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# THE INFLUENCE OF COMMUNITY COMMITMENT ON KNOWLEDGE MANAGEMENT IN ONLINE COMMUNITIES OF PRACTICE

A doctoral dissertation submitted to Dakota State University in partial fulfillment of the requirements for the degree of

**Doctor of Science** 

in

Information Systems

October 22, 2013

By James Gregory Greer

Dissertation Committee:

Amit Deokar, Ph.D. (Chair) Surendra Sarnikar, Ph.D. Viki Johnson, Ph.D.



#### **DISSERTATION APPROVAL FORM**

This dissertation is approved as a credible and independent investigation by a candidate for the Doctor of Science in Information Systems degree and is acceptable for meeting the dissertation requirements for this degree. Acceptance of this dissertation does not imply that the conclusions reached by the candidate are necessarily the conclusions of the major department or university.

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#### **DECLARATION**

I hereby certify that this dissertation constitutes my own product, that where the language of others is set forth, quotation marks so indicate, and that appropriate credit is given where I have used the language, ideas, expressions or writings of another.

I declare that the dissertation describes original work that has not previously been presented for the award of any other degree of any institution.

Signed,

James Gregory Greer

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My thanks also goes to Dr. Rajeev Bukralia and Dr. Ahmad Al-Omari, whose excellent dissertations were suggested to me as models to imitate in format and structure.

#### **ABSTRACT**

Online Communities of Practice allow their members to transcend the limitations of geography when communicating about a topic. However, many communities of practice fail due to a lack of knowledge sharing. How can community leaders build communities of practice that facilitate knowledge sharing and knowledge utilization among their members?

One of the driving factors in any group is the commitment that members make to the community. Past research has shown that the continuance, affective and normative commitment of members influences thread-reading, posting and moderating behaviors in online communities. However, online communities of practice may have different dynamics than other online communities, especially when measuring the crucial behaviors of knowledge collection, contribution, utilization and community moderation. Community commitments play a crucial role in the life of an online community of practice. Community leaders need to know what factors drive members to make a commitment to the community and whether those commitments encourage knowledge sharing and utilization, which is the goal of online communities of practice. Group members must gain knowledge they can use outside the group or they are unlikely to return.

This study contributes to the research on online communities of practice by addressing the following three questions. What factors serve as antecedents to a member making a commitment to the online community of practice? How are knowledge sharing, and group moderation behaviors influenced by a member's commitment to the community? How do knowledge collection and contribution behaviors affect knowledge utilization in an online community of practice?

The proposed community commitment model of knowledge sharing in online communities of practice posits the following relationships. Satisfaction, social capital, obligation and altruistic factors influence the formation of community commitments in online communities of practice. Ease of use, usefulness, and system reliability help determine whether or not a member makes a continuance commitment to the community. Social interaction, shared language, reciprocity, trust and identification encourage members to make an affective commitment. Positive social influence and enjoying helping impact whether or

not a member makes a normative commitment. Community commitment predicts knowledge management and group moderation behaviors. Members with a high continuance commitment are most likely to collect knowledge. Strong affective commitments lead members to contribute knowledge and act as group moderators. Members who help moderate and facilitate the group are likely to have a stronger normative commitment. Knowledge sharing behaviors increase knowledge utilization on the part of the member. Members who collect more knowledge tend to utilize more knowledge. Members who contribute knowledge utilize more knowledge as well.

To determine the validity of the model, a survey instrument was developed and tested to measure community commitment and knowledge management. Online communities of practice were surveyed to examine the types of commitments that group members make to a community and the antecedents and results of those commitments. The results were analyzed using structural path analysis techniques.

According to the analysis of the survey data, members make continuance (need-based), affective (emotion-based) and normative (obligation-based) commitments to online communities of practice. Usefulness and system reliability lead members to make a continuance commitment. Social interaction and identification encourage members to make an affective commitment. Positive social influence and altruism influence members to make a normative commitment. Members who make a continuance commitment engage in more knowledge collection behaviors. Members who make an affective commitment contribute more knowledge and engage in more group moderation behaviors. Members who make a normative commitment engage in more group moderation activities. Members who collect knowledge are more likely to contribute and utilize knowledge. Members who contribute knowledge tend to utilize more knowledge.

The results of this study imply that community leaders can increase knowledge sharing and knowledge utilization behaviors by strengthening the commitment that group members make to a community. Need-based commitments can be increased by improving the ease of use of the platform and the usefulness of the knowledge shared in the community. Emotionally-based commitments can be encouraged by increasing opportunities for social interaction between group members and fostering an environment that causes members to identify with the community. Obligation-based commitments can be encouraged by

recruiting group members who enjoy helping others and by allowing group members to exert a reasonable amount of peer pressure on each other.

#### **DECLARATION**

I hereby certify that this dissertation constitutes my own product, that where the language of others is set forth, quotation marks so indicate, and that appropriate credit is given where I have used the language, ideas, expressions or writings of another.

I declare that the dissertation describes original work that has not previously been presented for the award of any other degree of any institution.

Signed,		
James Gregory Gr	reer	

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#### **CHAPTER 1**

#### INTRODUCTION

#### 1.1 Background and Motivation

The members of an online community of practice make continuance, affective and normative commitments to their communities which affect their knowledge sharing and utilization and group moderation behaviors. These commitments are influenced by satisfaction, social capital, obligation and altruistic factors.

Lave and Wenger (1991) defined a community of practice as "an activity system about which participants share understandings concerning what they are doing and what it means in their lives and for their community". A community of practice chooses a topic of interest and then creates a community to meet members' needs regarding that topic. In an online community of practice, the primary relationships between the members are mediated by computer technology.

Online communities of practice face the challenge of crafting an online environment that encourages a long-term commitment from the people in the community they serve. Community of practice members were surveyed to answer the following research questions. What factors influence members to make commitments to their communities? How does the type of commitment a member makes to a community of practice affect moderating behaviors and knowledge contribution and collection? How do knowledge collection and contribution behaviors affect knowledge utilization?

Online communities are typically volunteer efforts, with the rewards for participation existing only in the context of the online community (Bateman, Gray, & Butler, 2011). Unfortunately, poorly designed or poorly run sites lose membership and become stagnant or perish completely. A consulting firm estimated that about half of the online communities set up by Fortune 1000 companies will not live up to expectations. This is due to technical issues in some cases, but primarily due to a failure to create effective collaborative processes for its members, which is related to the high turnover rate (Ransbotham & Kane, 2011). Many

visitors to online communities do not return after their initial visit. This is unfortunate because online communities of practice have a great potential to allow people to build a community around esoteric topics despite the boundaries of distance, culture, and organizational structure. However, some visitors do return and make a measureable commitment to participating in group activities. Successful online communities are able to encourage members to make a commitment to their community because of the services the community provides, a love for the community, or through a feeling of duty to the community (Bateman et al., 2011).

#### 1.2 Problem of the Study

The purpose of this study is to identify what kind of commitments participating members make to their online communities of practice and to determine what factors precede the commitment. Knowing these motivating factors may allow community leaders to better create effective online communities of practice. Leaders may be able to understand the motivations of their members and change some of the antecedent factors to encourage community commitment, which can influence how that person behaves in the community. The study also seeks to determine the relationship between community commitments and knowledge sharing and utilization and group moderation activities.

Bateman, Gray and Butler (2011) proposed three types of commitment to online communities: continuance, affective and normative. Members who continue in an online community because they are afraid they would not be able to easily replace the benefits they get from the community are showing continuance commitment. Members who have a strong emotional attachment to the community are displaying an affective commitment. Members who participate in the group because they feel like they ought to embody a normative commitment. Bateman, et al. (2011) use continuance, affective and normative commitments to explain participation behavior within online communities. This research project is significant because knowing the motivating factors that precede a commitment may allow community leaders to increase knowledge sharing behaviors in online communities of practice. Leaders may find it difficult to influence the commitment of their members directly,

but may be able to change some of the factors which this study specifies as antecedents to community commitment.

#### 1.3 Research Questions

The objectives of this research project are to develop a survey which can be used to measure behavior and attitudes in an online community of practice in order to answer the following research questions.

Research Question One: What are the antecedents to the formation of community commitments in an online community of practice?

Research Question Two: How do community commitments affect moderating behaviors and knowledge contribution and collection behavior in online communities of practice?

Research Question Three: How do knowledge collection and contribution behaviors affect knowledge utilization in an online community of practice?

#### 1.4 Results, Significance and Contribution

The analysis of the survey data showed the following results. Knowledge utilization is significantly influenced by knowledge collection and knowledge contribution behaviors. A continuance or need-based commitment significantly impacts Knowledge collection. In turn, a member's continuance commitment is significantly affected by the ease of use and usefulness of the community.

Knowledge contribution behaviors are significantly influenced by a member's affective commitment to the community. Social interaction and identification with the community are significant factors that drive a member to make an affective or emotional commitment to the community.

Community moderation behaviors are influenced by affective and normative commitments. A normative or obligation-based commitment is influenced by positive social influence experienced by the member and the extent to which a member enjoys helping others.

This research project is significant because it narrows the focus of study to online communities of practice, where many of the existing studies look at online communities in general. This study also examines the factors which lead to community commitment in online communities. This study also takes a fairly comprehensive look at possible factors which influence knowledge sharing in online communities of practice.

#### 1.5 Organization of Dissertation

Chapters one and two of this paper introduce the topic and review the existing literature on online communities of practice and community commitment. The literature review is broken down into the following sections: communities of practice, knowledge sharing and utilization, community commitment, the research gap and factors which have been proposed to affect knowledge sharing and utilization in online communities. Chapter three describes the relevant theories and the proposed community commitment model of knowledge sharing in online communities of practice. Chapter four describes the methodology used to create, distribute and analyze the survey. Chapter five argues for the validity of the results and then analyzes the results of the survey. Chapter six summarizes the results and draws conclusions and applications for practice.

#### **CHAPTER 2**

#### LITERATURE REVIEW

#### 2.1 Introduction

Research into online communities of practice has increased over the past ten years. This chapter summarizes relevant research on online communities of practice and relevant research about online communities in general. The definition of communities of practice is discussed. Knowledge management within a community of practice is described as consisting of knowledge collection, knowledge contribution and knowledge utilization. Theories on community commitment are described. Other factors which affect knowledge sharing in communities of practice are grouped into satisfaction factors, social capital factors, obligation factors and altruistic factors. Table 2.1 lists key studies used in this research. Appendix A lists additional articles which are loosely related to this topic. Appendix B is a comprehensive listing of articles relevant to the matter at hand.

Table 2.1: Current research regarding important elements in online communities of practice.

Topics	Key Studies	Findings
Altruism: enjoy	(Chang & Chuang,	Altruism, positively influences knowledge sharing.
helping	2011)	Participant involvement moderates the relationship of
		altruism and the quantity of knowledge shared.
Communities of	(Fang & Neufeld,	Situated learning and identity construction lead to sustained
practice	2009)	participation where members make conceptual and practical
		contributions to the community.
Communities of	(Guldberg &	Community of practice members learn through legitimate
practice	Mackness, 2009)	peripheral participation and knowledge creation.
Communities of	(Lave & Wegner,	Community members interact through legitimate peripheral
practice	1991)	participation, situated learning, identity construction and
		sustained participation.
Community	(Bateman et al., 2011)	The continuance, affective and normative commitments of
commitment		members influences thread-reading, posting and moderating
		behaviors in online communities.
Community	(J. P. and N. J. A.	Community commitment has three components: continuance
commitment	Meyer, 1991)	(need-based), affective (emotion-based) and normative
		(obligation-based).
Community	(Wasko & Faraj,	Members who committed to an online community felt a
commitment	2005)	responsibility to assist other members. Community
		Commitment, social capital, reputation and enjoying helping
		increased knowledge contribution behaviors.
Knowledge	(Ma & Agarwal,	Knowledge contribution is encouraged by information need
contribution	2007)	fulfillment, satisfaction, perceived identity verification, group
		identification, tenure and offline activities.
Knowledge	(Chen & Hung, 2010)	Knowledge utilization is positively affected by the behaviors
utilization		of knowledge contributing and collecting.
Moderation	(B. Gray, 2004)	The group moderator provides technical help, supports group
behaviors		processes, facilitates the social aspect of the community and
		enhances learning
Moderation	(Hara & Hew, 2007)	The moderator plays an essential role by assisting new
behaviors		members, and screening requests for membership and posts.

Topics	Key Studies	Findings
Moderation	(Silva et al., 2009)	Moderators, membership ground rules, profile information,
behaviors		good conduct, relevant posts, and group discipline all increase
		group cohesion in online communities.
Obligation: positive	(Posey et al., 2010)	Positive social influence increases self-disclosure. Privacy
social influence		risk perception decreases self-disclosure. A culture of
		collectivism increases self-disclosure.
Satisfaction: ease of	(Lu et al., 2011)	Usability and sociability theory show that perceived
use		enjoyment and a sense of belonging determine a member's
		intention to continue to use a virtual community. They break
		usability down into information service quality (ease of
		finding information) and interaction support quality (ease of communication).
Satisfaction: ease of	(Preece, 2001)	Communities of practice that are easy to use encourage
use		members to share knowledge.
Satisfaction:	(Phang et al., 2009)	Knowledge sharing is encouraged by perceived usability and
reliability		sociability. Usability is determined by system reliability, ease
		of use, and knowledge tracking fulfillment.
Satisfaction:	(Lu et al., 2011)	Usefulness is the members' perception of whether or not the
usefulness		community will increase their job performance. Usefulness
		influences the intention to continue to participate and is
		influenced by information service quality, interaction support
		quality, event organization, and the leader's involvement.
Social Capital	(Chang & Chuang,	Identification, reciprocity, and shared language positively
	2011)	influence knowledge sharing. Reputation, social interactions
		and trust had positive effects on quality, but not quantity of
		shared knowledge.
Social Capital	(Ganley & Lampe,	People with deeper online social networks have fewer
	2009)	structural holes and more social capital.
Social Capital	(Robert, L.P., Jr.,	Structural and cognitive social capital are important for
	A.R. Dennis, 2008)	virtual teams.
Social Capital:	(Posey et al., 2010)	Reciprocity and trust increase self-disclosure.
reciprocity and trust		
Social Capital:	(Chen & Hung, 2010)	Knowledge sharing is affected by reciprocity, trust,
reciprocity and trust		knowledge sharing self-efficacy, and perceived relative
		advantage.

#### 2.2 Communities of Practice

A community of practice allows long-term relationships between an individual and other similar individuals, other communities of practice, and the world at large outside of the community of practice (Guldberg & Mackness, 2009). Individuals participate in a community of practice to learn about a particular topic and form their identity. Members learn through legitimate peripheral participation and creating knowledge (Guldberg & Mackness, 2009). Fang and Neufeld (2009) describe the three components of Wegner and Lave's (1991) legitimate peripheral participation: situated learning, identity construction and sustained participation. They define situated learning as learning in everyday practice. Situated learning connects people, actions, knowledge and the surrounding world. In other words, what the member learns, they put into practice outside of the community. Identity construction happens as a group member incorporates their group membership into their self-concept and builds their self-esteem somewhat on their approval by the group. Sustained participation takes place as the member is 'present' and interacts with the community of practice in such a way that it allows them to engage in situated learning and construct their identity (Fang & Neufeld, 2009).

Lave and Wegner (1991) also defined communities of practice as "a group that coheres through 'mutual engagement' on an 'indigenous' (or appropriated) enterprise, and creating a common repertoire" (Guldberg et al. 2009). In other words, a community of practice chooses a topic of interest and then creates knowledge about that topic for the community members to put into practice.

Communities of practice originally met face-to-face, however the advent of online communities made it possible to communicate without face-to-face meetings. Preece (2001) defines an online community as a group communicating in a virtual space for a specific reason, with supporting technology and rules of behavior (Trier, 2008). In an online community of practice, the primary relationships between the members are mediated by computer technology.

#### 2.3 Knowledge Sharing and Knowledge Utilization

Knowledge utilization is an important aspect of effective communities of practice. Group members utilize knowledge when they apply knowledge gained from the community of practice in other areas of their lives (Chen & Hung, 2010). Knowledge utilization must take place for the knowledge to have value to the community member. Knowledge sharing is made up of knowledge contribution and knowledge collection behaviors, which should enable the member to utilize the knowledge in settings outside the online community of practice.

#### 2.3.1 Knowledge Sharing

In order for knowledge to be shared in an online community of practice, one or more members must contribute it and one or more members must collect it. Knowledge contribution typically takes the form of making posts to the online community of practice. Knowledge collection typically takes place when other members read the posts. However, knowledge may be collected and contributed in other formats, depending on the platform used by the online community of practice. Chang and Chuang (2011) researched how social capital and individual qualities motivate group members to share knowledge in a community.

The theories of social capital, individual motivation and participant involvement all play a part in determining why people share knowledge in online communities. Chang and Chuang (2011) use the theories of social capital and individual motivation to describe why people share knowledge within online communities. They innovatively combine the theories of social capital and individual motivation to more completely describe the knowledge sharing process. Chang and Chuang conducted a survey and found that knowledge sharing is positively influenced by altruism, identification, reciprocity, and shared language.

Reputation, social interaction and trust had positive effects on the quality, but not the quantity of shared knowledge. The participant involvement moderates the relationship of altruism and the quantity of knowledge shared. They explain the interaction of social capital theory and individual motivations in online communities (Chang & Chuang, 2011).

#### 2.3.2 Knowledge Utilization

Chen and Hung (2010) used individual motivation theory to explain why people share knowledge in Professional Virtual Communities. Chen and Hung gathered survey data from

two virtual communities and used structured equation modeling to verify the factors which influence the increase of community knowledge. Reciprocity, trust, knowledge sharing self-efficacy, perceived compatibility and perceived relative advantage affect knowledge sharing. Knowledge contributing and collecting positively affected knowledge utilization. Knowledge collecting affected community promotion. Knowledge contributing had a limited effect on community promotion. They created an integrated framework for knowledge sharing in online communities. Chen and Hung (2010) suggested that knowledge utilization should vary with knowledge collection and contribution. The more knowledge to which a member is exposed, the more they should be able to apply it to their life outside of the community of practice. Knowledge utilization should also increase as a member contributes knowledge to the community. Knowledge contributions indicate that the member is thinking through the information in the community of practice and is therefore more likely to find an application for it.

#### 2.4 Moderating Behaviors

Members who help moderate the discussion seem to have a direct impact on knowledge management in online communities of practice. Knowledge sharing increases when a moderator enforces the rules of the community (B. Gray, 2004; Hara & Hew, 2007; Silva, Goel, & Mousavidin, 2009). Gray (2004) highlighted how the moderator had a positive impact in a community of practice. Silva, Goel and Mousavidin (2009) researched how moderators and other factors increased the cohesiveness of community blogs. Hara and Hew (2007) showed the importance of a moderator in a nursing community of practice.

Gray (2004) performed an interpretive study of a community of practice set up for adult education program coordinators. The members of the community participated for following reasons: acquiring new skills and organizational policies, connecting with colleagues, reducing feelings of aloneness and isolation. The study also highlighted the importance of a group moderator in providing technical help, supporting group processes, facilitating the social aspect of the community and enhancing learning (Gray 2004).

Gray's field study (2004) highlights the role of the moderator in a particular community of practice. The moderator made herself available. She helped members learn the technology. She managed the flow of the discussion by making posts when members did not,

by posting questionnaires, surveys, resources and playing "devil's advocate". She refocused the threads to make sure they contained learning opportunities for the members. She encouraged members to post and thanked them when they did. She helped the members form a social community by providing emotional support and creating threads which were unrelated to the work environment. She also scheduled "live" synchronous events.

Silva, Goel and Mousavidin (2009) researched the cohesiveness of community blogs. They used the theory base for communities of practice to find the following things that influence cohesion: membership ground rules, moderators, profile information, good conduct, relevant posts, and group discipline. They did a comprehensive review of the literature on communities of practice literature and included some information about blog research.

Hara and Hew (2007) used an in-depth case study to see how nurses shared knowledge in an online community of practice. Most of the members perceived that the moderator had an essential role to play. The moderator assisted new members who did not know the system. The moderator of the listserv screened requests for membership as well as requests to post messages to the listserv. Screening the messages kept the messages on-topic and professional. This also allowed the moderator to enforce "netiquette" (Hara & Hew, 2007).

