EVALUATING THE EFFECT OF REWARDS ON THE LEVEL OF PARTICIPATION IN COMMUNITIES OF PRACTICE AT UNDP

EVALUATING THE EFFECT OF REWARDS ON THE LEVEL OF PARTICIPATION IN COMMUNITIES OF PRACTICE AT UNDP

A Thesis Presented to

The Graduate School of Bangkok University

In Partial Fulfillment

of the Requirements for the Degree

Master of Business Administration

By

Christian Thomas Walter

2012

This thesis has been approved by

the Graduate School

Bangkok University

Title : Evaluating the Effect of Rewards on the Level of Participation in Communities of Practice at UNDP

Author : Christian Thomas Walter

Thesis Committee :

Thesis Advisor

(Assoc. Prof. Dr. Vincent M. Ribiere)

Thesis Co-advisor

(Mr. Joseph David Galipeau)

Graduate School Representative

(Asst. Prof. Dr. Kasemson Pipatsirisak)

External Representative

(Dr. Haruthai Numprasertchai)

(Asst. Prof. Dr. Sivaporn Wangpipatwong)

Dean of the Graduate School

8 / Nov. / 2012

Walter, C. T. MBA (Master of Business Administration), September 2012,
Graduate School, Bangkok University

Evaluating the Effect of Rewards on the Level of Participation in Communities of Practice at UNDP (122 pp.)

Advisor of thesis: Assoc. Prof. Vincent Ribiere, Ph.D.

ABSTRACT

The purpose of this research is to investigate the effects of rewards on the participation and how rewards affect the networking behavior in communities of practice (CoP) in a working environment, in order to explore if rewards can help to foster the growth of CoPs. Four communities of practice, of which one was administered rewards to, were compared from November 2010 to January 2012. The timeframe consisted of a five month reward period. At the end of the period rewards were given to the members contributing most to the community. A comparative analysis was performed as well as a social network analysis for the community rewards were given to. The result showed that the rewards had no significant effect on the participation in the community, neither in contributing more content nor in the networking behavior of the members. The study empirically verified that rewards do not necessarily have to have an effect on communities of practice and demonstrates that when providing rewards, the choice of the reward has to be appropriate and valuable to the community, and that rewards have to be made visible enough for the community to respond.

Approved: [redacted]

Signature of Advisor

ACKNOWLEDGEMENT

First of all, I would like to thank my supervisor Assoc. Prof. Dr. Vincent Ribiere, who has provided me with valuable guidance in every stage of the writing process of this thesis. I would also like to thank Mr. David Galipeau for giving me the opportunity to work with the UNDP and helping me to collect the necessary data and with facilitating the communications with the UNDP head office in New York. Finally I would like to thank my family and friends who have supported me during the thesis process and the two years of my MBA journey.

TABLE OF CONTENTS

Page

TABLE OF CONTENTS (CONTINUED)

Page

TABLE OF CONTENTS (CONTINUED)

Page

LIST OF TABLES

Page

LIST OF TABLES (Continued)

Page

LIST OF FIGURES

Page

CHAPTER 1

INTRODUCTION

1.1 Background

Communities of practice (CoP) are a popular topic in knowledge management, because they are fostering knowledge sharing, learning, help develop best practices, and can be the source of continuous process improvement, or even new product developments. The idea of communities of practice originates from the theory of situated cognition. Instead of setting up seminars or lectures to provide training in a field and thereby separating context from learning, learning in communities of practice is bound to the context of the community. Situated learning is thought of being more efficient than context unrelated learning, because it focuses on learning as a social practice instead of viewing it as a purely cognitive task.

Originally the term communities of practice, as it was coined by Wenger and Lave (1991) does not necessarily consider an organizational setting. Instead communities of practice can be understood as communities that exist for a broad range of topics, activities and situations in everyday life. Lave and Wenger (1991) refer to an apprenticeship - master relationship, where over the time the apprentice can get into the core of the community and become a master of the domain. Brown and Duguid (Brown & Duguid, 1991) connected the concept to organizational learning by referring to a study by Orr (1990) who explained the process of sharing and storytelling for problem solving at Xerox, without calling it CoP. Organizational learning is a fundamental organizational process, which emphasizes that organizations

can learn from experience. This can happen on an individual level, each member of the organization learns in the organizational context, and on the organizational level, where the organization as a whole learns.

Nonaka (1991) brings both, the individual and the organizational level, together by focusing on creating an organizational environment where tacit knowledge can easily be shared among organizational members, learn from it, and distribute it easily within the organization. Brown and Duguid (1991) link this tacit knowledge exchange with CoPs. They focus on storytelling for knowledge sharing, because storytelling creates the context in which a shared understanding is created. It is also a way to make tacit knowledge explicit, which can be seen as the externalization step in Nonaka's (1995) SECI model. Bringing the perspective of learning in communities of practice and organizational learning together, shows how important the distinction between individual and organizational learning is but also how similar both concepts are. In both concepts the individual learns within the organizational or community context through participation, in return the community or organization learns as a whole through its individuals.

However, organizations include a wide array of topics, problems, or domains, which don't have to be necessarily mastered by all organizational members. CoPs can tap into this problem. They create themselves around a certain issue or domain providing a space, aside of organizational hierarchies, to discuss and solve problems. This can be a blessing and curse for an organization at the same time. Communities can help to solve problems, and bring the organization forward. On the other hand it means that a community within the organization exists, that is somehow working

alongside the organizational structure, and that makes the communities difficult to control or facilitate.

Companies have tried to facilitate the creation of CoPs to increase knowledge sharing; they have tried to align them with organizational needs and strategies, and have tried to increase innovational output and value creation (Wenger, McDermott, & Snyder, 2002). However, this task is rather difficult due to the organic nature of CoPs. If there is too much managerial influence they lose their voluntary participation and might just become one of many tasks to do. However, Wenger et al. (2002) state that it might be necessary to detect and facilitate communities of practice in order to maximize organizational benefit.

One of the main concerns of organizations when trying to facilitate communities of practice is then to provide a space for knowledge sharing and motivating members to join communities and participate in sharing their expertise and ideas. Since organizations operate in a globalized world and are spread around the globe, information and communication technologies are the tools of choice to connect community members.

In contrast to computer mediated information transfer and communication, the original concept of communities of practice thought of direct face to face contact, which is in a global context not always possible. Technology mediated communication however influences the way interactions happen, not only because of a technological barrier that has to be overcome by the users, but also in terms of communicating with people one does only know virtual or maybe barely through seldom face to face encounters. Wenger et al. (2002) note that it might be possible

that communities can feel less real and therefore motivation to participate might not be as high as in a face to face community. Motivation to contribute can be seen as a general issue in communities of practice that are implemented by the management rather than self-created communities, because participation is not voluntary but just another task. One obvious management tool to increase motivation seems to be rewarding community contribution.

In this study the motivation through rewards to foster contribution to the community is examined.

At the end of 2010 the United Nations Development Programme (UNDP) has introduced a social media-based extranet, called 'Teamworks', as part of implementing its Knowledge Management Strategy. It is designed as a social networking platform with blogs, micro blogs, social bookmarking, wikis and space collaboration functions to connect all 8000 UNDP staff members globally, plus the counterparts and colleagues from UN organizations, NGOs and governments they are engaging with.

The UNDP, currently led by former New Zealand Prime Minister Helen Clark, was founded in 1966 and is the development network of the United Nations (UN) with the mission to "help people built a better life" (UNDP, 2012). The UNDP is active in 177 countries worldwide and develops local capacities for sustainable development. UNDP encourages the protection of human rights, gender equality, and protection of minorities and the most underprivileged and helpless in the world. The UNDP coordinates all UN development activities and supports the global push of the Millennium Development Goals (MDG), the main goal being cutting world poverty

by half until 2015, by supporting countries in providing policy and technical advice to countries working in achieving the MDGs, by coordinating the UN efforts to achieve the MDGs, and by conducting in depth country reports to measure the MDG progress. In addition the UNDP promotes micro financing in the 38 least developed countries and works with more than 7000 volunteers to support development and peace in countries around the world. The UNDP works in four main areas.

1. Poverty Reduction & Achieving the Millennium Development Goals (MDGs)
2. Democratic Governance
3. Crisis Prevention & Recovery
4. Environment & Sustainable Development (UNDP, 2011)

For all four areas the UNDP has set up communities of practice to enable local teams to learn from each other.

UNDP's online communities of practice (operated so far through e-mail) which had been in existence in the organization for over 10 years are now also moving to Teamworks. This change requires a major culture shift across UNDP globally in all of its offices in over 160 countries.

Therefore, an exercise to provide rewards to community members is run on one of the online communities of UNDP (Poverty Practice Community). At this point the UNDP Poverty Practice Community (PPC) has 2371 members and more than 2000 content items. It is led by a practice director, has an advisory team of eight member, and two facilitators, called resource team.

The objective of the reward is to increase the overall participation in the community of practice and subsequently the value creation of the communities. The reward scheme at UNDP is running on a yearly basis and is rewarding top contributors with different, high value prices.

For the UNDP it is necessary to know the effects the rewards have on the members of the community of practice in order to be able to continue, adjust, or abandon the reward practice.

1.2 Statement of Problem

Motivation to participate in communities of practice and to share knowledge is a very complex problem that has been widely discussed in the literature, mainly on the basis of Social Capital Theory and Social Exchange Theory. However, the research on incentive and reward schemes to motivate participation has shown mixed results. Some researchers point out benefits of rewards on motivation, others point to the negative side, but there are also researchers that note that incentives have no long term effect or no effect at all on knowledge sharing or any participative behavior. To complicate the problem further; research on reward schemes within communities of practice is not very broad. Only few qualitative studies have focused on this particular situation.

Furthermore it is not clear what other effects rewards can have on the community. How do rewards affect the community as a whole, and single participants and their role within the community in particular? For example, it could be possible that giving rewards results in a higher contribution but in a decreasing quality, if members expect that they will receive a reward depending on their amount of

contribution. A study by Fahey et al. (2007) showed that providing competitive rewards to a community can destroy the trust within the community, which might eventually lead to a breakup of the community.

1.3 Intention of the study and reasons

Research on incentives and reward schemes to increase the motivation of knowledge sharing and participation provides mixed results. Particularly, incentives schemes to increase sharing within CoPs has not had researchers attention to a great extend so far. Empirical result on a large community in a transition of adopting a new technology might lead to new insights on the effects of incentive schemes.

Furthermore, results can help the UNDP to adjust, abandon or continue their current incentive approach. Results might also show other factors influencing the adoption and the participation within communities in general and the UNDP Poverty Practice Community in particular. This might eventually lead to a framework that can be applied for further community development.

1.4 Research Objectives

The study aims to understand the effects of reward schemes on participation within a community of practice. It aims to gain insights on the effects of the rewards on participant's motivation, their roles in the community and the community itself. Therefore it tries to better understand the group/social changes that might occur in term of dynamics, behaviors and sharing practice in a CoP. Eventually the results should provide a better understanding of the effects the application of rewards had, which might lead to a framework or guidelines to support future reward scheme.

1.5 Major Research Question: Sub- Question Development

Main research question: How do rewards affect the communities of practice in terms of participation and structure?

Sub-Questions:

Question 1. How do rewards affect engagement in the communities of practice?

Question 2. What effects have rewards on the quantity of contributions in the community?

Question 3. What effects have rewards on the structure of the community?

1.6 Assumptions

The research assumes that rewards will affect participation in the community of practice. Further, the research assumes that rewards will have an impact on the community as a whole, in the form of the quantity of contributions.

It is assumed that at the beginning of the announcement of the quantity incentive scheme and at the end of the reward period the quantity of contributions will be higher, than throughout the rest of the period. This is because the awareness of the program is higher during the initial phase and should be before the end of the phase.

1.7 Scope of Research

The goal of the research is to get insights of the effects of rewards on participation in the community. The study will only take the Poverty Practice Community of the UNDP into account and will compare it with three other similar

communities of the UNDP. The secondary social network data for the community was collected in July 2012 and is not a longitude data, but instead is a sum of all the relationships between members from the beginning of the community to this point in time. Special interest is given to the time between August 16th 2011 to 31st December 2011, which was the phase in which the reward scheme was carried out the first time. Global announcement of the reward scope and function of the reward scheme was made to the community on August 16th 2011.

1.8 Benefits of the Research

The research results should help in understanding the effects of reward schemes on knowledge sharing in general and in virtual communities of practice in particular. The results should assist the UNDP and other organizations in implementing effective incentives schemes to increase participation, in terms of quantity of knowledge sharing.

1.9 Limitations of Research

The research is taking placing in one UNDP community of practice only comparing it to three other communities. It is therefore not possible to make generalizable assumptions about the results, since every organization has developed a unique set of cultural assets and behaviors, or code of conduct. Furthermore the UNDP is an international development organization and not a private organization in the sense that it has to be financial profitable. As an organization the UNDP has a unique position, which is probably reflected in the way people work together. Furthermore, participation and knowledge sharing can depend on many factors, wherefore it is difficult to eliminate every factor that might have an influence.

CHAPTER 2

LITERATURE REVIEW

Communities of Practice are a popular topic in organizational science, education, information science and other research areas. However, the concept itself is very diverse and not consistent throughout the literature. In particular the terms of community, virtual community, informal teams or groups are sometimes significantly differently used.

The purpose of the first part of the literature review is to provide an overview of the different concepts and ideas behind communities of practice. The literature offers four main concepts, predominantly developed by Lave and Wenger (1991), Brown and Duguid (1991), Wenger (1998) and Wenger, McDermott and Snyder (2002). The literature will focus on those similar concepts but will point out differences where they exist. The original concepts were developed at the end of the 1980s and mid-1990s, when information and communication technologies did not allow building basic online communities, not to speak of Web 2.0 Social Networks like Facebook or Google Plus. Therefore the focus in those early developments is on face to face communities. In 2002 Wenger et al. (2002) extended the concept to distributed communities, but the concept of distributed communities is timelessly broad. In this regard the literature review will extend the fundamental concepts to communities that exist predominantly distributed, through information communication technologies, often called virtual communities.

The second part of the literature review will be concerned with participation in communities of practice. It will focus on the question why knowledge sharing takes places, how motivation to share can be raised, as well what kind of an organizational environment should be present to foster community of practice participation and knowledge sharing.

The third part will cover the structure of communities. This includes different membership roles, as well as difference between roles of communities with organizations.

In short this part of the literature review will cover:

1) Communities of practice, concepts and definitions.
2) Participation in communities of practice, knowledge sharing and motivation.
3) Structure of communities of practice, their role in organizations, different membership roles' and differences between co-located and distributed communities.

The literature review will conclude hypotheses that are going to be tested.

2.1 Communities of Practice

The confusion about how communities of practice can be defined steams from the fact that literature provides four, sometimes very different, ideas of communities of practice. In particular the works of Lave and Wenger (1991) "Situated learning: legitimate peripheral participation", "Organizational learning and communities of practice: toward a unified view of working, learning and innovation" (Brown & Duguid, 1991), "Communities of practice: learning, meaning and identity" (Wenger,

1998), and “Cultivating communities of practice” (Wenger et al., 2002). The first three publications are rather theoretical approaches to the topic, and while they share a common ground on some topics, like locally and socially constructed meaning, they differ on basic but very central topics such as community, learning, power, formality, diversity and change (Cox, 2005). “Cultivating communities of practice” (Wenger et al., 2002) on the other hand, is a simplification of the concept and more of an practitioners guide of implementing communities of practice. Only the two last publications have a clear definition of CoPs, but even though the publications are by the same author these definitions differ. In their latest book Wenger et al. (2002) define communities of practice as a “group of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis.” (Wenger et al., 2002, p. 4), whereas in “Communities of practice: learning, meaning and identity” (Wenger, 1998) a community or practice is a group defined through mutual engagement, a joint enterprise and a shared repertoire. Cox (2005) rightly points out, that the 2002 publication is a completely different concept than in the previous publications, and indeed Wenger et al. (2002) transform the learning concept into a management concept that seems to be rather easy to apply. For the purpose of clarifying the concept and problems that arise with it, the literature review will compare the different approaches by following the concept of Wenger (1998) and pointing out differences and similarities along the way. This is appropriate because Wenger’s (1998) approach is the most analytical and developed one of the four.

Communities of practice have their root in constructivism. The principle of learning is shifting from the instructor to the learner, by using the concepts of ill-structured

problems. These are authentic, complex problems which individuals are facing in real life. Learning happens in a social context, through participating collaboratively, by trying to achieve shared goals, which are established within the group. Cognitive tools, like categorization and organization, or planning, and an instructor-, coach-, or facilitator offer help in this process. The role of the instructor or facilitator is seen as a guide to reach these goals, while the individual is learning at the same time to solve the problems (Christopher, 2001).

Communities of practice evolve, as the name indicates, around a community. The community develops practices, through negotiating meaning and identity (Wenger, 1998). Those four components; community, practice, meaning, and identity, are essential for learning and interrelated. CoPs are kept together by the members common purpose, similar experience and the need to know and learn what others know in the domain the community of practice evolved around (Terra & Gordon, 2003). They ground on active individual decision making within a group instead of decisions based on formal organizational hierarchies (Christopher, 2001). Communities of practices are in their essence dynamic social constructs, functioning by self-management and ownership (Collier & Esteban, 1999). They can be virtual or real, they go through a lifecycle, can have varying forms and rates of participation, and can eventually vanish (Wenger et al., 2002).

Practice itself is a complex term that incorporates “doing” in context of a social history and immediate context. It cannot be distinguished from its social context because it develops over time in a social structure. A community can evolve out of necessity to solve a problem that occurs in a given context (Liedtka, 1999).

Practices include the vast social scale from explicit language to tacit values. They evolve through collaboration from the community and create behavior from manual activity to theoretical outputs, or even “to not doing something” (Brown & Duguid, 1991; Wenger, 1998). Brown and Duguid (1991) mention the importance of narration, storytelling, to create a context in which a practice works. This highlights the importance of the situation the practice is developed in and where learning can take place in. Through creating and telling the story the individual himself and the community as a whole create a unique identity. Stories are probably the most useful way in communities to transfer knowledge, because the narration itself creates a context, which can be easily understood. This makes it possible to deduct the important issues and apply them to similar situations. However, stories are not the only way of sharing knowledge or practice creation.

For Wenger (1998) practice has three dimensions of community property, which are mutual engagement, a joint enterprise and a shared repertoire. Those three terms can’t be separated. The mutual engagement of community members around a joint enterprise creates a shared repertoire of meanings and understanding. But mutual engagement does not by default entitle one to be part of the community, rather it is the inclusion in being part of what matters to the community, which is called the joint enterprise.

