

# Collective Action in Electronic Networks of Practice: An Empirical Study of Three Online Social Structures

Fredric Landqvist<sup>+</sup>, Robin Teigland<sup>\*</sup>

<sup>+</sup>Viktoria Institute, Sweden, <sup>\*</sup>Stockholm School of Economics, Sweden

*fredric.landqvist@viktorias.se, robin.teigland@hhs.se*

**Abstract.** Electronic networks of practice are computer-mediated social spaces in which individuals working on similar problems self-organize to help each other and share perspectives. Based on previous research positing that the interaction created by network participants produces an online public good of knowledge, the purpose of this empirical paper is to use theories of public goods and collective action to investigate this provision of knowledge. While based on the same technology platform and a similar concept, we examine three cases in different professions: education, healthcare, and tourism by examining how the 1) heterogeneity of the individuals, 2) relational structure of social ties, 3) norms of behavior, 4) affective factors, and 5) sanctions for noncompliance impact the creation of a public good. We find that the most successful effort to create an electronic network of practice was within education and that one contributing factor was the site's ability to leverage existing offline networks of practice to create a relational structure of stronger social ties between members. In summary, these results reveal that taking a unitary view of the underlying collective masks possible heterogeneity along a number of important dimensions and as a result may undermine the likelihood that the public good is created and maintained.

## Introduction

Recent advances in information and communication technologies have led to the emergence of online social structures where the primary purpose is knowledge exchange. Known by a variety of names, e.g., virtual, electronic, or online

communities, the study of these online social structures is critical because they have fundamentally altered our understanding of how and why people share knowledge by removing the barriers of same place and same time communication. Online social structures, such as newsgroups, listservs and bulletin boards, generally comprise an unlimited number of geographically dispersed individuals with diverse organizational, national, and demographic backgrounds who share knowledge by helping each other solve problems, telling stories of personal experiences, and debating issues based on shared interest (Sproull & Faraj, 1995; Wasko & Faraj, 2000). These electronic networks enable individuals to interact around a specific practice, regardless of physical proximity or prior personal acquaintance, thus eliminating the need for people to have met face-to-face in order to communicate. This increases an individual's access to knowledge resources by amassing greater numbers of like-minded individuals through electronic links than previously available in a local community (Teigland 2003).

Although prior researchers have used the term "community" to describe these online structures, we follow Wasko & Teigland (2004) and use the term "electronic network of practice". These researchers define an electronic network of practice as *a self-organizing, open activity system focused on a shared practice that exists through computer-mediated communication*. We feel that the use of the term network rather than community is more appropriate since these online structures are generally characterized by sparsely connected, weak, indirect ties as opposed to the frequent face-to-face interactions and direct personal ties characteristic of a community.

Despite the growing interest in online social structures such as electronic networks of practice, we know surprisingly little about how or why these structures support knowledge exchange (Desantis & Monge, 1999; Lin, 2001). For instance, an enduring characteristic of these structures is the propensity of individuals to provide their valuable knowledge and insights to strangers (Kollok & Smith, 1996; Rheingold, 1993; Wasko & Faraj, 2000), yet why individuals participate in this activity when there is no obvious benefit to them remains not well understood. Furthermore, the availability of technology to support communication does not necessarily translate into the creation of open discussion forums focused on knowledge exchange. As many organizations have discovered, the creation of an online social space is no guarantee that knowledge sharing will actually take place (Alavi & Leidner, 1999; Orlikowski, 1996).

Thus, the goal of this empirical study is to investigate electronic networks of practice by drawing upon theories of public goods and collective action. Building upon work by Fulk, Flanagin, Kalman, Monge, & Ryan (1996) and Wasko & Teigland (2004), we investigate one fundamental research question: *How do the characteristics of the underlying collective affect the creation and maintenance of a sustainable electronic network of practice?* In order to do so, we investigate

three cases built upon the same technical platform and a similar concept in three different professions: tourism, healthcare, and education. The paper then concludes with a discussion and areas for future research.

## Theoretical Background

We begin with a discussion of public goods and collective action. Typical examples of public goods include both tangible and intangible goods, such as public parks, lighthouses, and public television, and these goods are generally associated with two characteristics: nonrivalry and nonexcludability. Nonrival goods are those that are not used up or depleted in their consumption (Shmanske, 1991) while nonexcludable goods (Head, 1962) are those that all individuals in a collective may consume regardless of whether they contribute to the production or maintenance of the good. While public goods generally exhibit both nonrival and nonexcludable characteristics, a connection between nonrivalry and nonexcludability does not necessarily exist. A nonrival good can be excludable or non-excludable while a nonexcludable good can be either rival or non-rival (Shmanske, 1991).