#### 2.5 Community Commitment

Organizational commitment is a well-developed field of study within organizational behavior. Organizational commitment describes the psychological bonds between members and their organizations. It has been used to describe the behavior of volunteers at non-profit organizations. Since online communities of practice are primarily volunteer efforts, commitment theories are appropriate to describe behavior in this context (Bateman et al., 2011). Meyer and Allen (1991) described community commitment as having three components: continuance, affective and normative commitment. Researchers have accepted these three kinds of commitment as strong indicators of behavior in an organizational context (Meyer and Herscovitch 2001; Meyer, Stanley, and Herscovitch 2002). Wasko and Faraj (2005) suggested that social capital and the individual factors of reputation and enjoying helping increased knowledge contribution behaviors. They tied commitment to knowledge contribution behaviors in online communities of practice and suggested that members who committed to an online community felt a responsibility to assist other members. Bateman, et

al. (2011) suggested that continuance commitments lead to reading "threads", affective commitments lead to making posts and moderating the discussion, and normative commitments lead to moderating behaviors.

The application of community commitment research to the domain is a relatively recent development (Bateman et al., 2011; Wasko & Faraj, 2005). Bateman, Gray and Butler (2011) use the members' commitment to the online community to describe members' reading, posting and moderating habits. The Bateman, et al. (2011) research is significant, but it does not uncover the precursors to community commitment. Meyer and Allen's (1991) research on community commitment in organizations breaks commitment into three basic types: continuance commitment, affective commitment, and normative commitment.

#### **2.5.1** Continuance Community Commitment

Continuance community commitment is the awareness that the member will lose something that may be difficult to replace if they leave the community. Bateman, Gray and Butler (2011) suggested that a continuance commitment drove members to read more "threads" or posts within the online community. Members who are most concerned about the value they receive from the community engage in behaviors that they feel are most likely to give them the result they want.

#### 2.5.2 Affective Community Commitment

Affective community commitment is the member's emotional attachment to the organization. Bateman, Gray and Butler (2011) suggested that an affective commitment encouraged members to reply to more posts. They also discovered that members with an affective commitment are more likely to engage in behaviors that moderate the discussion. Members with a strong emotional attachment to the community are more likely to respond to other members to form relationships with them. These members also participated in moderating behaviors to help ensure group norms were enforced and further promoted the success of the online community.

#### 2.5.3 Normative Community Commitment

Normative commitment is the feeling of obligation to remain part of the group. Bateman, Gray and Butler (2011) suggested that a normative commitment compelled members to engage in more moderating behaviors, but the relationship was much weaker than the relationship between affective commitments and moderating behaviors. They did not find a relationship between normative commitments and either reading or posting behavior. Normative commitments are less effective at promoting the welfare of the online community than affective commitments.

#### 2.5.4 Gap in Research

Even though significant research has been done on online communities and online communities of practice, the application of community commitment research to the domain is relatively new (Bateman et al., 2011). The Bateman, et al. research does not discuss precursors to community commitment. A number of studies look at knowledge sharing within online communities and online communities of practice, however due to scope concerns, they do not take a comprehensive view which would include more of the factors (Chang & Chuang, 2011; Chen & Hung, 2010; Ma & Agarwal, 2007).

#### 2.6 Factors which affect Knowledge Sharing and Utilization

A number of factors have been shown to affect how group members interact within a community of practice. For the purposes of this research, the relevant constructs are grouped into satisfaction factors, social capital factors, obligation factors and altruism factors.

#### 2.6.1 Satisfaction Factors

Satisfaction factors describe how pleased the member is with the community of practice. These factors include ease of use, usefulness, and system reliability.

Ease of Use. Perceived usability or ease of use describes the relative ease with which the users can begin to use the various facets of the system. Usability studies often examine user learning curve, user productivity, user satisfaction, user knowledge retention and errors made by user. Preece (2001) splits usability into the following: support for interaction, navigation, design of information, and access. Preece suggests that communities of practice that are easy to use encourage members to share knowledge. Lu, Phang and Yu (2011) examine continuing participation in virtual communities using usability and sociability theory.

Preece (2001) proposes several metrics to judge success in online communities. Usability describes the relative ease with which the users can begin to use the various facets of the system. Usability studies often examine user learning curve, user productivity, user satisfaction, user knowledge retention and errors made by user. Preece describes usability as being made up of support for interaction, navigation, design of information, and access. Support for interaction describes how easily users can communicate. Metrics include the learning curve for interaction tools, the amount of time to send or receive a message, user satisfaction, retention and errors. Design of information describes the ease with which users can process the information about the community. Metrics include length of time to find information or perform information-related tasks, user satisfaction, user information retention, and user information access errors. Navigation describes the ease with which members can move through the site to find the information they need. Preece suggests the following metrics: learning curve for navigation, time for user navigation, navigation information retention, user satisfaction, and navigation errors. Access describes the ubiquity of the platform for users with various hardware and connection speeds. Metrics include software component access, download time, average response time, and software problems (Preece, 2001).

Lu, Phang and Yu (2011) evaluated virtual communities to see why people continue to participate in them. They used usability and sociability theory to posit that usefulness, perceived enjoyment and a sense of belonging determine a member's intention to continue to use a virtual community. The following things drive these factors: information service quality, interaction support, quality incentive policy, event organization, and leaders' involvement. They break usability down into information service quality and interaction support quality. Information service quality describes how easily members can find the information that they need. They describe interaction support quality as the ease with which members can communicate with each other. Perceived enjoyment is the extent to which the user enjoys using the system, regardless of the other benefits. They describe a sense of belonging as the social aspect of being a part of something. They break sociability down into the incentive policy, event organization and leaders' involvement. The incentive policy describes how the community recognizes and rewards contributions. Event organization describes activities the leadership organizes to get members to interact with each other.

Leaders' involvement may include actions by members in addition to the group moderator such as active members and opinion leaders. Leaders can serve as knowledge resources, encourage and shape content, enforce group norms and help build a healthy environment (Lu et al., 2011).

*Usefulness*. Information need fulfillment describes how the knowledge extant in the community of practice is useful and relevant to the needs of the members. Members who feel the community of practice meets their needs should be more likely to spend time contributing knowledge (Ma & Agarwal, 2007).

Lu, Phang, and Yu (2011) found that usefulness, enjoyment and a sense of belonging drove members' intentions to continue to participate in virtual communities. The authors define perceived usefulness as an individual's opinion about whether or not using a particular technology will increase their job performance. In turn, information service quality, interaction support quality, incentive policy, event organization, and leaders' involvement were antecedents to usefulness, enjoyment and the sense of belonging.

System Reliability. The reliability of an online community of practice's platform is the member's perception that the system provides a consistent user experience, is dependable and is available at any time of the day or night. Phang, Kankanhalli and Saberwal (2009) showed that perceived usability enhanced knowledge seeking and contribution in online communities. Ease of use, system reliability, and knowledge tracking fulfillment make up perceived usability. According to Phang et al. (2009), system reliability is crucial to knowledge collectors because they are seeking the knowledge to solve a problem under deadline pressure. Therefore, the platform for the online community of practice must be free from errors, consistently provide the content, and be available at any time.

#### 2.6.2 Social Capital Factors

Social capital is the socioeconomic value of a person's social network. Members participate in an online community and share knowledge when they feel it will build their social capital and make additional resources available to them (Ganley & Lampe, 2009). According to Robert, Dennis and Ahuja (2008), social capital can be envisioned as containing three dimensions: structural social capital, cognitive social capital and relational social capital.

Structural Social Capital (Interaction). The structural dimension of social capital describes the extent of the interpersonal linkages between group members and departments within a community. Ganley and Lampe (2009) examine online communities through the lens of social capital and social networking theory. Robert, Dennis and Ahuja (2008) used the theory of social capital to explain how teams integrate knowledge. Preece (2001) proposes sociability as one of the metrics which can be used to determine success in online communities.

Ganley and Lampe (2009) used quantitative analysis of the Slashdot.org community to apply social capital and social networking theory to online communities. How do communities which only offer virtual rewards get people to dedicate real time toward creating content? Ganley and Lampe looked at how individual motivation encourages members to generate high quality content for the website with virtual rewards. People create social networks of direct and indirect relationships because of the resources they offer. The socioeconomic value of a person's network represents their social capital. Social capital enables someone to gain benefit from their interactions with others. Ganley and Lampe (2009) look for "structural holes". When pathways or bridges of less populated segments surround two densely populated network clusters, the less populated areas may form a structural hole. Brokers reach across structural holes. Brokerage in networks gives more new information from different sources. Closed systems do not connect to other network segments. A closed network may give increased social capital to its primary members. These closely knit groups trust each other more. Closure in networks helps groups maintain focus on specific goals and ideas.

People with broader networks tend to have more structural holes and lower social capital. People with deeper networks have fewer structural holes and more social capital. Ganley and Lampe (2009) propose changes to the mechanisms of online communities that will make them more successful. They also suggest creating a "What my friends are saying" page for brokers and invitation-nly "power user" forums for people with a high degree of closure.

Robert, Dennis and Ahuja (2008) studied team interactions over "lean" digital networks. They conducted an experiment with forty-six teams with prior histories and anticipated future relationships and gave them tasks to perform in-person and online. They

used the theory of social capital to explain how the teams integrated knowledge. Robert et al. break social capital down into structural, cognitive, and relational social capital. They assert that social capital can answer part of the following question: Why do team members not integrate knowledge from other team members? They found that structural capital and cognitive social capital are more important to knowledge integration for virtual teams. Relational capital remained important regardless of the environment. Knowledge integration helped teams make better decisions. Their study had some limitations: the use of student subjects and the difficulty of operationalizing cognitive capital (Robert, L.P., Jr., A.R. Dennis, 2008).

Preece (2001) suggests sociability as one of several metrics to judge success in online communities. Sociability has to do with practices that encourage users to interact socially online. Preece contends that purpose, people and policies build sociability. "Purpose" describes the reason the community exists. Purpose metrics measure the quantity and quality of messages and their relevance, and interaction and reciprocity between members. "People" describes the people in the group and the roles they adopt. People metrics include the number and types of people who participate in the group and their various roles, as well as user experience, age, gender, and particular needs. "Policies" describes the formal and informal rules the group members follow. Metrics analyze the policies in place and their effectiveness, and the extent to which they encourage relationships.

Cognitive Social Capital (Shared Language). The cognitive dimension of social capital describes how members are more easily able to share knowledge, when a community shares a language or codes (Chang & Chuang, 2011). A shared language between members enhances communication and builds a sense of community.

Relational Social Capital. The relational dimension describes the relationship between a group member and the organization itself. Components of the relational dimension of social capital are "trust, norms, obligations, expectations and identification" (Chang & Chuang, 2011). When the community environment facilitates the formation of interpersonal relationships, the members share knowledge with greater frequency (Cheliotis, 2009; Silva et al., 2009). Chang and Chuang (2011) showed how altruism, identification, reciprocity, and shared language positively influence knowledge sharing in online communities. Reputation, social interactions and trust had positive effects on the quality of shared knowledge. They

suggested that participant involvement moderated the relationship of altruism and the quantity of knowledge shared.

Trust. When group members feel they can predict the actions of the other group members and know they will not be taken advantage of, they are more likely to share knowledge in the community practice. Ibrahim and Ribbers (2009) examined how trust impacts interorganizational systems. Ba (2001) created an online social structure to help community members trust each other. Chen and Hung (2010) suggested that trust influences knowledge contributing and knowledge collecting behaviors.

Ibrahim and Ribbers (2009) examine how competence and openness trust affect interorganizational systems. However, they do not make an application to online communities of practice. They examine four types of interorganizational systems (IOS) resources: human knowledge, organizational domain-knowledge, business processes and IOS infrastructure. The authors suggest that future research might ask about additional types of trust, such as: credibility, benevolence and affect (Ibrahim & Ribbers, 2009).

In the context of e-commerce, Ba (2001) described several levels of trust. Deterrent or calculus-based trust means that someone acts in a trustworthy way because they fear the negative consequences of acting untrustworthily. Information-based trust allows members to predict the actions of the others because of their previous interactions with each other. Transference-based trust means that if one member trusts another member, the member can trust any third parties trusted by the intermediary (Ba, 2001).

Ba (2001) asked what online social structures promote trust. Ba created a social structure that should engender trust between online community members. They described community as "the Holy Grail of the Internet." Ba described how calculus-based trust becomes information-based trust. Information-based trust becomes transference-based trust. Ba listed barriers to trust and describes how reputation systems such as eBay's user ratings can help build calculus-based trust and make sellers more concerned about their reputation. However, in the online environment cheaters find it easy to create new online identities. Using third parties to manage reputation can help build trust (Ba, 2001).

In face-to-face communities of practice, members learn to trust each other through a series of interactions. Trust in online communities is more challenging because the members often never see each other and even online interactions may be infrequent. Online community

members are more likely to share knowledge when they believe they can rely on the other members of the community to provide honest, accurate information and not misuse information they are given. Chen and Hung (2010) suggest that trust significantly predicts knowledge contributing behaviors and knowledge collecting behaviors.

Perception of Reciprocity. Some individuals share knowledge because they expect other members will reciprocate. They expect to gain from other individuals sharing knowledge. Reciprocity describes how the individual believes other members of the community will act in sharing knowledge. Individuals that believe other members will reciprocate their efforts will be more likely to share knowledge (Chang & Chuang, 2011; Chen & Hung, 2010). Reciprocity also increases the likelihood the members will self-disclose online (Posey, Lowry, Roberts, & Ellis, 2010). Bergquist and Ljungberg (2001) researched open source development communities through the lens of gift giving theories.

Bergquist and Ljungberg (2001) examined open source development communities. They used a virtual ethnography to study open-source software (OSS) development groups. They used the theories of gift giving to explain knowledge sharing in a digital domain. The gift economy creates openness and organizes relationships. Open source software communities generate new ideas by giving gifts. The giver receives power by giving and uses it to guarantee code quality.

Identification. Group members identify with online communities that have members they perceive as similar to themselves. Over time, being part of the community of practice becomes part of the group member's personal identity. Members who identify themselves as members of the community are willing to remain active members of the community (Chang & Chuang, 2011). Knowledge sharing is increased when members post profile information and make relevant posts (Silva et al., 2009). Identification occurs when a member sees themselves as part of a community. Identification is reflected in the image a group member presents to a community.

A member's identity within the group can change over time. Often a member will begin as a novice who participates on the fringes of the group and then reach expert level where they participate in the core of group activities and then they will ultimately transition out of the community of practice. An individual's identity within the community comes from their interactions with other community members and their place on the topic's learning curve

(Guldberg & Mackness, 2009). Ma and Agarwal (2007) described factors which contribute to knowledge contribution in online communities using self-presentation theory as a base.

Ma and Agarwal (2007) examined how virtual presence, persistent labeling, selfpresentation and deep profiling all affect perceived identity verification which influence satisfaction and knowledge contribution within online communities. Knowledge contribution is motivated by the ability to communicate identifying information and verify that information. Such communication leads to benefits such as recognition and increased selfworth. The ability to communicate identity in the desired way affects knowledge contribution directly and indirectly through satisfaction. They defined identity as a member's selfassessment of various aspects of themselves such as intelligence, physical presence, personality, and motivating factors. They further defined identity communication as how someone strives to portray their identity to other people. Goffman's (1967) self-presentation theory suggests that people put their need to present their identity ahead of goals that might bring people together. Identity communication is important in online communities for three reasons. First, members acquire information more efficiently when they can identify the experts. Second, people with similar identities form relationships with greater frequency. Third, communication of identifying information enables the knowledge contribution process. The theory of self-verification, which grew out of cognitive dissonance theory, suggests that people participate in interpersonal relationships when they feel the group recognizes and verifies their identities. The authors conceptualized perceived identity verification as how someone perceives the group sees their identity. Factors which may influence perceived identity verification include the amount of time the member has belonged to the community and the extent to which the members interact in real-world settings. The following things affect knowledge contribution: the member's identification with the group, the extent to which the group meets the informational needs of the member, length of time in the group and real-world interaction with other group members.

Virtual co-presence takes place when group members get the sense that they share the same space with other group members. Communities build virtual co-presence by using synchronous communication tools like chat or instant messenger as well as displaying the members and their activities online (Ma & Agarwal, 2007).

Persistent labeling builds identity verification by requiring that all of a member's interactions with the online community occur under the same user name. However, their data did not reveal a significant relationship between persistent labeling and knowledge contribution (Ma & Agarwal, 2007).

Self-presentation allows members to share their perception of their identities with other group members. Online communities achieve this through the selection of a user name, a signature on posts, a profile picture / avatar or nickname, member profile, link to personal web pages, or tools which build interactivity (Ma & Agarwal, 2007).

Deep profiling allows new users to select the most influential members in the group so they can know who to approach for information. Communities achieve this through publishing membership directories, giving group members rankings or reputation scores, eliciting feedback, listing actions by various members and providing the ability to search archived information in the online community (Ma & Agarwal, 2007).

### **2.6.3** Obligation Factors (Positive Social Influence)

Obligation factors are those that build a sense of duty to share knowledge in the community of practice. Obligation factors include positive social influence. Positive social influence from the community to share knowledge should also contribute to knowledge sharing (Posey et al., 2010). The subjective norm, or social influence, is pressure exerted by peer groups to encourage members to share knowledge and is a 'first order factor' in the intention to share knowledge (Bock, Zmud, Kim, & Lee, 2005). In other words, if the group member feels their peers want them to share knowledge in the community of practice, they are more likely to do so.

Posey, Lowry Roberts and Ellis (2010) researched French and British online community users and how they disclose personal information on social networking sites. Even though their research does not address knowledge sharing directly, self-disclosure approximates contributing knowledge. The researchers see self-disclosure as relevant because businesses can use such self-disclosure to market to individuals. They used the social exchange theory which contends that the benefits of the community must outweigh the costs. Social penetration theory suggests that people self-disclose to build relationships. The authors also theorize that people with stronger tendencies toward collectivism self-disclose more than

people from cultures with weaker relational ties. The main benefit of self-disclosure is that the other party may also self-disclose. The main drawback of self-disclosure is putting oneself at risk. They used a market research firm to randomly select British and French social networking users, taking special care to stay away from people who are in the normal range for college. They discovered the following relationships. Positive social influence, reciprocity, and trust positively influence self-disclosure. In their study, positive social influence measures the social pressure to use online communities, not actual disclosure. The perception of privacy risk decreases disclosure. People from collectivist cultures with stronger ties between individuals self-disclose more than non-collectivist cultures. For instance, the French are more individualistic than the British and self-disclose less in online communities (Posey et al., 2010).

Bock, Zmud, Kim and Lee (2005) examined explicit and implicit knowledge sharing behaviors using the theory of reasoned action and suggested that the intention to share knowledge is driven by the subjective norm, the attitude toward knowledge sharing and the organizational climate. They define the subjective norm as perceived social pressure or social influence from the group to engage in certain behaviors. The attitude toward knowledge sharing is influenced by anticipated extrinsic rewards, and anticipated reciprocal relationships. Anticipated extrinsic rewards had a negative effect on the attitude toward knowledge sharing. The organizational climate is impacted by fairness, affiliation and innovativeness. The subjective norm was influenced by the sense of self-worth and the organizational climate. The subjective norm influenced the attitude toward knowledge sharing as well as the intention to share knowledge.

#### 2.6.4 Altruism Factors (Enjoy Helping)

Altruism factors are involved when members share knowledge because of the good feeling they get from helping others. Many members of a community will share knowledge because of their altruism, or the sense they have that their contributions help other people and they feel appropriate behavior requires helping others (Chang et al. 2010; Cheliotis 2009). Wasko and Faraj (2005) suggested that, in addition to social capital factors, the individual factors of reputation and enjoying helping had a positive influence on knowledge contribution

behaviors. They found members who shared knowledge in an online community often felt a responsibility to assist other members.

### 2.6.5 Control Factors: Tenure, Sex and Age

The amount of time that someone has been in the group and their age can also influence how members share knowledge. It may be important to control for these variables when performing research in online communities. The model proposed by Bateman, et al. (2011) controls for sex, age in years, and tenure, which is the amount of time they have spent on the website and the length of time since they joined the group. Statistically controlling for these variables should make it easier to see if the proposed relationships are significant.

Butler (2001) created a resource-based theory of sustainable social structures through an empirical study of listserv information. Benefits like information, influence and social support attract members to a community and encourage them to stay. Members of the community create a social structure by giving of their energy and time. Communities survive by creating benefits with greater value than the costs associated with the community. The community must transform the resources contributed into the community into tangible benefits for the members. Communities with large memberships can have a number of advantages by having increased resources. However disadvantages come from a less closely knit group, and a smaller percentage of users contributing to the group. The group must communicate at some level for the group to function, but an excess of communication activity makes a member consider leaving the group. The interaction of the membership size and communication activities create sustainable communities (Butler, 2001).