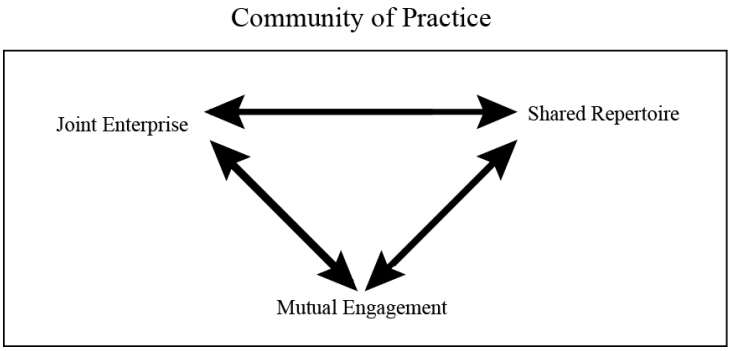


Figure 2.1: Properties of a Community of Practice

Obviously mutual engagement creates relationships among people but it does not mean that those people are homogenous, although this possible, nor does it mean they are always harmonious (Brown & Duguid, 1991; Cox, 2005; Wenger, 1998). Since a community of practice evolve around certain problems, competencies and roles can or will overlap and the longer a community exists the greater their shared history.

This history is largely created through the process of negotiation of a joint enterprise, or in other words, the discussion that evolve around the enterprise. Since a community of practice is not necessarily homogenous, and indeed diversity and homogeneity make the engagement in a community productive, the meanings within a community have to be negotiated (Wenger, 1998).

But meanings within a community are not self-contained, nor are the communities (Brown & Duguid, 1991; Wenger, 1998). They are part of the large social context and so are the community members. The position of the members in the community and larger environment influences them as single entities and the community as a larger entity respond to the social context with practices. Each

member produces a practice for themselves to cope with these influences but these practices are also a part of the community. This negotiation or joint development brings the community as well as the individual forward (Christopher, 2001). As a result of the negotiation process, the community becomes accountable for what the members do and what is happening around it (Wenger, 1998).

The negotiation process also decides what is important to the community and what leaves it unconcerned. Those rules of conduct are not necessarily outspoken but intrinsically developed through the negotiation. Over time the joint negotiation process creates a body of shared repertoire, like words, methods, documents, behaviors and other artifacts. The repertoire is based on the community's history but remains ambiguous, which allows it to be always dynamic and changeable. The repertoire then becomes the foundation for the negotiation of meaning (Wenger, 1998). Inevitably this results in a unique identity of the community and its members, a "we" that is reflected in the community as a whole and each individual.

Different constellations can create communities of practice. Constellations in general define the relations among entities. In regard to communities of practice's constellations define locality, proximity, and distance. All those relations can facilitate or prohibit shared learning. The same historical background, for example having the same formal education even though being from different cultures, can make it easier for people to form a community, because they have something in common (Wenger, 1998; Wenger et al., 2002).

It should be added that the term "community" has in general a positive connotation, which is not the case in Wenger's (1998) application of the term. He

notes that communities can have negative implications and that there can be a master and apprentice power play, although this is neglected by Browne and Duguid (1991) (see also Cox (2005) comment on this issue).

Wenger (1998) lists 14 indicators that might show that a community of practice has been formed.

1) Sustained mutual relationship
2) Shared ways of engaging in doing things together
3) Rapid flow of information and propagation of innovation
4) Absence of introductory preambles, as if conversations and interaction were merely the continuation of an ongoing process
5) Very quick setup of a problem to be discussed
6) Substantial overlap in participants' descriptions of who belongs
7) Knowing what other know, what they can do, and how they can contribute to an enterprise
8) Mutually defining identities
9) The ability to assess the appropriateness of actions and products
10) Specific tools, representations, and other artifacts
11) Local lore, shared stories, inside jokes, knowing laughter
12) Jargon and shortcuts to communication as well as the ease of producing new ones
13) Certain styles recognized as displaying membership
14) A shared discourse reflecting a certain perspective on the world

2.2 Learning in the community.

The concept of learning in the community is insofar different, that it stretches the notion of situation. Situation is the context in from which the practice steams, since the actual content is narratively contextualized, including for example the history of the problem, how the practice developed and so forth. At the same time it is the situation within the community that enables the learning. The community boundaries are not strictly defined, belonging and not belonging are fluid, and the participation of its members is voluntary (Brown & Duguid, 1991). Although being fluid in terms of not having strict rules against joining; practice, norms, and behavior determine belonging and can become boundaries.

Learning can evolve through a shared history. It develops form mutual engagement, or collaboration, in the community, aligning the engagement through understanding the joint enterprise, and developing a repertoire, styles, and discourses (Liedtka, 1999; Wenger, 1998). Learning therefore never comes to an end, because renegotiation takes places all along. As a consequence renegotiation creates practice, which again is the foundation for new learning. A community will then evolve around the new on the basis of the old, trying to adapt to change and new insights, which is why it can be the source of innovation (Brown & Duguid, 1991). Wick (2000) notes that this is what makes communities of practice so valuable, it is not the knowledge itself but the ability to use this knowledge to stay on the cutting edge of development.

Communities have boundaries, created through practices (Wenger, 1998). By being given peripheral access and the legitimacy of participation it is easier to learn about the domain (Brown & Duguid, 1991; Gherardi, Nicolini, & Odella, 1998;

Wenger, 1998). Peripheral access is for the beginner necessary in order to learn the rules of the community, only then can he advance to a full member. Peripheral roles are important to communities of practice, because they allow individuals to develop different skills and expertise that can become important to the community (Christopher, 2001). Becoming a member, by applying the practices correctly requires learning. It requires competence and experience which can be seen as a two-way interaction.

Competence can drive experience and therefore individual learning, through aligning the experience to the competences required by the community. On the other hand; experience can drive competence. When new experiences are gained for that no practices exists the community may change the required competences to handle the new experiences (Wenger, 1998). Expertise can also come from outside the community, through the context the community is evolving in (Christopher, 2001).

This two-way approach enables the community to transform, on a community and individual level. Therefore what is called “knowledge in practice” is based on the local or community’s regime of competences and the orientation of the practices. If insights from overlapping communities or other entities challenge those practices they may very well be abandoned for better practices, be changed or evolve to something new. This can happen because by being part in a community, one is also part of other social environments that are not part of the community. Participation and reification in non-community events has implications for the community and so has the community implications for the rest of the world. Every member of a community also

part of something else, which results in multi-memberships and a nexus of perspectives (Wenger, 1998).

Different communities create different reifications, which can be introduced to other communities. These are called boundary objects. An object in a certain context of a community can be understood or used differently in another community. The problem is to renegotiation the meaning between communities. But the multi-membership in communities can also be used to transfer some useful elements from one practice to another (Wenger, 1998). Brokers are people that connect communities and can create and provide new possibilities or approaches to meaning to a community. Brokering involves not only the transfer of meaning but also the coordination and the alignment of different perspectives. It requires the legitimacy to influence but also to create attention, deal with different, sometimes conflicting, interests. The problem lies in the avoidance of being rejected as an intruder and not becoming a full member, because brokers contribution is situated in the middle of both poles (Wenger, 1998).

2.3 Communities of Practice in Organizations

Communities of practice often start within a tight group of people, who work closely together, have the same background or face the same problem. If communities go unrecognized by organizations their value can't be fully harnessed. Communities of practice create different kinds of values for organization, both short and long term, tangible and intangible, such as improved problem solving, or the ability to take advantages of emerging new markets. It is therefore advisable for organizations to encourage and lead community development (Wenger et al., 2002). Without an

organizational stimuli CoPs are likely to remain small closed groups and their boundaries can become so strong that they can blind themselves, and stop developing (Terra & Gordon, 2003).

Communities of practice are also a way to develop new strategies or implement existing ones. The main value however, is connecting peoples' personal development and the organizations strategies. Because communities of practice are always trying to integrate cutting edge problems, members are able to be on the frontier of development and try to incorporate the latest knowledge in their field (Wenger et al., 2002). Communities connect people across boundaries they can tap into knowledge they would otherwise not be able to receive (Terra & Gordon, 2003). In organizations members are by definition multimembers, this means they are members of one or more communities and their respective department, team or workgroup. Because of their multi-membership members know the organizational goals, requirements and problems that are faced every day. In their community they address those issues, and create the very practices to solve those issues by themselves. By managing their own knowledge, they remain accountable for the outcome (Wenger, 1998; Wenger et al., 2002).

2.4 Organization Relations

Communities can be in different relations to the organization and therefore face different challenges. Unrecognized communities, even unrecognized by the members themselves, have little value and usually don't include all the people that would profit from being members. Since they are unrecognized, the communities are not aligned to the organizations strategy, neither their domain, nor their practices.

Such bootlegged communities are only known to a small informal circle and they have usually not the power or capability to push practices forward. Their impact is rather small (Wenger et al., 2002).

Legitimized communities are officially regarded as valuable parts of the organization, and highly visible. They face the challenge of high expectations and, often, rapid growth. Supported communities can receive direct funds from the organization, which in return makes the communities accountable for the resources received. This can result in the pressure of delivering results on a short rather than a long term (Wenger et al., 2002).

Institutionalized communities of practice are an official part of the organization and fully aligned with the organizational strategy, which often leads to fixed definitions of goals, over management and extension of the its existing beyond its usefulness (Wenger et al., 2002). For example; Palloff and Patt explicitly state that facilitation, in form of a guide, is necessary to set goals, or criteria to meet them, and evaluation if they have been met, as well as guiding peer and self-evaluation. Facilitation also allows developing interactions between old and new members (Christopher, 2001).

However, it can be argued that management intervention is against the idea of communities of practice and in fact unproductive (Fox, 2000), but there is no clear evidence for neither argument (Borzillo, Aznar, & Schmitt, 2011).

2.5 Global Communities of Practice.

Communities of practice can take any size and its members do not necessarily have to be co-located. Since in a globalized economy organizations are located

everywhere around the world and communication technologies are rapidly evolving it is still possible to be part of a regular communication process.

Nevertheless, global spread imposes challenges on communities of practice. Different time zones and geographical separations make it impossible to meet face to face on short term demand. The physical distance bears the need for virtual tools which cannot fully substitute face to face contact. This makes the existence of the community feel less real (Wenger et al., 2002). The more distributed the community is the more likely it is that the group is large, which results in the impossibility to know every member. Naturally, this will result in subgroups. This, if properly guided, can however be conductive to individual and group development, but the larger the group the more facilitators are needed for a community to function (Borzillo et al., 2011). Hislop (2005) in the same notion states that because communities of practice get their value from informal relationships the network must make it possible to actually create those connections. A large network can make this impossible, wherefore it is not enough to just adopt communities or network structures but it has to be facilitated.

Distribution also results in different organizational affiliations, spanning boundaries over different business units or even to other organizations. In fact, many organizations use communities of practice across teams to create a double-knit structure. Tight team structures are interwoven with loose community structures to create business solutions that are applicable and innovative (McDermott, 1999). With extensive boundary spanning across departments and organizations the problem of priorities and intellectual property arises. Sharing knowledge takes time, which might

have been spent on immediate tasks. Different business units and managers have different agendas and therefore priorities can vary. Especially in cross-organizational communities the problem of intellectual property arises when practices developed with content from outside the organization (Wenger et al., 2002).

Another problem ascends through the participation of different cultures, not only national cultures but also professional and organizational. Different cultures have different ways relating to one another, speak of different languages and the capability to speak foreign languages (Christopher, 2001). This can lead to communication problems and misinterpretations. Those problems have to be addressed without eliminating the cultural distinctions (Wenger et al., 2002).

Ardichvili et al. (2006) found that modesty, in terms of not asking minor questions and because of language problems can hinder participation. Cultural differences in fear of losing their jobs, especially in a highly competitive job market like China, power distance, cultural preference of face to face communication instead of online communication, and differences in in- and out group orientation to share knowledge, could hinder participation as well.

2.6 Virtual Communities of Practice

Communities of practice become virtual communities of practice, because their members are located around the world and communication technologies are primarily used to bridge this locational gap. Virtual communities of practice can be defined as “a technological-supported cyberspace, centered upon communication and interaction of participants, resulting in a relationship being built up” (Lin, Lin, &

Huang, 2008, p. 743). There are several differences between a co-located community of practice and a virtual community of practice.

Co-located communities usually come to existence because people who know each other have a similar interest or background. Virtual communities are created for a certain purpose, around an idea or a challenge that an organization would like to address. In this case a possible joint enterprise is created, which a certain group should be the interested in. However, there is then no guarantee that knowledge sharing and learning or any form of participation will take place.

Most virtual communities also have no clear distinction about who is a member or not, whereas co-located communities have. The size of the community has a direct impact on formation and lifecycle (Borda & Bowen, 2009). The virtual boundaries are more fluid, because very often members can join or leave as pleased, without having to go through an initiation rite or approval by its members. Since members cannot see each other, at least initially, norms do not play such a great importance as they would in a co-located community.

Palloff and Pratt note that for virtual communities the same needs apply as for classic communities of practice, such as a clearly defined common interest or domain, the establishing of a master – apprentice structure, and defined practices (Christopher, 2001). Additionally they note that different membership roles, subgroups and facilitators should be established, similar to the later publication by Wenger et al. (2002). However, the technology that can be used within the community has also an impact on the structure of the community itself (Borda & Bowen, 2009).

Borda and Bowen (2009) list different collaboration tools and their functions that can be used to run a virtual community, such as community portals, social networking sites, meeting setup tools, blogs, wikis, project management tools, instant messaging with and without video and voice, media sharing and other tools like discussion forums. Single technologies do not exclude other; instead their functions overlap or help to overcome each other's shortcomings.

Virtual communities of practices are not without limitations in terms of technology use, technological distribution and technological limitations. The facilitating technology hosting the virtual community can be a barrier to participating in the community. In case of information technologies the ease of use, the difficulties related to a technology can hinder the actual use, even though the intention to participate exists (Kim, 2000; Venkatesh, Morris, Davis, & Davis, 2003).

Being distributed around the world can also mean that the access to communication technology is not given on the high level of developed countries. Limitations in internet bandwidth, for example, can decrease the motivation to use communication technologies altogether.

More limitations researchers have pointed out are the missing face to face communication or physical presence (Christopher, 2001). In order to overcome this barrier, researchers have suggest to use as many different kind of media as possible, such as audio, video, computer added design (CAD), text, links, presentations and other forms. Nevertheless face to face communication is important, for initial contact as well as for understanding (Christopher, 2001). Palloff and Pratt however note that asynchronous communication and the absence of physical appearance make it easier

to join an online community. There is not an obvious hierarchy, thus every member appears to be rather equal at the beginning (Christopher, 2001). The negative side of asynchronous communication is, that one doesn't know when a person is available and will get back on the topic, if ever, especially when it is considered how many different communication tools are available (Haythornthwaite, Kazmer, Robins, & Shoemaker, 2004). Synchronous communication tools such as video chat or instant messaging can be used to directly contact a person and get an instant feedback, which is good for a one to one situation. However, if the problem is solved and both parties do not engage subsequently on the community platform to let the rest of the community know it becomes a challenge for the community to catch up on new developments.

Another problem of asynchronous discussions is the way people participate, in terms of length, spelling, and time. Short, superficial messages with bad spelling, can be annoying, or if a reward system is in place that promotes contributing, be regarded as plain abuse (Fahey et al., 2007). Lengthy articles on the other hand are extremely time consuming for both, creator and reader (Christopher, 2001).

Hara (2008) notes that information technologies can only support practice but not identity, which refers to what Wenger et al. (2002) call a less real feeling of the community. Hara (2008) proposes a framework for information technologies to support communities of practice on the dimension of practice and community. In the practice dimension IT should support instrumental actions such as information search, communicative actions, like knowledge and information sharing, discursive action, like discussions, and strategic actions like negotiations, whereas on the identity

dimension rhetorical actions should be supporting the development of a professional identity. This can, if at all, technologically most likely only be achieve by imitating face to face communication through video-conferencing. Hence, if information and communication technologies area heavily used, the community of practice might still be week from an identity point of view.

Rogers (2000) suggest to structure activities, by providing active roles to members, provide goals, and systematically bringing in people that can help the community, among others. Kim (2000) names nine design strategies for online community building. She asks for a clear definition of the purpose that is reflected in the community design. Since technology will continuously improve the technology used has to be flexible, so it can evolve over time, with the community and decreasing the need of a complete new adoption. Member profiles should reflect the needs of the members and the community and eventually reflect the history of the community. Virtual communities should further be designed for different community roles, in order to make joining the community simple, and at the same time support experienced community members in their advanced participation. Further, leadership or facilitation should be developed that can help members of the community to get along and help them if problems occur. This also includes providing guidelines how to participate, especially setting ground rules. Regularly repeating events and community rituals can further foster a community spirit. Face to face events are often necessary to create the feeling of community and help overcome shortcomings of information and communication technologies (Kim, 2000; Wenger et al., 2002). Rituals on the other hand are taking special occasions into account and create rites to

celebrate them. Eventually, as the community grows, the creation of subgroups should be possible for the members itself (Kim, 2000).

2.7 Participation – Knowledge sharing in communities of practice

The main benefit from communities of practice is knowledge sharing and the promise of innovation steaming from it. Knowledge sharing can be defined as "the provision of task information and know-how to help others and to collaborate with others to solve problems, develop new ideas, or implement policies or procedures" (Wang & Noe, 2010, p. 119). Communities of practice develop differently in terms of the rate of participation. Participation can be broadly divided in either knowledge sharing or the search for knowledge (Ardichvili, Page, & Wentling, 2003; He & Wei, 2009). The question is how to motivate members to not only increase participation, but also the quality of contributions and using the community as a main source of knowledge. Additionally, there is a question why people should contribution in virtual communities, when they (most of the time) not even know each other (Chiu, Hsu, & Wang, 2006).

Research has shown that the willingness to share knowledge can be influenced by various factors, for example information technology, altruistic and conformist considerations, extrinsic motivators, like economic rewards, intrinsic motivation, which is means being motivated by the pleasure and satisfaction from a specific activity (Barabási & Albert, 1999, p. 137), organizational climate, the ease of sharing, management involvement, among other reasons (Ardichvili et al., 2003; Jeon, Kim, & Koh, 2011; Lin, Hung, & Chen, 2009).