Considerable research has provided evidence that public goods are generally subject to underproduction by a collective (Shmanske, 1991). The nonrival nature of a public good allows the good and its benefit to be offered to everyone in the collective, and nonexcludability influences individual decision-making about participation in the production, maintenance, or consumption of the public good. In particular, nonexcludability may result in the tendency to free-ride, i.e., to consume the public good without contributing to its production or maintenance. In fact, the optimal individual decision is to free-ride and consume the public good without contributing anything in return. However, if everyone decided not to contribute, then the public good would not be created and everyone in the collective would be worse off (Teigland & Wasko, 2004).

### Applying Collective Action and Public Goods Theories to Electronic Networks of Practice

In the formal language of collective action theory, we suggest then that the participants in an electronic network of practice form the collective. These individuals create a continuous stream of knowledge by posting and responding to messages, and the archive of collective knowledge in the saved messages produced by this interaction exhibits the characteristics of a public good. First, the archive of collective knowledge is nonrival since one individual's use of this knowledge does not deplete the supply or diminish the ability of other individuals to use the knowledge as well. In terms of nonexcludability, when one participant responds to a posting, then all members may benefit even though they did not

contribute to the original exchange. Furthermore, the costs of posting a message to the network are the same, regardless of the number of individuals who benefit. Consistent with research on public goods, online social spaces that are created to enhance knowledge exchange often remain empty spaces where no one contributes or some collectives while initially sustained lose participants and then die out over time (Desanctis & Roach, 2002). Based on collective action and public goods theory, researchers would argue that the above occurs because rational individuals act to maximize their own self-interest and as a result do not spend their valuable time contributing to electronic networks of practice.

Prior collective action and public goods research (Wasko & Teigland 2004) has identified five critical areas for understanding the production and maintenance of public goods in electronic networks of practice: 1) heterogeneity of the individuals in the collective, 2) the relational structure of social ties between individuals in the collective, 3) the norms of behavior of the collective, 4) the affective factors of the collective, and 5) the sanctions for noncompliance in the collective. We briefly discuss each of these five critical areas below.

#### Heterogeneity of the Individuals in the Collective

Researchers have proposed that the more heterogeneous a group is in terms of its interests and resources, the more likely that there is a critical mass or subset of members who have a high enough level of resources and/or interests to produce the public good (Oliver et al., 1985). Prior research has found that individuals who have higher levels of professional expertise and organizational tenure (Constant et al., 1996) and those who lack access to private alternatives such as co-workers or acquaintances (Wasko & Teigland, 2002) are more likely to participate and provide useful advice in electronic networks. Other resources might include time, access to and competency in technology, or position in the particular practice. As for interests, prior research indicates that individual motivations, reputation, organizational/ community affiliation, access to a peer group, access to useful information, enjoyment and learning influence participation in electronic networks (Constant et al., 1996; Lakhani & von Hippel, 2000; Wasko & Faraj, 2000).

#### Relational Structure of Social Ties

A second area focuses on the attributes of the aggregate network structure of social ties representing the personal relationships that exist between individuals in the collective as a whole. Previous research suggests that electronic networks of practice are characterized by generalized exchange (Fulk et al., 1996) and may have a network structure like a star, where a critical mass of individuals sustain the network by responding to all others in the network as a whole (Wasko & Teigland, 2002). The structure of social ties may also be characterized by the

attributes of the network's social ties, e.g., strong, intermediate, or weak (Wellman et al., 1996).

#### Norms of Collective Behavior

Norms are a key component of collective action (Coleman, 1990; Nahapiet & Ghoshal, 1998; Putnam, 1995a,b) in that they allow collectives to function effectively to produce and maintain public goods by providing a structured set of rules for coordination, as well as setting expectations about acceptable behaviors and actions (Ostrom, 1990). Organizational research suggests that norms of cooperation (Nahapiet & Ghoshal, 1998), reciprocity (Putnam, 1995b), openness and teamwork (Starbuck, 1992), and tolerance of both criticism and failure (Leonard-Barton, 1995) are conducive to knowledge sharing. In electronic networks of practice, prior research suggests that norms develop around the appropriate conduct in the network (Wasko & Faraj, 2000). For instance, in some electronic networks of practice, new participants are expected to review frequently asked questions before posting their questions. Other electronic networks of practice establish various norms around the tone of the exchange, where breaches of "netiquette" result in flaming.