Ransbotham and Kane (2011) propose a two stage collaboration model in their quantitative study of featured articles on Wikipedia. First, the community must create knowledge. Second, the community must retain knowledge, which involves knowing which information to retain and which has become obsolete. The community has different needs in each stage. In general, moderate turnover in a community can have advantages. However, most communities get more turnover than they need. The authors suggest future research might examine how critical factors may change when the group creates or retains knowledge (Ransbotham & Kane, 2011).

## 2.7 Summary

The literature concerning knowledge sharing in online communities of practice and online communities in general is wide and varied. However the research can be grouped into articles on communities of practice, knowledge management, moderating behaviors, community commitment, and factors which affect knowledge management such as satisfaction, social capital, obligation and altruism factors. Additional articles which are more loosely related to this topic can be found in Appendix A and a complete list of articles can be found in Appendix B.

# **CHAPTER 3**

### RESEARCH MODEL AND HYPOTHESES

#### 3.1 Introduction

Ongoing knowledge contribution and utilization is an essential contributor to the health of an online community of practice. Community commitment describes the bonds that form between a group member and the organization. Satisfaction, social capital, obligation and altruism factors can influence a member's commitment to an online community of practice. This chapter describes the community commitment model of knowledge sharing in online communities of practice by discussing the theoretical framework underpinning the model and then describing the research model and related hypotheses.

#### 3.2 Theoretical Framework

The theoretical framework that supports the community commitment model of knowledge sharing in online communities of practice is made up of the following components. First, knowledge management theory describes how knowledge collection, contribution, utilization and moderation behaviors are factors which are important in long-term community of practice success. Second, the group moderator plays an essential role in the community. Third, the community commitment theory explains the types of commitments members make to a community of practice and how it affects their behavior in the community. Fourth, satisfaction theories such as ease of use, usefulness and system reliability explain member behavior according to their perception of the community. Fifth, social capital theory shows how the value of a member's social network within the community can determine their behavior. Sixth, obligation factors indicate the importance of social and organizational pressure to participate in online communities of practice. Seventh,

altruistic factors can explain why people might share knowledge in an online community of practice.

### 3.2.1 Knowledge Sharing and Utilization

Knowledge management theory describes the interplay between knowledge collection, contribution, and utilization behaviors which are important in long-term community of practice success. Knowledge utilization is the application of knowledge gained in the online community to the member's life outside the community (Chen & Hung, 2010). Therefore, the major goal of an online community of practice is to give their members knowledge they can utilize in their professional and personal lives. In order for knowledge to be utilized by the group members, it must be shared. Knowledge sharing can be broken down into two distinct behaviors, knowledge collecting and knowledge contributing (Chen & Hung, 2010). Members collect knowledge when they find useful information or data in the community of practice. Members contribute knowledge when they present information or data that has been useful to them to the community through online posts or personal interactions with the members. As can be seen in Figure 3.1, Chen and Hung (Chen & Hung, 2010) postulate that knowledge utilization is driven by knowledge contribution and knowledge collection, which are in turn driven by contextual and individual factors.

#### 3.2.2 Group Moderation

Knowledge sharing increases when the rules of the community are enforced by a moderator (B. Gray, 2004; Hara & Hew, 2007; Silva et al., 2009). In order for an online community of practice to operate successfully, the group must be moderated to make sure that the purpose of the group as a whole does not get supplanted by members trying to achieve their own purposes. For instance, if one academic researcher posts a survey to an online community of practice, it might not be a problem, but a large number of off-topic academic surveys might inhibit the sharing of knowledge in the online community of practice.

Moderation behaviors may be exhibited by members in an official capacity and by the general membership.

Gray (2004) suggested that group moderators answer questions about the community platform's technology. Moderators facilitate the processes of the group by posting when the discussion has slowed and making sure posts are on-topic and useful. Group moderators

enable social interaction by scheduling online and offline events and enable improved learning. Silva, Goel and Mousavidin (2009) found that the activity of group moderators increased the cohesiveness of online communities. Hara and Hew (2007) suggested that moderators assisted members unfamiliar with the system, approved member requests, approved posts to keep messages on-topic and professional and enforced the rules of the community.

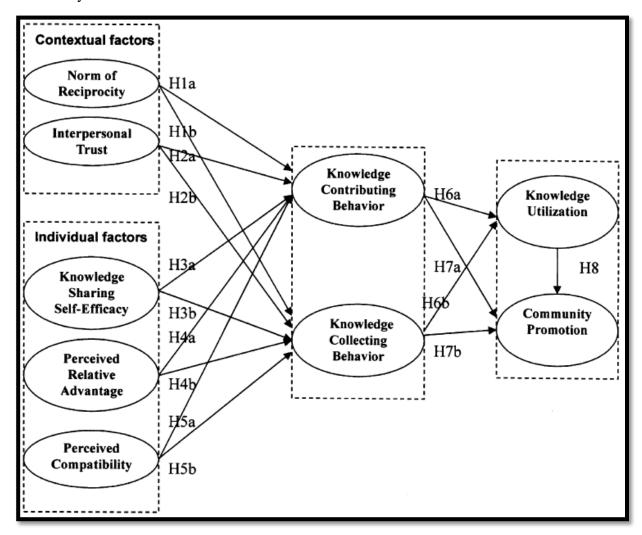


Figure 3.1 An integrated framework for examining knowledge sharing (Chen & Hung, 2010)

### 3.2.3 Community Commitment

The types of commitments members make to an organization and the resulting changes to their behavior are described by organizational or community commitment theory. Community commitment describes the psychological bonds that tie members to their

organizations. Community commitment aptly describes the behavior of volunteers in an organizations like online communities of practice (Bateman et al., 2011). Therefore, community commitment should have a significant effect on knowledge sharing behaviors in online communities of practice.

Community commitment has three integral parts: continuance, affective and normative commitment that serve as strong motivators in communities (Meyer and Herscovitch 2001; Meyer, Stanley, and Herscovitch 2002). Members who participate in an online community of practice because they feel the knowledge there is not available other places are showing a continuance community commitment. People who engage in knowledge sharing activities with an online community because they have an emotional attachment to the community are exhibiting an affective community commitment. Participants who take part in community activities out of a sense of obligation or duty display a normative commitment.

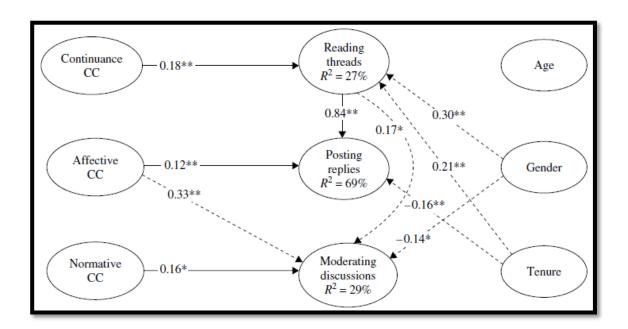


Figure 3.2: Results of PLS Analysis on a Community Commitment model in Participation in online Communities (Bateman et al., 2011).

Wasko and Faraj (2005) suggested that group members with a commitment to an organization "consider it a duty to assist other members and contribute knowledge" in an attempt to repay the help they have received. Bateman et al. (2011) posited that community commitment theory describes how different types of commitment will lead to different types

of behavior. As can be seen in Figure 3.2, Bateman et al. (2011) suggested that members with a continuance commitment read more posts in online communities. Participants with affective commitments post more replies and engage in more moderation behaviors. People with normative commitments tend to moderate the discussion more.

#### 3.2.4 Satisfaction Factors

The perception that the online community of practice meets the needs of a member can be described as satisfaction and is made up of community usability, usefulness and system reliability. Perceived usability and perceived sociability drive knowledge seeking and contribution in online communities. As can be seen in Figure 3.3, ease of use, system reliability, and knowledge tracking fulfillment influence perceived usability (Phang et al., 2009).

Ease of use describes the member's perception of the difficulty of retrieving knowledge from and contributing knowledge to the online community of practice. Communities that are easy to use should have a low learning curve, and the ability to find desired information quickly (Preece, 2001).

Phang et al. (2009) define knowledge tracking fulfillment as the perception that the system can "track knowledge activities" through the use of a discussion forum or other knowledge sharing activities. Since the purpose of the online community of practice is to share knowledge, knowledge tracking fulfillment can be seen as the usefulness of the community. Lu, Phang, and Yu (2011) define perceived usefulness as a member's perception that using a particular technology will increase their job performance through increased knowledge utilization.

A platform for an online community of practice is reliable when the system is not prone to unpredictable errors, has the capability to carry out the member's instructions and is always available. Phang et al. (2009) suggested that system reliability influenced overall system usability which in turn had an effect on knowledge contributing and collecting behaviors. They also note that reliability had a larger influence on knowledge collectors than knowledge contributors, because the contribution of knowledge to an online community of practice is typically seen as not time-sensitive.

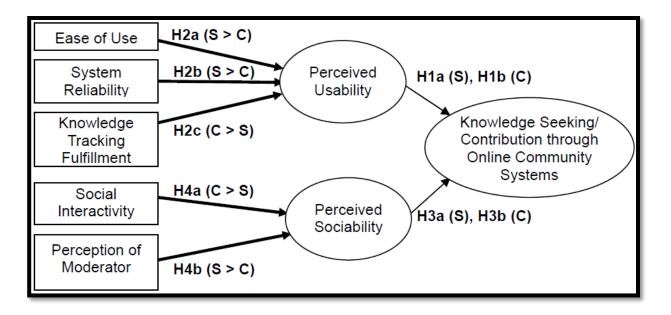


Figure 3.3 Knowledge Seeking / Knowledge Contribution Research Model (Phang et al., 2009)

## 3.2.5 Social Capital Factors

The value of a member's social network within the community, also known as social capital, can have a large part to play in how the member behaves. Wasko and Faraj (2005) tied social capital to increased knowledge contribution behaviors in online communities of practice. Chang and Chuang (2011) posited that social capital factors and individual motivations impacted knowledge sharing quantity and quality in online communities. Social capital can be broken down into three dimensions: structural, relational and cognitive. The structural dimension of social capital describes the social interaction between group members. The cognitive dimension of social capital primarily describes the language that members share because of their knowledge of a particular subject or through their interactions with the online community of practice. The relational dimension is made up of trust, identification and reciprocity. Trust is the extent to when members believe that other group members will behave in the way they say the will behave. Identification occurs when a group member incorporates their membership in the group as part of their self-concept or identity. Reciprocity describes a member's perception that their good actions will be followed by good actions by others in the community (Chang & Chuang, 2011).

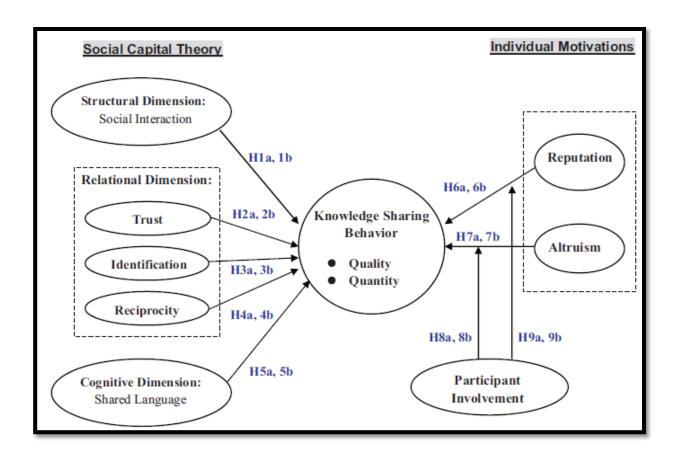


Figure 3.4 Social Capital and Individual Motivations Model of Knowledge Sharing in Online Communities

(Chang & Chuang, 2011)

## 3.2.6 Obligation, Altruistic and Control Factors

Behavior in online communities of practice can be influenced by obligation and altruistic factors as well as a number of factors outside of the control of the community leaders such as age, tenure and sex.

Positive social influence is an obligation factor which describes the social and organizational pressure a member feels to participate in an online community of practice. Positive social influence to use an online community increases self-disclosure behaviors in online communities (Posey et al., 2010). Group members are more likely to participate in online communities of practice when they feel it is something that their colleagues or supervisors want them to do.

Enjoying helping others is an altruistic factor which describes a member who helps others for the good feeling they get from doing it or because they feel it is their duty to do so. As can be seen in Figure 3.4, Chang and Chuang (2011) posit that altruism has a positive

influence on the quantity and quality of knowledge shared in online communities because it is seen as "organizational citizenship behavior" that helps the group as a whole achieve its goals. As can be seen in Figure 3.5, group members may contribute knowledge by providing answers to questions simply because they enjoy helping other members (Wasko & Faraj, 2005).

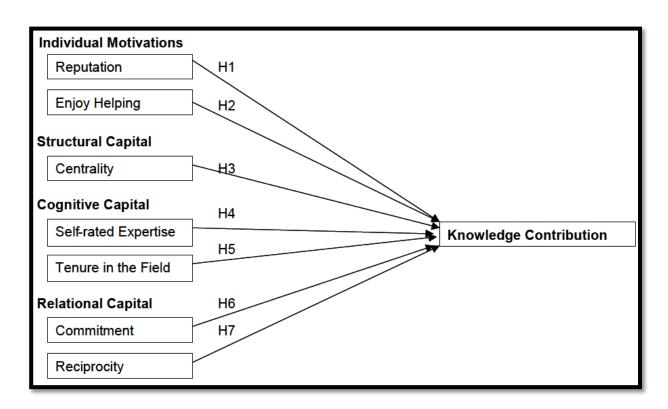


Figure 3.5 Individual Motivations, Social Capital and Knowledge Contribution Model (Wasko & Faraj, 2005)

Some intrinsic factors that influence member behavior should be considered even though they are not easily controlled by the leadership of the community. The age and sex of a member as well as the length of time and amount of time they have spent with the group can have an impact on moderation, knowledge sharing and utilization behaviors. As can be seen in Figure 3.2, Bateman, et al. (2011) argued that these factors should be controlled for in the analysis to provide more accurate results for the overall model.

### 3.3 Research Model and Hypotheses

Using the preceding theoretical base, the community commitment model of knowledge sharing in online communities of practice describes how satisfaction, social capital, obligation and altruistic factors drive the continuance, affective and normative commitments made by group members in online communities of practice. In addition, this model describes the effect that the various types of community commitment have on variables critical to the health of an online community of practice, such as moderating behaviors and knowledge collection, utilization, and contribution.

This model proposes that knowledge collection has a direct effect on moderation behaviors, knowledge contribution and utilization. Knowledge contribution is also suggested as an influence on knowledge utilization. The following factors influence the organizational commitment made to the community of practice: ease of use (Lu et al., 2011; Phang et al., 2009), usefulness (Chang & Chuang, 2011; Ma & Agarwal, 2007), system reliability (Phang et al., 2009), positive social influence (Bock et al., 2005; Posey et al., 2010), members who enjoy helping (Chang & Chuang, 2011), and the member's social capital. Social capital is the worth of a person's social network in a community and is comprised of interaction, shared language, reciprocity, trust, and identification (Chang & Chuang, 2011).

The proposed research model, in Figure 3.6, shows the effect of community commitments on knowledge management behaviors and shows how satisfaction factors, social capital factors, obligation factors and altruistic factors influence the type of commitments that members make to the group.

First, the proposed model describes how the group moderation and knowledge management constructs are interrelated. The model suggests that knowledge utilization is influenced by knowledge collection and knowledge contribution behaviors. It also suggests that knowledge contribution is influenced by knowledge collection behaviors and moderating behaviors.

Second, the model proposes a relationship between the type of member's community commitment and their knowledge management and moderation behaviors. The model indicates that members with continuance commitments will engage in more knowledge collection behaviors. Members with affective commitments should engage in more

knowledge contribution and group moderation behaviors. Members with normative commitments should engage in more moderating behaviors.

Finally, the model predicts that satisfaction factors are made up of the ease of use, usability, and the reliability of a community of practice. Since satisfaction is necessary to feel a community meets a need which cannot be met elsewhere, satisfaction factors should impact the continuance commitment. Social capital factors are made up of social interaction, shared language, reciprocity, trust and identification. Since people make emotional commitments primarily due to their relationships with group members, social capital factors should encourage members to make an affective commitment to the community of practice.

Obligation factors are comprised of positive social influence and altruistic factors embodied by members who enjoy helping. A sense of obligation or duty comes either from external pressures or internal mores, so normative commitments are led by obligation and altruistic factors.

#### 3.3.1 Knowledge Collection, Contribution and Utilization Constructs

The following constructs describe knowledge management behaviors in online communities of practice, which are made up of knowledge utilization, knowledge contribution, and knowledge collection.

Knowledge Utilization. Knowledge utilization is an important aspect of effective communities of practice. Members utilize knowledge when they apply knowledge gained from the community of practice to their lives outside the community (Chen & Hung, 2010). The knowledge utilization must take place for the knowledge to have value to the community member.

Chen and Hung (2010) posited that knowledge sharing (contributing and collecting) positively affected knowledge utilization. They suggested that knowledge utilization should vary with knowledge collection and contribution. The more knowledge to which a member is exposed, the more they should be able to apply it to their life outside of the community of practice. Knowledge utilization should also increase as a member contributes knowledge to the community. Knowledge contributions indicate that the member is thinking through the information in the community of practice and is therefore more likely to find an application for it.

Hypothesis H1: As the knowledge collection behaviors of a member increases, their knowledge utilization behaviors will also increase.

Hypothesis H2: As the knowledge contribution behaviors of a member increases, their knowledge utilization behaviors will also increase.

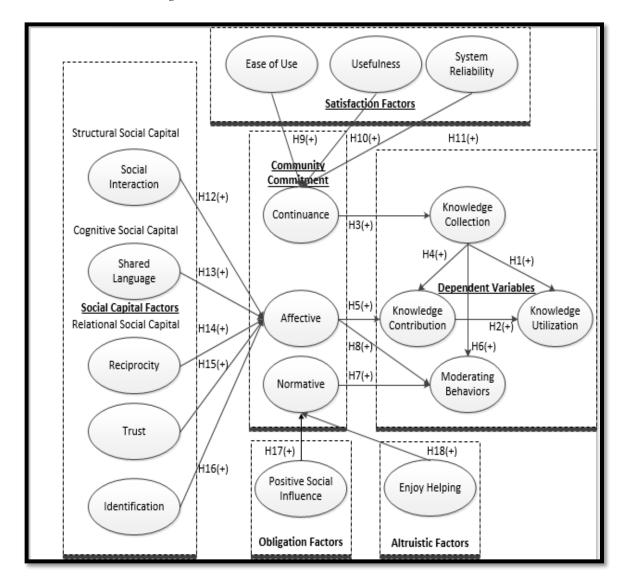


Figure 3.6 Development model: A Community Commitment Model of Knowledge Sharing in Online

Communities of Practice

*Knowledge Sharing*. Knowledge sharing is the process where explicit or tacit knowledge is communicated from one person to another. Explicit knowledge is knowledge that is written down or codified. Tacit knowledge only exists in the minds of the people who know it. Some researchers argue that while explicit knowledge can be shared using

technological means through the organization's structure, tacit knowledge can only be communicated interpersonally (Chang & Chuang, 2011). In order to be effective, the person receiving the knowledge must be able to act on it. Knowledge sharing can take place between individuals, within organizations or across organizations (Becerra-Fernandez, I., A. Gonzalez, and R. Sabherwal, 2004). Chen and Hung (2010) suggest that knowledge sharing in an online community consists of knowledge contributing activities and knowledge collecting behaviors. In order for knowledge to be shared in an online community of practice, one or more members must contribute it and one or more members must collect it. Knowledge contribution typically takes the form of making posts to the online community of practice. Members collect knowledge when they read posts made by other members. However, knowledge may be collected and contributed in other ways as well, depending on the online community platform.

Knowledge Collection. Chen and Hung (2010) describe knowledge collection and knowledge contribution as complementary constructs that comprise knowledge sharing. Group members collect knowledge when they seek out and reuse knowledge they find in the community of practice. Bateman, et al. (2011) found that group members with a continuance commitment were more likely to read posts because they were interested in the information they could draw from the community. Therefore, a continuance commitment to the community of practice may drive knowledge collecting behaviors. In other words, members who feel it would be difficult to replace the benefits of the community are most likely to collect knowledge from the community.