Motivators can be separated into individual motivators for personal outcome and motivators for community related outcome expectations (Chiu et al., 2006), or for economic value and organizational capacity (Davenport & Hall, 2002). Similarly, Wang and Noe (2010) propose that environmental factors and individual characteristics have an impact in motivational factors. Eventually, environmental, individual and motivational factors have an effect on knowledge sharing. Chiu et al. (2006) show that the organizational factors have a greater impact on knowledge sharing quantity and quality wise, whereas the personal outcome expectations can in fact have negative effects. The willingness to share depends usually on reciprocity, either direct or indirect. Social exchange theory suggests that unlike in economic exchange, the obligations are not fixed but that nevertheless a return in the future is expected (Blau, 1964). Indirect or generalized reciprocity does not expect a direct compensation for the contribution but anticipates to be rewarded at a later stage through a third party (Davenport & Hall, 2002; McLure Wasko & Faraj, 2005), given that a long term relationship exists (Kankanhalli, Tan, & Wei, 2005). However, empirical results are mixed (Chiu et al., 2006; Wang & Noe, 2010) and show that reciprocity is not always increasing knowledge sharing. In fact, the expectation to receive something in return can decrease the quantity of sharing, and has no effect on the quality whatsoever (Lin et al., 2009). If there is no payback for the provided knowledge the costs for the individual might be too high, which then becomes a barrier to knowledge sharing (Chang & Chuang, 2011; Gee-Woo, Zmud, Young-Gul, & Jae-Nam, 2005). Nevertheless, reciprocity builds trust, which is another motivator for knowledge sharing (Lin et al., 2009).

Ardichvili et al. (2003) note that the willingness to share knowledge steams from the fact that employees' see knowledge as a public good, that does not belong to an individual but to the organization as a whole. Sharing then happens because of an obligation not out of self-interest. This is increased by an organization fostering mutual sharing. More self-base reasons were the urge to establish themselves as experts, officially through the hierarchy, and unofficially through contributing, and the more altruistic feeling of giving something back through mentoring and sharing expertise. Since those members are confident that they can help others, they are more motivated to do so (Kankanhalli et al., 2005). Sharing knowledge can also contribute to the professional development, and certainly does if one is to establish themselves as an expert to increase the possibility of career advancements (Correia, Paulos, & Mesquita, 2009; Lin et al., 2009; McLure Wasko & Faraj, 2005).

Correia et al. (2009) note that the access to necessary knowledge, and the amount of information, for daily tasks can be motivating too, if the proximity of the domain to the professional domain of the participants is close. The community can, if the information is reliable, work as an encyclopedia (Ardichvili et al., 2003) and therefore help in the decision making process (Correia et al., 2009). On the negative side this can also prohibit participation, because employees lose their distinctiveness compared to others if they share. By giving up this power, one might not receive the rewards, or even feel that one's position in the organization becomes obsolete (Correia et al., 2009; Wang & Noe, 2010).

Knowledge sharing can also contribute to the learning of the person who is sharing. Employees might not be able to know in which manner the knowledge they

want to transfer will be understood, but the process of sharing provides them with the opportunity to deepen their understanding of the material or receive inputs from community members on how to develop the topic (Wang & Noe, 2010) and subsequently share it.

Trust is an important variable in knowledge sharing (Usoro, Sharratt, Tsui, & Shekhar, 2007). Usoro et al. (2007) found that along three dimensions of trust, integrity based, competence based, and benevolence based, a strong relation to knowledge sharing can be found. Lin et al. (2009) found that reciprocity mediated through trust leads to positive knowledge sharing effects. The more trust there is within a community the more likely it is that knowledge will be shared. For a community to function there must be trust between the people, in that they will not misuse the knowledge shared and that the knowledge gained is reliable and objective (Ardichvili et al., 2003). Trust can be raised when people know each other wherefore it takes time to develop. The organizational culture and climate can create trust by reducing the cost of possible negative effects of knowledge sharing by decreasing the competition among the employees. Organizational cultures seeking to encourage innovation tend to increase knowledge sharing through subjective norms (Wang & Noe, 2010). It has also been shown that the more ties within people of communities exits and the longer they have lasted, the more will be shared and the greater its use is perceived (Chiu et al., 2006). It has been noted that people tend to share less with those that are perceived to have a high capability, than those who are perceived having a high integrity. Procedural and distributive justice can have an indirect effect, through organizational commitment in an organization can encourage tacit knowledge

sharing, between the management and employees, as well as between coworkers (Wang & Noe, 2010).

Management plays an important role in the motivating community contribution, through public recognition of the community and rewarding contribution, being it financially or through recognition (Borzillo et al., 2011). Top management support will positively affect knowledge sharing in terms of quality and quantity, since the management can serve as a mediator between organizational climate and intention (Wang & Noe, 2010). However, supervisory control through managers has a stronger effect on quantity than quality of the contribution (King & Marks, 2008). Quality of contributions is rather determined by the organizational culture.

The management can also value the community by participating in it themselves (Correia et al., 2009). Managers, who have power over rewards and are experts (expert power) in their area, can have a positive effect on knowledge sharing as well (Wang & Noe, 2010). The personal perception of each community member on the knowledge sharing behavior of the community has a significant influence on their own knowledge sharing behavior (Lin et al., 2009), it might therefore be useful to let well known managers participate in communities in order to provide a lighthouse effect. Management intervention seems however to have no effect on knowledge seeking behavior. When it comes to knowledge seeking, employees tend to focus on their cognitive belief structures (He & Wei, 2009). Management has also an influence on trust. If employees trust that the management will value knowledge sharing, they will have less of "giving up" assets and contribute (Birgit, 2008).

2.8 Rewards and incentives to increase participation

A lack of incentives and rewards has been seen as a barrier to knowledge sharing by some researches (Wang & Noe, 2010), but there are also claims that using rewards and incentives will have a negative effect, because of a motivational crowding-out effect. This suggest that monetary rewards will undermine intrinsic motivation, especially when the intrinsic motivation was already strong (Muller, Spiliopoulou, & Lenz, 2005). Problems with rewards arise, where it is not clear who should get the reward, since new developments most often ground on previous work. Furthermore, offering rewards assumes that employees would not actively do what the organization would like them to do. Rewards are used to lead employees to do expected activities. It can become a practice to control people, leading to lower self-determination. Rewards also tend to produce rather short term changes and the behavior change is likely to vanish once rewarding is discontinued. This might be because rewards do not stimulate knowledge sharing, but instead try to change the attitude towards it (Jiacheng, Lu, & Francesco, 2010). It is also possible that knowledge is not seen any longer as a public good because rewards have to be secured (Fahey et al., 2007).

Companies can offer tangible rewards, like increased payments for single participants, or rewards that help building the community, or members can gain more subtle rewards, such as being in the core of the community. The most straight forward approach organizations can take is tying the benefits to increase stock value or revenues. Another way is to link rewards to skill-based pay systems or to the rate of participation. In this case employees are rewarded for their commitment to the

community. Another kind of reward is the access to knowledge and information in return for contribution.

Free riding has then to be managed by establishing rules of access. This reward refers to a kind of social capital. Social capital is the capital that lies in the relations between people (Chang & Chuang, 2011). It is not only increased through the information the person might provide but also through the possibilities each actors can provide through being part in a community.

As already established, missing trust and the fear to lose power if knowledge is shared can inhibit participation. This might be countered by tying rewards to career advancements or security rewards (Davenport & Hall, 2002). By helping colleagues performing well, individuals can get votes on their contributions from their colleagues and are awarded on this basis. This approach tries to reward collaboration instead of competition and to insure quality at the same time. Cooperative reward systems, rewards for helping each other or incentives the whole group benefits from, are more successful than competitive reward schemes (Wang & Noe, 2010). Another, less tangible, way to promote participation is to enhance reputation above normal reorganization through contribution by inviting participants to workshops or special projects. This acknowledges their higher level of commitment as well as their skills and makes them attractive working colleagues (Davenport & Hall, 2002).

Incentives on the other hand can be applied if rewards are not feasible, or in addition to them. Incentives in this notion are work environment changes that make it easier for the employee to share knowledge. The benefits are much more subtle than in reward schemes. Incentives can be making knowledge sharing, knowledge

acquisition, and helping colleagues' job requirements, instead of things expected to happen. These requirements can be very specific by providing a certain timeframe employees have to spend on such activities or by giving them particular duties, like training or sharing project results.

A method that directly relates to the concept of communities of practice is mentoring new or peripheral members through members that have established a high reputation in the community. This can facilitate the learning process, especially of tacit knowledge, and bring members slowly into the community core (Borzillo et al., 2011; Brown & Duguid, 1991; Davenport & Hall, 2002; Wenger et al., 2002). Mentors itself gain a benefit by being chosen to be and recognized as a mentor. Using mentors also decreases the fear of contributing and provides the new member with a person to trust. Otherwise new members might feel that they have not the right to post, or might feel that their contributions are not relevant to the company. They also might fear to get criticized of ridiculed (Ardichvili et al., 2003). The more participants share the stronger the ties between them get and the mutual trust increases, which in return allows for easier knowledge sharing.

However, empirical results on reward and incentive systems have been mixed. Some studies have shown that organizational rewards in form of promotions, bonus, higher salary, and performance based salaries have positive effects (Muller et al., 2005), on the frequency on sharing, so do incentives, especially when employees identify with the organization. Hall and Graham (2004) suggest to offer an explicit reward to attract people to the community, however they note that this will not

necessarily result in participating. For participation they suggest using soft rewards (incentives) that increase personal reputation and satisfaction.

Lee and Ahn (2007) suggest using rewards based on the quantity and quality of the knowledge shared. They also suggest providing different reward equations depending on the relation between quantity and quality. Kankanhalli et al. (2005) for example found that rewards are only helpful, when the organizational and personal interest overlap. On the contrary studies found that anticipated extrinsic rewards had negative effects or no effect at all. In their case study of SAP's attempt to raise knowledge sharing and participation in their virtual community Fahey, Vasconcelos et al. (2007) found mainly negative effects. Conflicts about the abuse of the rewards program, decreasing trust between the members and the lack of novel, explorative discussions were some of the negative effects (Fahey et al., 2007). He and Wei (2009) report that for individual continuance usage behavior of a knowledge management systems rewards are just irrelevant. Li and Jhang-Li (2010) note that incentives should be given for every time knowledge sharing happens, instead of periodic incentives. They also mention that group rewards are more efficient than individual rewards. Cabrera and Cabrera (2002) suggest that to overcome the public-good dilemma of knowledge sharing, to provide incentives depending on the success of the community as a whole. Cress et al. (Cress, Barquero, Schwan, & Hesse, 2007) suggest to use different reward models depending on whether quality or quantity of knowledge is the priority. For example a reward scheme could focus on the quantity of contributions at the birth of a community of practice, until a critical mass of contributors is reached, then the reward scheme is changed in order to increase the quality of contributions.

2.9 Knowledge Sharing Environment

The more natural it is for members to interact the more likely it is that knowledge sharing is taking place. Davenport and Hall (2002) list four techniques that can help setting the environment:

Clear rules of operation of the community. For example Ardichvili et al. (2003) note that too unspecific guidelines and too complex, time consuming community operations can be a barrier to contribution.

Shared language; the use of a common framework to classify information.

Social Events.

Collocation of staff.

Kim (2003) adepts Maslow's hierarchy of needs to online environments, as outlined in Table 2.1. She also calls for feedback loops that empower the community over time. Since the community is defined by the management in the first place it is not possible for the community to take over from the beginning. The purpose and tool of the community are delivered by the management. However, by maturing the community will better know what it needs and should therefore be part of building and maintaining the community culture.

Ardichvili et al. (2003) note that the main barriers to share in virtual communities are the fear to lose face, letting colleagues down, information inaccuracy, misleading information and the lack of directions of acceptable and not acceptable contributions. Several authors (for example (Ardichvili et al., 2003; Correia et al., 2009; Davenport & Hall, 2002)) mention that confidentiality problems

can inhibit sharing and as a consequence should be addressed by the organization. Therefore a process has to be established that reduces redundant, misleading or all in all useless information.

Brown and Duguid (2000) provide an example of knowledge sharing at Xerox, where every participant can provide practices, but every tip has to go through a review process, before it gets accepted to be included in the knowledge repository. This process tries to work around all those problems mentioned above. The name of the contributor is eventually attached to the practice, to increase the contributor's reputation.

Table 2.1: Maslow's Hierarchy of Needs adapted for Online Communites

(Kim, 2000, p. 19)

Need	Offline	Online
Physiological	Food, clothing, shelter	System access: the ability to maintain one's identity, and participate in a Web community
Security and safety	Protection from crimes and war; the sense of living in a fair and just society	Protection form hacking and personal attacks; the sense of having a "level playing field"

(Continued)

Table 2.1 (Continued): Maslow's Hierarchy of Needs adapted for Online Communites (Kim, 2000, p. 19)

Social	The ability to give and receive love; the feeling of belonging to a group	Belonging to the community as a whole, and to subgroups within the community
Self-esteem	Self-respect; the ability to earn the respect of others, and contribute to society.	The ability to contribute to the community, and be recognized for those contributions.
Self-actualization	The ability to develop skills and fulfill one's potential	The ability to take on a community role that develops skills and opens up new opportunities.

Wasko and Faraj (2005) suggest that organizations should focus their attention on some core employees that have experience in practice, using extrinsic motivators to create a critical mass, that can sustain the community. By leveraging their centrality from the online network into the real work environment they not only increase the members' reputation but also provide new members, or lurkers with a go-to person, which makes the network and the knowledge more accessible.

Hall and Graham (2004) note the importance of social support within the community. They found that co-location and small group size are important for genuine knowledge location. Since in global communities it is most of the time not possible to meet face to face, it might be advisable to break the larger network into smaller groups or local communities that can meet face to face on a regular basis (Davenport & Hall, 2002; Wenger et al., 2002).

Technological problems are another area that can inhibit community usage. Hsu and Lin (2008) studied knowledge sharing via blogs and found that the ease of use is one of the main predictors for sharing online. Low response time, poor community (web) design, lack of tools to find, extract and share information as well as the difficulty of using them, are some of the possible technology shortcomings (Correia et al., 2009).

Evangelou and Karacapilidis (2005) propose a knowledge sharing catalyst framework to overcome problems in the socio-cultural and technological context. They argue that knowledge sharing can be encouraged through implementing positive and negative reinforcements in the organizational culture and the knowledge management system, shown in Figure 2.1.

Negative reinforcement	*Positive reinforcement*	*Negative reinforcement*	*Positive reinforcement*
Socio-cultural context catalysts		*Technological context catalysts*	
• 'Knowledge is power' dilemma	• Establishment of constructive relationships	• Expendability and redundancy of knowledge workers	• Maintenance of user profiles
• Hierarchy-based knowledge approach	• Respect to social and individual identities	• Too generic interfaces	• Interactive features
• Underestimation of knowledge to be shared	• Cultivation of a 'shared purpose' sense	• Dissatisfactory presentation of functional, aesthetic, and structural issues	• Flexibility
• Negative criticism and loss of reputation and respect	• Common language and understanding	• Dissatisfactory performance	• Use of organization-wide language
• Manipulation of shared knowledge	• Clarification of roles and scopes	• Complex queries to retrieve shared knowledge	• Development of intelligent tools
• Abuse or loss of literary property	• Reputation building	• Abuse or loss of literary property	• Asynchronous and distant communication
• Lack of absorbing capacity	• Assignment of tasks according to interests	• Lack of security and confidentiality	• Easy and quick access to valuable knowledge
• Lack of security and confidentiality	• Measurement and reward of cooperation		• Knowledge elicitation, processing, storage, and dissemination features
	• Ties and commitment		• Externalization of sharing outcomes
	• Development of knowledge-sharing culture		• Establishment and constant surveillance of security protocols
	• Distinction of capabilities between employees and technology		• User-friendly interface
	• Shared codes, values, and objectives		
	• Reciprocity		
	• Commitment		
	• Trust		

Figure 2.1: Knowledge sharing catalyst of socio-cultural and technological context (Evangelou & Karacapilidis, 2005)

To overcome such problems and strengthen communities within the organization IBM Global has implemented a pyramid knowledge management framework addressing problems on different levels. The foundation are environmental factors, including vision, strategy, and a value system that encourages knowledge sharing. Leadership is directly involved in the community participation, wherefore there is a link to the top pyramid layer, which includes measurement and incentive programs, to reinforce value sharing and promote best practice reuse. On the other hand the top layer is connected with the environment by making the commitment of the leaders to the environment visible. In between those two layers are management systems that process the management of intellectual capital and the knowledge life cycle, process connecting the informal networks with the formal organization, and technologies that enable effective knowledge management (Gongla & Rizzuto, 2001).

2.10 Structure

Communities of practice in organizations can take different forms in terms of member size, existence, location, diversity, or boundary wise, intentional or not intentional, institutionalized or unrecognized. Community size can vary from very few to more than a thousand members. However, with size comes a difference in structure because it is not possible for all members to know each other. Very large communities can have subdivision, or regional parts. As previously mentioned communities can dissolve and stop existing other might be able to sustain for centuries.

Traditional communities of practices and virtual communities go through a lifecycle, because they develop their norms, practices, relationships and other resources over time. Wenger et al. (2002) define five stages, potential, coalescing, maturing, stewardship and transformation, which are not necessarily consecutive. The first stage is about establishing the community, the domain, norms and practices. Coalescing is all about redefining and fine tuning what is valuable to the community, for example what kind of knowledge should be shared. In the maturing phase communities need to define their role within the organization and what belongs or does not belong to the community. The community also tries to find and solve knowledge gaps in their area in a more systematic way. In the stewardship phase the community takes this approach further in maintaining the relevance of the domain in the organization, through keeping a focus on cutting edge problems, while keeping discussions engaging and lively. Finally, in the transformation stage, it can dissolve or become something completely new. Palloff and Pratt name their similar stages, “forming, norming, storming, performing, adjourning (Christopher, 2001).

Haythornthwaite et al. (2004) call their three stages initial bonding, early membership, and late membership, focusing more on the individual then the group.

In creating a virtual community Palloff and Pratt suggest four virtual community building steps, initial phase, conflict phase, intimacy and working phase, and termination, whereas Seufert calls them content, intention, contracting and settlement, focusing more on community learning (Christopher, 2001).