#### Collective Affective Factors

Researchers suggest that a variety of affective factors, such as trust (McAllister, 1995; Nahapiet & Ghoshal, 1998; Ring & Van de Ven, 1994), influence collective action. Affective factors include obligation to the collective and identification with the collective (Nahapiet & Ghoshal, 1998), affiliation (Leana & Van Buren, 1999), commitment (Mowday et al., 1979), sentiment and ethical legitimation (Reisman, 1990), and organizational citizenship (Organ, 1988). These affective factors support collective action because individuals are more likely to suppress self-interest when there are strong, positive associations between individuals and the collective (Leana & Van Buren, 1999). In online settings, researchers have found that people with a strong sense of identification and attachment are more likely to participate and assist others (Wellman & Gulia, 1997) while individuals posting valuable advice to an intra-organizational electronic network were motivated by a sense of organizational citizenship (Constant et al., 1996). Individuals from electronic networks noted that they participated and helped others due to a moral obligation similar to "been there, done that", to pay back to the network and the profession as a whole (Wasko & Faraj, 2000), and to a sense of identification with the network and with the network's goals (Lakhani & von Hippel, 2000).

#### Collective Sanctions for Noncompliance

Researchers note that collective action is more likely to occur in collectives that are able to enforce sanctions for noncompliance with collective norms (Olson,

1965; Ostrom, 1990). In order to enforce these sanctions, individual behavior in the collective must be monitored, which consumes time and resources that could be devoted to other activities (Ostrom, 1990). However, Olson contends that in large collectives individuals will prefer to free-ride unless they are restrained and defectors punished for their actions (Olson, 1965). Although active participation in an electronic network of practice is fully visible and easy to monitor, the open, anonymous, and electronic nature of the network makes it difficult to render and enforce significant sanctions against free-riding or other forms of defection.

In summary, collective action research suggests that public goods are more likely to be created and sustained in collectives where there is a heterogeneity of resources and interests, a pattern of social ties that supports exchange, norms to guide collective behavior, strong affective ties between individuals and the collective, and collective sanctions that punish self-interested behavior. We would expect then that the likelihood of creating and maintaining a sustainable electronic network of practice would be dependent upon the ability of the features offered on the network site to support the necessary preconditions for the collective of practitioners.

## Research Method and Data Collection

All data from the three business cases have been gathered through interpretive case studies, and one of the researchers has been involved in the development of the described electronic network of practice applications. Table 1 provides an overview of the data collection.

### Common Technical Platform and Concept

All three sites used the same technical platform provided by Autonomy, a software vendor in the knowledge management systems arena. This technical solution incorporated features for information retrieval, automatic hyper-linking, intelligent-agents, automatic information classification and taxonomy generation, and lastly dynamic profiling that facilitates the individualization of information services. Autonomy uses advanced pattern-matching techniques together with neural-networks to make concept-agents of either information items (in all forms, structured, semi- and unstructured) or end-user profiling. The profiling feature makes the end-user aware of possible collaboration networks and communities.

All the sites also had similar platforms to encompass different forms of computer-supported collaborative work (CSCW) mainly simple bulletin-board features and document sharing, with either Microsoft or Lotus Notes software. However, there were no listservs or newsgroup applications used. In all cases the principle concept was to use Autonomy as a portal solution, and within this to use

the CSCW applications to develop electronic networks of practice. The dynamic end-user profiling thru intelligent agent training and other end-user content related behaviors (searching, posting on bulletin board and reading/browsing) were to help users to find peers with similar interests and with whom the users could collaborate through the CSCW features.

<b>Organization &amp; Site</b>	<b>Interviewee</b>	<b>Data collection</b>
LocusMedicus International Inc. (Healthcare) <a href="http://www.locusmedicus.net">www.locusmedicus.net</a>	- Founder/owner	- Development of site - Two telephone interviews approx. 30 minutes to 1 hour with founder - One 3 hour workshop with founder - Continuous e-mail correspondence with founder - Analysis of project documentation
Swedish Tourism & Travel Council <a href="http://www.turkom.nu">www.turkom.nu</a>	- Infomaster - Project manager - CFO - Stakeholder	- Development of site - Two telephone interviews with infomaster approx. 30 minutes to 1 hour - One 1 hour meeting with infomaster, project manager, and CFO - One 3 hour workshop with infomaster - E-mail correspondence with infomaster - Analysis of project documentation and documented usability reports
The Knowledge Foundation (KKS) (Education) <a href="http://www.kollegiet.com">www.kollegiet.com</a>	- Project manager - Stakeholder	- Development of site - Two telephone interviews with project manager approx. 30 minutes to 1 hour - One 3 hour workshop with project manager - Continuous e-mail correspondence with project manager and stakeholder - Analysis of project documentation, end-user survey, and web statistics

Table 1. Overview of data collection

## Case Studies

### LocusMedicus.net (Healthcare)

In 1998 two Swedish medical professionals founded the portal [www.locusmedicus.net](http://www.locusmedicus.net) in order to improve the ability of healthcare professionals to deliver effective care. The primary vision of the site was to cultivate a

stronghold for healthcare professionals, be it doctors or nurses, in which LocusMedicus would deliver information services such as a knowledge navigator and decision support in the clinical day-to-day operations. One of the primary driving factors behind the development of LocusMedicus was that patients were becoming increasingly better informed due to their ability to use the Internet to find new clinical findings to their medical problems. A second factor was the exponential increase in available medical information. At the time of LocusMedicus' development, there were more than 6000 medical journals and 100 000 medical information services available on the Internet.