Hypothesis H3: As members' continuance commitment to a community of practice increases, their knowledge collection behaviors will increase.

Knowledge Contribution. Chen and Hung describe knowledge contribution as an essential part of knowledge sharing. Group members contribute knowledge they have gained through experience to the community of practice (Chen & Hung, 2010). Bateman, et al. (2011) found that group members who read posts are more likely to post replies. It follows that members who collect knowledge may also be more likely to contribute knowledge to the community of practice. This may happen because the group members are exposed to more questions from other members and are therefore more likely see something to which they

have an answer. Also their increased knowledge of the domain of the community of practice may give them more knowledge to contribute.

Hypothesis H4: As the knowledge collection behaviors of a member increases, their knowledge contribution behaviors will also increase.

Bateman, et al. (2011) showed that members with an affective commitment to the community were more likely to reply to posts in the online community and perform informal group moderation activities. An affective commitment describes members who have a love or affection for the online community. The proposed model posits that members who are emotionally attached to a community are most likely to share knowledge within the community and perform moderation services to community members that will make the community as a whole function better. Group members who have formed an emotional attachment to the group want the group to thrive and continue, so they engage in behaviors that will ensure the community's longevity. In this model, it is expected these sustaining behaviors will take the form of knowledge contribution and moderating behaviors.

Knowledge contribution behaviors are necessary for the group to thrive because new knowledge is necessary to facilitate the exchange of knowledge between group members, which is what keeps people coming back to the community.

Hypothesis H5: As a member's affective commitment to a community of practice increases, their knowledge contribution behaviors will increase.

#### **3.3.2** Group Moderation Constructs

Bateman, Gray and Butler (2011) define informal moderating behaviors as behaviors which foster dialogue in the community of practice by discouraging off-topic posts that do not fulfill the informational needs of the community, mediating disagreements between members and reprimanding members when they behave inappropriately. Gray (2004) suggested that moderating behaviors also included assisting members who needed help learning how to work the technology and making relevant posts when the discussion has slowed. Bateman et al. (2011) suggest that group members who collect knowledge may also engage in increased moderating behaviors. This may occur because the members are spending more time on the system and observing more behavior by other members.

Hypothesis H6: As the knowledge collection behaviors of a member increase, their group moderating behaviors will also increase.

Bateman, et al. (2011) shows that normative commitments to the community can drive group moderation behaviors. Members with normative commitments participate in the group because it is something they feel like they ought to do. Group members who feel an obligation to participate in the community are most likely to participate in ways that help other members and enforce the rules of the community of practice.

Hypothesis H7: As a member's normative commitment to a community of practice increases, their moderating behaviors will increase.

Bateman, et al. (2011) shows that affective commitments to the community can also influence group moderation behaviors. Members with significant emotional attachments to the group demonstrate an affective commitment. Group members with a strong emotional attachment to the community tend to participate in ways that benefit the group as a whole and ensure its survival by helping other members and enforcing the community of practice's rules.

Hypothesis H8: As a member's affective commitment to a community of practice increases, their moderating behaviors will increase.

#### **3.3.3** Community Commitment Constructs

Bateman, et al. (2011) defined community commitment as the psychological ties between the member and the organization and used it to predict members' reading, posting and moderating habits. Meyer and Allen's (1991) research on community commitment in organizations divided commitment into three basic types: continuance commitment, affective commitment, and normative commitment.

Continuance Community Commitment. Members who feel they will lose something that may be difficult to replace if they leave the community exhibit a continuance community commitment. Bateman, et al. (2011) suggested employees with a continuance commitment to an employer will only seek to preserve the relationship to the employer in ways that seek the individual's benefit. Therefore, a continuance commitment would drive members to read more "threads" or posts within the online community, because it gives the member the information they need. Members who are most concerned about the value they receive from

the community engage in behaviors that they feel are most likely to give them the result they want.

Affective Community Commitment. Members who have an emotional attachment to the community display an affective commitment. Bateman, et al. (2011) described employees with an affective commitment to an employer as engaging in activities that further the goals of the organization as a whole. They suggested that an affective commitment made members reply to more posts, an activity which was essential for the health of the community. They also discovered that members with an affective commitment engaged in more behaviors that moderated the group and ensured group norms were enforced. Members with a strong emotional attachment to the community were more likely to respond to other members to form relationships with them.

Normative Community Commitment. A normative commitment is feeling obligated to participate in the group. Bateman, et al. (2011) said that an employee with a normative commitment to an employer contributed to the goals of the overall organization, but did so out of a feeling of obligation. They suggested that a normative commitment compelled members to engage in more moderating behaviors. Normative commitments are less effective at promoting the welfare of the online community than affective commitments.

#### 3.3.4 Satisfaction Constructs

Satisfaction factors describe how pleased the member is with the community of practice. These factors include ease of use, usefulness and system reliability. Satisfaction factors most directly influence members with a continuance commitment because those members only participate in the community to the extent that it benefits them. If they are dissatisfied with the community, then they will perceive less benefit and they will not participate in the community.

Ease of Use. Ease of use can be equated with the term "usability". Lu, Phang and Yu (2011) suggested that information service quality affected ongoing participation in a community by changing how the users perceived that the community was useful, enjoyable and a place they felt they belonged. The perception that a community was easy to use drove users to form a stronger continuance commitment to the community. Phang, et al. (2009) explained that if information need fulfillment is the benefit of using a community of practice,

a lack of ease of use can be considered the cost. Since a continuance commitment is defined as what the member feels they get from the community and the ease with which the community can be replaced, the members' perception of the ease with which knowledge can be gained from the community can impact their continuance commitment to the community.

Hypothesis H9: A member who feels the community of practice is easy to use develops a stronger continuance commitment to the community.

Usefulness. The usefulness of an online community of practice includes the quality, quantity and utility of shared knowledge. Ma and Agarwal (2007) defined information need fulfillment as the extent to which the community meets the information seeking goals of its members. They tied information need fulfillment to member satisfaction and knowledge contribution. Information need fulfillment can affect a member's continuance commitment because a chief reason the member joins an online community of practice is so they can receive knowledge from the group. The member's perception of how well the online community of practice fulfills that need determines how easily the member will think the group can be replaced. As a member's perception of the usefulness of the community's knowledge increases, they are more likely to see the community as irreplaceable which results in a higher level of continuance commitment.

Hypothesis H10: A member who feels the community of practice is useful develops a stronger continuance commitment to the community.

System Reliability. Phang et al. (2009) defined system reliability as the perception that a system is "stable, robust, and available to facilitate a task whenever it is needed." They argue that system reliability is especially important when people are seeking knowledge because the knowledge seeker typically has some decision to make or problem to solve. If a member cannot rely on the technology of the online community of practice to deliver the needed knowledge, this decreases the group member's continuance attachment to the group. Since they are unable to procure the knowledge they need and must seek it from some other source, it would cause the member to see the group as less valuable to them and encourage them to seek a replacement community.

Hypothesis H11: A member who feels the community of practice is reliable develops a stronger continuance commitment to the community.

#### 3.3.5 Social Capital Constructs

Chang and Chuang (2011) defined social capital as the value of the member's social network within the community. The following dimensions comprise social capital: the structural dimension, the cognitive dimension, and the relational dimension. Chang and Chuang (2011) tied social capital to the quantity and quality of knowledge sharing within the community. Wasko and Faraj (2005) associated structural, cognitive and relational social capital factors with increased knowledge contribution behaviors. Since social capital factors most directly describe the social and personal relationship between the members and the organization, a member's affective commitments should be positively influenced by their social capital in the context of the group.

Structural Dimension: Social Interaction. The structural dimension of social capital describes the extent of the interpersonal linkages between group members and departments within a community. Chang and Chuang (2011) described the structural dimension of social capital as intense social interactions and relationships between members. They argued that personal relationships lead to increased knowledge sharing. An affective commitment describes a member's emotional attachment to the community, and social interaction influences a member's emotional commitment. Having close relationships with other group members should build an emotional attachment to the group and drive the member to behave in ways that benefit the group as a whole. Intensely positive personal interactions may give group members a reason to visit and participate in the community of practice even if they do not expect to always gain knowledge from the group.

Hypothesis H12: Users who interact with other members of the group more frequently increase their affective commitment to the community.

Cognitive Dimension: Shared Language. Chang and Chuang (2011) defined the cognitive dimension of social capital as the language shared between the members of the community. Members of an online community of practice often develop new terms, abbreviations and shared assumptions through frequent interactions. A shared language is tied to quantity and quality of knowledge sharing. A shared language between members enhances communication and builds a sense of community, which should build a member's affective commitment to the community through a stronger emotional attachment.

Hypothesis H13: As a member develops a shared language with their community, their affective commitment to the community will increase.

Relational Dimension. The relational dimension describes the relationship between a group member and the organization itself. Chang and Chuang (2011) used the relational dimension of social capital to describe the trust the member has with other members, the expectation that positive actions will be repaid in kind, and a shared identity with the group.

Relational Dimension: Reciprocity. Some individuals contribute knowledge because they expect other members will reciprocate. They expect to gain from other individuals contributing knowledge. Reciprocity describes how the individual believes other members of the community will respond to their sharing knowledge. Individuals that believe other members will reciprocate their efforts to share knowledge will be more likely to share knowledge. Chang and Chuang (2011) associated reciprocity with quantity and quality of knowledge sharing. Members are more likely to make an emotional investment in a community, if they feel that their efforts to contribute knowledge to the community will be repaid in kind. This should lead members with high perceptions of reciprocity to make a stronger affective commitment to the online community.

Hypothesis H14: Members who believe other members will respond positively to their own positive actions will have higher affective commitments to the community

Relational Dimension: Trust. Chang and Chuang (2011) defined trust as the belief that other community members will act in ways that are consistent with the community's rules and norms. Online community members were more likely to share knowledge when they believed they could rely on the other members of the community to provide honest, accurate information and not misuse information they were given. Trust significantly predicted knowledge contributing behaviors and knowledge collecting behaviors (Chang & Chuang, 2011). It is difficult to have a great love for an online community if one does not trust the other members of the community.

Hypothesis H15: Members who trust members of their community increase their affective commitments to the community.

<u>Relational Dimension: Identification</u>. Chang and Chuang (2011) defined identification as the member's recognizing that they belong to a unique online community. They tied the

member's identification with the group to knowledge sharing quantity and quality. Group members identify with online communities that have members they perceive as similar to themselves. Over time, belonging to a community of practice becomes part of the group member's personal identity. Identifying with the group influences a member's affective commitment. Members who feel they have found a group of kindred spirits and a place to belong will make a stronger emotional investment in the group.

Hypothesis H16: Users who can identify with the group increase their affective commitments to the community.

#### 3.3.6 Obligation, Altruism and Control Constructs

Obligation factors, such as positive social influence, and altruism factors, such as enjoying helping, can influence the normative commitments made by members of an online community of practice. Age, sex and tenure are factors which have an influence on knowledge management and group moderation behaviors, but since they cannot easily be changed by community leadership, they should be controlled in the statistical analysis.

Obligation Factors (Positive Social Influence). Obligation factors, such as positive social influence, encourage members to make a normative or obligatory commitment to the online community of practice. Bock, Zmud, Kim and Lee (2005) defined social influence as peer pressure to act in a particular way. If group members feel their peers want them to participate in the community of practice, they are more likely to do so out of a feeling of obligation. Normative commitments are defined by an obligation to follow group norms or rules imposed by others. Group members are more likely to form normative or obligation-based commitments, if they perceive positive social pressures from their peers or superiors encouraging them to follow the norms of the community and contribute knowledge.

Hypothesis H17: A member who receives positive social influence increases their normative commitment to the community.

Altruistic Factors (Enjoy Helping). Some members post answers to questions because they are altruistic and get a good feeling from helping others. Chang and Chuang (2011) showed that altruism was a significant contributor to the quality and quantity of knowledge sharing in online communities. They suggested that members who enjoy helping other members gained self-satisfaction when they fulfilled their altruistic tendencies by giving aid

to other group members. Members who enjoy helping other members are more likely to form a normative commitment to the community because they feel that helping others is the "right thing to do" or a "duty". Even though they enjoy helping, they see it as an obligation. Members who enjoy helping other people will be influenced to make a normative commitment to the online community of practice.

Hypothesis H18: A member who enjoys helping members of the community increases their normative commitments to the community.

Control Factors. In order to highlight the posited relationships in their model, Bateman, et al. (2011) control for the following variables: age, sex and tenure. They describe age as the member's age in years. Tenure describes the amount of time a member has been in the group as well as the amount of time they spend on the website. Statistically controlling for these variables should make it easier to see if the proposed relationships are significant.

#### 3.4 Summary

The community commitment model of knowledge sharing in online communities of practice is based on the theories that govern knowledge management, group moderation, community commitment, social capital, social influence and altruism. It describes the relationship between the knowledge management and group moderation outcome variables and community commitment. It also describes the relationship between the types of community commitments and the antecedent factors of satisfaction, social capital, obligation and altruism.

## **CHAPTER 4**

### RESEARCH METHODOLOGY

#### 4.1 Introduction

This chapter examines the research methodology of the study. First the research design is discussed. Second, the design of the survey is explained. Third, the validity of the survey instrument is considered, giving special notice to the face and content validity of the survey. Fourth, the process used to distribute the survey and collect the data is described.

## 4.2 Research Design

The community commitment model of knowledge sharing in online communities of practice is based on the following theories: knowledge management, community commitment, social capital, usability, social influence and altruism. When these theories are examined in academic research, field studies with surveys are often used (Bateman et al., 2011; Chang & Chuang, 2011; Chen & Hung, 2010; Phang et al., 2009; Posey et al., 2010; Wasko & Faraj, 2005). Field studies analyze a real-world situation using quantifiable measures. Surveys, also known as research instruments, quantify data in an understandable way. In order to ensure the validity of the constructs and the originality and significance of the research, a thorough review was conducted of literature pertaining to online communities of practice and online communities in general. Most of the questions on the survey were adapted from questions used in previous research. Experts in the fields of information systems and academic research were also consulted in the design of the survey which resulted in many changes from the original questionnaire.

### 4.3 Survey Instrument Design

Once the basic research model was constructed from the constructs latent in the literature review, a survey was created to test the validity of the model. As mentioned previously, existing question and construct combinations were used whenever possible to

ensure the content validity of the survey. Reusing survey questions that were validated in prior research builds the content validity of the survey (Straub, Boudreau, & Gefen, 2004).

In the final version of the survey, each construct had at least three questions and many had four or more questions. During the analysis of the data, a handful of questions were thrown out due to poor loadings, but each construct had at least two questions describing it. Exceptions to this include the control constructs of age and sex, which did not have multiple questions for obvious reasons. Demographic information such as age, sex, country of residence and online community platform were collected and can be seen in Table 4.2. About ten percent more women responded to the survey than men. The most populated age groups were spread between the thirties, forties and fifties, with twenty-nine percent, twenty-four percent and twenty eight percent, respectively. Sixty percent of the respondents listed the United States of America as their residence. Europe and Asia were the main foreign respondents at thirteen and twelve percent respectively. Facebook and LinkedIn were cited as the platform for the majority of the Online Communities of Practice in the survey. Facebook and LinkedIn were the main communities specifically contacted to host the survey. However, nearly a quarter of the respondents were not sure about which platform their community used. Almost seventy percent of the respondents said they spent from one to five hours each week on the community of practice. Fifteen percent said they spent between six and ten hours a week on the community of practice. A glitch in the survey permitted some respondents to leave this question blank, so there are five missing values.

The survey also asked the community members the number of times they logged into the online community of practice each month. The results were an unusual curve with the majority of responses being either one to five times a month (thirty-three percent) or more than twenty-five times a month (twenty-six percent). Since the data is self-reported, it is possible this curve may have to do as much with how people estimated their usage and perhaps a different scale might be used in future research.

About seventy-five percent of the respondents described themselves as active users. Often online communities of practice have many more inactive users than active users (Ransbotham & Kane, 2011), but a truly inactive member would not see the posting of the survey in order to be able to respond to it. It is likely that the inactive members who

responded to the survey either were part of the pilot group or heard about the survey outside of their community of practice.

Survey respondents were given the option of describing themselves as members, moderators, administrators and owners. A checkbox was used for these options, allowing the respondents to select any combination of the four responses. Ninety-two percent of the respondents described themselves as members. Since the survey required a response on this question, the remaining eight percent selected one of the remaining options. Respondents selected moderator, administrator and owner at relatively equivalent rates of eight percent, nine percent and seven percent. Of the sixty-six respondents who selected moderator, administrator or owner, twenty-six selected more than one of those three roles, suggesting that community leaders often play multiple roles in online communities of practice.

Table 4.3 lists the survey questions, their source in the literature, related constructs as well as the mean, standard deviation, loadings and t-statistics. Other than the aforementioned demographic questions and the tenure questions, the responses were measured on a seven point Likert scale which ranged from strongly disagree (1) to strongly agree (7). Other exceptions to this include questions which quantitatively measured knowledge utilization and contributing behaviors.

**Table 4.2: Respondent Profile** 

Characteristic	Item	Freq.	Percentage	Characteristic	Item	Freq.	Percentage
Age	20 or younger	1	0%	Sex	Female	251	55%
	21-29	43	9%		Male	202	45%
	30-39	132	29%		Total	453	100%
	40-49	108	24%				
	50-59	125	28%	Online Community Platform			
	60-69	34	8%		Educause Discussion Group	4	1%
	70 or older	10	2%		Facebook	95	21%
		453	100%		Forumotion.net	21	5%
					Google +	10	2%
Residence	Outside US	180	40%		LinkedIn	137	30%
	Africa	8	2%		ListServ email group	21	5%
	Asia	55	12%		Microsoft Sharepoint Community Portal	13	3%
	Australia	9	2%		Not Sure	103	23%
	Europe	61	13%		Other Platform (see below)	32	7%
	North America (Outside USA)	26	6%		Yahoo Groups	17	4%
	South America	21	5%			453	100%
	USA (United States of America)	273	60%				
		453	100%				

Characteristic	Item	Freq.	Percentage	Characteristic	Item	Freq.	Percentage
Tenure	Missing Value	5	1%	Tenure	Never	4	1%
(Hours Per Week)	Do not Spend Any time	28	6%	(Logins per Month)	1 - 5 times	151	33%
	1 - 5 Hours	312	69%		6 - 10 times	71	16%
	6 - 10 Hours	69	15%		11 - 15 times	42	9%
	11 - 15 Hours	22	5%		16 - 20 times	31	7%
	16 - 20 Hours	8	2%		21 - 25 times	34	8%
	21 - 25 Hours	4	1%		More than 25 times	120	26%
	More than 25 hours	5	1%			453	100%
		453	100%				
Status	Active	332	73%	Role	Member	418	92%
	Inactive	121	27%	(Can be more than one)	Moderator	37	8%
		453	100%	1	Administrator	40	9%
					Owner	31	7%
					Moderator, Administrator, or	66	15%
					Owner		
					(Total will not equal 100%.)		