Dale (2010) distinguishes between four different kinds of communities of practice. First, helping communities, solve day to day issues. The main purpose is to connect employees, build trust between them, and strengthen their relations to facilitate peer learning and drawing from each other's experience, so each member is able to come up with solutions for their day to day task by themselves. Second, best practice communities develop guidelines and procedures and provide access to valid up to date information. They focus on collaboration to seek a better or new understanding of developments in their field, and to implement and verify best practices. Third, knowledge stewarding communities are organizing, managing, and stewarding a body of knowledge that is valuable to the organization. Those communities create taxonomy of issues for shared understanding, provide access to knowledge which they organize in a convenient way. They assemble knowledge to increase the productivity of collaborative knowledge and idea generation. Fourth, innovation communities of practice develop new ideas that keep the organization at the cutting edge. They are a supportive creative environment that works multi-disciplinary, and provide opportunities to channel and support ideas.

Dubé et al. (2006) created a typology for communities and virtual communities of practice based on the characteristics demographics, organizational context, membership characteristics, and technological environment on a range from low to high. The typology allows to compare communities and to address their strength and challenge, which can be addressed through the organizations management.

Maggio et al. (2009) take a different approach by explaining Peter Gloor's taxonomy based the terms of purpose, size, physical proximity, membership, leadership, diversity, lifecycle, and sponsorship and institutionalization. The taxonomy does then allow to create three kinds of communities. 1) Collaborative Innovation Networks, with the purpose of innovation and the focus on new insights, with peer groups of innovators in the core to achieve a common goal, 2) Collaborative Interest Networks, that evolve around a topic of interest, with less frequent participants and no common goal, 3) Collaborative Learning Network, in which participants try to actively share and reciprocally benefit from each other by doing so.

2.11 User types

User types can be described as user characteristics that reflect a usage pattern in a community. User types can reflect different types of skills, preferences, motivations (Brandtzæg & Heim, 2009).

Dale (2010) refers to three different roles within a community; sponsors, facilitators and members. Sponsors provide the organizational recognition within the organization. Facilitators are providing help and ensure the community of practice runs smoothly. Members are those who participate in the community. Dale also makes

a distinction between three different kinds of memberships. Experts, who are permanent or temporary members that share their knowledge, contributors, who ask and reply to questions frequently, and readers, who contribute rarely if ever and mainly observe and read contributions in the community. Dale notes that each role can be shared by several people and one person can have several roles.

Lambe (2005) defines several archetypes of actors that can be present in a community. Archetypes are created through the history of the community and can vanish if the community changes, nevertheless they provide an overview over possible roles that can exist within the community. Overall Lambe defines eleven different archetypes, outlined in Table 2.2.

2.12 Maturity measurement and value creation measurement

Communities of practice produce and apply knowledge to processes. However, organizations have to make a causal connection between the knowledge created, applied and the benefit of the application. Communities of practice should make it easier to measure the value because the whole process of knowledge creation is outlined in the community. Value measures are not only useful to the organization itself, they can also help the community to get a feedback on their processes, be a starting point to discuss and help to develop better practices or refocus on the domain. Eventually this will make communities more effective and dynamic. However, it is likely that communities will not be on the same level of activity all the time (Dale, 2010). One can think of seasonal changes due to holidays, conferences in specific knowledge areas or general seasonal changes that affect the business.

Table 2.2: Archetypes adopted from Lambe (2005)

Archetype	Characteristics
The Mediator	Connects participants with each other Shares knowledge Open minded Listens
Energy Vampire	Mainly asking, often repetitious, basic questions Questions asked are not stimulating discussions Comments are rather negative
Lurker	Takes little risk, very cautious Makes the majority of members in a community Often wants to consume instead of sharing Feels not knowledgeable enough to share valuable knowledge Lack of time Prefers one to one conversations Intimidated by the audience

(Continued)

Table 2.2 (Continued): Archetypes adopted from Lambe (2005)

The Angry Little Man	Confrontational Bad temper Limited perspective Sense of superiority
The Beginner	Asks basic questions but with an open approach that elicits sharing Naïve attitude
The Hostage	Unmet expectations Frustrated by projects or agenda the core community has, because he can't influence them, even though he has an active interest in doing so Misses feedback to his comments
The Backstabber	Opportunistic Works for his own advantage Communicates through private message rather than using open discussion boards.
The Professor	Analytic, intellectual, thoughtful but wordy Knowledgeable

(Continued)

Table 2.2 (Continued): Archetypes adopted from Lambe (2005)

The Sophist	Wordy and questioning Polemic and pedantic Arrogant
The Visionary	Sees things in the big context Inspiring contributions Broad interests
The Guru	High reputation Powerful, can intimidate lurkers Brief but profound participation

Depending on the approach chosen it is therefore necessary to keep the life cycle of communities in mind, when measuring value creation.

Maturity on the other hand shows how sophisticated the community is in terms of overall development. Both measures can go hand in hand. If for example a community is not at a maturity level to create innovations, then as a result, measurement of innovation output will most likely show unsatisfying results. Maturity measurements often rely on a typology, such as the typology done by Dubé et al. (2006), to be able to compare communities of practice.

Gongla and Rizzuto (2001) explain the use of an evolution model at IBM Global, similar to a maturity model, to assess the state a community is in and what it can deliver. Similar to the life-cycle model of Wenger et al. (2002) they define two, five stage models, evolution and function, that jointly explain the stage of the

community and what they do at this particular state. 1) Potential; is the community forming stage and their main function is connecting people, 2) Building; is the definition process in which the context is created, 3) Engaged; the community improves its process through learning, 4) Active; the community realizes the value of knowledge sharing and the collective work, therefore is collaborating, 5) Adaptive, the knowledge produced is used for creating a competitive advantage for the organization, which can mean that it can be translated into innovative products or other organizational benefits. However, similar to Wenger et al. (2002), Gongla and Rizzuto (2001) express that communities can go back and forth between evolution stages. In order to push communities to the next evolutionary level they name enablers that support people, processes and technologies. To make those communities successful on a long term IBM Global creates scenarios based on the assessment of a community grounded on the IBM Global knowledge management framework.

Building on this framework Smits and de Moore (2004) propose a knowledge governance framework by adding different types of management activities. Their model defines the organizational context of knowledge management processes, distinguishing on three levels, operational, maintenance and long term knowledge management. The framework then works to link knowledge management to organizational context. To measure knowledge management in communities of practice they use the SECI (socialization, externalization, combination, internalization) process proposed by Nonaka and Takeuchi (1995) and the intellectual capital method, which allows measuring intangible resources, such as knowledge. Smits and de Moor (2004) then link human capital with tacit and structural capital with explicit knowledge and divide each in two categories. To benchmark the

knowledge management they compare actual outputs with desired outputs by comparing indicators and through applying Senge's system view on learning organizations to detect problems that can explain the gap between actual output and desired output. Operationalized is their idea by analyzing documents, web and desk research, as well as five questions that are asked to managers in the organization. Through this approach they address knowledge resources, community relevance, and the three knowledge management processes. In their case study of a financial firm they created the indicators along the SECI terms, like direct communication links, non-assigned working time, regulated socialization, number of bytes of project documents and so on. However, even though a company's knowledge resources are linked to the organizational context the knowledge couldn't be based on the quantitative indicators. This can have two reasons. Either the indicators based on the SECI categories were not matching the organizational categories, as mentioned by Smits and de Moor (2004), or because knowledge is not static and the value it creates can't be directly be put into numbers.

In this case an approach to measure knowledge with static values has to be set in context of the organization and cannot be derived from a theoretical model. Wenger et al. (2002) suggests a dual approach by using stories accompanied by a systematic documentation process.

Stories allow expressing not only the knowledge gained and applied but they are also able to link community activities, used resources and outcomes to each other. Because the causal relationships are so complex and include different contextual factors, that it is hardly codify able. Wenger et al. (2002) propose a three element

story capturing practice. The first part is the initial knowledge development activities that lead to the new practice. Second, the knowledge resource generated and third how the practice was applied to create organizational value and what would have happened without applying it. Of course not any story can be used. A systematic approach has to be used to capture the diversity of efforts made by the community. Wenger et al. (2002) suggest a bottom-up, top-down or a mixture of both approaches. The bottom-up approach starts in the community, who has to identify all of its activities and start following those activities through the process of knowledge creation to understand the effects. This may uncover previously not realized values, but can also end up not being in line with the organizational strategy or issues. The top-down approach first identifies what the organizational goals are, what knowledge for this goal is needed, and what the community did to address those issues. The problem with this method is that the focus of the community entirely changes to match the organizational needs, which can result in losing dynamic and motivation because members might match their intrinsic interest or value. A mixture of both approaches can complement each other and avoid the negativities.

Wenger et al. (2002) suggest a five step process throughout the measurement process. The first step is clarifying for what purpose the measurement is done. Who is the audience, what does the audience need to know, and why do they need to know it? Secondly, it has to be defined what to collect. This includes how much as well as what types of stories and which connected statistics, like the amount of members connected to each other, forum post or participation rates in other forms. Since stories have to be created it is, in a third step, necessary to raise awareness about measurements. Therefore it is important that creating stories is a process that is done along the work

of the community. Ad hoc production of stories is difficult, because people are usually busy. If story writing is part of the commitment of community membership, it does not feel like an administrative task. The fourth step would be define when and where to measure. This includes defining, who collects the data, in what frequency, through which methods, and where to store and how to distribute it. The last step is to combine the data into and create an overall picture.

Lesser and Storck (2001) propose that the communities of practice increase the employees social capital which then influence the organizational performance. They state that because communities of practice overcome organizational boundaries, they increase social capital in the form of connections, relationships and common context. This gain in turn improves the organizational performance by decreasing learning curves, increasing customer responsiveness, reducing or preventing reinvention and increasing innovation. They focus on the three key dimensions of social capital defined by Nahapiet and Ghoshal (1998), namely structural, relational and the cognitive dimension. The structural dimension simply refers to the capability of an individual to make connections with others. The relational dimension goes further by not only assessing the chance but instead actively creating and reinforcing connections between them. Following Nahapiet and Ghoshal (1998) this dimension has four components obligations, norms, trust and identification. The cognitive dimension refers to establishing a common ground of knowledge, such as languages, acronyms, assumptions or narratives (Lesser & Storck, 2001). Those three dimensions and their categories might be able to serve as a theoretical foundation for measurements of community of practice performance.

Andriessen and Verburg (2004) suggest a three part tool called “community assessment tool” or CAT to assess communities of practice in the organization. CAT-Members is a questionnaire of closed items to the members of the community. CAT – Coordinator a list of open questions for the coordinators, and CAT- Context; a set of open questions for a high level informant of the organization, that address the knowledge management strategy and practices in the organization. They describe the process as gathering the contextual information first, before interviewing the coordinators of the previously identified communities. The survey is subsequently issued to the members of the community from which the final report is drawn.

Capece and Costa (2009) use social network analysis to measure knowledge creation in virtual teams. They are using ‘network degree centralization’ and ‘network flow betweeness centralization’ to measure centralization, ICT usage variety and ICT usage variability, leadership style, and the average frequency of communication, as a team configuration index. They then define a two category performance index, based on the idea of quality and quantity of creations.

Hinds and Lee (2009) suggested to create a health index and success measures for virtual communities. For the authors success measures can directly be derived from a functioning community. If a community is functioning is determined by its member’s needs or social aspects and by the technological aspects, as the capability of the platform used. They success is then visible in the usage of the virtual platform, the project outputs and the impacts these outputs have. On the other hand they call for health measures that can determine how sustainable a community is. These health

measures focus on user opinions or complaints rather than on participation. This should directly take social and technological aspects into account.

2.13 Research Model and Hypothesis Development

From the literature it becomes evident that there are certain reoccurring factors influencing knowledge sharing. Broadly they can be divided into individual, environmental and technological factors, with individual and environmental factors affecting each other, as shown in Figure 2.1. Every factor has several dimensions, listed in Table 2.3. However not all environmental dimension might influence every individual dimension. Environmental dimensions might also moderate how technological factors affect participation. For example, if an organization only provides one technology to use the member has no choice but to use it, wherefore the effect would be quite strong even though the technological influence on participation could be negative. Another case is that environmental factors could either be organizational factors or community environmental factors. It is difficult to distinguish between them, especially because organizational factors will have an impact on the community.

The focus of the research is however on the effects of rewards on the quantity of participation, wherefore other environmental factors and technological factors will mostly be disregarded in this study. As in Table 2.3 outlined, rewards are one dimension of the environment.

To the authors knowledge no study has so far quantitatively investigated the effect of rewards on community participation, neither on the quality of participation nor on the quantity. The intention to share knowledge has been widely assessed and

the literature review has outlined the major individual factors into account that are known to affect knowledge sharing and Table 2.3 also lists several factors that are individually perceived but stand in a relation to the community as a whole and influence the sharing of knowledge.

Trust consists of the belief regarding benevolence, integrity and abilities in others, which affects how the individual perceives the trustworthiness of a single person, the community, and it's content (Kankanhalli et al., 2005). Several studies (Nahapiet & Ghoshal, 1998) have mentioned that when the level of trust is high, there might be more willingness in sharing knowledge. Blau (1964) refers to trust as building and maintaining reciprocal exchange relationships.

Table 2.3: Different Dimensions of the three factors influencing participation in online communities

Technological Factors	Environmental Factors	Individual Factors
Response Time/ Performance	Organizational Culture	Intrinsic Motivation Enjoying helping people Self-Efficacy

(Continued)

Table 2.3 (Continued): Different Dimensions of the three factors influencing participation in online communities

Quality of Community Design	Organizational Climate Competitiveness or collaborative Supportive or criticizing Controlling or autonomous	Personal Outcome Expectations Establishing oneself as an expert/ Reputation Career advancement Access to necessary knowledge Loss of Power
Ease of use	Management Involvement	Perception of community reciprocity and obligations towards the community
Security and Property rights management	Rewards	Trust in the people, community, and content
Features and Tools	Incentives	
Asynchronous or real-time communication	Community Rules and Guidelines	
	Shared Language	
	Social Events	
	Colocation	

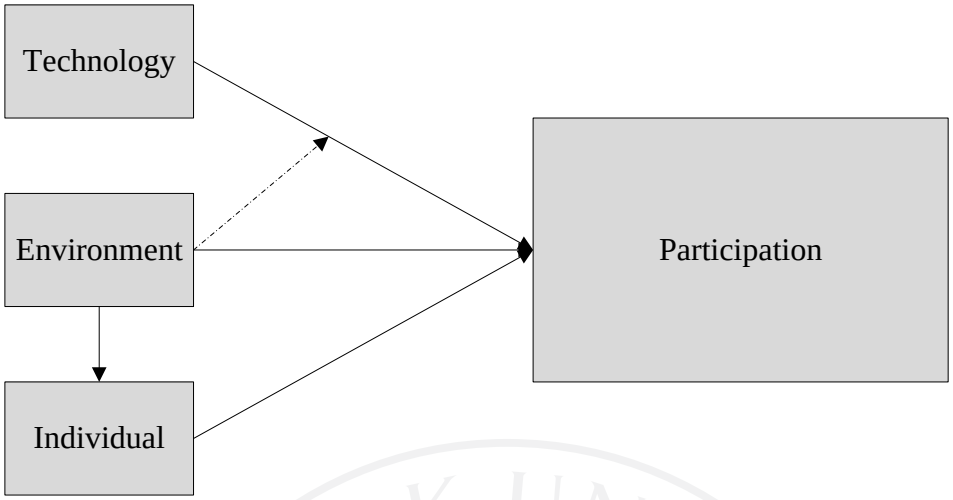


Figure 2.3: Relationships among the three identified factors influencing community participation

In Social Exchange Theory (Hernandes & Fresneda, 2003) mutual reciprocity is seen as one of the reasons that justify the investment of time and effort in knowledge sharing and previous studies have shown on sharing in electronic networks have shown that reciprocity facilities knowledge sharing (McLure Wasko & Faraj, 2005).

H1. The more content is created the more people will start participating in the community.

The hypothesis is not directly related to the question, if rewards are increasing contributions, rather it has an indirect relation. It is assumed that rewards will increase contributions in general which creates a larger amount of content. The more content is available in the community the more valuable it might become to its members. The more content there others share, the more opportunity there is to contribute for the members with various experiences. In essence, because there is more content there

will be more contribution. The hypothesis is then related to rewards because if rewards can get the members of the community to start contributing, even though there is not enough content yet, they would have had an important effect. In this sense rewards might then be a quick starter for the community to reach a certain threshold from which the community can then operate by itself, without further rewards, because enough content is present so that members can benefit from the community even without external rewards.

Rewards itself are extrinsic motivators and can support the individuals, the community or both. The former is likely to increase competition whereas the latter are likely to increase collaboration. In this case rewards were given for individual contributions. While this can have negative effects on trust, reciprocity and other community perceptions that were listed in the literature review, it should nevertheless increase contributions. Therefore Hypotheses 2 state:

H2.1 Before the rewards are administered the average contribution to the community should be lower than during the reward phase.

H2.2 Before the rewards are administered the average contribution to the community should be equal to other communities.

H2.3 During the reward administration phase the average contribution to the community should be higher than in communities without a reward scheme.

Wenger and other suggest that there are different types of members in the community. There are official roles, such as CoP member or CoP moderator, but there are also informal roles such as those mentioned by Lambe (2005). The literature

suggest that the more members are involved in the community the more they getting into the inner circle, because they are adopting and understanding the habits, terms and ways the community interacts. This means that the more content members contribute the community the more they interact with existing or new members.

A way to measure this phenomenon is to use the method of social network analysis. Social Network Analysis maps the interactions between actors to mathematically explain how a community or network of people works. It offers several mathematical models that try to explain why a person is important, or in social network terms, central to a community. One of those mathematical measures is called in-degree centrality. In-degree centrality is a measure how often an actor is nominated by other actors. An actor can be everything from an actual person to an event, such as a blog-post. However, in-degree centrality is only applicable in a directed network. A directed network, in contrast to a non-directed network, assumes that a nomination is only reciprocal when both actors nominate each other. In a non-directed network the nomination of one of the actors is sufficient for reciprocity. In contrast to the in-degree the out-degree refers to the amount of one actor's nominations. It is however possible to not only map and analyze the nominations between the same entities, for example members, but also between two different entities, such as members and events. For example, whenever a community member writes a blog post, the members participates in this event, therefore adding to its out-degree. These kind of networks are called 2-mode networks, in contrast to 1-mode network which only measure the relations between one kind of entity.

In this case the in-degree centrality refers to the actors nominations of other actors as colleagues.

In order to verify Wenger's claim of more engagement equaling more importance or centrality to the network, the in-degree centrality is values can be used to measure if centrality and contribution are positively related.

H3 An actor's in-degree centrality is positively related to its contributions to the community.

H3.1 A high in-degree centrality is positively related to the creation of articles.