Thus, the principle idea behind LocusMedicus was to provide an information intermediary service that would get healthcare professionals on-line as well as to promote an electronic network of practice by providing collaborative features that would facilitate knowledge sharing between these professionals. LocusMedicus aimed at having a very slim editorial process, primarily by aggregating medical journals and making smart packages of other provider's content. Additionally, the site focused on making the navigation experience as easy as possible through automatic hyperlinks, content categorization, and a personalized information service through the use of intelligent agents. Discussion fora were also created and LocusMedicus personnel were responsible for monitoring the discussions to keep the threads and conversations within a professional and ethical manner.

In order to promote participation, LocusMedicus targeted existing healthcare networks and professional affiliations, and by the end of 1999 there were more than 7000 registered members, primarily doctors and nurses, in Scandinavia. Initially LocusMedicus focused on a closed setting for practitioners only and had very strong identity control mechanisms before individuals could be approved as a worthy LocusMedicus member. One of the main reasons for this was to be able to host a collaborative closed setting where healthcare professionals could speak openly about clinical cases without having "expert-patients" lurking around. First time end-users had the opportunity to browse the content but were restricted from using the "Forum" (collaborative) features. Unfortunately, this strong identity and proven medical educational registration process was later removed based on the idea by the site's management that it would be easier to increase the number of members through open membership and also to get away from an overwhelming administrative task of "checking" every new member.

LocusMedicus managed to allocate well-known experts within the different aspects of the healthcare professional community and had them train intelligent agents (known as "Collectors"). In this manner, it was hoped that the less experienced end-user learn from their more experienced peers and reuse their acknowledged expertise. In contrast to more traditional electronic networks of practice, the use of the intelligent agents was also chosen such that the healthcare experts would only to have to answer the really tricky questions in the "Forum"

since the relatively easy questions would then be handled by the underlying trained intelligent agents.

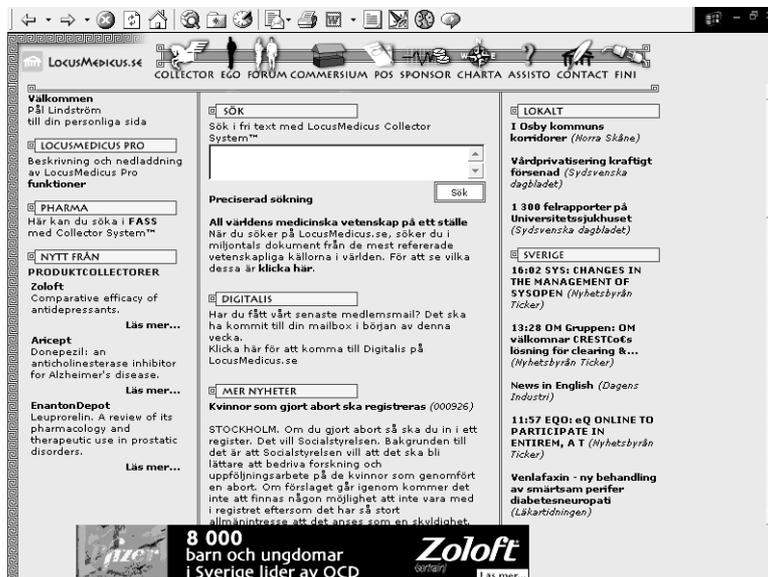


Figure 1. LocusMedicus.net (Personalized startpage, anno 2000)

The strong focus on existing healthcare networks and the involvement of famous well-known experts in the field helped draw the right attention to the use of the site initially. However, LocusMedicus never really managed to become an active and sustainable electronic network of practice and remained an information intermediary portal only. While end-users and engaged well-known experts periodically started new discussions within the CSCW features, these individuals were also searching for peer networks. However, the level of active participants was not sufficient to create an ongoing discussion and knowledge exchange, thus leading to the site's closure.