**Table 4.3: Measurement Items Summary** 

Construct	Item	Mean	Standard	Loadings	T Statistics
			Deviation		
UTIL	Utilization				
UTIL1	I use knowledge gained from this online community in making informed decisions (Ma & Agarwal, 2007).	5.21	1.61	0.90	86.15
UTIL2	I use resources obtained from this online community to find additional knowledge on these topics (Self-Developed).	5.40	1.61	0.89	77.03
UTIL3	I apply information gained from this online community to handle challenges or solve problems in my work or personal life. Adapted	5.00	1.75	0.88	56.37
	from Chen and Hung (2010).				
UTIL4	I use insights obtained from this online community to improve my professional knowledge level or my expertise in certain topic	5.30	1.71	0.83	35.13
	areas. Adapted from Adapted from Chen and Hung (2010).				
UTIL5	How often do you use or apply the knowledge obtained from the online community elsewhere, either in your work or personal life	4.26	1.64	0.71	23.02
	(Self-Developed)?				
COLL	Knowledge Collection				
COLL1	I participate to learn more about topic areas discussed in this online community (Self-Developed).	5.58	1.65	0.84	40.72
COLL2	I visit this online community to learn from other members' thoughts and experiences (Self-Developed).	5.64	1.60	0.86	48.30
COLL3	I search this online community for helpful resources and/or solutions on specific topics (Self-developed).	5.11	1.91	0.79	32.91
COLL4	I use this online community is to gain new insights related to the certain topic areas (Self-Developed).	5.53	1.66	0.91	77.70
CNTR	Knowledge Contribution				
CNTR1	I contribute my understanding about topic areas discussed in this online community (Self-Developed).	4.38	1.95	0.93	98.59
CNTR2	I share my thoughts and experiences with other members' in this online community (Self-Developed).	4.33	1.98	0.94	106.71
CNTR3	I contribute helpful resources and/or solutions in this online community (Self-Developed).	4.27	2.01	0.93	107.93
CNTR4	I share my insights on specific topics discussed in this online community (Self-Developed).	4.34	2.02	0.95	144.62
CNTR5	How often do you contribute your knowledge on certain topics on this online community? Adapted from Chen and Hung (2010).	3.65	1.91	0.83	43.71
MODR	Moderating Behaviors				
MODR2	I try to settle disputes between members of this community. Adapted from Bateman et al. (2011).	2.97	1.82	0.88	64.69
MODR3	I reprimand other members' inappropriate behavior in this online community. Adapted from Bateman et al. (2011).	2.75	1.85	0.84	42.19

Construct	Item	Mean	Standard	Loadings	T Statistics
			Deviation		
MODR4	I assist members who need help learning how to work the technology in this online community. Self-Developed, but suggested by	3.88	2.07	0.82	42.17
MODDS	Gray (2004).	2.14	1.02	0.97	50.02
MODR5	I often make posts when the discussion has slowed. Self-Developed, but suggested by Gray (2004).	3.14	1.92	0.87	59.82
CONT	Continuance Community Commitment				
CONT1	If I stopped coming to this community, it would take me a long time to find a community that could replace it (Bateman et al. 2011).	4.63	2.15	0.92	76.38
CONT3	The content of this community is too valuable for me to stop visiting (Bateman et al. 2011).	4.91	1.86	0.95	171.32
AFFT	Affective Community Commitment				
AFFT1	I feel like a part of the group in this online community (Bateman et al. 2011).	5.04	1.75	0.90	93.55
AFFT2	I feel a strong connection to this online community (Bateman et al. 2011).	4.78	1.88	0.96	188.66
AFFT3	This online community has a great deal of personal meaning for me (Bateman et al. 2011).	4.40	2.04	0.96	249.16
AFFT4	I have a real emotional attachment to this online community (Bateman et al. 2011).	3.91	2.16	0.91	105.51
NORM	Normative Community Commitment				
NORM1	I feel an obligation to continue visiting this online community (Bateman et al. 2011).	3.97	2.06	0.88	64.31
NORM2	I would feel guilty if I stopped visiting this online community now (Bateman et al. 2011).	3.45	2.10	0.93	94.46
NORM3	I keep coming to visit this online community because I have a sense of obligation to it (Bateman et al. 2011).	3.37	2.09	0.95	164.64
NORM4	I visit this online community partly out of a sense of duty (Bateman et al. 2011).	3.20	1.98	0.86	48.17
NORM5	This online community deserves my loyalty (Bateman et al. 2011).	4.00	2.11	0.83	47.89
INTR	Social Interaction				
INTR1	I have frequent communication with some members in this online community (Chang & Chuang, 2011).	4.01	2.10	0.90	81.34
INTR2	I maintain close interactions with some members of this online community. Adapted from Chang et al. (2011).	3.87	2.11	0.92	104.85
INTR3	The members of this online community actively initiate online or offline events. Adapted from Chang et al. (2011).	4.07	2.07	0.85	50.46
INTR4	The members of this online community meet each other in informal offline meetings (Lu et al., 2011).	3.66	2.06	0.82	43.36
LANG	Shared Language				
LANG1	Members share common terms or jargons, unique to this online community. Adapted from Chang et al. (2011).	4.82	1.75	0.72	14.10
LANG2	Members of this online community use an understandable communication pattern during discussions. Adapted from Chang et al.	5.42	1.37	0.90	37.91
	(2011).				
RCPT	Reciprocity				

Construct	Item	Mean	Standard	Loadings	T Statistics
			Deviation		
RCPT1	I know that other members in this online community will help me, so it is only fair to help other members. (Chang & Chuang, 2011).	5.53	1.47	0.93	74.89
RCPT2	I believe that members in the online community would help me if I needed it (Chang & Chuang, 2011).	5.56	1.45	0.95	115.32
RCPT3	It is fair to help each other in an online community (Chang & Chuang, 2011).	5.86	1.34	0.86	34.32
TRST	Trust				
TRST1	Members of this online community are truthful in dealing with one another (Chang & Chuang, 2011).	5.49	1.37	0.93	107.66
TRST2	Members of this online community behave in a consistent manner (Chang & Chuang, 2011).	5.45	1.36	0.92	82.00
TRST3	Members of this online community will not take advantage of others even when the opportunity arises (Chang & Chuang, 2011).	5.16	1.54	0.91	86.58
TRST4	Members of this online community will always keep the promises they make to one another (Chang & Chuang, 2011).	4.89	1.45	0.91	87.51
IDFN	Identification				
IDFN1	When someone praises this online community, it feels like a personal compliment (Ma & Agarwal, 2007).	4.38	1.98	0.90	79.11
IDFN2	If stories in the media criticized this online community, I would feel bad (Ma & Agarwal, 2007).	4.68	1.93	0.87	49.26
IDFN3	When I talk about this online community, I usually say "we" rather than "they" (Ma & Agarwal, 2007).	4.42	2.04	0.89	76.78
EOUS	Ease of Use				
EOUS1	It is easy to navigate this online community (Lu et al., 2011).	5.38	1.51	0.91	71.22
EOUS2	It is easy to find the information I need in this online community (Lu et al., 2011).	5.08	1.51	0.92	77.90
EOUS3	It is easy to learn how to use the various features in this online community. Adapted from Phang et al. (2009).	5.29	1.45	0.89	45.64
USFL	Usefulness				
USFL1	I find the knowledge shared in this online community to be reliable (Chang & Chuang, 2011).	5.54	1.37	0.87	60.64
USFL2	I find the knowledge shared in this online community to be understandable (Chang & Chuang, 2011).	5.74	1.21	0.85	38.70
USFL3	New content is posted frequently in this online community (Chang & Chuang, 2011).	5.42	1.51	0.79	33.23
USFL4	Members can obtain abundant content and knowledge from this online community (Chang & Chuang, 2011).	5.33	1.55	0.87	63.33
USFL5	The knowledge shared in this online community is relevant to my problems/the tasks in personal/work life (Ma & Agarwal, 2007).	5.35	1.53	0.87	62.10
USFL6	The knowledge shared in this online community can help me make informed decisions in my work/personal life (Ma & Agarwal,	5.18	1.55	0.86	58.56
	2007).				
RELB	System Reliability				
RELB1	This online community is always available for my use (Phang et al., 2009).	6.18	1.26	0.92	55.90
RELB2	The technology platform of this online community is robust enough for my use (Phang et al., 2009).	5.84	1.36	0.90	55.06

Construct	Item	Mean	Standard	Loadings	T Statistics
			Deviation		
RELB3	I do not experience system crashes while using this online community (Self-Developed).	6.01	1.40	0.84	26.80
POSI	Positive Social Influence				
POSI1	People I know personally think I should participate in this community. Adapted from Bock et al. (2005).	3.75	2.08	0.87	55.46
POSI2	Other members of this online community think I should participate in this community. Adapted from Bock et al. (2005).	3.91	2.13	0.91	93.48
POSI3	Generally speaking, I respect and put in practice suggestions from my peers. Adapted from Bock et al. (2005).	4.79	1.82	0.77	28.04
ENHP	Enjoy Helping				
ENHP1	I enjoy helping others in this online community (Chang & Chuang, 2011).	5.32	1.57	0.97	130.92
ENHP2	It feels good to help others solve their problems in this online community (Chang & Chuang, 2011).	5.39	1.60	0.98	231.39
ENHP3	I like to support other members in solving their problems/issues in this online community (Chang & Chuang, 2011).	5.36	1.59	0.98	247.22

### 4.4 Survey Instrument Validation

Several steps were taken to ensure the validity of the survey. This section examines the face and content validity of the survey and the results. Face validity is the extent to which a research method measures what is says it measures. Straub, Bourdreau and Gefen (2004) define content validity as whether or not the research instrument measures a construct in a way that is representative of all the ways the construct could be measured. For instance, the tenure construct can be measured as the length of time the member has been associated with the community as well as the amount of time the member spends working with the community weekly (Bateman et al., 2011). Straub, et al. (2004) suggest pretesting surveys to build content validity. This was done in two stages. The pretest stage involved "vetting" the proposed survey with information systems professors at a midwestern university and other experts in the fields of information systems and academic research at three other universities. The reviewers received a copy of the proposed questionnaire as well as the proposed model and definitions of the associated constructs. They reviewed the survey questions for validity and relevance and to ensure that no crucial constructs were omitted.

For the second stage or "pilot" stage, the revised survey was uploaded to the SurveyMonkey website and sent to a pilot group of members of online communities of practice. The pilot group included students pursuing advanced degrees in information systems at a midwestern university and faculty and staff associated with a small southwestern university. The pilot stage doctoral students and the pretest stage experts, who have formally studied communities of practice, were used to fine-tune the survey by making sure the wording was clear. Only minor changes were needed after the initial pilot group. Overall, the strategy of having experts look at the questionnaire and pilot-testing the questionnaire should build the face and content validity of the survey.

#### 4.5 Sampling and Data Collection

In order to further support the validity of the survey, the methods used to sample and collect the data will now be discussed. The necessary sample size is discussed followed by a description of how the data was collected.

## 4.5.1 Sample Size

One of the challenges in using the partial least squares method is deciding what number of responses makes an appropriate sample size. Results were collected over a three month period. Over six hundred responses were collected, of which 456 were judged to be complete. Three responses were removed because it appeared that the respondent was not filling them out accurately due to the number of responses that were the same.

Gefen, Straub and Boudreau (2000) suggested that since Partial Least Squares (PLS) is founded in Linear Regression models, that the sample size should be a large multiple of the number of constructs. In the case of this model, there are twenty constructs, counting the control variables. If one assumes ten responses for each construct, this would suggest a sample size of 200. In this particular case there are more than twenty responses for each of the constructs. Gefen, et al.(2000) also suggested that a sample needs at least ten times the number of items in the most complex construct. The most complex construct in this model is the affective community commitment construct. It has five independent variables and itself is the independent variable for two additional constructs. Including the control variable questions, thirty-two questions are related to the constructs directly tied to the affective commitment. This would suggest a necessary sample size of three hundred and twenty.

However, Goodhue, Lewis, & Thompson (2012) proposed that the "rule of thumb" cited by Gefen, et al.(2000) might underestimate the sample needed in a PLS analysis. They contended that since PLS is based on multiple linear regression that Cohen's (1988) method for calculating multiple linear regression samples would provide a better estimate than taking ten times the number of constructs going into the model. Cohen (1988) defines statistical power as the "probability that [a statistical test] will yield significant results". Cohen's method for calculating the number of responses necessary for a multiple linear regression to reach the desired statistical power is complex. Therefore, the overall statistical power of the model will be estimated and then the necessary samples size will be calculated. On page 420 of his book *Statistical Power Analysis for the Behavioral Sciences, Second Edition*, Cohen (1988) provides Table 9.3.2 to calculate the "Power of the F Test as a Function of  $\lambda$ , u, and v a = .01" (Cohen, 1988).

The variable u, or the "degrees of freedom of the numerator of the F ratio" (Cohen, 1988), represents the number of independent variables. Of the seventeen constructs, sixteen

serve as an independent variable for at least one of the other constructs. There are sixty-three questions related to the sixteen independent variables and the three control variables. B is the strength of the correlation ( $R^2$ ) for the model. As the strength of the correlation decreases, the statistical power decreases and the necessary sample size increases. In this case, the lowest correlation was used, which is the  $R^2$  value for the knowledge collection construct: 0.3314. The variable a is the measure of significance. Cohen provided tables for a = .01 and a = .05 significance levels. A significance of .05 was chosen because it provided a reasonable guideline for the calculation of statistical power. Variable v, or "the degrees of freedom of the denominator of the F ratio", is the number of results, 453, less the number of independent variables (sixty-three), less one. This provides a v value of 389. The variable  $t^2$ , which represents the effect size is calculated by taking the strength of the correlation,  $t^2$  and dividing it by one less  $t^2$ . The resulting formula is  $t^2 = t^2/(1-t^2) = .3314/(1 - .3314) = .4957$ . The variable lambda ( $t^2$ ), or the noncentrality parameter is calculated by multiplying the effect size by the number of responses.  $t^2$ 0 and  $t^2$ 1 and  $t^2$ 2 and  $t^2$ 3 and  $t^2$ 4 and  $t^2$ 5 and  $t^2$ 5

	1 2	1		1 2	_
u: 63	$R \cdot R^2 - 3314$	a: .05	V: 389	l f²⋅ 4957	λ· 224
u. 03	D. K = .3317	a03	v. 307	1 7 . 7 . 7	7c. 224

Since the information is in a table, there are some limitations. If one uses a U of 60 (instead of the actual value of 63) and a v of infinity (instead of 389) and a  $\lambda$  of 40 (instead of 203), this generates a power of 90. This means the results of the study have a ninety percent chance of being significant and not a random occurrence.

Cohen shows how to interpolate between v values on the table. If the v value is changed from infinity to 120, the power drops to 76. The interpolated power will be equal to the lower power plus the inverse of the lower v less the inverse of the actual v divided by the inverse of the lower V less the inverse of the higher v multiplied by the higher power less the lower power. Cohen postulates that one divided by infinity gives a result of zero. So, the inverse of an infinite v is zero. This gives the following formula.

Power= PowerL + 
$$((1/vL - 1/v)/(1/vL - 1/vU))$$
 (PowerU - PowerL)  
Power =  $76 + ((1/120 - 1/389)/(1/120 - 0))$  ( $90 - 76$ ) =  $80.34$ 

Therefore, a more accurate measurement of the power of the statistical model is around 80.

Now that the basic statistical power of the model has been estimated as a frame of reference, the estimate of the necessary sample size will be calculated. On page 452 of his book *Statistical Power Analysis for the Behavioral Sciences, Second Edition*, Cohen provides Table 9.4.2 to calculate the " $\lambda$  values of the F Test as a Function of Power, u, v, and a = .05" (Cohen, 1988).

The variable u, or the "degrees of freedom of the numerator of the F ratio", is calculated as 63, using the same method as the previous section. B, the strength of the correlation ( $R^2$ ) for the model, is also the same as the prior calculation: 0.3314. As mentioned previously, the variable a, the measure of significance, is set to a .05 significance level. Variable v, is set to 389, using the previous calculation. The variable lambda ( $\lambda$ ), or the noncentrality parameter is calculated as 59.0 by retrieving the value from Table 9.4.2 using the following variables:

u: Number of	B: $R^2$ = Criterion	V: 389	a: Significance	Column Power
Independent	variance in the	(Infinity)	Criterion= .05	= .99
Variables =	population = 0.3314			
63 (60)	(Chose lowest –			
	COLL)			

The minimum sample size is calculated with the following formula:  $N = \lambda (1 - B)/B$ . N = 59(1-0.3314)/0.3314 = 119

As with calculating statistical power, the tables can be used to calculate a more correct  $\lambda$  using the following formula:

$\lambda L = 78.2$	$\lambda U = 59$	vL = 120	v = 389	vU = (Infinity)

$$\lambda = \lambda L - ((1/vL - 1/v)/(1/vL - 1/vU)) (\lambda L - \lambda U)$$
  
$$\lambda = 78.2 - ((1/120 - 1/389)/(1/120 - 0)) (78.2 - 59) = 64.83$$

The  $\lambda$  is used to calculate the sample size:

$$N = \lambda (1-B)/B$$
  
 $N = 64.83 (1-0.3314)/0.3314 = 130.79$ 

Therefore the minimum sample size using the Cohen method should be somewhere near 131. However, in this study there are 453 responses, which should exceed the necessary sample size regardless of the method used to calculate it.

#### 4.5.2 Data Collection

The survey was sent to over sixty online communities of practice on LinkedIn, Yahoo Groups and Facebook. A quick search of the LinkedIn group directory reveals over nine hundred communities of practice. Many of these groups are closed groups and it was not possible to get access. The majority of the communities were groups on LinkedIn that identified themselves as communities of practice. However, as can be seen in Table 4.2, a number of other sites were involved as well. Respondents were asked to answer the questions about the community in which they were most active. Respondents were also asked to forward the survey link to other community of practice members they thought might be interested. The literature review for the paper was gathered into an electronic book and made available on the Smashwords website. Respondents to the survey were given access to the electronic book with the research for no charge. Online Communities of Practice which hosted the surveys were promised they would eventually receive the results of the research. The postings to the online communities of practice directed the members to the SurveyMonkey website, where the results were collected. Results were collected over a three month period. Four hundred and fifty-six complete responses were found in over six hundred total responses. Three records were removed because the respondents entered an unlikely number of responses that were the same. Table 4.3 lists the questions from the survey and the mean and standard deviation of the responses. Table 4.2 lists the profile of the data sample.

#### 4.6 Summary

The research methodology has been explained by detailing the process of the research design, the creation and validation of the survey instrument and the sampling and collection of the data.

# **CHAPTER 5**

## DATA ANALYSIS AND RESULTS

#### 5.1 Introduction

This chapter discusses the analysis of the data and the overall results of the survey. First, the demographic information for the respondents is discussed. Second, the validity and reliability of the model are examined. Third, the data is analyzed by assessing the validity and structure of the measurement model.

## 5.2 Sample Characteristics and Descriptive Statistics

Over six hundred members of online communities of practice responded to the survey. When surveys with more than nine missing fields were removed, 456 responses remained. Of these, three records were removed as outliers. Table 4.2 shows the demographic profile of the respondents. Fifty-five percent of the respondents were female. Over eighty percent of the respondents were between thirty and sixty. Sixty percent of the respondents showed the United States of America as their residence. Over half the respondents listed their online community platform as Facebook or LinkedIn, but twenty-three percent of the respondents were not sure. Table 4.3 lists the specific questions on the questionnaire and the mean response and the standard deviation.

#### 5.3 Initial Assessment of Validity and Reliability

The following section examines construct and discriminant validity, reliability and common methods bias to assess the validity and reliability of the survey responses. Reliability describes the extent to which a construct is internally consistent and is a good operationalization of the construct (Straub et al., 2004). Cronbach's Alpha values should exceed .7 because it measures the internal consistency of the model. Table 5.4 examines the

validity of the structural model by listing the Cronbach's Alpha, the composite reliability and average variance extracted (AVE) scores (Straub et al., 2004). To measure internal reliability, composite reliability evaluates the actual loadings which make up the construct factor scores and should provide a better measure than Chronbach's Alpha alone (Chin, 1998a). Assuming the accuracy of the parameter estimates, the composite score measures reliability and should exceed .8 (Straub et al., 2004). To conservatively measure reliability, Average Variance Extracted (AVE) should exceed .5 to show that the model accounts for at least fifty percent of the variance in the model (Straub et al., 2004).

As can be seen in Table 5.4, all the constructs meet these requirements, except for language, which has a Cronbach's Alpha of 0.53. The hypothesis associated with the language construct did not appear to have a significant impact on the overall model. This may explain part of the problem with that particular construct. In addition, the tenure control construct has sufficient AVE (0.74) and composite reliability score (0.85) but a lower Chronbach's Alpha score (0.66). However the tenure construct does not play an essential role in the model. Overall, the data analysis shows that the model has reasonable validity.

## 5.4 Data Analysis and Results

Now that the reliability of the survey instrument has been discussed, the analysis of the data continues by assessing the measurement model, reviewing construct and discriminant validity and then testing the structural model.

#### **5.4.1** Assessment of Measurement Model

This study used Partial Least Squares (PLS) to analyze the survey responses and validate the proposed model. PLS analyzes the latent variables in multiple indicator equation models and works well with smaller sample sizes and data which may not have a normal distribution (Lu et al., 2011). PLS shows relationships between independent and dependent constructs, where multiple questions combine to form each construct. Since this study proposes a significant extension to existing models it uses PLS as a theory development tool (Ma & Agarwal, 2007). SmartPLS 2.0 software (Ringle, Wende, & Will, 2005) was used to analyze the survey data.