H3.2 A high in-degree centrality is positively related to the creation of blog posts.

H3.3 A high in-degree centrality is positively related to the creation of bookmarks.

H3.4 A high in-degree centrality is positively related to the creation of events.

H3.5 A high in-degree centrality is positively related to the uploading of files.

H3.6 A high in-degree centrality is positively related to the participation in community forum discussions.

H3.7 A high in-degree centrality is positively related to the uploading of galleries.

The hypotheses point the positive relation between in-degree centrality and contribution out. It is however questionable if this prevails during the reward phase.

As rewards might have an effect on the motivation that leads to participation it might eventually change the structure of the community. Those actors who previously did not participate or were not in any way involved in the community might now be in for the reward, leading to a higher amount of contributions by those less connected to other community members.

H4 A high in-degree centrality is positively related to an above average contribution.

H4.1 A high in-degree centrality is negatively related to an above average contribution during the reward phase.

CHAPTER 3

RESEARCH METHODOLOGY

This study is intended to explore the relationship between participation in a community of practice and rewards administered for contribution to the community of practice. The main objective is to explore the potential effect on participation behavior in the community. Furthermore the objective is to give practical advice to practitioners especially those running this particular community.

As identified in the literature review (Chapter 2) there is not extensive research on administering rewards in communities of practice, and even research on rewards for knowledge sharing is not very broad. This study is therefore an opportunity to broaden the understanding of the effects of rewards on a community.

This chapter will provide details on the research methodology that will be adopted for the research work and to address the problems identified in literature review. It will outline the sample, and analysis approach as well as the available secondary data. Furthermore, the chapter will point out possible shortcomings and problems that might occur by choosing this specific strategy and its implementation.

3.1 Research Strategy

The research strategy a researcher adopts should be appropriate for the particular research and the objectives it tries to achieve. In this case the research is applying a case study research strategy focusing on one particular CoP at the UNDP, the Poverty Practice Community, with the objectives to measure participation

moderated through rewards and the examine possible effects that rewards could have on the community structure. In this case longitude data collected from the UNDP community of practice system Teamworks was provided by the UNDP for the time period 2006 to July 2012 for the Poverty Practice Community and community user data for three other communities of practice at UNDP for the same timeframe are available. Data for equally run communities that have not been given rewards in the same timeframe allow comparing the different communities. It allows gaining insights on different developments that might have occurred due to the promise of rewards for participation.

3.2 Sample and secondary data description

The reward scheme was administered in the Poverty Practice Community (PPC) of the United Nations Development Program (UNDP) which is therefore the studied population. Members of the PPC include every UNDP management level. Included in the population is one practice director, who is also member of the eight member strong advisory team, and two members of the resource team. Those community members, especially the resource team, manage the community. The majority of members are employed by the UNDP with working locations around the world. For every user of the UNDP it is possible to join and leave the community at every point in time, wherefore there is no fixed number of members.

At the end of the available data the Poverty Practice Community, which is the community the rewards were given to, had 2307 members. The Democratic Governance Community had 2192 members. The Human Development Community had 1687 members and the Crisis Prevention Community had 1980 members.

The secondary data received from the UNDP consists of participation data from 2006 to January 2012. The data contains information on content information, member information, and view and participation information and is part of a larger collaborative environment. The data does not only include data for one CoP but for all communities within the collaborative online environment of UNDP. Table 3.1 describes the data in detail.

Table 3.1: Detailed content of secondary data

User Information	Viewing information of community page	Content Information	Comments to content information
Internal User ID	Community ID	Type of Content • Poll • Article • Blog • Bookmark • Event • File • Forum • Gallery • Status • Wiki	Type of Content • Poll • Article • Blog • Bookmark • Event • File • Forum • Gallery • Status • Wiki

(Continued)

Table 3.1 (Continued): Detailed content of secondary data

Date and Time when joined the CoP	UserID	Group ID indicating from which environment the content origins	Group ID indicating from which environment the content origins
Last Login to the CoP	Times of Views	Data and Time of creation	Data and Time of creation
Organisation within UN/ UNDP		Internal content ID	Internal content ID
Location		Titel of the Content	Content of the comment
UN Duty Station		Views	Expertise of the member who commented
Department		Unique Views	
Role in CoP		Recommendations	
		Comments on the Content	

The data was spread over four excel files. For the four communities the number of contribution records is 24941. A contribution is every form of creating content in the community, for example writing a blog article, commenting on any item or uploading files. Additionally there are 19921 records about Teamworks

members, their account creation and last login date, as well as different community spaces and 9477 records of Teamworks members of viewing one of the four community spaces.

In addition relationship data from the community will be collected to conduct a social network analysis. The data will be collected directly from the community platform by extracting every user who contributed to the community and then matching the user with the user id available from the participation data. In order to gain the full network, every user will be checked for colleagues in their profile. The colleague links will be followed and their profile will be checked for membership in the Poverty Practice Community. If the user is a member of the Poverty Practice Community, their colleagues will be checked for membership as well. This step will be repeated until all users are matched with the existing data. The data then consists of the relationship ties, called colleagues, in the community. A colleague can be added to one's personal profile by sending a virtual colleague request. Once the request is accepted the person is added to one's profile. In this way a one-mode network is created, which links the members of the community in a directed way, since the connection is only accepted if both members agree to be colleagues.

3.3 Procedure

Before a descriptive and inferential statistics and the social network analysis can be performed the secondary data has to be prepared for the analysis. A feature of the Poverty Practice Community is that members can post content on behalf of other members. This is mentioned on top of every comment made. This feature is heavily used but makes it impossible to give credit to the original contributor if not taken care

of. Therefore it is necessary to go through every item, original post and all comments, to check if the post was made on behalf of another member or if it really belongs to the person the post origins from in the secondary data. The correct attribution has then to be used to correct the secondary data. For the purpose of this study this will be done from the first of November 2010 until January, 2012, as this is the date the secondary data stops.

In order to be able to conduct the social network analysis it is necessary to extract the relationship ties of the community between the actors contributing to the community. This data is not provided by the secondary data received from the UNDP. In order to obtain the data the researcher has to open every content item in the online network and navigate to the network profile of the original contributor and the comments contributors. Subsequently all those people mentioned as colleagues have to be extracted. The timeframe extracted sums up all the connections made until July. The data has then to be entered into the social network analysis software NodeXL (Foundation, 2012), which allows calculating the in-degree centrality and to visually represent the network. In addition a second network will be created that shows the relationships between the actors and the content items they created in the community.

A social network analysis is an analysis of the relationships between the members of the community. In this particular case a relationship is established when two actors add each other as colleagues. It can be distinguished between a directed and not directed network (Cross & Parker, 2004). A directed network is a network in which both parties acknowledge to “know” each other. Since in the Teamworks network one has to accept or acknowledge the request to be added as a colleague, the

network is indeed directed. A not-directed network would on the other hand be a network where no mutual acknowledgement is needed.

A second way would be to use a 2-mode network, which connects actors with actors and with events. Because there are in fact two different kinds of actors, humans and events, one speaks of 2-mode networks. An event could for example be a forum post, and actors, even though not connected through a colleague link, could be connected because they contribute to the same forum thread. In this case the 2-mode network is disregarded as the research is interested in the effects the rewards have on networking among members of the community, rather than their relations to contributions.

In this study it is hypothesized that those actors with a large body of knowledge will have more relationships or ties to other actors than those actors with less knowledge. Furthermore it is assumed that those people who contribute more have more knowledge and that their colleagues will add them to their network to have a valuable source at hand. This is why this research focused on in-degree centrality. In-degree centrality is a method of measuring how central an actor is by counting all the incoming relationship the actor has. In contrast, for example, betweeness centrality counts how often an actor connects other actors in the network (Figure 3.4).

The NodeXL software used is a template for Excel. The data is entered in a normal excel spreadsheet. The first row contains the actors (Vertex in NodeXL) from whom the relationship goes out, the second row to who it goes. This creates a (visible) network in the software but more importantly allows calculating the different centrality and network measures (Figure 3.2).

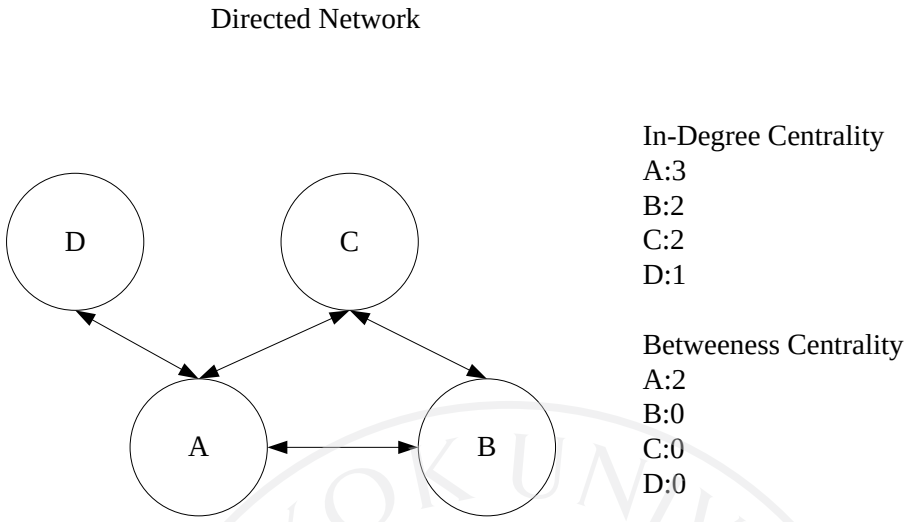


Figure 3.4: Directed Social Network In-Degree and Betweeness Centrality

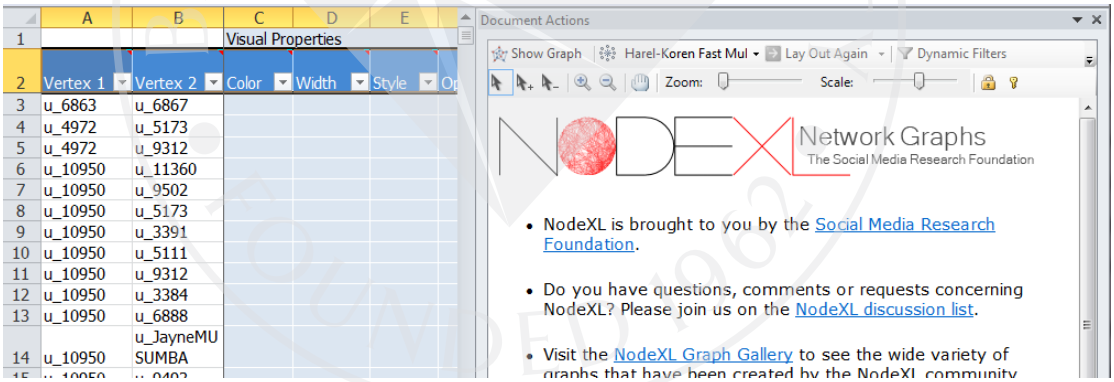


Figure 3.2: Screenshot NodeXL

The results of the social network analysis and the cleaned secondary data can then be used for descriptive and inferential statistics, which includes the comparison of average contribution rates with two other communities of practice at the UNDP. Those communities are operated in exactly the same way as the Poverty Practice Community but lack the administration of rewards.

3.4 Limitations

Limitations of the study arise with the posts made on behalf of other members. It might be that posts on behalf of others cannot be attributed to the correct person as they are not a member of the community or have an account at the UNDP Teamwork network. It is also possible that people have commented on the topics are not active members of the community, as it is possible to cross-post a discussion or article into a different community. However, it is not possible to eliminate the feature and delete the content as it would break the logic flow of the discussions. If one comment of a non-members is deleted and the next comment response to this very post, it would have to be deleted as well, since it is likely it wouldn't have been made if the previous post did not exist.

Another limitation might be the way of collecting the relationship ties between the actors. Only those actors are actively involved are checked for relationship ties with other members of the community. There might still be members missing who just did not post any comments to the community but only observe the current topics and discussions. This might turn out as a limitation since the members not actively participating might have named actors as colleagues who are frequently contributing. A second limitation with not having to collect the data directly from the network is that there is no timestamp available when an actor did a colleague request and when it was accepted, wherefore the data is static, compared to the time stamped secondary data.

CHAPTER 4

ANALYSIS AND RESULTS

The Teamworks environment went online at the end of 2010. Accounts for the Poverty Practice Community (PPC) members, previously engaged in the community via email, were created. Initially 1736 accounts were created in November 2010. Subsequently smaller batches of members were added automatically. There is no data available on how often members visit the community, but there is data available when their last login happened. Table 5 shows the amount of members added in relations to the last login. Apart from November 2010 members were automatically added in April 2011, May 2011, and July 2011. Overall this accounts for 2307 user accounts in the community and 1534 (66.49%) users that have looked at the first page of the community at least once. Of those 1534 users 1203 looked at the first PPC page after the rewards were announced on August 16th. The results were compared with three other communities of practice at the UNDP. The communities only differ in topics and that no awards for contribution were provided after August 16th 2011. Table 4.1 provides an overview of the different values for members that joined the community between November 2010 and the 4th January 2012, the amount of users who accessed at least once the community starting page, and the amount of members that viewed the community space after August 16th 2011.

Table 4.1 shows that the participation continuously increases, however that is the case for all examined communities (see Table 4.1 to Table 4.3 in the Appendix). Table 4.2 shows that all the communities, apart from Human Development, were

visited at least once by more than 50% of the subscribed community members for the timeframe November 2010 to 16th January 2012. The members visiting the community during the reward period is for the PPC 14.35% lower (52.15%), but the visiting rate during this period drops for all communities between 8.89% for the Human Development Community and 15.51% in case of the Crisis Prevention Community.

Table 4.3 shows the differences in the drop rates. In the last two month only 32.68% of the PPC community members looked at the community space, which is a drop of another 19.46% of participation.

In contrast the Human Development community only dropped by 16.48% in viewings. Overall viewing of the PPC community space is still at the second highest percentage, only lower to the larger Democratic Governance Practice.

Table 4.1: Relations of Users Joined the PPC Community to last view of the first community page

Reward Period (Yes/No)	Month	User Joined	Number of users that logged in the last time in each
No	November 2010	1736	4
No	December 2010	11	17
No	January 2011	38	16
No	February 2011	13	32

(Continued)

Table 4.1 (Continued): Relations of Users Joined the PPC Community to last view of the first community page

No	March 2011	18	33
No	April 2011	62	34
No	May 2011	57	41
No	June 2011	10	47
No	July 2011	338	65
Yes	August 2011	11	74
Yes	September 2011	5	90
Yes	October 2011	6	120
Yes	November 2011	1	207
Yes	December 2011	0	351
No	January 2011 (as of 16th January)	1	403
Data: Taken from User Information Joined and Last Viewed			

If one looks at the contribution to the community in terms of content items over the same period it can be seen that the overall amount of content for all communities is steadily increasing. However the content creation is dropping at the end of the year. Figure 4.1 shows the aggregated number of contributions across all possible categories to contribute in (Articles, Blogs, Bookmarks, Events, Files,

Forum, Gallery, and comments to the original post in each category) for all communities.

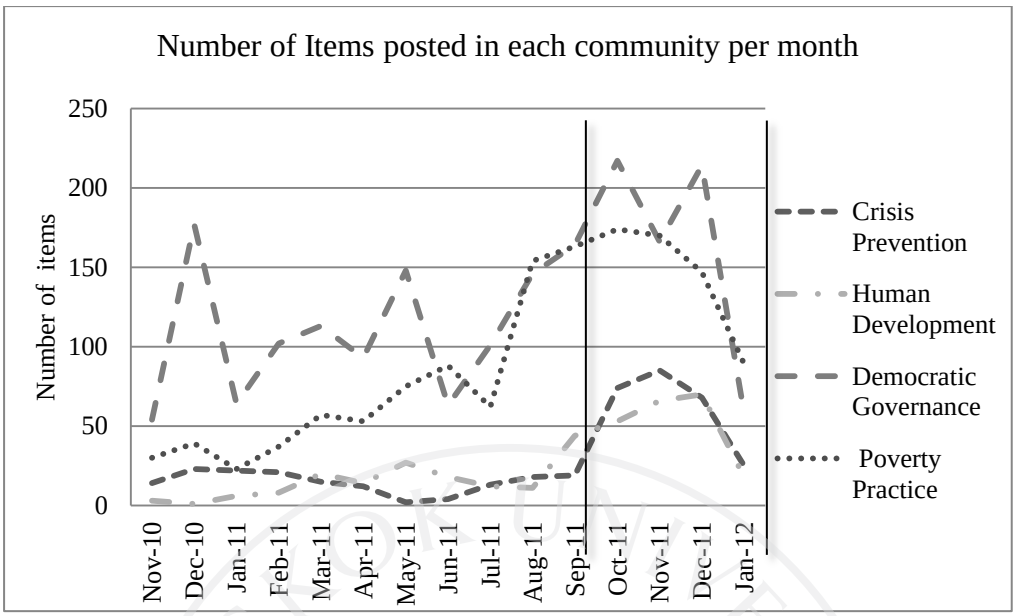
Table 4.2: Comparison of Communities Joined, Accesses, Accessed after 16th Aug 2011

Community	User Joined	User Accessed	User Accessed after 16th August, 2011	Accessed between 1st Dec 2011 and 16th Jan 2012
Poverty Practice Community	2307	1534 (66.49%)	1203 (52.15%)	754 (32.68%)
Democratic Governance	2192	1562 (71.26%)	1228 (56.02%)	779 (35.54)
Crisis Prevention and Recovery	1980	1245 (62.88%)	938 (47.37%)	575 (29.04%)
Human Development	1687	834 (49.44%)	684 (40.55%)	406 (24.07%)
Data: Taken from User Information Joined and Last Viewed				

Table 4.3: Community Rate of Access Rates Drops

Community	Access Rate overall	Drop Rate during the reward period time	Drop Rate to Dec 2011/Jan 2012
Poverty Practice Community	66.49%	14.35%	19.46%
Democratic Governance	71.26%	15.24%	20.48%
Crisis Prevention and Recovery	62.88%	15.51%	18.33%
Human Development	49.44%	8.89%	16.48%
Data: Taken from User Information Joined and Last Viewed			

The graph shows that all communities somehow start to take off between July 2011 and September 2011 and break down in January, which is likely because the data is only available for half of the month. It might also be that this decline is related to the holiday season in all western countries. However, the graph shows that in the last quarter of 2011 the participation in all communities increased. Figure 4.2 shows the relation between the user accessing the space and the content created for the PPC Community.