### TurKom.nu (Tourism)

Tourism is a very fragmented and heterogeneous industry in Sweden with more than 20,000 organizations of which almost all are very small, one-man shows or small to medium-sized organizations. The networking within the industry has always been either geographically focused or practice-specific, e.g., the hotel industry. However, in 1999 the Swedish Tourist Authority, the Swedish Tourism & Travel Council, and the Swedish Tourist and Travel Industry Federation together started an inter-organizational development project to increase the effectiveness and efficiency in the tourism industry. This project included the development of the Internet site, www.turkom.nu. The main concept behind TurKom was that the site would provide access to information and knowledge

within strategic and important tourism-related areas and that this access would then encourage networking and knowledge sharing among the geographically dispersed Swedish tourism professionals.

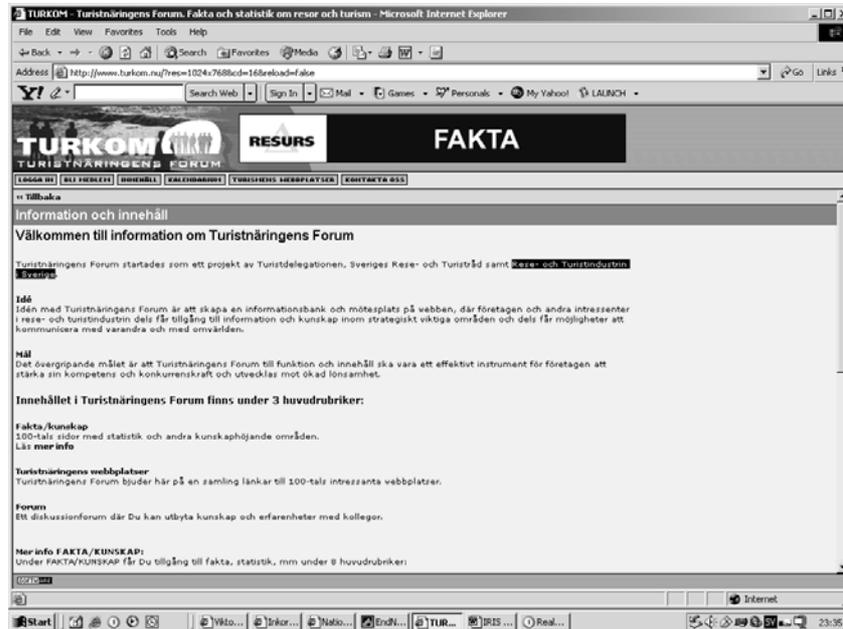


Figure 2. www.turkom.nu

The TurKom project was very influenced by the success story behind LocusMedicus, which basically led to a “copy’n’paste” of the LocusMedicus technical platform as well as the packaging of the different included information services on the site. Since the tourism industry did not have a tradition of refereed “best-practice” in the form of scientific publications such as that of the healthcare profession, TurKom was designed to aggregate a wide variety of information resources with the hope that these would attract the targeted users’ attention. Additionally, TurKom included information regarding travel statistics, how to get governmental funding, and how different regional political decisions would affect the tourism industry. Since one of the goals of the site was also to involve the professionals in continuous learning, tourism research sites were also included. Similar to LocusMedicus, users could personally train intelligent agents to search for individual content from the wide variety of information sources; however, the site did not rely upon experts for this training unlike LocusMedicus. It was hoped then that the above features would increase the value offered to users, thus attracting users so that the CSCW features could then be cultivated. During the trials the site development team, however, found it very hard to get the right attention from its targeted users. The complexity in fulfilling all the different information needs of the widely heterogeneous population of tourism professionals led to an extremely heterogeneous information architecture.

Additionally, individuals never took the time to become active participants in the fora launched, thus hindering the development of electronic networks of practice. One reason was that the tourism professionals were not familiar with intelligent agents. As one individual proclaimed in the usability-lab test, “This site is crap, is this an empty void?” He had skipped reading the introduction about how content delivery was based on the end-users training intelligent agents. As a result, he had not personally trained any agents, which made the “personalized start home page” empty with no content at all. Resulting from this is that the end-user then felt that there was no one with whom to discuss in the forum, thus the “forum” feature appeared useless. Another reason relates to the cultural norms of the tourism industry. Individuals in the small organizations were often too busy focusing on performing their day-to-day activities to think about the strategic positioning of their future service offerings. Nor were they used to discussing their problems in open fora. Thus, they never really saw the need to participate in any of the fora. Due to this lack of user activity and collaboration, the TurKom site was closed as of January 1, 2005.