The model was evaluated to establish construct, convergent, discriminant, and structural validity. How constructs are measured and operationalized comprises construct validity. Factorial validity is part of construct validity and shows the validity of latent constructs. The variables used to measure constructs must correlate with each other more strongly than they do other constructs. The measurement model's goodness of fit is described by convergent and discriminant validity (Gefen & Straub, 2005).

How well the survey questions fit the constructs they measure is referred to as the "outer model". Convergent or outer model validity is shown through the item loadings and T-Statistics. To estimate the t-values and item loadings, SmartPLS 2.0 performed a "Bootstrapping" procedure with 1,812 samples (Chin, 1998a). A handful of questions with low item loading scores were removed after the bootstrapping procedure. The remaining item loadings exceed .7. All the t-scores now have a score larger than 1.96 which makes them significant at  $\alpha = 0.05$  significance level. Fifty of the sixty-seven remaining items had loadings greater than .85 (Chin, 1998b).

The discriminant validity of the model can be seen in Table 5.4 which analyzes the average variance extracted (AVE) of the items. The measurement items should correlate with the appropriate construct more strongly than they do any other constructs. The square root of the AVE for each latent construct is compared with the correlation between that construct and any of the other latent constructs (Chin, 1998a). The bolded square roots of the AVE exceed the correlations of other constructs.

Table 5.4: Correlation of Latent Variables and Square Root of Average Variance Extracted (AVE)

	AVE	Composite	$\mathbb{R}^2$	Cronbach's	Communa	Redun	UTIL	COLL	CNTR	MODR	CONT	AFFT	NORM	INTR	LANG	RCPT	TRST	IDFN	EOUS	USFL	RELB	POSI	ENHP
		Reliability		Alpha	lity	dancy																	
UTIL	0.72	0.93	0.60	0.90	0.72	0.39	0.85																
COLL	0.73	0.91	0.33	0.87	0.73	0.23	0.74	0.85															
CNTR	0.84	0.96	0.51	0.95	0.84	0.08	0.51	0.44	0.92														
MODR	0.73	0.91	0.42	0.87	0.73	-0.00	0.30	0.23	0.55	0.85													
CONT	0.87	0.93	0.47	0.85	0.87	0.08	0.61	0.57	0.48	0.32	0.93												
AFFT	0.87	0.96	0.66	0.95	0.87	0.33	0.55	0.51	0.65	0.53	0.60	0.93											
NORM	0.79	0.95	0.39	0.93	0.79	0.27	0.32	0.22	0.43	0.57	0.38	0.61	0.89										
INTR	0.76	0.93		0.90	0.76		0.37	0.27	0.61	0.57	0.42	0.70	0.54	0.87									
LANG	0.67	0.80		0.53	0.67		0.48	0.48	0.35	0.21	0.42	0.44	0.29	0.38	0.82								
RCPT	0.84	0.94		0.90	0.84		0.50	0.48	0.45	0.30	0.49	0.54	0.42	0.43	0.54	0.91							
TRST	0.84	0.95		0.94	0.84		0.46	0.44	0.36	0.21	0.42	0.49	0.37	0.35	0.58	0.63	0.92						
IDFN	0.79	0.92		0.87	0.79		0.50	0.41	0.54	0.52	0.52	0.74	0.62	0.63	0.42	0.60	0.55	0.89					
EOUS	0.82	0.93		0.89	0.82		0.42	0.46	0.35	0.23	0.45	0.48	0.24	0.32	0.46	0.50	0.49	0.41	0.91				
USFL	0.73	0.94		0.92	0.73		0.77	0.73	0.47	0.24	0.67	0.56	0.29	0.35	0.61	0.62	0.62	0.51	0.61	0.85			
RELB	0.78	0.92		0.86	0.78		0.43	0.52	0.27	0.09	0.34	0.34	0.14	0.17	0.51	0.57	0.52	0.27	0.59	0.65	0.88		
POSI	0.73	0.89		0.81	0.73		0.38	0.33	0.46	0.48	0.39	0.52	0.60	0.50	0.40	0.45	0.40	0.52	0.31	0.39	0.21	0.85	
ENHP	0.95	0.98		0.97	0.95		0.53	0.50	0.63	0.49	0.54	0.60	0.48	0.51	0.47	0.68	0.53	0.63	0.41	0.59	0.44	0.56	0.97

## **5.4.2** Structural Model Testing

Figure 5.7 shows the overall validity of the hypotheses by listing the path coefficients and significance (R-square). The R-square value measures the degree to which the independent variables control the change in the dependent variables. As shown in Figure 5.7, the R-square values range from 0.33 to 0.66, showing an overall strong effect. Path coefficients are similar to standardized coefficients used in regression analysis. To be significant, the paths should have a t-score of more than 1.96 which represents a p-value less than 0.05. Hypotheses which are not significant are shown with a dotted line in Figure 5.7.

Table 5.5 shows that many of the hypotheses were supported significantly by the survey. Perhaps, what is more interesting about the results are the theorized relationships which did not appear to be significant. Knowledge collection did not have a significant impact on moderation behaviors (H6). Reliability (H11) had a significant negative effect on continuance commitments. Language (H13), reciprocity (H14), and trust (H15) had no significant influence on affective commitments to the community.

**Table 5.5: Path Coefficients** 

Hypothesis	Significant		Original Sample	Sample Mean	Standard Deviation	Standard Error	T Statistics ( O/STERR )
			(O)	(M)	(STDEV)	(STERR)	
H1	Yes	As the knowledge collection behaviors of a member increases, their knowledge utilization behaviors will also increase.	0.6487	0.6511	0.0394	0.0394	16.4814
H2	Yes	As the knowledge contribution behaviors of a member increases, their knowledge utilization behaviors will also increase.	0.2074	0.2054	0.0400	0.0400	5.1846
НЗ	Yes	As members' continuance commitment to a community of practice increases, their knowledge collection behaviors will increase.	0.5417	0.5417	0.0458	0.0458	11.8232
H4	Yes	As the knowledge collection behaviors of a member increases, their knowledge contribution behaviors will also increase.	0.1315	0.1316	0.0426	0.0426	3.0873
H5	Yes	As a member's affective commitment to a community of practice increases, their knowledge contribution behaviors will increase.	0.4434	0.4441	0.0465	0.0465	9.5315
Н6	No	As the knowledge collection behaviors of a member increase, their group moderating behaviors will also increase.	-0.0026	-0.0035	0.0437	0.0437	0.0602
Н7	Yes	As a member's normative commitment to a community of practice increases, their moderating behaviors will increase.	0.3914	0.3921	0.0512	0.0512	7.6381
Н8	Yes	As a member's affective commitment to a community of practice increases, their moderating behaviors will increase.	0.2261	0.2251	0.0648	0.0648	3.4877
Н9	Yes	A member who feels the community of practice is easy to use develops a stronger continuance commitment to the community.	0.1206	0.1193	0.051	0.0510	2.3637
H10	Yes	A member who feels the community of practice is useful develops a stronger continuance commitment to the community.	0.7271	0.7289	0.046	0.0460	15.8209
H11	Yes	A member who feels the community of practice is reliable develops a stronger continuance commitment to the community.	-0.2012	-0.2004	0.0533	0.0533	3.7766
H12	Yes	A member who feels the community of practice is reliable develops a stronger continuance commitment to the community.	0.3716	0.3701	0.0452	0.0452	8.2214
H13	No	As a member develops a shared language with their community, their affective commitment to the community will increase.	0.0602	0.0599	0.0408	0.0408	1.4758

Hypothesis	Significant		Original	Sample	Standard	Standard	T Statistics
			Sample	Mean	Deviation	Error	( O/STERR )
			(O)	(M)	(STDEV)	(STERR)	
H14	No	Members who believe other members will respond positively to their own positive actions will have	0.0483	0.0476	0.0494	0.0494	0.9784
		higher affective commitments to the community.					
H15	No	Members who trust members of their community increase their affective commitments to the	0.0703	0.0726	0.0485	0.0485	1.4501
		community.					
H16	Yes	Users who can identify with the group increase their affective commitments to the community.	0.4166	0.4178	0.0522	0.0522	7.9864
H17	Yes	A member who receives positive social influence increases their normative commitment to the	0.4872	0.489	0.0469	0.0469	10.3944
		community.					
H18	Yes	A member who enjoys helping members of the community increases their normative commitments to	0.2040	0.2022	0.0493	0.0493	4.1366
		the community.					

Hypothesis Six: Knowledge Collection Leads to Moderating Behaviors. Bateman (2011 p. 849), suggested that reading threads in an online community would have a positive effect on the moderation behaviors, such as encouraging members to keep their posts on topic, mediating disputes, and reprimanding inappropriate behavior. However, the correlation between reading threads and moderation behaviors was one of the lower correlations in the Bateman (2011) study. In this study, increased knowledge collection did not have a significant impact on moderation behaviors (H6). However, of the five moderation questions in this survey, one of the Bateman questions was thrown out, and the other two were selfdeveloped from Gray (2004). In general, the moderation questions scored among the lowest of all the questions on the survey, with scores ranging from 2.75 (disagree) to 3.88 (slightly disagree). As can be seen in Table 4.2, about fifteen percent of the respondents considered themselves to be in positions of leadership, within the community. So, it may be that ordinary members of online communities of practice simply do not engage in moderation behaviors in large numbers. Also, the knowledge collection questions in this study were self-developed and self-reported by the respondents, whereas Bateman et al. (2011 p. 847) used objective measures provided by the online community platform to determine the number of threads read by a specific member during a certain time frame. Since the constructs are operationalized slightly differently, it makes sense that the relationships between the constructs might differ as well.

Hypothesis Eleven: Reliability Leads to Continuance Commitments. The path coefficient between system reliability and continuance commitment (H11) is -.2012. All the other significant path coefficients are positive, except for the control variables. This would seem to indicate that the more unreliable a system is, the more people want to make a continuance commitment to it, which is counterintuitive. It should be noted that this study replaced the one of the questions used by Phang et al. (2009 p. 731) with a self-developed question. The questions on reliability scored high with scores that averaged between 5.84 (Slightly Agree) and 6.01 (Agree). In addition, two of the continuance commitment questions used by Bateman et al. (2011 p. 847) were thrown out due to a low t-statistic. Phang et al. (2009) suggested that reliability would have a significant impact on system usability perceptions and an indirect effect on knowledge seeking and knowledge collecting. However,

they also suggested that system reliability was more important for knowledge collectors than knowledge contributors because knowledge contribution could typically happen at any time and knowledge collection was often under a deadline. It is possible that since answering a survey is a knowledge contribution behavior that more members who primarily contribute knowledge participated in this survey than members who primarily collect knowledge. It is also possible that the perception of reliability is influenced by the continuance or need-based commitment. So, the more a person has a need for the information on the system, the more frustrated they are when the system is not available and their perception of the reliability of the system decreases.

The results of the survey were controlled for age, sex and tenure. However, due to the complexity of the model, the only constructs which were controlled for these variables were the dependent variables of knowledge utilization, knowledge contribution, knowledge collection and moderation. Therefore, it is possible that these variables might have had an effect on the relationship between reliability and the affective commitment. The way tenure was measured might have an impact on the perception of reliability. Tenure was measured by the number of hours spent on the system each week as well as the number of logins per month. The tenure question about the length of time that a member has been part of the community of practice had to be thrown out due to a low t-statistic score.

One could argue that the member who logs in most often and stays on the system the greatest length of time is likely to have a heightened awareness of system downtime and other problems. Even though it was not part of the model, the data analysis showed a .16 correlation between tenure and reliability. The question about the number of hours per week had a .06 correlation with the reliability construct. The question about the number of logins per month had a .19 correlation with the reliability construct. However, a negative correlation would be needed to support the assertion the increased tenure always negatively affects the perception of system reliability. It should also be noted that the tenure construct had a borderline Chronbach's alpha score of .66.

In addition, over half of the respondents reported that their online communities of practice were hosted by Facebook or LinkedIn, which are sites that provide a consistent quality experience. Perhaps this is indicative that most of the hosting sites for communities of practice provide a sufficiently robust system. It is also possible that the continuance

commitment indicates that the members need the knowledge in the community enough to ignore small problems with the technology.

Hypothesis Thirteen: Shared Language Leads to Affective Commitments. Shared language (H13) did not have a significant impact on the affective commitment made to the group (H13). The Language construct had a low Chronbach's Alpha score (.5303) and that may affect these results. One of the Chang and Chuang (2011 p. 17) questions for the Language construct had to be thrown out due to a low t-statistic, which left two questions. One of the remaining language questions was changed in a potentially significant way from the original research. "Members in the virtual community use common terms or jargons" (Chang and Chuang 2011 p. 17) was adapted to read "Members share common terms or jargons, *unique to this online community*." It is possible that this influenced the result of the responses to this question.

Hypothesis Fourteen: Reciprocity Leads to Affective Commitments. Reciprocity (H14) also does not seem to influence the affective commitment made by members. While Chang et al.(2011 p. 16) support the influence of reciprocity on the quantity and quality of knowledge sharing behavior, Chen and Hung (2010) found that the "norm of reciprocity" had a significant impact on knowledge collecting behavior, but did not have a significant effect on knowledge contributing behavior. Just as the moderation questions scored uniformly low, the reciprocity questions scored uniformly high, with means that ranged from 5.53 to 5.86 (Slightly Agree). Respondents to the survey were given the following instruction, "While answering the survey questions, please consider any one online community of practice where you are most active, either in personal or work context, regardless of the technology platform (e.g., LinkedIn) used by the community." Therefore, it's possible that groups with a highly reciprocal nature were over-represented in the group.

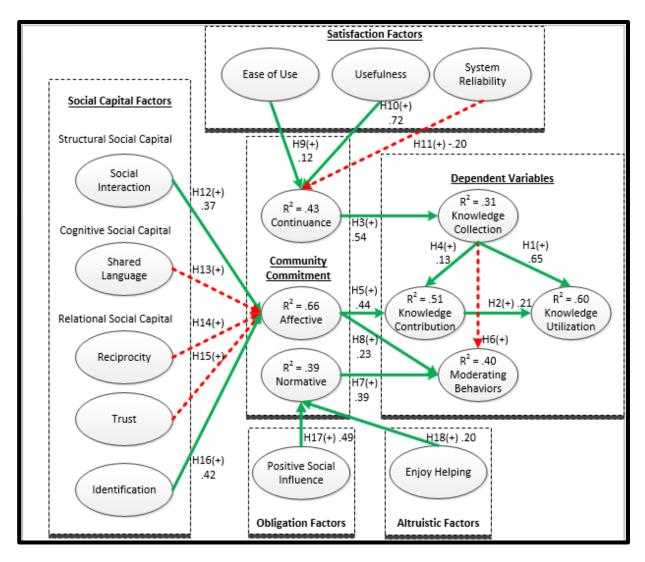


Figure 5.7 Tested model: A Community Commitment Model of Knowledge Sharing in Online Communities of Practice

Hypothesis Fifteen: Trust Leads to Affective Commitments. Trust also does not seem to significantly influence the affective commitment to the group. In the study by Chang et al.(2011 p. 16), trust had a significant impact on the quality of knowledge sharing, but not the quantity of knowledge sharing. Chang et al. also operationalized knowledge sharing quantity and quality as that done by the group as a whole. This study operationalizes knowledge collection and contribution as something done by the respondent and focuses on quantitative measures. It may be that trust is less important in online communities of practice than other types of communities. Members are not typically going to blindly follow the advice of someone in their online group, but would typically evaluate information there as a

suggestion. Even advice which works in some cases, may not work in a particular person's environment.

Control Variables. The control variables were unpredictable in which of the dependent variables they significantly affected. Age did not have a significant impact on knowledge utilization, collection or contribution, but did have a significant influence on moderation activities. Sex did not have a significant effect on knowledge collection or contribution, but did impact knowledge utilization and moderation activities. Tenure did not have a significant impact on knowledge utilization, but did have a significant influence on moderation activities and knowledge collection and contribution.

In the context of the research on online communities, language, reciprocity, trust, and system reliability do have a significant part to play in the life of a community of practice. This study only shows that they do not impact the community commitments of the members in a significant way.

## 5.5 Summary

This section has analyzed the survey data collected from the respondents. It listed the descriptive profile of the survey respondents, assessed the validity and reliability of the survey, and analyzed the data by examining the validity of the measurement model and the structural model.

# **CHAPTER 6**

# **CONCLUSIONS**

#### 6.1 Introduction

This research shows how group moderation and knowledge management behaviors affect each other, how community commitments affect knowledge management and group moderation behaviors and how community commitments are formed in online communities of practice by satisfaction, social capital, obligation, and altruism factors. This chapter draws conclusions from the analysis of the survey data. First, the study and findings will be briefly reviewed. Second, the findings will be discussed. Third, theoretical and practical contributions will be considered. Fourth, the limitations of the study will be noted. Fifth, implications for additional research will be suggested.

## 6.2 Overview of the Study and Findings

Online communities of practice exist to enable their members to share knowledge they can utilize in their personal and professional lives. Formal and informal group moderators play an essential role in creating an environment conducive to knowledge sharing. After an extensive literature review, this study proposed a model that highlighted community commitment as a major factor in determining group moderation and knowledge sharing and utilization behaviors. The overall concept of community commitment can be broken down into continuance (need-based), affective (emotion-based), and normative (obligation-based) commitments to the community. Prior research showed that continuance commitments increase the behavior of reading of posts on discussion boards, normative commitments positively influence group moderation behaviors and affective commitments increase a member's tendency to make posts to answer questions and to engage in behaviors that moderate the discussion and enforce the rules of the group (Bateman et al., 2011). The model

predicted that continuance commitments would drive knowledge collecting behaviors, normative commitments would drive moderation behaviors and affective commitments would drive knowledge contribution and group moderation behaviors. This study also suggested factors which influence members to make a commitment to an online community of practice. The satisfaction factors of ease of use, usefulness, and system reliability were thought to enhance need-based commitments. The social capital factors of social interaction, shared language, trust, reciprocity and identification were posited to impact emotion-based commitments. The obligation factor of social influence and the altruistic factor of enjoying helping were proposed as factors that encourage members make normative commitments to the community.

A survey was sent to over sixty online communities of practice on LinkedIn and Facebook and Yahoo Groups. The partial least squares method was used to analyze the user responses. Over six hundred responses were received and 453 were complete enough to be used in the data analysis.

The following research questions were addressed by the survey and resulting analysis. Research question one: What are the antecedents to the formation of community commitments in an online community of practice? Affective, or emotionally-based, commitments are impacted by the social capital factors of social interaction, and identification. Normative, or obligation-based, commitments are driven by obligation factors such as positive social influence and altruism factors such as enjoying helping. Continuance, or need-based, commitments are influenced by usefulness, and ease of use which are satisfaction factors.

Research question two: How do community commitments affect moderating behaviors and knowledge contribution and collection behavior in online communities of practice? The analysis of the data shows that a continuance commitment has a significant influence on knowledge collection behaviors, affective commitments impact knowledge contribution and moderation behaviors and normative commitments have a measurable effect on moderating behaviors.

Research question three: How do knowledge collection and contribution behaviors affect knowledge utilization in an online community of practice? Knowledge collection has a

significant influence on knowledge contribution and knowledge utilization. Knowledge contribution has a significant effect on knowledge utilization.

## **6.3** Discussion of Findings

The community commitment model of knowledge sharing in online communities of practice uses the theories of knowledge management, community commitment, system usability, social capital, positive social influence and altruistic behavior to describe how knowledge is shared in online communities of practice.

When looking at the results of the statistical analysis overall, the initial model shows some promise. The survey results did indicate relationships between the dependent variables. Knowledge collection seems to engender knowledge contributing and knowledge utilization behaviors, but not moderating behaviors. Knowledge contribution also seems to have a significant impact on knowledge utilization. The knowledge utilization construct had an R<sup>2</sup> value of .60, which means that the knowledge collection and knowledge contribution constructs explained sixty percent of the variance in knowledge utilization.

Community commitment has a strong overall effect on behavior in online communities of practice. Members with a strong continuance commitment showed more knowledge collection behaviors. The continuance commitment construct accounted for thirty-three percent of the variance in the knowledge collection construct. Members with a normative commitment showed more moderating behaviors. Affective commitments also positively affected moderating behaviors. These two constructs made up forty-two percent of the variance in the moderating behavior construct. Members with an affective commitment showed more knowledge contribution behaviors. Affective commitments made up fifty-one percent of the variance in the knowledge contribution construct.