Data: Taken from Content Information

Figure 4.1: Number of Items posted in each community per month

Considering that the content of the community growth with every post, correlation between the stacked contributions and the views were calculated. Indeed, the correlation is highly significant at .914(Sig.000) for the PPC (Table 4.4). Table 4.5 shows all the correlations for all four communities. It shows that the more content is available, the more user will at least visit the community.

H1 stated: The more content is created the more people will start participating in the community.

$H_0$1. The more content is created not more people will start participating in the community.

Therefore the Null Hypothesis is rejected and the alternative Hypothesis H1.1 is accepted.

Table 4.4: Correlations Views and Stacked Contributions Nov 2010 to Jan 2012

		Views	Stacked Contributions
Views	Pearson Correlation	1	.914**
	Sig. (2-tailed)		.000
	N	15	15
Stacked Contributions	Pearson Correlation	.914**	1
	Sig. (2-tailed)	.000	
	N	15	16

**. Correlation is significant at the 0.01 level (2-tailed).

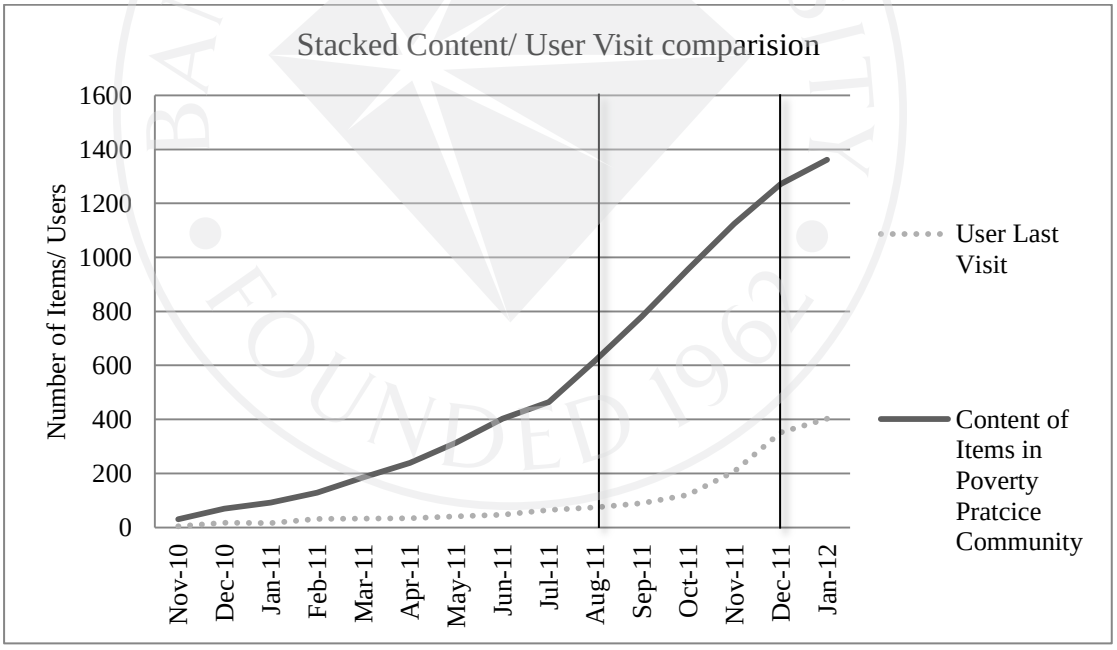
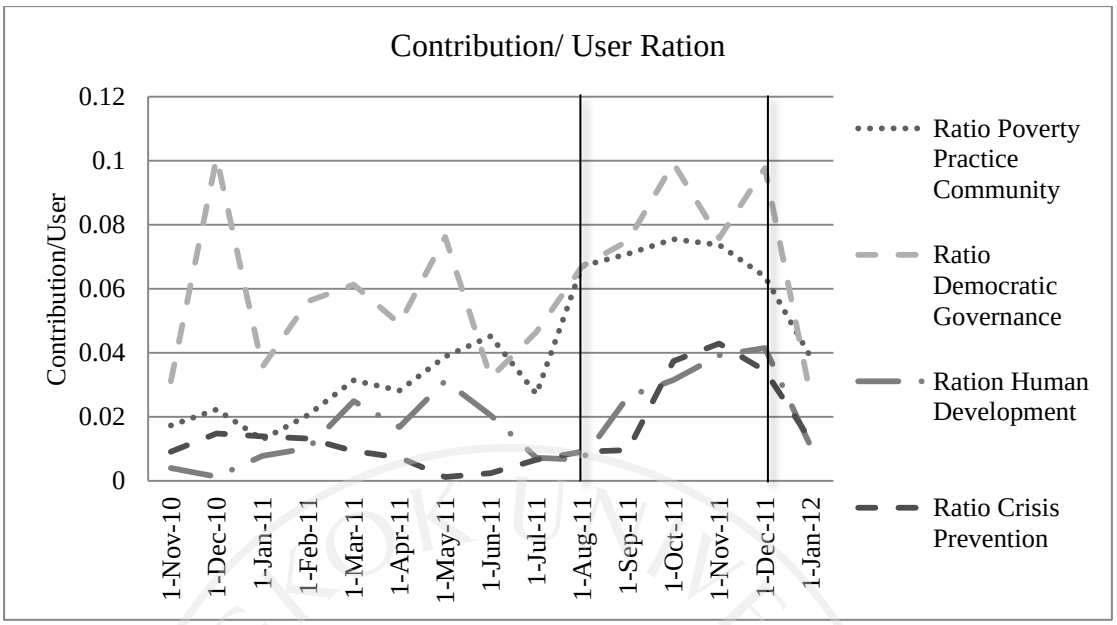


Figure 4.2: Stacked Content to User Visit relation for the PPC community

Table 4.5: Correlations between stacked contributions and views

Community	Pearson Correlation
Poverty Practice Community	.914 (significant at 0.01, 2-tailed)
Democratic Governance	.884 (significant at 0.01, 2-tailed)
Human Development	.970 (significant at 0.01, 2-tailed)
Crisis Prevention	.972 (significant at 0.01, 2-tailed)

On August 16th the rewards were announced. It was expected that during the reward period the average contribution to the community would be higher. For all the communities the average monthly contribution per user is listed in Table 4.6 and shown in Figure 4.3. In order to be able to create this table the number of new content items created during the month, including comments to original content items, was divided by the amount of members of the community at this point in time. There is no data available on the monthly login rates. Therefore it was not possible to distinguish between the active and not active members, non-active members being those who do not check the community space for updates. Figure 4.3 looks almost identical to Figure 4.1, however there are some subtle differences. The contribution to user ratio of the PPC community is in every month but June 2011 and January 2012 lower than of the Democratic Governance Community.



Data: Taken from Content Information and Comments to content information

Figure 4.3: Contribution/ User Ration for all Communities

This is somewhat unexpected, as it was expected that the rewards would increase the participation, if not in absolute numbers so at least at the contribution ratio. Table 4.6 shows the contributions per user. The "post per user" is higher during the reward period in the PPC community but in most cases below the ratio of the Democratic Governance Community. The paired t-test to see if there is a higher contribution during the reward period, was done by splitting the stacked contribution of active users into the period before and during the rewards (Appendix for all communities), which in fact is the case (see Table 4.7).

H2.1. Before the rewards are administered the average contribution to the community should be lower than during the reward phase.

$H_0$2.1 Before the rewards are administered the average contribution to the community should not be lower than during the reward phase.

The Null Hypothesis cannot be rejected since the contribution during the reward period is not significantly higher than before the reward period, wherefore the alternative Hypothesis H2.1. cannot be accepted.

However, there is a tendency to more contributions during the reward period. Unfortunately this is not a unique feature to the PPC Community. All, but the Democratic Governance community, show an increase in their contribution per user ratio. Since the contribution increases in all communities it might have been that the rewards actually attracted new users instead of increasing the participation of the existing user base. It might have been that different or new users in the PPC community started to participate, while the contributing users remained more or less the same in the other communities.

Table 4.6: Contribution per User Ratio

Reward Period (Yes/No)	Month	Poverty Practice Community	Democratic Governance	Human Development	Crisis Prevention
No	Nov-10	0.017	0.031	0.004	0.009
No	Dec-10	0.022	0.101	0.001	0.015
No	Jan-11	0.013	0.036	0.008	0.014
No	Feb-11	0.021	0.056	0.010	0.013
No	Mar-11	0.031	0.061	0.025	0.009
No	Apr-11	0.028	0.049	0.017	0.007

(Continued)

Table 4.6 (Continued): Contribution per User Ratio

No	May-11	0.039	0.076	0.031	0.001
No	Jun-11	0.045	0.032	0.021	0.002
No	Jul-11	0.027	0.047	0.007	0.007
Yes	Aug-11	0.067	0.067	0.007	0.009
Yes	Sep-11	0.071	0.075	0.026	0.010
Yes	Oct-11	0.075	0.099	0.031	0.037
Yes	Nov-11	0.074	0.076	0.039	0.043
Yes	Dec-11	0.064	0.098	0.042	0.034
No	Jan-12	0.039	0.026	0.011	0.013
Taken from Content Information and Comments to content information					

Table 4.7: Paired Sample Test - Contribution before rewards and during rewards

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	OverallContributionBefore	.89	618	5.775	.232
	OVerallContributionDuring	1.16	618	4.919	.198

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	OverallContributionBefore & OVerallContributionDuring	618	.316	.000

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	OverallContributionBefore - OVerallContributionDuring	-.273	6.293	.253	-.771	.224	-1.080	617	.280

Data: Content Information and Comments to content information

Therefore it was compared how many users participated before the reward period, in the reward period, and the percentage of how many new users started to participate during the reward period.

The results can be found in Table 4.8. It shows that the smaller communities gain more new members (by percentage) than the already larger groups. While it makes sense that when a community grows new contributors emerge, it seems that the reward had no effect in attracting new participants in the Poverty Practice Community. If one looks at the percentage of new members compared to the even larger Democratic Governance Community, one can see only a small difference between the levels of attraction of the two communities to new contributors, but the Poverty Practice Community shows a lower attraction of new users than the Democratic Governance Community.

However, if the rewards would have had an effect on acquiring new user the percentage should have been higher than in the Democratic Governance. It seems unlikely that rewards would encourage members that already participate in contributing more, while not attracting new members.

It is interesting that the PPC starts on a similar low contribution level compared to the Human Development and Crisis Prevention communities and then increases to almost the level of the Democratic Governance Community. The increase only lasts until October before it slowly decreases until January. The high increase from the July drop cannot be attributed to the new automated addition of members to the community since the addition, although in a different size, was made to all

communities. The only external change in all communities was that the rewards were given to the PPC.

Table 4.8: Amount of Members Contributing to the Communities Before and During the Reward Period

	Poverty Practice Community	Democratic Governance	Human Development	Crisis Prevention
Contributors before the reward period	150	193	26	46
Contributors during the reward period	205	265	83	97
Percentage of new contributors (absolute amount)	70.24% (144)	73.21% (194)	86.75% (72)	86.6% (84)
Data: Taken from Content Information and Comments to Content Information				

What might be possible is that the amount of content available in the community reached a point where it makes it worthwhile to at least look at the content. Nevertheless, it does not seem to translate into a significantly higher contribution.

H2.2. Before the rewards are administered the average contribution to the community should be equal to other communities.

$H_0$2.2 Before the rewards are administered the average contribution to the community should not be equal to other communities.

The Null Hypothesis can be rejected as the contribution to the PPC starts at a similar level compared to the other three communities and never passes the contributions per user ratio of the Democratic Governance Community and the alternative Hypothesis H2.2. can be accepted.

H2.3. During the reward administration phase the average contribution to the community should be higher than in communities without a reward scheme.

$H_0$2.3 During the reward administration phase the average contribution to the community should not be higher than in communities without a reward scheme.

At the same time the research fails to reject $H_0$2.3 and fail to accept H2.3. as the contribution in the half year of rewarding for it is not passing the Democratic Governance Community even though the participation per user ratio is starting in August on the same level. In fact, the Democratic Governance Community has higher contributions per user than the Poverty Practice Community and is gaining more new contributors. In terms of attracting new contributors the PPC is the weakest of all compared communities, with only 70.24% being new users that contribute, compared to 86.6% and 86.75% new users.

Hypotheses 3 and 4 elaborate on the effects of the rewards on the networking and informal membership role. The in-degree centrality for all people that contributed

between November 2010 and January 2012 to the PPC was collected manually. The In-degree centrality represents the amount of friendship or colleagues ties that are shown in the social network profile. The in-degree was then calculated using NodeXL (Foundation, 2012). H3 and its sub-hypothesis focus on the different types of contributions.

There is a low positive correlation (.397, sig 0.01) between contributions and in-degree centrality. The result is rather surprising as it indicated that a high contribution would not necessarily result in many contacts in the community. Therefore it was tested if betweeness centrality, a measure how members help connect other members, was tested for correlations and indeed shows that there is a positive correlation between overall participation and betweeness centrality (.665, sig .000). Table 4.9 shows the correlations between the different ways of participating and the in-degree in betweeness centrality.

The test for correlation was also done for every possible way to participate in the community, namely articles, blogs, bookmarks, events, files, forums and galleries. The in-degree however does not positively correlate on a high level with any way of participation. The highest positive correlation of the in-degree is with articles (.385, sig .000) and forums (.379, sig .000), nevertheless it is correlated.

All ways of contributing to the community were significantly (0.01) positively correlated with in-degree centrality and betweeness centrality. For betweeness centrality the positive correlations were much higher, indicating that those who participate in the community in whatever form, but especially in articles and forums,

connect people with each other. The only exception was the contribution of events, which is insignificantly negatively correlated to the betweeness centrality.

Table 4.9: Correlations In-degree, In-betweenes, and Ways of Participation to the Community

Data: Taken from Content Information, Comments to Content Information, and collected network relationships

Correlations

		Article	Blog	Bookmark	Events	Files	Forum	Gallery	OverallParticipation	InDegree	Betweeness
Article	Pearson Correlation	1	.170**	.338**	.086*	.442**	.583**	.455**	.751**	.385**	.651**
	Sig. (2-tailed)		.000	.000	.033	.000	.000	.000	.000	.000	.000
	N	618	618	618	618	618	618	618	618	618	180
Blog	Pearson Correlation	.170**	1	.101*	.035	.112**	.617**	.035	.521**	.275**	.402**
	Sig. (2-tailed)	.000		.012	.391	.005	.000	.385	.000	.000	.000
	N	618	618	618	618	618	618	618	618	618	180
Bookmark	Pearson Correlation	.338**	.101*	1	-.009	.284**	.295**	.609**	.466**	.173**	.411**
	Sig. (2-tailed)	.000	.012		.819	.000	.000	.000	.000	.000	.000
	N	618	618	618	618	618	618	618	618	618	180
Events	Pearson Correlation	.086*	.035	-.009	1	.012	.089*	-.006	.075	.175**	-.002
	Sig. (2-tailed)	.033	.391	.819		.766	.026	.878	.064	.000	.979
	N	618	618	618	618	618	618	618	618	618	180
Files	Pearson Correlation	.442**	.112**	.284**	.012	1	.297**	.573**	.781**	.190**	.291**
	Sig. (2-tailed)	.000	.005	.000	.766		.000	.000	.000	.000	.000
	N	618	618	618	618	618	618	618	618	618	180
Forum	Pearson Correlation	.583**	.617**	.295**	.089*	.297**	1	.311**	.765**	.379**	.668**
	Sig. (2-tailed)	.000	.000	.000	.026	.000		.000	.000	.000	.000
	N	618	618	618	618	618	618	618	618	618	180
Gallery	Pearson Correlation	.455**	.035	.609**	-.006	.573**	.311**	1	.601**	.175**	.556**
	Sig. (2-tailed)	.000	.385	.000	.878	.000	.000		.000	.000	.000
	N	618	618	618	618	618	618	618	618	618	180
OverallParticipation	Pearson Correlation	.751**	.521**	.466**	.075	.781**	.765**	.601**	1	.397**	.665**
	Sig. (2-tailed)	.000	.000	.000	.064	.000	.000	.000		.000	.000
	N	618	618	618	618	618	618	618	618	618	180
InDegree	Pearson Correlation	.385**	.275**	.173**	.175**	.190**	.379**	.175**	.397**	1	.426**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000		.000
	N	618	618	618	618	618	618	618	618	618	180
Betweeness	Pearson Correlation	.651**	.402**	.411**	-.002	.291**	.668**	.556**	.665**	.426**	1
	Sig. (2-tailed)	.000	.000	.000	.979	.000	.000	.000	.000	.000	
	N	180	180	180	180	180	180	180	180	180	180

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 4.10: Correlations In-degree, In-betweenes, and ways of Participation in the Community for the Reward Period

Data: Taken from Content Information, Comments to Content Information, and collected network relationships

Correlations

		Article	Blog	Bookmark	Events	Files	Forum	Gallery	OverallParticipation	InDegree	Betweeness
Article	Pearson Correlation	1	.178**	.356**	.158**	.126**	.435**	.351**	.660**	.373**	.583**
	Sig. (2-tailed)		.000	.000	.000	.002	.000	.000	.000	.000	.000
	N	618	618	618	618	618	618	618	618	618	180
Blog	Pearson Correlation	.178**	1	.051	-.006	.077	.651**	.027	.586**	.262**	.289**
	Sig. (2-tailed)	.000		.205	.872	.057	.000	.497	.000	.000	.000
	N	618	618	618	618	618	618	618	618	618	180
Bookmark	Pearson Correlation	.356**	.051	1	-.005	.323**	.087*	.671**	.531**	.155**	.441**
	Sig. (2-tailed)	.000	.205		.905	.000	.030	.000	.000	.000	.000
	N	618	618	618	618	618	618	618	618	618	180
Events	Pearson Correlation	.158**	-.006	-.005	1	-.004	.067	-.004	.093*	.054	-.015
	Sig. (2-tailed)	.000	.872	.905		.916	.095	.931	.021	.183	.843
	N	618	618	618	618	618	618	618	618	618	180
Files	Pearson Correlation	.126**	.077	.323**	-.004	1	.168**	.537**	.556**	.038	.147*
	Sig. (2-tailed)	.002	.057	.000	.916		.000	.000	.000	.346	.049
	N	618	618	618	618	618	618	618	618	618	180
Forum	Pearson Correlation	.435**	.651**	.087*	.067	.168**	1	.132**	.789**	.281**	.494**
	Sig. (2-tailed)	.000	.000	.030	.095	.000		.001	.000	.000	.000
	N	618	618	618	618	618	618	618	618	618	180
Gallery	Pearson Correlation	.351**	.027	.671**	-.004	.537**	.132**	1	.560**	.168**	.576**
	Sig. (2-tailed)	.000	.497	.000	.931	.000	.001		.000	.000	.000
	N	618	618	618	618	618	618	618	618	618	180
OverallParticipation	Pearson Correlation	.660**	.586**	.531**	.093*	.556**	.789**	.560**	1	.345**	.642**
	Sig. (2-tailed)	.000	.000	.000	.021	.000	.000	.000		.000	.000
	N	618	618	618	618	618	618	618	618	618	180
InDegree	Pearson Correlation	.373**	.262**	.155**	.054	.038	.281**	.168**	.345**	1	.426**
	Sig. (2-tailed)	.000	.000	.000	.183	.346	.000	.000	.000		.000
	N	618	618	618	618	618	618	618	618	618	180
Betweeness	Pearson Correlation	.583**	.289**	.441**	-.015	.147*	.494**	.576**	.642**	.426**	1
	Sig. (2-tailed)	.000	.000	.000	.843	.049	.000	.000	.000	.000	
	N	180	180	180	180	180	180	180	180	180	180