Figure 3. MittKollegiet (the personalized part of the Kollegiet site)

## Kollegiet (Education)

The Knowledge Foundation (Stiftelsen för kunskaps & kompetens utveckling, KKS) was established by the Swedish Parliament to help Sweden become more competitive by focusing on research and postgraduate programs, competence development in the education industry, and school development and IT. KKS initiated a project within the focus area of “school development and IT” with the aim of building an electronic network of practice site called Kollegiet (“staff”). The targeted users were teachers and other related professionals in the educational

system who were interested in school development. KKS focused on information integration and content provision (as editors), and the content was designed to be of practical use in the day-to-day operations. Additionally, one important task of Kollegiet was to cultivate knowledge sharing among an active network of practitioners with a strong commitment to IT-integrated education and school development, as well as to facilitate the creation of local networks of teachers at the schools. Kollegiet also provided experiences and best-practices within subjects such as ethics and source criticism on the Internet, methods and competencies to accomplish flexible learning processes, internationalization issues, and ideas for how to stimulate children's and youngsters' curiosity within the areas of science and technology.

Kollegiet made a large investment in an editorial process with both an editor and a network of active writers within the main focus areas, encompassing this with the development of a content management system. Kollegiet not only depended on the ideas of information intermediary services aggregating from other free available Internet resources, but Kollegiet also had some extra information services, such as environmental scanning with a subscribed content feed focused on Kollegiet specific issues. This was a very popular way for professionals to stay current with up-coming events and changes in governmental policies dealing with the educational system. The personalization features were covered in a specific part of the site, called "Mitt Kollegium" (My Colleagues), where all features dealing with collaboration and intelligent agents were placed.

To date, Kollegiet is a very active site and has a large (+7000) end-user base registered in MittKollegiet. Moreover, after running this site for more than three years, KKS is now about to unfold more collaborative features for Kollegiet to further facilitate knowledge sharing among its members. However, there is one foreseeable problem in regards to this effort and that is how to get the large end-user base to interact more on a daily basis since the use of Kollegiet is not something that local schools support. The use of Kollegiet is mainly done on a voluntary basis and the interaction is usually performed after work.

## Discussion

In summary, while the three cases had the same technical solution and a similar concept for building an electronic network of practice through providing an information service, only one sustainable electronic network of practice resulted, Kollegiet. Below we compare the three cases based on the five critical areas identified: 1) heterogeneity of the individuals in the collective, 2) the relational structure of social ties between individuals in the collective, 3) the norms of behavior of the collective, 4) the affective factors of the collective, and 5) the sanctions for noncompliance in the collective. A summary is presented in table 2.

	<b>LocusMedicus</b>	<b>TurKom</b>	<b>Kollegiet</b>
Attributes of Individuals	Heterogeneous in resources but poor level of technology competency	Very high level of heterogeneity in interests and resources	Heterogeneous in resources, but homogeneous in interests
Relational Structure of Social Ties	Low social ties since the fora never became active	Failed to leverage offline networks of practice	Leveraged strong social ties in offline networks of practice
Norms of Collective Behavior	Collaboration among novices intimidated due to use of intelligent agents trained by experts	Low norms because too diverse user base	Strong norms of collaborating for common good of profession
Collective Affective Factors	Strong sense of identity and high degree of trust	Fear of competition led to decreased level of trust	Strong degree of trust and affiliation
Collective Sanctions for Noncompliance	All discussions monitored and membership initially restricted	Open access, but no monitoring since no active participants	Open access but due to specific and focused content, "intruders" a rare sight
Ability to create sustainable electronic network of practice	Relatively high level of collaboration initially but then failed to sustain this leading to site closure	Poor level of activity and collaboration led to site closure	Successfully sustained electronic network of practice with future developments planned

Table 2. Overview of the three cases

## LocusMedicus

In terms of resources and interests, the targeted users of LocusMedicus were quite heterogeneous in terms of professional expertise as indicated by the use of experts to train intelligent agents. Additionally, individuals within the healthcare profession as in any scientific profession may be characterized by a high degree of interest in reputation and staying current with developments within the field as well as a high level of identity and collective behavior (Van Maanen & Barley, 1984). This may explain the initial interest in the site. However, while there was this initial interest, no critical mass of active collaborators developed. One explanation may be that there was not a sufficient number of users who were competent in using the technology provided by LocusMedicus. Additionally, one reason for the lack of critical mass may be due to the choice to use the experts to train the intelligent agents. This decision may have constrained the development of a critical mass of interested collaborators since it was expected that individuals should use the agents first before asking questions in the fora. This then created the norm that the fora were to be used for expert questions only, perhaps resulting in the situation that more novice individuals may have felt too intimidated to ask questions in these fora. Finally, the decision by the site's management to remove the restricted access through membership may also have changed the nature of the site for its users. Since anyone could enter the fora, the level of trust and thus the

affective element of the collective may have been reduced. One interviewee commented on this in the following way, “Maybe when we took away the rigor in membership processing, we also lost some vital trust issues.”