Obligation and altruism factors had a consistent effect on normative commitments. Members who enjoy helping and perceive positive social influence seem to make a more normative commitment to the community. Obligation and altruism factors were responsible for thirty-nine percent of the variance in the normative commitment construct.

However satisfaction factors showed somewhat more complicated of results. Ease of use and usefulness led to an increased continuance commitment, but system reliability did not positively influence continuance commitments. Satisfaction factors made up forty-seven

percent of the variance in the continuance commitment construct, but this is a little misleading because reliability actually had a significant negative effect on continuance commitments.

Social capital had a mixed influence on members making an affective commitment to the community. While social interaction and identification had a significant impact on a member's affective commitment, shared language, reciprocity and trust did not. Despite the lack of influence by shared language, reciprocity and trust, social interaction and identification made up for sixty-six percent of the variation in the affective commitment construct.

#### **6.4** Theoretical Contribution

This study is significant in that it shows the importance of community commitments in knowledge sharing in online communities of practice, as opposed to online communities in general. Continuance, affective and normative commitments all have a significant positive impact on knowledge collection, knowledge contribution and group moderation behaviors respectively. The study also takes a comprehensive look at possible factors which influence the formation of community commitment in online communities of practice. The analysis of this research shows that ease of use and usefulness positively impact continuance commitments; social interaction and identification positively influence affective commitments; and positive social influence and enjoying helping have a positive effect on normative commitments. The proposed model also shows how knowledge collection and contribution influence knowledge utilization.

### 6.5 Practical Contribution

This research gives the following implications for practicing community leaders. Community leaders who want to improve the continuance commitment of their members should make sure the system is easy to use and provides useful knowledge. Community leaders can do this by making sure it is easy to learn how to navigate the community to find information (Phang et al., 2009) and encouraging frequent quality knowledge contribution (Chang & Chuang, 2011). Community leaders seeking to build an affective commitment should concentrate on increasing interaction between members and encouraging members to

incorporate group membership into their sense of self. Community leaders might do this by communicating frequently with group members and initiating online or offline group events (Chang & Chuang, 2011). Community leaders who want to encourage a normative commitment should seek out group members who enjoy helping others (Wasko & Faraj, 2005), and build policies that give members the ability exert positive social influence on each other (Posey et al., 2010). Community leaders may also choose to make the online platform more reliable, build the shared language within the community, encourage members to reciprocate and build trust, but these actions may not have a direct impact on the community commitment of the members.

#### 6.6 Limitations

This study is subject to the following limitations. Over sixty groups on LinkedIn, Facebook and Yahoo Groups were contacted. Most communities had more than one hundred members. Therefore, the response rate to the survey was low. Subjects participated in the survey voluntarily and there is a possibility of non-response bias. As an incentive, respondents were given access to an e-book on research on online communities of practice and the communities and the respondents were promised eventual access to the results of the study. It is possible that the particular type of incentive might have drawn in a particular type of group member and influenced the overall results of the study. Unfortunately, group members who do not participate in surveys are quite difficult to study. Also, the survey was sent most often to online communities of practice with more than one hundred users. There is a possibility that the dynamics of smaller communities differ from those of larger communities. Table 4.2 also shows that the community platforms which responded were more or less public platforms like Facebook and LinkedIn. It may be possible that the dynamics of privately owned platforms which are internal to particular organizations might have different dynamics as well.

Since the results of the survey are self-reported, it is difficult to know if the respondent has an accurate perception of the online community of practice and their behavior in it. However, since the purpose of the survey was to address a large cross-section of online communities of practice on differing platforms, it would have been difficult to verify the respondents' perception of their behavior. Similarly, the survey was the only method used to

collect data for this study. Therefore, there is a possibility of common method bias. However, a wide range of studies of different types were used in the formation of the survey to counter this concern.

The constructs of system reliability (Phang et al., 2009), shared language, reciprocity, and trust (Chang & Chuang, 2011) have often been shown to have a significant impact on the operation of online communities. The results in this study only show that they did not have a significant impact on the formation of community commitments. Satisfaction factors were only measured against how they affected continuance commitments and social capital factors were only measured against how they impacted affective commitments. There is a large body of research concerning online communities and it is possible that one of the many constructs left out of the model may describe factors which lead up to a group member making a particular type of commitment.

#### **6.7** Future Research

This study paves the way for a number of possible future projects. Different statistical methods could be used on the existing survey dataset to see if there are additional significant relationships between the constructs other than those theorized. One of the drawbacks of using partial least squares (PLS) is that it does not typically indicate the existence of relationships which were not theorized. Also, additional PLS models could be used to determine the effect of system reliability, shared language, reciprocity, and trust on the non-community commitment constructs in the model. This survey could be used to see if different types of online communities are similarly affected by member commitment. For instance, one could argue that community commitment would have a similar influence in any virtual community, even if it is not a community of practice, per se. Additional research could also examine the antecedents to community commitment to see what community actions are most likely to strengthen those attributes of the community. The survey could also be used to compare community commitment in an online community of practice to commitments in face-to-face communities of practice. A follow-up survey could be done with the survey respondents to see how their relationship with the community has changed over time

#### 6.8 Conclusion

Online communities of practice offer unparalleled opportunities for group members to share knowledge. Unfortunately, many online communities of practice do not realize these advantages due to a lack of participation in knowledge sharing activities. The community commitment model of knowledge sharing in online communities of practice describes how knowledge utilization is driven by knowledge collection and knowledge contribution. Group moderation behaviors are influenced by knowledge collection behaviors. Community commitments play a large role in explaining behavior of online community members.

Continuance commitments engender knowledge collection behaviors. Normative commitments lead to moderating behaviors. Affective commitments influence knowledge contribution and group moderation behaviors. Satisfaction factors, such as ease of use and usefulness, increase the continuance commitment of members. Affective commitments are determined by social capital factors such as social interaction and identity. Normative commitments are influenced by obligation factors, such as positive social influence and altruism factors such as enjoying helping.

Community leaders who want to increase knowledge sharing behaviors should consider encouraging members to make continuance, affective and normative community commitments. They can do this by making the system easy to use (Phang et al., 2009) and useful (Chang & Chuang, 2011), providing an environment that encourages social interaction (Chang & Chuang, 2011), helping members build their membership in the group into their self-concept, and providing an environment where users can exert positive pressure on each other to participate (Posey et al., 2010) and recruiting and encouraging members who enjoy helping others (Wasko & Faraj, 2005).

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# **APPENDICES**

# APPENDIX A: EXTENDED LITERATURE REVIEW

A number of articles were reviewed for this research project that did not have an immediate bearing on the creation of the model. The outline for this section is adapted from the research by Erat, Desouza, Schafer-Jugel, and Kurzawa (2006) who suggest a number of "Critical Success Factors" necessary to build, manage and sustain Business Customer Communities. They did exploratory research using interviews and observation. They divide the critical success factors into three dimensions: People, Knowledge and Technology. This research is broken down into individual factors, community factors, knowledge factors and technology factors. Some articles were specifically framed in a specific type of online community and are described separately.

### 7.1 Individual Factors

Individual factors which affect knowledge sharing include knowledge sharing self-efficacy, perceived relative advantage, perceived compatibility, reputation, individual rewards, the perception that sharing knowledge results in positive benefits for the sharer that outweigh the costs, and group leaders with strong reputations. A risk to privacy, especially to members from cultures with weak social ties can make members less likely to share knowledge.

The confidence a group member has in their ability to provide usable knowledge to the group describes knowledge sharing self-efficacy. Group members who feel they have more to contribute, tend to contribute more (Chen & Hung, 2010).

Perceived relative advantage describes how the group member perceives the result of their sharing knowledge. If the group member believes they will get a higher return from sharing knowledge than the investment sharing knowledge takes, then they will be more likely to share knowledge (Chen & Hung, 2010). Similarly, Mayer (2009) applied the field of

economics to social networks. He argued that the stochastic models of economics describe social networking. People weigh the cost and benefit of their decisions. He suggested that social networks lead to improved flow of information. Social networks lead to increased market segmentation. Network size can affect pro-social behavior (Mayer, 2009).

Perceived compatibility describes the perceived "fit" between the shared knowledge and the needs of the community. Group members share knowledge more often when they judge that their knowledge sharing behaviors match the purpose and focus of the group (Chen & Hung, 2010).

Community members share knowledge more when they feel their reputation within the community will increase (Chang & Chuang, 2011). Individual rewards can encourage people to contribute their knowledge to the community. Xu, Jones and Shao (2009) surveyed Open Source Software developers and found that developers contributed to the community because of the rewards they thought they would receive. Specifically, the developers needed the end product, expected that their reputation and skills would improve and because they enjoyed the work (Xu et al., 2009). Expert members with more experience contribute more knowledge and more resources make the most contributions because they desire to increase their reputation (Wasko, Teigland, & Faraj, 2009). Financial incentives can also drive members' motivations to share knowledge (Cheliotis, 2009).

Social exchange theory proposes that people will engage in a community only as long as the perceived benefits outweigh the perceived costs. Posey (2010) suggested that the perception of a risk to privacy will decrease members' tendency to self-disclose. Members from collectivist cultures, self-disclose more than those from cultures with weak social ties (Posey et al., 2010).

# **7.2** Community Factors

Community factors include group moderation and turnover levels. Other factors can include leadership effectiveness, interpersonal relationship and ideology of the community. Effective leadership can enhance knowledge sharing through enthusiasm, support and recognition of accomplishments.

The people dimension described by Erat, Desouza, Schafer-Jugel, and Kurzawa (2006) includes the following factors: Leadership, collaborative membership, "win-win" thinking,

willingness to work through conflict, stakeholder involvement, membership fluctuation contingency planning, rotation of community roles, new member recruitment. For the purposes of this research, these are referred to as community factors.

Hara and Hew (2007) used an in-depth case study to see how nurses shared knowledge in an online community of practice. The nurses engaged in the following activities: knowledge sharing, and solicitation. Nurses shared the following types of knowledge: institutional practice, and personal opinion. The following factors can also encourage knowledge sharing in online communities of practice. Voluntary membership enhances knowledge sharing. Communities where the members do not compete with each other encourage the sharing of knowledge (Hara & Hew, 2007).

Turnover can have a mixed effect on knowledge sharing within a community of practice. Communities need fresh members in order to keep from stagnating. However, the collected knowledge of the group declines when members spend less time in the community (Bateman et al., 2011; Ransbotham & Kane, 2011).

Wasko, Teigland and Faraj (2009) examined the social structures in communities of practice. They used the theory of collective action and the theory of public goods. They performed a social network analysis and conducted a survey. They found that general exchange and a "critical mass" of members sustains the NOP (Network of practice).

Individuals more frequently form a relationship with the community as a whole than with a particular individual in the community. The core membership creates and maintains the knowledge store. Despite turnover, the pattern of exchange is consistent over time. Wasko, et al. (2009) suggested that future research might include using a different network of practice or a different medium. They also suggested performing a longitudinal study over time. They also wondered how the "critical mass" of core users forms initially and how they create the "public good". Future research might uncover why some members "Freeload". They also wondered about the "shape" of the core community and which shapes operate most effectively (Wasko et al., 2009).

Trier (2008) proposed dynamic analysis of social networks to support "static" social network analysis. Trier's article contains good information about Social Network Analysis. It also contains the names of a number of graphing software packages.

## 7.2.1 Community Life Cycle

Iriberri and Leroy (2009) proposed critical success factors for each phase in the life cycle of online communities: Inception, Creation, Growth, Maturity and Death. They defined various types of online communities and delineate various benefits provided by online communities. They suggested five stages of community life and different types of communities. They also reviewed different metrics researchers use to define success. Lastly they divided the success factors between the stages of the life cycle and types of online communities.

They suggested the following metrics from their literature review: volume of member's contributions and quality of relationships between members, measures related to sociability (participants, message rate, satisfaction, perception of reciprocity and trust) and usability (interface errors, productivity, satisfaction), and quantitative and qualitative measures. Iriberri and Leroy suggested the following questions for future research.

Researchers could test empirically to determine if the guidelines appropriately direct communities in particular stages (Iriberri & Leroy, 2009).

Erat, Desourza and Kurzawa (2006) listed four phases in the formation of interorganizational communities: Preparing, planning, initiating, and sustaining. They also listed a large number of Business Customer Community Critical Success factors and divided them into people, knowledge, and technology. People factors in online community success include the following. Find a leader. Find collaborative members. Look for solutions where everyone "wins". Avoid areas that may lead to conflict. Solicit help from stakeholders. Expect membership levels to change over time. Community roles should be revolving positions. Use new members to keep the discussion going (Erat et al., 2006).

#### 7.2.2 Online Community Success Metrics

Toral, Martinez-Torres, Barrero and Cortez (2009) used social networking analysis to determine what factors into success of online communities. They proposed cohesion of the network, community core, and centrality of the network as antecedents of community success. They measured "success" by the number of active developers, the overall size of the community and the number of threads within the community.

#### 7.3 Knowledge Factors

The knowledge dimension described by Erat, Desouza, Schafer-Jugel, and Kurzawa (2006) included the following factors: critical topic, vision for knowledge implementation, varying perspectives, codes for participation, informal interaction context, open discussion of challenges, record achievement of knowledge gains, experience capture, clarification of existing knowledge domain, cross community interaction, and formation of advisory board.

Hara and Hew's (2007) case study on a nursing online community of practice indicated the following knowledge factors encouraged knowledge sharing. Practical knowledge that validates the practices of the members can encourage knowledge sharing. Communities where the knowledge represents best practices within the industry encourage the members to share their knowledge.

## 7.4 Technology Factors

The technological artifacts used to create the online community of practice can also play a part in the ability and willingness of group members to share knowledge. The technology dimension described by Erat, Desouza, Schafer-Jugel, and Kurzawa (2006) included the following factors: technology coverage, technology leadership, technology championing, training, transparency, ownership, privacy, channel use guidelines, event planning, document planting, and news updates. The authors suggested some of the following questions for future research. What role does leadership play in encouraging knowledge sharing? What role does the sponsoring organization play in the online community? They also suggested confirmatory empirical testing to establish a link between performance and the level of knowledge sharing and the link between knowledge sharing and the community culture, technology, and standard (Erat et al., 2006).

Hara and Hew's (2007) case study into a nursing community of practice revealed, among other things, that the ability to communicate asynchronously is key to the success of knowledge sharing within a community of practice. Synchronous communication happens when users communicate directly in the same time frame. Asynchronous communication allows users to communicate outside of a specific time frame. An online chat system exemplifies a synchronous communication because it requires that both users engage in the

same time frame. Email exemplifies asynchronous communication because messages do not require that members log in simultaneously.

# 7.5 Research by Type of Community

Some of the research on online communities seemed specific enough to the type of online community being studied to group in that way. Types of communities studied by the research below include open source software development groups, interorganizational communities, virtual worlds, learning communities, online reviews and online auctions.

# 7.5.1 Open Source Software (OSS) Development Communities

Hahn, Moon and Zhang (2008) used Social Network Analysis to study the formation of OSSD (Open Source Software Development) teams. They analyzed data from real OSSD projects organized on SourceForge.net. They wanted to know what motivated developers to join specific teams. They discovered that developers tend to join projects initiated by people they already have ties with. Developers also tend to join projects that have teams with high-status developers. The authors suggested the following research questions: What role do the initiators and developers play in recruiting new developers? How does the joining process change over the life-cycle of the project? How does the process of developers joining a team change the structural characteristics of the network? Future researchers might use data from a different OSS development area. Additional research could examine how the process of team formation affects the overall success and sustainability of the project (Hahn et al., 2008).

Fang and Neufeld (2009) used the theory of Legitimate Peripheral Participation to explain sustained participation in OSS (Open Source Software) projects. They defined situated learning as learning in everyday practice. Situated learning connects people, actions, knowledge and the surrounding world. Identity construction happens as a group member incorporates their group membership into their self-concept and builds their self-esteem somewhat on their approval by the group. The individual motivations that get someone involved in an OSS project do not drive their sustained participation. Situated learning and identity construction most influence sustained participation in an OSS project. Sustained participation also influences situated learning and identity construction. They suggest the following areas for future research. First, future research could empirically test their model.

Second, researchers could collect additional primary data by interviewing programmers. Third, researchers could use quantitative surveys to make the results more generalizable. Fourth, research could examine the role of community level factors to the model. Fifth, researchers could examine power and roles to see how they factor into participation. Sixth, future research could examine the role of Bourdier's theory of practice.

Xu, Jones and Shao (2009) studied open source software projects and the motivation of people who contribute to them. Xu asks why people contribute to Open Source Software projects by creating a research model which includes individual and community factors. They surveyed volunteer OSS developers. Involvement helps determine performance. The following individual motivations drive involvement: personal software needs, expectation of increased skills and reputation, and enjoyment. Project community also plays a part with factors such as: the effectiveness of the leadership, interpersonal relationship, and the ideological basis of the community. The authors suggested that future studies might examine a different OSS environment to test the generalizability of their results. They also suggested that since they only examined active projects, their data underrepresents projects which completed successfully or failed outright (Xu et al., 2009).

Cheliotis (2009) reviewed Open Source Software development communities and what he terms open source "Cultural" communities. Cheliotis used a quantitative analysis of creative commons licensing to examine how Individual Motivations and Community Factors influenced the type of licensing chosen by OSS and "cultural" developers. These cultural communities allow users to collaborate on music and films and other media. Cheliotis compared OSS development communities to cultural development communities and looked specifically at the usage of the creative commons license. He found a number of predictors for which creative commons license an OSS developer will choose. The individual and the community influences the choice of license. Financial incentives, ideology and altruism influence the Author. Financial incentives can include Market Value expectations, Reuse value expectations, and reputation expectations. The quality of the work, commercial potential and intended use drive the market value expectations. Degree of reuse, market value of reused content and impact of derivative code on the market drive reuse value expectations. Tolerance for commercial use influences ideology. The expectation that other people will reciprocate influences altruism.

The type of medium, the goals of the community and the membership determines the community influence. The common use of the medium and reuse and sharing of the medium influence the type of medium chosen. Community policies influence the aims and ownership of the community. Community practices and norms and the expectation that others will act in a similar way influences the behavior of the membership. Cheliotis suggested that future research could describe loosely coupled web services and "API mashups" (Cheliotis, 2009).

# 7.5.2 Interorganizational Communities

Romano, Pick and Roztocki (2010) reviewed literature on collaboration in interorganizational and cross-border communities. They described three of the theories and propose a new theory that fills in the gaps left by the other two. They modified the classification model of Chatterjee and Ravichandran, the Lee classification model, the Kumar and Van Dissel classification model, to create the motivational model for technology-supported collaboration. Their model suggested that satisfaction and performance are determined by the quality of the collaboration. Collaboration quality is itself influenced by the structure of the task and process, the proximity, and information technology support. Collaboration quality is also influenced by motivation. Motivation is influenced by trust, collaboration factors, external pressures, perceived value, and commitment. The innovative model contains a feedback loop where the dependent variables of satisfaction and performance also influence trust, motivation commitment and perceived value. Future researchers should consider validating the model through an empirical study.

Erat, Desourza and Kurzawa (2006) examined business customer communities. They performed initial research to describe the communities and the challenges they face in their formation. They briefly summarized the history of marketing in the Internet age. They quoted Lave and Wenger's definition of a community of practice as a space where members share their activities and what it means for them and the community. They described three types of external communities: customer cross border communities, private customer communities and external business customer communities. A group of selected customers and employees who meet to share knowledge to create new products and services make up customer cross-border communities (CBCs). Critical challenges for CBCs include internal acceptance, customer identification, incentives, trusting relationships, communication, and knowledge capture.

When hosted by a firm, groups of customers who share information and opinions about the vendor form private customer communities. Challenges include sustainable membership levels, communication, belonging, trust, and knowledge transfer from customers. The vendor typically starts business customer communities and solicits information over the long term from other organizations which consume the product or function within the supply chain. The authors describe the differences between these types of communities.

#### 7.5.3 Virtual Worlds

Messinger, Stroulia, Lyons, Bone, Niu, Smirnov, and Perelgut (2009) researched virtual "worlds" and suggested that in five years organizations may find virtual worlds as important as the world wide web. They traced the history of virtual worlds. They created a taxonomy of virtual worlds which defines them by purpose, place, platform, population and profit model. They summarized existing literature on Virtual Worlds. They also used a survey to conduct an in-depth case study of Second Life.