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 4.11: Independent Sample T-Test - Above Average Contribution to In-degree and Betweeness – Nov. 2011 to Jan. 2012

Group Statistics

	AboveBelowAverage	N	Mean	Std. Deviation	Std. Error Mean
InDegree	1.00	81	3.79	3.208	.356
	.00	537	1.17	1.642	.071
Betweeness	1.00	81	3222.469136	6712.771807	745.8635341
	.00	537	210.3947858	1140.860433	49.23176154

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
InDegree	Equal variances assumed	81.273	.000	11.465	616	.000	2.623	.229	2.173	3.072
	Equal variances not assumed			7.216	86.426	.000	2.623	.363	1.900	3.345
Betweeness	Equal variances assumed	181.336	.000	9.562	616	.000	3012.074350	315.0190267	2393.432890	3630.715810
	Equal variances not assumed			4.030	80.698	.000	3012.074350	747.4865737	1524.726266	4499.422434

Data: Taken from Content Information, Comments to content information, and collected network relationships

Table 4.12: Independent Sample T-Test - Above Average Contribution to in in-degree and betweeness - Aug 2011 to Dec 2011

Group Statistics

	AboveBelowAverage	N	Mean	Std. Deviation	Std. Error Mean
InDegree	1.00	80	3.58	3.283	.367
	.00	538	1.20	1.677	.072
Betweeness	1.00	80	3189.862500	6627.843619	741.0154438
	.00	538	220.8420074	1263.178843	54.45950695

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
InDegree	Equal variances assumed	72.507	.000	10.105	616	.000	2.371	.235	1.910	2.831
	Equal variances not assumed			6.336	85.227	.000	2.371	.374	1.627	3.114
Betweeness	Equal variances assumed	154.887	.000	9.349	616	.000	2969.020493	317.5926758	2345.324843	3592.716143
	Equal variances not assumed			3.996	79.855	.000	2969.020493	743.0139472	1490.334498	4447.706487

Data: Taken from Content Information, Comments to content information, and collected network relationships

H3. An actor's in-degree centrality is positively related to its contributions to the community.

$H_0$3. An actor's in-degree centrality is not positively related to its contributions to the community.

The Null Hypothesis $H_0$3. can be rejected and the alternative Hypothesis H3. can be accepted as an actor's in-degree centrality is positively related to its contributions to the community. However it should be noted that the betweeness centrality has a stronger correlation with contributions.

H3.1. A high in-degree centrality is positively related to the creation of articles.

$H_0$3.1. A high in-degree centrality is not positively related to the creation of articles.

The Null Hypothesis $H_0$3.1. can be rejected and the alternative Hyopthesis H3.1. can be accepted as a high in-degree centrality is positively related to the creation of articles.

H3.2. A high in-degree centrality is positively related to the creation of blog posts.

$H_0$3.2. A high in-degree centrality is not positively related to the creation of blog posts.

The Null Hypothesis $H_0$3.2. can be rejected and the alternative Hyopthesis H3.2. can be accepted as a high in-degree centrality is positively related to the creation of articles.

H3.3. A high in-degree centrality is positively related to the creation of bookmarks.

$H_0$3.3. A high in-degree centrality is not positively related to the creation of bookmarks.

The Null Hypothesis $H_0$3.3. can be rejected and the alternative Hyopthesis H3.3. can be accepted as a high in-degree centrality is positively related to the creation of articles.

H3.4. A high in-degree centrality is positively related to the creation of events.

$H_0$3.4. A high in-degree centrality is not positively related to the creation of events.

The Null Hypothesis $H_0$3.4. can be rejected and the alternative Hyopthesis H3.3. can be accepted as a high in-degree centrality is positively related to the creation of articles.

H3.5. A high in-degree centrality is positively related to the uploading of files.

$H_0$3.5. A high in-degree centrality is not positively related to the uploading of files.

The Null Hypothesis $H_0$3.5. can be rejected and the alternative Hyopthesis H3.3. can be accepted as a high in-degree centrality is positively related to the creation of articles.

H3.6. A high in-degree centrality is positively related to the participation in community forum discussions.

$H_0$3.6. A high in-degree centrality is not positively related to the participation in community forum discussions.

The Null Hypothesis $H_0$3.6. can be rejected and the alternative Hyopthesis H3.3. can be accepted as a high in-degree centrality is positively related to the creation of articles.

H3.7. A high in-degree centrality is positively related to the uploading of galleries.

$H_0$3.7. A high in-degree centrality is not positively related to the uploading of galleries.

The Null Hypothesis $H_0$3.7. can be rejected and the alternative Hypothesis H3.3. can be accepted as a high in-degree centrality is positively related to the creation of articles.

Even though not part of the hypothesis those results are also true for the betweenes centrality, apart from the event creation which was negatively correlated to betweeness centrality.

It was then tested if there is a difference in the correlations only for the time of the reward period. There is a difference for the contribution of files and events, which seem to be not significantly correlated to the in-degree and again in the case of events negative correlated to the betweeness, even though not significant.

Eventually it seems that it is more likely to connect people when one contributes through articles, bookmarks, forums, and galleries. In order to deepen this preliminary conclusions H4. asks if an above average contribution is positively related to the in-degree. Since it was found that the correlation was usually higher for betweeness centrality, the same test was run for both centrality measures and for the

whole period November 2010 to January 2012, the period before the rewards and the reward period itself (Table 4.11 and Table 4.12). For the November 2010 to January 2012 period the average contribution is *1.275* posts per user for those who actively contribute to the community (not all people that are counted as members of the community). The same users contributed 0.885 posts per user for the phase November 2010 to July 2011 and for 0.4627 contributions per person during the reward period.

H4. A high in-degree centrality is positively related to an above average contribution.

$H_0$4. A high in-degree centrality is not positively related to an above average contribution.

The Null Hypothesis $H_0$4. can be rejected and the alternative Hypothesis H4. can be accepted since the in-degree is significantly (0.000) positively related to an above average contribution.

Beforehand it had been established that not all users actually posted over the whole year and the average contribution is confirming this result. Therefore it is reasonable to ask if the in-degree centrality, and betweeness centrality respectively, is different only for the sample that actually contributed in each phase.

Considering that the rewards should affect more contributions they should not necessarily affect networking behavior, as this is not part of the reward scheme.

H4.1. A high in-degree centrality is negatively related to an above average contribution during the reward phase.

$H_0$4.1. A high in-degree centrality is not negatively related to an above average contribution.

The Null Hypothesis $H_0$4.1. fails to be rejected and the Hypothesis H4.1. cannot be accepted since the results show that there is no relation between the in-degree and the betweeness of people contributing to the community, neither for the period before nor during the reward period (Table 4.13).

Table 4.14 shows a summary of all the Hypotheses and if they were validated.

Table 4.13: Correlation between In-Degree and Betweenes Centrality and their contribution to the community before and during the reward phase

Descriptive Statistics

	Mean	Std. Deviation	N
AmounofContentbyUserBefore	3.85	11.594	142
indegree	1.49	1.978	142
betweenes	736.19	2551.358	142

Correlations

		AmounofContentbyUserBefore	indegree	betweenes
AmounofContentbyUserBefore	Pearson Correlation	1	.122	-.039
	Sig. (2-tailed)		.149	.643
	N	142	142	142
indegree	Pearson Correlation	.122	1	.442**
	Sig. (2-tailed)	.149		.000
	N	142	142	142
betweenes	Pearson Correlation	-.039	.442**	1
	Sig. (2-tailed)	.643	.000	
	N	142	142	142

**. Correlation is significant at the 0.01 level (2-tailed).

Data: Taken from Content Information, Comments to content information, and collected network relationships

Descriptive Statistics

	Mean	Std. Deviation	N
AmounofContentbyUserDuring	3.4927	8.06142	205
indegree2	1.4634	1.83241	205
betweeness2	446.4780	2064.92748	205

Correlations

		AmounofContentbyUserDuring	indegree2	betweeness2
AmounofContentbyUserDuring	Pearson Correlation	1	.112	-.019
	Sig. (2-tailed)		.110	.784
	N	205	205	205
indegree2	Pearson Correlation	.112	1	.400**
	Sig. (2-tailed)	.110		.000
	N	205	205	205
betweeness2	Pearson Correlation	-.019	.400**	1
	Sig. (2-tailed)	.784	.000	
	N	205	205	205

**. Correlation is significant at the 0.01 level (2-tailed).

Data: Taken from Content Information, Comments to content information, and collected network relationships

Table 4.14: Hypothesis Summary Table

Hypothesis	Validated (Yes/No)
H1. The more content is created the more people will start participating in the community.	Yes
H2.1. Before the rewards are administered the average contribution to the community should be lower than during the reward phase.	No
H2.2. Before the rewards are administered the average contribution to the community should be equal to other communities.	Yes

(Continued)

Table 4.14 (Continued): Hypothesis Summary Table

H2.3. During the reward administration phase the average contribution to the community should be higher than in communities without a reward scheme.	No
H3. An actor's in-degree centrality is positively related to its contributions to the community.	Yes
H3.1. A high in-degree centrality is positively related to the creation of articles.	Yes
H3.2. A high in-degree centrality is positively related to the creation of blog posts.	Yes
H3.3. A high in-degree centrality is positively related to the creation of bookmarks.	Yes
H3.4. A high in-degree centrality is positively related to the creation of events.	Yes
H3.5. A high in-degree centrality is positively related to the uploading of files.	Yes
H3.6. A high in-degree centrality is positively related to the participation in community forum discussions.	Yes
H3.7. A high in-degree centrality is positively related to the uploading of galleries.	Yes

(Continued)

Table 4.14 (Continued): Hypothesis Summary Table

H4. A high in-degree centrality is positively related to an above average contribution.	Yes
H4.1. A high in-degree centrality is negatively related to an above average contribution during the reward phase.	No

CHAPTER 5

DISCUSSION AND CONCLUSION

The analysis shows that, in contrast to the preliminary assumptions, rewards most likely do not play a significant role in the contribution to the Poverty Practice Community. At most they are engaging members in the moment they are announced. During the reward period the analysis was not able to show higher contributions rates per user, or higher subscription, or growth rates. There is not more content created, nor is there more networking or different networking. The structure of the community, in terms of how people are connected, shows that those contributing more do network more, but the results do not show that there is a significant difference in networking behavior before and during the reward period.

The fact is that all communities grow, to a certain extent, over the analyzed period. They all create more content and gain new members. The Poverty Practice Community starts at a similar low level as the Human Development and Crisis Prevention Communities and then levels of, reaching the level of the Democratic Governance Community in August, which is the month the reward was announced. The level of contribution per user is on par with the Democratic Governance Community in the month the reward period is starting. Despite the announcement of rewards the Democratic Governance community outperforms the Poverty Practice Community in terms of contributions and new member participation during the reward period.

The most extreme jump in contributions happens in the Poverty Practice Community between July and August. The contributions per member more than double, however this is also true for the Democratic Governance community in the comparison of June and July and for the Crisis Prevention Community for September – October, wherefore the increase might just be a coincidence rather than a result of the reward.

In any case, the rewards do not affect the contribution in a long run, as the gains in contributions only slightly rise and at the end of the year start to drop, even though the reward period is coming to an end, which was expected to actually reinforced contribution rates, as members might have tried to secure their rewards.

Despite the rewards not mattering much, or not at all, contributing to the community is obviously related to the networking in the community. It does not matter in what way people contribute to the community, if they write in the forum, blogs or participate in other forms; it is always positively related to the in-degree centrality of the members and most of the time positively related to their betweeness centrality. In fact, the betweeness centrality shows higher correlations than the in-degree centrality, which can be an indicator that those contributing more are better connected, rather than hubs for expertise. The latter would be true if the in-degree centrality would have shown a higher correlation.

Another indicator that the rewards did not affect the community much is that there is no difference in the in-degree and betweeness centrality for members that contribute before and for members that contribute during the reward period. It was expected that if rewards are given the effects on networking behavior would have

been negative, as the reward was not designed to support networking. However, this is not the case. The results show that there is no change in networking behavior for both groups whatsoever.

It can be concluded that the rewards did not have a major effect on the community, at the very least not longer than two month. The question is subsequently, why the community does have higher contribution rates during the reward period than before the reward phase. Reasons might be that the rewards were either not regarded valuable enough, to spend a valuable amount of time on contributions, that the rewards were not visible enough or for organizational cultural reasons. All these cases would explain why there is no impact on the community.

In all communities alike, the access rates drop eventually and a core of roughly 24% to 35% of all members remain accessing the community. The interesting is however that the lower the access rate, the higher the contribution per user is, which means that a low percentage of the community members is making up for the vast majority of not engaged members.

A possible reason for this result might be that the communities established two things. First, they established a threshold of content which makes it worthwhile to access the community, at the very least to read the content. Ng, Lin, and Chiu (2005) studied the information sharing in a music sharing peer to peer network. They speak of a deadlock that will eventually destroy the community if not enough content is present that can be shared or attract members, or if there are no members that contribute without expecting any benefits.

Even though the Communities of Practice are not peer to peer communities in the strict sense, it might have been that the analyzed period showed exactly these symptoms. Initially the contribution to the PPC (and all other communities for that matter) was very low. However, since all the communities are specifically aligned to the goals of the UNDP, and have a full time management (moderators) who can and will encourage contributions, and upload content themselves, it might have resulted in enough content for the community to become relevant to members, who engage eventually.

A second phenomenon that was observed is a decreasing numbers in members accessing the community increase the access rates. This means fewer members are looking at the community more frequently. The percentage of members that access the community drops from 71.26% to 35.54% in the PPC until December 2011 and in the lowest case, the Human Development Community, to 24.07%. This kind of drop is not necessarily abnormal as the Pareto-Principle is suggesting that roughly 80% of the community content will be created by only about 20% of the community members. However, the Pareto Equilibrium might not sustain as the community moves on, more longitude data is needed to verify this assumption.

This leads to the limitations of this study. While there is enough data to display the contributions for a one year frame, there is no data to extend the study to the period after the rewards were discontinued. Since there is a step increase from July 2011 to August 2011 in the PPC it might be that after the reward period the contributions are falling back to the level of July 2011. The data from December 2011 and mid-January 2012 might suggest that this is the case, if one looks only at the PPC

community, however all other communities decrease similarly. Since the UNDP communities of practice are work related communities, in contrast to private communities, the instant drop might just be related to the world-wide holiday season.

A second shortcoming is that there is no information available how visible the rewards were to the community. The rewards were announced on the starting page of the community in order for every user accessing the community to see them. However, we only have the access rates, and those do not provide enough information about how users perceive the starting page. It is also unknown how the value and appropriateness of the rewards were perceived by the community. It had already been established that in case of a high intrinsic motivation rewards might have a negative effect on the community. While the analysis did not show any negative effects, and it is therefore unlikely that the community was opposed to the ideas of rewards, it is possible that the majority of members were just not aware of the rewards. However, data does not exist for both cases.

A further shortcoming then steams from the fact that there is no data on the motivation to participate and the actual participation. In between rewards could have been moderating the relationship in order to analyze how they affect the intention to participate. The original research methodology included a data collection and survey to study these effects. Unfortunately it was eventually not possible to conduct the survey and the further that study in this direction as policy changes at the UNDP prohibited the collection of additional survey data. Therefore this task was beyond the scope of this study. Another limitation was the collection of the social networking data. In contrast to the actual usage data, the social networking data is not longitude

data but static. This might have influenced the results regarding the in-degree and betweeness centrality over the different periods. However, timeline data was not available.

Lastly, while UNDP has more than four communities of practice the analysis only focused on the four largest. Members in smaller communities might have different ways of engaging with each other and that might have led to more compelling results or a more detailed comparison.

5.1 Future research

Despite the limitations, the study provides a step into quantitatively analyzing the effects of rewards in communities of practice. Since this is a first step much remains to be discovered about how rewards can affect a community of practice and the participation of its members. Future studies might focus on the link between the perception of rewards by the community and the eventual results of the application of the rewards. One could link the organizational culture to the perception of the rewards in order to establish if rewards, or what kind of rewards, are an appropriate means for increasing the participation.

It would also be valuable to examine more deeply the relationships between the community members and how they are affected by the provision of rewards. In this study an in-degree and betweeness approach was used, but there are other means of analyzing group relations and their effectiveness in creating useful content or economic value.

Furthermore it would be useful to analyze the effect of rewards on the quality of contributions. While quality is difficult to define it is of huge importance.

Depending on the rewards given to the community, they might have an effect on the quality of contributions. Future research could therefore focus on the possible trade-off between increased contribution and decreased contribution quality.

5.2 Managerial Recommendations

This research set out to examine the influence of rewards on the contribution in a community of practice at the UNDP, by comparing different communities at the UNDP with one community that received rewards for contributing. The findings suggest that rewards do not have a significant effect on the contribution to the community.

For the given setting the application of rewards does not seem to be useful and past research has shown mixed results (Fahey et al., 2007). It is likely that depending on the organizational culture and the kind of provided rewards, the effects of rewards will vary. Managers have the option to create competitive reward schemes, which reward individuals for the quantity or quality, or both. Or they can create rewards schemes that try to reward the group as a whole, again in terms of quality, quantity or both. Other potential influence factors are the value of the reward and its visibility.