## TurKom

Individuals within the TurKom’s targeted users group could be described as a heterogeneous group in terms of resources, e.g., tenure, expertise, information technology competency, etc. Additionally, since many of those involved in the tourism industry are one-man shows or small operations, they often lacked private alternatives. However, there is some indication that individuals participated in their local offline networks, thus dampening their interest to participate online. This latter factor may have outweighed the former factors in explaining the inability of users within TurKom to create a critical mass. Additionally, as noted above, individuals were more interested in performing their day-to-day activities than discussing strategic or other issues online with others. Finally, their information needs and profiles may have been too diverse, thus leading to the inability of individuals to be able to identify with others online.

Another reason may be inherent in the tourism profession as indicated by one interviewee. She explained that the failure of the TurKom site could be because the Swedish tourism industry does not have a culture of continuous knowledge sharing through knowledge codification, such as documenting best practices or storytelling, other than what occurs during face-to-face meetings at periodic industry conventions. She commented, “The doctors have the knowledge seeking, sharing, networking and continuous learning within their spines, whereas our industry is driven mainly on true entrepreneurship.” This spirit of entrepreneurship and an interest in bottom-line profits may have led to a feeling of competition between the members, thus inhibiting members to share knowledge with one another.

## Kollegiet

Similar to the other two cases, the members of the Kollegiet were diverse in terms of their resources. However, unlike LocusMedicus, this group displayed a high degree of technology competency, and unlike TurKom, the users were a much more targeted group, i.e., interested in the specific topic of integrating IT in schools. Additionally, this site built upon the already established local networks of education professionals and served as a complement to these, thus leading to stronger ties within the network. Additionally, the teaching profession displays the characteristics of a very strong guild, and the sense of belonging to a practice that is for “the common good” may explain why so many members participated in Kollegiet. Finally, anybody interested in education was welcome to participate in

the network, but since the content and discussion were very specific and focused, “intruders” were a rare sight.

## Future Research and Concluding Remarks

As of today, Kollegiet is the only active site, thus the future development of Kollegiet and its ability to sustain an electronic network of practice will provide an interesting opportunity to investigate the lifecycle of an electronic network of practice. Future research will focus on end-user interviews, comparing this with the visions shared by the stakeholders in this paper. While our Kollegiet research shows that it is a platform well suited to sustain an electronic network of practice, many end-users still only use it as an information intermediary portal and instead collaborate and network elsewhere. In our future research, we plan to focus more in depth on the relationship between offline and online networks of practice.

In conclusion, these three different cases illustrate the difficulty in transforming an electronic space into a sustainable electronic network of practice in addition to how the underlying characteristics of the collective of practitioners impact this transformation. To build trust and engagement in knowledge creation and sharing among users truly needs an enduring and evolving development process. One interviewee concluded, “If you are able to provide the end-users with an information service that is easy to use and with content that is applicable to their daily practice, they will return on a regular basis. The thing that takes time and effort is to build trust. Without trust there won’t be any sustainable networks of practice”.

## Acknowledgments

We thank the Swedish Council for Working Life and Social Research for sponsoring this research through grant number 004-1268.

## References

- Alavi, M., and Leidner, D. "Knowledge Management Systems: Issues, Challenges and Benefits," *Communication of the Association for Information Systems* (1) 1999, pp 1-28.
- Desanctis, G., and Monge, P. "Communication Processes for Virtual Organizations," *Organization Science* (10:6) 1999, pp 693-703.
- Coleman, J.S. *Foundations of Social Theory* Belknap Press of Harvard University Press, Cambridge, MA, 1990.
- Constant, D., Sproull, L., and Kiesler, S. "The Kindness of Strangers: The Usefulness of Electronic Weak Ties for Technical Advice," *Organization Science* (7:2) 1996, pp 119-135.

