes, A., and Sensenbrenner, J. 1993. Embeddedness and immigration: Notes on the social determinants of economic action. *American Journal of Sociology* 98:1320–1350.
- Preece, J. 2000. *Online communities: Designing usability, supporting sociability*. Chichester, UK: John Wiley & Sons.
- Preece, J., ed. 2002. Supporting community and building social capital. *Communications of the ACM* 45(4) (special edition).
- Prusak, L., and Davenport, Th. H. 1998. *Working Knowledge, how organizations manage what they know*. Cambridge Harvard Business School Press.
- Putnam, R. 1993. The prosperous community: social capital and public life. *American Prospect* 13:35–42.
- Putnam, R. 2000. *Bowling alone: The collapse and revival of American community*. New York: Simon & Schuster.
- Resnick, P. 2001. Beyond bowling together: Sociotechnical capital. In *Human computer interaction in the new millenium*, ed. J. M. Carroll, 647–672. Reading, MA: Addison Wesley.
- Stahl, G. 2004. Building collaborative knowing—Elements of a social theory of learning. In *What we know about CSCL in higher education*, eds. J. W. Strijbos, P. A. Kirschner, and R. L. Martens, 53–86. Dordrecht: Kluwer Academic.
- Streeter, L. A., and Lochman, K. A. 1988. An expert/expert location system based on an automatic representation of semantic structure. In *Proceedings of the fourth conference on artificial intelligence applications, San Diego*, 345–350. New York: ACM-Press.
- Swan, J., Scarbrough, H., and Preston, J. 1999. Knowledge management, The next fad to forget people? In *Proceedings 7th European conference on information systems Copenhagen, Denmark*, 23–25 June, 11:668–678.
- Syrjänen, A. L., and Kuutti, K. 2004. Trust, acceptance and alignment: The role of IT in redirecting a community. In *Social capital and information technology*, eds. M. Huysman and V. Wulf, 21–52. Cambridge, MA: MIT Press.
- Uzzi, B. 1997. Social structure and competition in interfirm networks: The paradox of embeddedness. *Administrative Science Quarterly* 42:35–67.
- van Dissel, K. H. G., and Bielli, P. 1998. The merchant of Prato—Revisited: Toward a third rationality of information systems. *Management Information Systems Quarterly* 22(2):199–226.
- Vivacque, A., and Lieberman, H. 2000. Agents to assist in finding help. In *Proceedings of the conference on computer human interaction (CHI)*, 65–72. New York: ACM Press.
- Wasko, M. M., and Faraj, S. 2000. “It is what one does,” Why people participate and help others in electronic communities of practice. *Journal of Strategic Information Systems* 9:155–173.
- Wasserman, S., and Faust, K. 1994. *Social network analysis: Methods and applications*. Cambridge, UK: Cambridge University Press.
- Wenger, E. 1998. *Communities of practice*. New York: Cambridge University Press.
- Williamson, O. 1975. *Markets and hierarchies*. New York: Free Press.
- Won, M., and V. Pipek. 2003. Sharing knowledge on knowledge—The Exact peripheral expertise awareness system. *Journal of Universal Computer Science* 9(12):1388–1397.
- Yiman-Seid, D., and Kobsa, A. 2003. Expert finding systems for organizations: Problem and domain analysis and the DEMOIR approach. In *Expertise sharing: Beyond knowledge management*, eds. M. S. Ackerman, V. Pipek, and V. Wulf, 327–358. Cambridge MA: MIT Press.