Especially the value of the reward is a difficult variable, as it, at least partially, depends on the organizational culture as well. In different organizational cultures, rewards might be valued high, even though the monetary value is not. Furthermore, it might be that the intrinsic motivation to participate, at least in the UNDP communities, is very high, possibly because of the humanitarian topics they are dealing with. In such an extreme case, rewards might have no effects at all, because the organizational values might overrule the extrinsic motivation. An analysis of the

reasons for community members to participate in the community might therefore be useful, before a decision on reward administration is given.

Visibility is the second challenge that has to be overcome if rewards are going to have an effect. Members have to be personally notified that they can receive rewards for contribution. A general message might not be sufficient, especially in an environment in which the content is constantly changing. The notification has also to be made prominent for members that join after the reward period has started and all members should get constant updates on the ranking, if such applies, or who would at the very moment get the reward and how others do compared to the leaders. This will increase visibility and show that the community moderators or managers are taking the rewards serious and will not forget about it.

Rewards might be useful at the start of a community. Since no, or very few content, is available the value for joining members is rather low. Until the community reaches its tipping point rewards might actually help to keep members interested. However, it might be equally useful to create useful content for the community before it is officially started. One could ask experts in the community to share their knowledge upfront to create a small set of items of high value, on which people can comment and use as working examples for what content should be contributed to the community. The goal would be to move the tipping point closer to the community creation. A second area where rewards to the community might be helpful is timeframes right after season holidays or timeframes with general low contributions. This could help to rejuvenate the community and spark new discussions.

BIBLIOGRAPHY

Andriessen, J. H. E., & Verburg, R. M. (2004). *The development and application of the community assessment toolkit*. Paper presented at the The Fifth European conference on organizational knowledge, learning and capabilities, Insbruck.

Ardichvili, A., Maurer, M., Li, W., Wentling, T. Stuedemann, R. (2006). Cultural influences on knowledge sharing through online communities of practice. *Journal of Knowledge Management, 10*(1), 94-107.

Ardichvili, A., Page, V., & Wentling, T. (2003). Motivation and barriers to participation in virtual knowledge-sharing communities of practice. *Knowledge Management, 7*(1), 64-77.

Barabási, A., & Albert, R. (1999). Emergence of Scaling in Random Networks. *Science*, 286, 509-512.

Barabási, A. L. (2003). *Linked: How Everything Is Connected to Everything Else and What It Means*. New York: Plume.

Birgit, R. (2008). Trust in management and knowledge sharing: The mediating effects of fear and knowledge documentation. *Omega*, *36*(2), 206-220.

Blau, P. M. (1964). *Exchange and Power in Social Life*. New York: J. Wiley.

Borda, A., & Bowen, J. P. (2009). Virtual Collaboration and Community. In B. Whitworth & A. d. Moor (Eds.), *Handbook of Research on Socio-Technical Design and Social Networking Systems* (pp. 11). Hershey PA: IGI Global.

Borzillo, S., Aznar, S., & Schmitt, A. (2011). A journey through communities of practice: How and why members move from the periphery to the core. *European Management Journal, 29*(1), 25-42.

Brandtzæg, P. B., & Heim, J. (2009). Explaining Participation in Online Communities. In B. Whitworth & A. d. Moor (Eds.), *Handbook of Research on Socio-Technical Design and Social Networking Systems* (pp. 16). Hershey PA: IGI Global.

Brown, J., & Duguid, P. (1991). Organizational Learning and Communities-of-Practice: Toward a Unified View of Working, Learning, and Innovation. *Organization Science, 2*(1), 40-57.

Brown, J., & Duguid, P. (2000). Balancing Act: How to Capture Knowledge Without Killing It. *Harvard Business Review, 78*(3), 73-80.

Cabrera, A., & Cabrera, E. F. (2002). Knowledge-Sharing Dilemmas. *Organization Studies, 23*(5), 687-710.

Capece, G., & Costa, R. (2009). Measuring knowledge creation in virtual teams through the social network analysis. *Knowl Manage Res Prac, 7*(4), 329-338.

Chang, H. H., & Chuang, S.-S. (2011). Social capital and individual motivations on knowledge sharing: Participant involvement as a moderator. *Information & Management, 48*(1), 9-18.

Chiu, C.M., Hsu, M.H., & Wang, E. T. G. (2006). Understanding knowledge sharing in virtual communities: An integration of social capital and social cognitive theories. *Decision Support Systems, 42*(3), 1872-1888.

Christopher, J. M. (2001). A survey of current research on online communities of practice. *The Internet and Higher Education, 4*(1), 45-60.

Collier, J., & Esteban, R. (1999). Governance in the Participative Organisation: Freedom, Creativity and Ethics. *Journal of Business Ethics, 21*(2/3), 173-188.

Correia, A. M. R., Paulos, A., & Mesquita, A. (2009). *Virtual communities of practice: Investigating motivations and constraints in the processes of knowledge creation and transfer*. Paper presented at the ECKM09 - European Conference on Knowledge Management, Università Degli Studi Di Padova, Vicenza, Italy.

Cox, A. (2005). What are communities of practice? A comparative review of four seminal works. *Journal of Information Science, 31*(6), 527-540.

Cress, U., Barquero, B., Schwan, S., & Hesse, F. W. (2007). Improving quality and quantity of contributions: Two models for promoting knowledge exchange with shared databases. *Computers & Education, 49*(2), 423-440.

Cross, R., & Parker, A. (2004). *The Hidden Power of Social Networks*. Boston, MA: Havard Business School Press.

Dale, S. (2010). *Collaboration & Communities - Communities of Practice in UK Local Government*. Retrieved January 13, 2012, from http://www.ciaris.org/workspace_files/155/Communities_of_Practice _in_Local_Government_-_V2.0.pdf.

Davenport, E., & Hall, H. (2002). Organizational Knowledge and Communities of Practice. *Annual Review of Information Science and Technology, 36*, 171-227.

Dubé, L., Bourhis, A., & Jacob, R. (2006). Towards a typology of virtual communities of practice. *Interdisciplinary Journal of Information, Knowledge, and Management, 1*(1), 69–93.

Evangelou, C., & Karacapilidis, N. (2005). On the interaction between humans and Knowledge Management Systems: a framework of knowledge sharing catalysts. *Knowl Manage Res Prac, 3*(4), 253-261.

Fahey, R., Vasconcelos, A. C., & Ellis, D. (2007). The impact of rewards within communities of practice: a study of the SAP online global community. *Knowledge Management Research and Practice, 5*(3), 186-198.

Foundation, S. M. R. (2012). *NodeXL (Version 1.0.1.215)*. Retrieved July 16, 2012, from http://nodexl.codeplex.com/

Fox, S. (2000). Communities of practice, Foucault and actor-network theory. *Journal of Management Studies, 37*, 853-867.

Gee-Woo, B., Zmud, R. W., Young-Gul, K., & Jae-Nam, L. (2005). Behavioral Intention Formation in Knowledge Sharing: Examining the Roles of Extrinsic Motivators, Social-Psychological Forces, and Organizatioanl Climate. *MIS Quarterly, 29*(1), 87-111.

Gherardi, S., Nicolini, D., & Odella, F. (1998). Toward a social understanding of how people learn in organizations. *Management learning, 29*(3), 273-297.

Gongla, P., & Rizzuto, C. R. (2001). Evolving communities of practice: IBM global services experience. *IBM Syst. J., 40*(4), 842-862.

Hall, H., & Graham, D. (2004). Creation and recreation: motivating collaboration to generate knowledge capital in online communities. *International Journal of Information Management, 24*(3), 235-246.

Hara, N. (2008). *Communities of Practice Fostering Peer-to-Peer Learning and Informal Knowledge Sharing in the Work Place*. Berlin: Springer.

Haythornthwaite, C., Kazmer, M. M., Robins, J., & Shoemaker, S. (2004). Chapter 3: Community Development among Distance Learners:Temporal and Technological Dimensions. A Review of Learning, Culture and Community in online Education: Research and Practice, 21, 35-57. University of California, NY. Peter Lang Publishing, Inc.

He, W., & Wei, K.-K. (2009). What drives continued knowledge sharing? An investigation of knowledge-contribution and -seeking beliefs. *Decision Support Systems, 46*(4), 826-838.

Hernandes, C. A., & Fresneda, P. S. (2003). *Main Critical Success Factors for the Establishment and Operation of Virtual Communities of Practice*. Paper presented at the 3rd European Knowledge Management Summer School, San Sebastian, Spain. http://carlosmamede.org/2_kmss03_32.pdf%20-%20Fatores%20cr%C3%ADticos%20comunidades%20de%20pr%C3%A1tica%20virtuais%20-%20Espanha.pdf.

Hinds, D., & Lee, R. M. (2009). Assessing the Social Network Health of Virtual Communities. In B. Whitworth & A. d. Moor (Eds.), *Handbook of Research on Socio-Technical Design and Social Networking Systems* (pp. 16). Hershey PA: IGI Global.

Hislop, D. (2005). The effect of network size on intra-network knowledge processes. *Knowl Manage Res Prac, 3*(4), 244-252.

Hsu, C., & Lin, J. (2008). Acceptance of blog usage: The roles of technology acceptance, social influence and knowledge sharing motivation. *Information & Management, 45*(1), 65-74.

Jeon, S. H., Kim, Y. G., & Koh, J. (2011). Individual, social, and organizational contexts for active knowledge sharing in communities of practice. *Expert Systems with Applications, 38*(10), 12423-12431.

Jiacheng, W., Lu, L., & Francesco, C. A. (2010). A cognitive model of intra-organizational knowledge-sharing motivations in the view of cross-culture. *International Journal of Information Management, 30*(3), 220-230.

Kankanhalli, A., Tan, B., & Wei, K.-K. (2005). Contributing Knowledge to Electronic Knowledge Repositories: An Empirical Investigation. *MIS Quarterly, 29*(1), 113-143.

Kim, A. J. (2000). *Community Building on the Web*. Berkeley, CA: Peachpit Press.

King, W. R., & Marks, P. V. (2008). Motivating knowledge sharing through a knowledge management system. *Omega, 36*(1), 131-146.

Lambe, P. (2005). *Mapping the Culture of an Online Community - Archetypes and their Attributes Derived by ACT-KM Participants*. Paper presented at the ACT-KM Conference 13-14 October 2004. Retrieved May 16, 2012, from http://www.greenchameleon.com/thoughtpieces/archetypes.pdf

Lave, J., & Wenger, E. (1991). *Situated learning: legitimate peripheral participation*. Cambridge, UK: Cambridge University Press.

Lee, D. J., & Ahn, J. H. (2007). Reward systems for intra-organizational knowledge sharing. *European Journal of Operational Research, 180*(2), 938-956.

Lesser, E. L., & Storck, J. (2001). Communities of practice and organizational performance. *IBM Syst. J., 40*(4), 831-841.

Li, Y. M., & Jhang Li, J. H. (2010). Knowledge sharing in communities of practice: A game theoretic analysis. *European Journal of Operational Research, 207*(2), 1052-1064.

Liedtka, J. (1999). Linking competitive advantage with communities of practice. *Journal of Management Inquiry, 8*(1), 5-5-16.

Lin, F., Lin, S., & Huang, T. (2008). Knowledge sharing and creation in a teachers' professional virtual community. *Computers & Education, 50*(3), 742-756.

Lin, M. J. J., Hung, S. W., & Chen, C. J. (2009). Fostering the determinants of knowledge sharing in professional virtual communities. *Computers in Human Behavior, 25*(4), 929-939.

Maggio, M. D., Gloor, P. A., & Passiante, G. (2009). Collaborative innovation networks, virtual communities and geographical clustering. *International Journal of Innovation and Regional Development, 1*(4), 387-404.

McDermott, R. (1999). Learning Across Teams. *Knowledge Management Review*(8), 32-36.

McLure Wasko, M., & Faraj, S. (2005). Why should I share? Examining Social Capital and Knowledge Contribution in Electronic Networks of Practice. *MIS Quarterly, 29*(1), 35-57.

Muller, R. M., Spiliopoulou, M., & Lenz, H.-J. (2005). *The Influence of Incentives and Culture on Knowledge Sharing*. Paper presented at the Proceedings of the Proceedings of the 38th Annual Hawaii International Conference.

Nahapiet, J., & Ghoshal, S. (1998). Social Capital, Intellectual Capital, and the Organizational Advantage. *The Academy of Management Review, 23*(2), 242-266.

Ng, W. Y., Lin, W. K., & Chiu, D. M. (2005). Statistical modelling of information sharing: Community, membership, and content. *Performance Evaluation, 62* (1 - 4), 17-31.

Nonaka, I. (1991). The Knowledge-Creating Company. *Havard Business Review, 69*(6), 96-104.

Nonaka, I., & Takeuchi, H. (1995). *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation*. Oxford: Oxford University Press.

Orr, J. E. (1990). Sharing knowledge, celebrating identity: war stories and community memory in a service community. In D. S. Middleton & D. Edwards (Eds.), *Collective Remembering: Memory in Society* (pp. 169-189). Beverly Hills, CA: Sage.

Rogers, J. (2000). Communities of Practice: A framework for fostering coherence in virtual learning communities *Educational Technology & Society, 3*(3), 9.

Smits, M., & de Moor, A. (2004). *Measuring Knowledge Management Effectiveness in Communities of Practice.* Paper presented at the 37th Hawaii International Conference on System Sciences, Hawaii.

Smits, M., & De Moore, A. (2004). *Measuring knowledge management effectiveness in communities of practice.* Paper presented at the Proceedings of the 37th Annual Hawaii International Conference on System Science, Hawaii.

Terra, J. C., & Gordon, C. (2003). *Realizing the Promise of Corporate Portals - Leveraging Knowledge for Busness Success*. Burlington, MA: Elsvier Science.

UNDP. (2011). *UNDP at a Glance*. Retrieved May 28, 2012, from http://www.undp.org/content/undp/en/home/operations/about_us/_jcr_content/contentPar/developmentreport/file.res/w-undp_brochure_2012-Eng-final.pdf.

UNDP. (2012). *A world of development experience.* Retrieved May 28, 2012, from http://www.undp.org/content/undp/en/home/operations/about_us.html

Usoro, A., Sharratt, M. W., Tsui, E., & Shekhar, S. (2007). Trust as an antecedent to knowledge sharing in virtual communities of practice. *Knowledge Management Research & Practice, 5*(3), 199-212.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User Acceptance of Information Technology: Toward a Unified View. *MIS Quarterly*, *27*(3), 425-478.

Wang, S., & Noe, R. A. (2010). Knowledge sharing: A review and directions for future research. *Human Resource Management Review, 20*(2), 115-131.

Wenger, E. (1998). *Communities of Practice - Learning, Meaning, and Identity*. Cambridge, UK: Cambridge University Press.

Wenger, E., McDermott, R., & Snyder, W. (2002). *Cultivating Communities of Practice*. Boston, MA: Havard Business School Press.

Wick, C. (2000). Knowledge Management and Leadership Opportunities for Technical Communicators. *Technical COMMUNICATION, Fourth Quarter 2000,* 515-529.

APPENDIX

Table 4.1: Relations of Users Joined the Democratic Governance Community to last view of the first community page

Month	User Joined	Number of users that logged in the last time in each
November 2010	1736	0
December 2010	18	9
January 2011	41	18
February 2011	22	32
March 2011	26	34
April 2011	51	31
May 2011	48	47
June 2011	11	37
July 2011	217	82
August 2011	9	81
September 2011	7	78
October 2011	3	138
November 2011	1	196
December 2011	2	374
January 2011 (as of 16th January)	0	405

Table 4.2: Relations of Users Joined the Human Development Community to last view of the first community page

Month	User Joined	Number of users that logged in the last time in each
November 2010	743	1
December 2010	6	1
January 2011	16	7
February 2011	16	12
March 2011	23	13
April 2011	28	13
May 2011	32	19
June 2011	13	30
July 2011	783	38
August 2011	8	46
September 2011	5	60
October 2011	10	69
November 2011	2	119
December 2011	1	195
January 2011 (as of 16th January)	0	405

Table 4.3: Relations of Users Joined the Crisis Prevention Community to last view of the first community page

Month	User Joined	Number of users that logged in the last time in each
November 2010	1540	6
December 2010	11	10
January 2011	26	20
February 2011	16	28
March 2011	14	30
April 2011	37	23
May 2011	22	31
June 2011	2	42
July 2011	295	74
August 2011	5	71
September 2011	7	65
October 2011	3	108
November 2011	1	162
December 2011	0	278
January 2011 (as of 16th January)	1	297

Table 4.4: Paired Sample Test - Contribution before rewards and during rewards - Crisis Prevention Community

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	ContributionBefore	.3000	340	2.64263	.14332
	ContributionDuring	.4118	340	3.04361	.16506

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	ContributionBefore & ContributionDuring	340	.035	.522

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	ContributionBefore - ContributionDuring	-.11176	3.96063	.21480	-.53426	.31073	-.520	339	.603

Table 4.5: Paired Sample Test - Contribution before rewards and during rewards - Democratic Governance

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	ContributionBeforeDemocratic	2.5349	387	17.09485	.86898
	ContributionDuringDemocratic	2.1705	387	6.57258	.33410

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	ContributionBeforeDemocratic & ContributionDuringDemocratic	387	.619	.000

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	ContributionBeforeDemocratic - ContributionDuringDemocratic	.36434	14.00958	.71215	-1.03583	1.76451	.512	386	.609

Table 4.6: Paired Sample Test - Contribution before rewards and during rewards - Human Development

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	ContributionBeforeHumanDev	1.3021	96	7.71072	.78697
	ContributionDuringHumanDev	2.5208	96	7.74322	.79029

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	ContributionBeforeHumanDev & ContributionDuringHumanDev	96	.593	.000

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	ContributionBeforeHumanDev - ContributionDuringHumanDev	-1.21875	6.97092	.71147	-2.63119	.19369	-1.713	95	.090

BIODATA

Christian Walter

Date of Birth: 21 April 1984

Nationality: German

Tel: 081-430-0815

E-Mail: chr.walter@gmail.com

Education

2007-2010 FernUniversität Hagen Hagen, DE

B.A., Cultural Science, Major: Sociology.

Thesis: Analyzing Power in Organizations with Social Network Analysis

2010- Aug 2012 Bangkok University Bangkok, TH

Master of Business Administration

Thesis: Evaluating the effect of rewards on the level of participation in communities of practice at UNDP

Work Experience

2006 –2010 access Kelly OCG GmbH Cologne, DE

Marketing Assistant, Candidates Attraction and Placement

July 2010 – August 2012 Bangkok University Bangkok, TH

Research Assistant –Institute for Knowledge and Innovation