- Desanctis, G., and Roach, M. "Age, Size, and Contribution Dynamics in Online Learning Communities," Academy of Management Conference, Denver, CO, 2002.
- Fulk, J., Flanagin, A.J., Kalman, M.E., Monge, P.R., and Ryan, T. "Connective and Communal Public Goods in Interactive Communication Systems," *Communication Theory* (6:1) 1996, pp 60-87.
- Head, J.G. "Public Goods and Public Policy," *Public Finance* (17:3) 1962, pp 197-219.
- Kollock, P., and Smith, M.A. "Managing the Virtual Commons: Cooperation and Conflict in Computer Communities," in: *Computer-Mediated Communication: Linguistic, Social and Cross Cultural Perspectives*, S. Herring (ed.), John Benjamins, Amsterdam, 1996, pp. 109-128.
- Lakhani, K., and von Hippel, E. "How Open Source Software Works: "Free" User-to-User Assistance," The 3rd Intangibles Conference. Knowledge: Management, Measurement and Organization, Stern School of Business, NYU, 2000.
- Leana, C.R., and Van Buren, H.J.I. "Organizational Social Capital and Employment Practices," *The Academy Management Review* (24:3) 1999, pp 538-555.
- Leonard-Barton, D. *Wellsprings of Knowledge: Building and Sustaining the Sources of Innovation* Harvard Business School Press, Boston, 1995.
- Lin, N. *Social Capital* Cambridge University Press, Cambridge, UK, 2001.
- McAllister, D. "Affect- and Cognition-Based Trust as Foundations for Interpersonal Cooperation in Organizations," *Academy of Management Journal* (38:1) 1995, pp 24-59.
- Mowday, R.T., Steers, R.M., and Porter, L. "The Measurement of Organizational Commitment," *Journal of Vocational Behavior* (14) 1979, pp 224-247.
- Nahapiet, J., and Ghoshal, S. "Social Capital, Intellectual Capital, and the Organizational Advantage," *Academy of Management Review* (23:2) 1998, pp 242-266.
- Oliver, P.E., Marwell, G., and Teixeira, R. "A Theory of Critical Mass I: Group Heterogeneity, Interdependence and the Production of Collective Goods," *American Journal of Sociology* (91) 1985, pp 522-556.
- Olson, M. *The Logic of Collective Action* Harvard University Press, Cambridge, MA, 1965.
- Organ, D.E. *Organizational Citizenship Behavior* Lexington Publishers, Lexington, MA, 1988.
- Orlikowski, W.J. "Learning from Notes: Organizational Issues in Groupware Implementation," in: *Computerization and Controversy*, R. Kling (ed.), Academic Press, New York, 1996, pp. 173-189.
- Ostrom, E. *Governing the Commons: The Evolution of Institutions for Collective Action* Cambridge University Press, Cambridge, 1990.
- Putnam, R. "Bowling Alone: America's Declining Social Capital," *Journal of Democracy* (6) 1995a, pp 65-78.

- Putnam, R. "Tuning in, Tuning Out: The Strange Disappearance of Social Capital in America," *Political Science and Politics* (December) 1995b, pp 664-683.
- Reisman, D. *Theories of Collective Action: Downs, Olson and Hirsch* The Macmillan Press Ltd, Hong Kong, 1990.
- Rheingold, H. *The Virtual Community: Homesteading on the Electronic Frontier* Addison Wesley, Reading, MA, 1993.
- Ring, P.S., and Van de Ven, A.H. "Developmental Processes of Cooperative Interorganizational Relationships," *Academy of Management Review* (19) 1994, pp 90-118.
- Shmanske, S. *Public Goods, Mixed Goods, and Monopolistic Competition* Texas A&M University Press, College Station, 1991.
- Sproull, L., and Faraj, S. "Atheism, Sex and Databases: The Net as a Social Technology," in: *Public Access to the Internet*, B.K.J. Keller (ed.), MIT Press, Cambridge, MA, 1995, pp. 62-81.
- Starbuck, W.H. "Learning by Knowledge Intensive Firms," *Journal of Management Studies* (29:6) 1992, pp 713-740.
- Teigland, R. (2003). *Knowledge Networking: Structure and Performance in Networks of Practice*. Published doctoral dissertation. Stockholm: Stockholm School of Economics.
- Van Maanen, J. & Barley, S. R. 1984. Occupational communities: Culture and control in organizations. In B. M. Staw & L. L. Cummings (eds.) *Research in Organizational Behavior*, Vol. 6. Greenwich, CO: JAI Press.
- Wasko, M., and Faraj, S. "It Is What One Does: Why People Participate and Help Others in Electronic Communities of Practice," *Journal of Strategic Information Systems* (9:2-3) 2000, pp 155-173.
- Wasko, M., and Teigland, R. "The Provision of Online Public Goods: Examining Social Structure in a Network of Practice," *Proceedings of the 23rd Annual International Conference on Information Systems*, Barcelona, Spain, 2002.
- Wasko, M.M. & Teigland, R. 2004. Public Goods or Virtual Commons? Applying Theories of Public Goods, Social Dilemmas, and Collective Action to Electronic Networks of Practice. *Journal of Information Technology Theory and Application (JITTA)*. Special Issue on Virtual Communities.
- Wellman, B., and Gulia, M. "Net Surfers Don't Ride Alone," in: *Communities in Cyberspace*, P. Kollock and P. Smith (eds.), University of California Press, Berkeley, 1997.
- Wellman, B., Salaff, J., Dimitrova, D., Garton, L., Gulia, M., and Haythornthwaite, C. "Computer Networks as Social Networks: Collaborative Work, Telework, and Virtual Community," *Annual Review of Sociology* (22) 1996, pp 213-238.