The authors suggested the following questions for future research. How does the appearance of the avatar affect the interactions within the virtual world? How do people behave differently online than they do in the real world? How does an organization market to people in a virtual world? How does an organization distinguish between marketing to the avatar and marketing to the real person behind it? How can organizations employ the best business models for virtual worlds? How can organizations conduct market research within and about virtual worlds? How can organizations market virtual services? How do the differences between virtual worlds and the Internet affect retailing and ecommerce? How can organizations manage their customer relationships within a virtual world? How can organizations use virtual worlds to enhance communication between employees (Messinger et al., 2009)?

#### 7.5.4 Learning Communities

DeSanctis, Fayard, Roach and Jiang (2003) examined how new technologies impact learning communities. They described three case studies of various learning environments and described three types of online learning communities: information kiosks, associations and communities of practice. They closed with a handful of guidelines for online learning communities. This article approached the topic from a management perspective rather than

an information systems perspective. The authors suggested that future researchers use the same process on other learning environments rather than the three described in this study (DeSanctis et al., 2003).

#### 7.5.5 Online Reviews

Forman, Ghose and Wiesenfeld (2008) asked how the disclosure of a reviewer's identity changes the perception of the review. Forman used research on information processing and a quantitative analysis of data on Amazon.com to research how disclosing the identity of a reviewer impacted the perception of the review. Customers perceived reviews with identifying information more positively. Also, customers viewed reviewers with closer geographical locations more positively. Forman used a quantitative analysis of amazon sales and review data. For future research, Forman suggested measuring the member's level of identification in a different way. He suggested that further research could evaluate identity perceptions and use alternative analysis techniques. He also suggested that future researchers analyze the actual text of the reviews (Forman et al., 2008).

Duan, Gu and Whinston (2009) studied how informational cascades affect whether or not users will adopt software. Information cascades occur when users adopt software without a full analysis, simply because others have adopted the software. The authors did an empirical study of how users download software from CNET. The reviews for a product concern users less than the popularity of a product relative to the other products with the same features. Good reviews will have a positive effect on adoption with less popular software, but do not affect the most popular products. Duan suggested further study of the relationship between a popular item and the user reviews. Additional research could include information from another source. Researchers could survey customers to see if they pay attention to brand, product information and reviews. When reviews and market share influence each other, can a positive or negative cycle result? Future research could also model product diffusion as a non-linear function instead of a linear function (Duan et al., 2009).

#### 7.5.6 Online Auctions

Chua, Wareham and Robey (2007) used the theory of social disorganization to describe how online auctions fight fraud within their communities. Crime occurs more often in weak, disorganized communities. Members with an attachment to the community most

often fight crime in the community. They also described how the stages of community development occur online and draw distinctions between formal and informal control structures. They did in-depth case studies of online communities. They also did a quantitative study of several internet forums and conducted personal interviews with members who fought fraud. They found that communities tend to enforce rules differently than outside authorities, and that communities more effectively prevent crime than traditional authorities. They encourage law enforcement organizations to work with communities to establish "Clan" control within the communities. They suggested that future research address how leaders and members create advanced, interdependent communities. They also recommended longitudinal studies to see how these factors change over time. They used the social disorganization theory and encouraged the incorporation of other theories as well (Chua et al., 2007).

# APPENDIX B: RELEVANT JOURNAL ARTICLES

Below is a list of the journal articles reviewed. Many of these articles were used in the previous section. Since they were originally collected for the analysis of a topic they are summarized according to the Davis and Parker guidelines.

G.B. Davis and Clyde Parker (1997) suggested the following outline for a topic analysis: problem, importance of the research, theory base for research, significant prior research, possible research approach or methodology, potential outcomes of research and likelihood of each. These criteria were adapted and used to summarize the literature reviewed on online communities of practice. The articles were organized by theme, although often one article may contain several themes. The title and the reference are listed. The problem the research addresses and its relative importance are explained. The theoretical base and the research approach are shown. The results or outcomes of the study are listed along with suggested future research questions.

# 8.1 Auctions

**Theme:** Auctions

**Reference:** The Impact of Information Diffusion on Bidding Behavior in Secret Reserve Price Auctions (O Hinz & Spann, 2008)

**Problem:** How can sellers optimize their secret reserve price? How can buyers optimize their bidding price?

**Importance of the Research:** Allows buyers and sellers to more effectively manage online auctions

**Theory Base:** Information Diffusion

**Research Approach:** Authors created model and decision support system and performed a laboratory test of model and system.

**Outcomes:** Authors created \Online Auction Decision Support System. Authors propose that the buyer's social structure influences the estimate of the secret reserve price.

**Future Research Questions:** Their experiment assumes that agents always act the same way. How does false information impact the experiment? Test varying strategies by the Seller.

**Theme:** Auctions

**Reference:** Managing Information Diffusion in Name-Your-Own-Price Auctions (Oliver Hinz & Spann, 2010)

**Problem:** How does the "Secret" reserve price get communicated to bidders in an online auction?

**Importance of the Research:** Enables communication in online auctions.

**Theory Base for Research**: Information Diffusion and Social network Analysis

**Research Approach:** Laboratory Experiment

**Outcomes:** Bidders with many contacts access large amounts of information. "Bridge" Bidders that connect different parts of the network have dispersed information. Bidders in a strong "clique" have stale information.

**Future Research Questions:** Use a behavioral approach to this study rather than social network analysis. How does information overload affect the behavior of bidders? What incentives would encourage bidders to spread information?

# **8.2** Communities of Practice

**Theme:** Communities of Practice

**Reference**: Informal Learning in an Online Community of Practice (B. Gray, 2004)

**Problem:** How can an online community of practice improve informal learning?

**Importance of the Research:** Informal learning leads to the sustainability of online communities

**Theory Base:** Communities of practice

**Research Approach:** Authors conduct an interpretive study of forty-three participants in an online community of practice. Data sources included forum postings, chat sessions, email, a participant survey, and interviews.

**Outcomes:** New Members learned the rules of the community of practice. Existing members learned their identity and the meaning of their work. The research tracked the formation of the identity of the members as well as the identity of the group. The community rewarded members in the following ways: learning new skills and techniques, social connection, less isolation. The research highlighted the role of the moderator.

**Theme:** Communities of practice

**Reference:** Learning in Online Forums (DeSanctis et al., 2003)

**Problem:** What framework describes how electronic communication influences the

learning process? How can participants form electronic networks?

**Importance of the Research:** Learning determines the success of learning communities.

**Research Approach:** Authors examine three case studies of different types.

Outcomes: Guidelines for collaborative learning.

Future Research Questions: Apply same process to other learning venues.

**Theme:** Communities of practice

**Reference:** The Provision of Online Public Goods: Examining Social Structure in an Electronic Network of Practice (Wasko et al. 2009)

**Problem:** What social structures make for good communities of practice?

**Importance of the Research:** Social structures help sustain communities of practice.

**Theory Base:** Collective Action and Public Goods

**Research Approach:** The authors use Social Network Analysis and survey.

**Outcomes:** General exchange and a "critical mass" of member support and sustain the network of practice. Members form a relationship with the community more often than a relationship with a particular individual. Expert members with more experience contribute more knowledge and more resources make the most contributions because they desire to increase their reputation. The core membership creates and maintains the knowledge store. Despite turnover, the pattern of exchange should remain consistent over time.

**Outcome:** Communities of practice create knowledge for the public good. More knowledge leads to continued participation.

**Future Research Questions:** Examine a different type of network of practice or one using a different medium. Perform a longitudinal study over time. How did the critical mass form? How did the community create the public good? Why do freeloaders use the resources without contributing? What is the shape of the core user group within the community? Which shapes lead to the best results?

# 8.3 Marketing

**Theme:** Viral Marketing, Social Network Analysis

**Reference:** The Effects of the Social Structure of Digital Networks on Viral Marketing Performance (Bampo, Ewing, Mather, Stewart, & Wallace, 2008)

**Problem:** How do different social network structures affect the success of viral marketing campaigns? How can researchers model viral marketing campaigns? How can researchers simulate viral marketing campaigns in different types of social networks to see how a manager can make changes to the campaign in the early stages?

**Importance of the Research:** Impacts the effectiveness of viral marketing campaigns **Theory Base:** Behavioral and Management science, "Viral" marketing campaign
research.

**Research Approach:** The researchers created a simulation of a viral marketing campaign.

**Outcomes:** Model of viral marketing and guidelines for more effective viral marketing.

**Theme:** Marketing

**Reference:** Virtual Communities: A Marketing Perspective (de Valck, van Bruggen, & Wierenga, 2009)

**Problem:** How does the use of online communities affect their decision making processes? What patterns describe member participation within a virtual community? How do the most active members participate in discussions?

**Importance of the Research:** The authors describe "Word of mouse" as a growing in significance as a market influence.

**Theory Base:** Marketing

**Research Approach:** The authors use an online survey and "Netnography" (ethnography on the Internet) of interviews and observations of community members.

**Outcomes:** They describe six types of members: Core members, conversationalist, informationalists, hobbyists, functionalists, and opportunists.

**Future Research Questions:** The researchers encouraged a better definition of activities conducted online.

#### 8.4 Economics

**Theme:** Economics

**Reference:** Online Social Networks in Economics (Mayer, 2009)

**Problem:** How does economic theory describe social networks?

**Importance of the Research:** Enables organizations to match workers to jobs and attain educational goals.

**Theory Base:** Economics and Stochastic models (People weigh the cost and benefit of their decisions)

**Research Approach:** Authors conduct a literature review.

**Outcomes:** Social networks lead to improved flow of information. Social networks lead to increased market segmentation. Network size can affect pro-social behavior.

**Future Research Questions:** What influences the individual's motivations? How can communities build trust?

#### 8.5 Self-Disclosure

**Theme:** Self-disclosure

**Reference:** Proposing the Online Community Self-Disclosure Model: The Case of Working Professionals in France in the U.K. Who Use Online Communities (Posey et al., 2010)

**Problem:** Why do people self-disclose in online communities? Study specifically examines a cross-cultural setting.

**Importance of the Research:** Businesses can market to people who self-disclose their details on social networking.

**Theory Base:** Social Exchange Theory, Social Penetration Theory, Individualism versus collectivism theory

**Research Approach:** Market research firm randomly selected Facebook users. Researchers went out of their way to avoid using college students. Researchers put math sections in an online website.

**Outcomes:** Positive social influence, reciprocity, trust increase Self-disclosure. Privacy risk perception decreases disclosure. Collectivism increases self-disclosure. The French are more individualistic than the British.

Future Research Questions: Include a wider conceptualization of anonymity. What other factors besides individualism and collectivism would influence how the cultures chose to disclose? If collectivism benefits online communities, how do communities reinforce it and reward it? The study contained self-reported responses and represents only one moment in time. So, a longitudinal or objective study may also shed some light on the phenomena. A longitudinal study could observe Social penetration. What are the other elements of Social Penetration Theory in addition to Satisfaction, stability and security in a relationship? Can organizations ethically get people to self-disclose so that they can market to them?

# **8.6** Interorganizational Communities

**Theme:** Interorganizational cross border collaboration

**Reference:** A Motivational model for technology-supported cross-organizational and cross-border collaboration (Romano et al., 2010)

**Problem:** How do organizations collaborate across-national borders?

**Importance of the Research:** Special issue editorial

**Theory Base:** Modified classification model of Chatterjee and Ravichandran, modified Lee Classification model, modified Kumar and Van Dissel classification, motivational model for technology-supported collaboration (proposed).

**Research Approach:** The authors perform a Literature Review

**Outcomes:** The motivational model for technology supported collaboration.

**Future Research Questions:** The authors suggest several gaps, but fill them with their collaboration model. However, the research does not validate the new model with empirical research.

# 8.7 Knowledge Sharing

**Theme:** Knowledge Sharing, Individual motivations, Open Source Software development (OSS).

**Reference:** The Power of Gifts: Organizing Social Relationships in Open Source Communities (Bergquist & Ljungberg, 2001)

**Problem:** Why do people contribute to Open Source Software Projects?

**Importance of the Research:** Management of open source software projects

**Theory Base:** "Classic" theories of gift-giving. New developments of old theories for the digital domain: socialization of new OSS developers, gift giving as a power structure, gift and giving as peer review

**Research Approach:** Authors create an empirical test of theoretical foundations of gift-giving theory. Authors reviewed "official" OSS literature and compared against OSS newsgroups. Authors created a virtual ethnography.

**Outcomes:** The gift economy creates openness, and organizes relationships. OSS generates new ideas by giving gifts. The giver receives power by giving and uses it to guarantee code quality.

**Theme:** Knowledge Sharing, Social Capital, Individual motivations

Reference: Social Capital and Individual Motivations on Knowledge Sharing:

Participant Involvement as a Moderator (Chang & Chuang, 2011)

**Problem:** Why do people share knowledge in online communities?

**Importance of the Research:** Online communities exist to share knowledge.

**Theory Base:** Social Capital, Individual Motivation, and participant involvement

**Research Approach:** Quantitative: Results of a survey

**Outcomes:** Altruism, identification, reciprocity, and shared language positively influence knowledge sharing. Reputation, social interactions and trust had positive effects on quality, but not quantity of shared knowledge. Participant involvement moderates the relationship of altruism and the quantity of knowledge shared.

Outcome: Quantity and quality of shared knowledge

**Future Research Questions:** Conduct survey with a different demographic of members. Repeat study with different types of communities. Different types of communities may act in different ways. Since the Questionnaire was voluntary, "lurkers" may not have participated. People who do not participate may not understand their own motivations.

**Theme:** Knowledge Sharing, Individual Motivation, Community Factors, OSS Communities, Creative Commons Licensing, Rewards

**Reference:** From Open Source to Open Content: Organization, Licensing and Decision Processes in Open Cultural Production (Cheliotis, 2009)

**Problem:** What similarities do OSS development communities share with communities that develop "cultural" content such as Wikipedia or Kompoz? What factors influence the type of creative commons licenses used under which circumstances?

**Importance of the Research:** Cooperative "Cultural" development projects are becoming more popular. What drives creators to use what types of licenses?

**Theory Base:** Framework based on Coase's theory of the firm. Describes how OSS exist between individuals and companies.

**Research Approach:** Authors conducted a quantitative analysis of creative commons license usage.

**Outcomes:** Creation of decision tree and probabilities.

**Future Research Questions:** Examine of loosely coupled web services and application programming interface "mashups."

**Theme:** Knowledge Sharing, Individual motivations, Trust

**Reference:** To Give or to Receive? Factors Influencing Member's knowledge sharing and Community Promotion in Professional Virtual Communities (Chen & Hung, 2010)

**Problem:** Why do people share knowledge in PVCs (Professional Virtual Communities)? How do professional virtual communities differ from an online community of practice?

**Importance of the Research:** Knowledge sharing lies at the heart of why people form professional virtual communities.

**Theory Base:** Factors which influence the increase of community knowledge

**Research Approach:** Structured equation modeling of data gathered from people in two virtual communities

**Future Research Questions:** Data came from only two virtual professional communities. Repeat study with more communities. Perform a longitudinal study over the life cycle of a PVC. How does the level of knowledge activity influence the financial contribution of the PVC?

**Theme:** Knowledge Sharing, Community Factors, Business Customer Communities or External Communities

**Reference:** Business Customer Communities and Knowledge Sharing: Exploratory Study of Critical Issues (Erat et al., 2006)

**Problem:** What challenges face Business Customer Communities (BCC's) and how can communities overcome them?

**Importance of the Research:** Enables businesses to communicate with customers **Theory Base:** Customer community literature

**Research Approach:** The authors conduct a thorough case study (exploratory and descriptive research) of Lilly Critical Care Europe through analysis of interviews and observations.

**Outcomes:** Authors list a large number of BCC critical success factors and divide them into people, knowledge, and technology groups.

**Future Research Questions:** What role does leadership play in knowledge sharing? What role does the sponsoring organization play? Future researchers could conduct confirmatory testing including culture, technology, standards, etc. Does the performance of the group increase as the level of knowledge sharing increases?

Theme: Knowledge sharing, individual motivation, rewards

**Reference:** The Ties that Bind: Social Network Principles in Online Communities (Ganley & Lampe, 2009)

**Problem:** How does a website get the members to generate high quality content? How do relationship and reputation relate to the social network?

**Importance of the Research:** How do communities encourage content generation with only virtual rewards? Research would allow social networking sites to optimize the relationship between reputation and the network

**Theory Base:** Social Capital, Structural Holes, and Reputation systems

**Research Approach:** Quantitative analysis of the network on Slashdot.

**Outcomes:** Authors proposed changes to mechanism that will increase ability to make money. Between-ness, constraint, participation and investment all influence the "Karma" Score.

**Future Research Questions:** Perform more extensive data collection. Create qualitative surveys for a topical examination of relationships. How does theory about basic organizational structure transfer into the online arena?

**Theme:** Knowledge Sharing, Community Factors, Community of practice

**Reference:** Knowledge-sharing in an Online Community of Health-Care professionals (Hara & Hew, 2007)

**Problem:** Encouraging sustained knowledge sharing by nurses in an online community of practice.

**Importance of the Research:** Examines how communities of practice function across organizations. The coding method used for interviews and observations can gage current activities. The six proposed factors can improve new or existing communities of practice.

**Theory Base:** Communities of Practice

**Research Approach:** The authors conducted a qualitative, in-depth, mixed method case study. Authors used online observation, interviews and analysis the contents of online messages.

**Outcomes:** Study highlights the role of the moderator. Study researches knowledge sharing, and solicitation. Communities share the following types of knowledge: institutional practice and personal opinion. Communities sustain knowledge sharing through self-selection of members, validation of practices, sharing best practices, practicing non-competition, using asynchronous communication, and moderating discussions.

**Future Research Questions:** Use other communities of practice to confirm that six factors apply across other disciplines. Determine the relative importance of each factor during the community life cycle.

**Theme:** Knowledge sharing, created communities and emergent communities, empirical examination of research model, knowledge sharing

**Reference:** The Interaction Between Knowledge Codification and Knowledge-Sharing Networks (Liu, Ray, & Whinston, 2009)

**Problem:** How can knowledge codification and knowledge sharing networks combine for effective Knowledge Transfer?

**Importance of the Research:** Combined method may work better than either method by itself

**Theory Base:** Knowledge management theory, formal modeling of networks, formal game theory

**Research Approach:** The authors construct a mathematical model based in game theory.

Outcomes: Knowledge codification stores knowledge in electronic databases for retrieval and use. Codification works best with explicit knowledge. Members receive tangible rewards. Knowledge sharing networks connect people and allow them to share knowledge through interpersonal relationships. Knowledge sharing works best with tacit knowledge. Members receive intangible, social rewards. When a community has codification and sharing networks, members may "hoard" codified knowledge to bolster their social network. When people will probably need to share again, use sharing networks (low codification rewards) and codification (high codification rewards).

**Future Research Questions:** How does knowledge sharing and knowledge contribution affect other knowledge management issues like knowledge creation?

Theme: Knowledge sharing, Individual Motivations, Community Factors

**Reference:** Volunteers' Involvement in Online Community Based Software Development (Xu et al., 2009)

**Problem:** Why do people contribute to open source software (OSS) projects?

**Importance of the Research:** Management of open source software projects

**Theory Base:** Their research model incorporates individual motivations and community factors as drivers for involvement which drives performance.

**Research Approach:** Empirical analysis of data received from volunteer OSS developers.

**Outcomes:** Involvement determines performance. The following individual motivations drive involvement: personal software needs, expectation of increased skills and reputation, and enjoyment. Project community also plays a part with factors such as the effectiveness of the leadership, interpersonal relationship, and the ideological basis of the community.

**Future Research Questions:** Similar research in another OSS environment. Authors did not track which projects failed or successfully concluded.

# 8.8 Moderation

**Theme:** Moderation

Reference: Conflict and identity shape shifting in an online financial community (Campbell, Fletcher, & Greenhill, 2009)

**Problem:** What role does conflict play in the formation and reformation of a community's identity

**Importance of the Research:** Community design and governance

**Theory Base:** Contemporary Tribalism

**Research Approach:** Researchers adopt a "Broadly Ethnographic", Critical Interpretive perspective (Power and identity).

Outcomes: Conflict can define and align the ideals and values held by a community Future Research Questions: Research can validate theory using other approaches. Research may be able to find other roles besides *big man*, *sorcerer* and *trickster*.

Theme: Moderation, Community Factors, Communities of practice

**Reference**: Exploring the Dynamics of Blog Communities: The Case of MetaFilter (Silva et al., 2009)

**Problem:** What makes a community blog cohesive?

**Importance of the Research:** Cohesive communities function better.

**Theory Base:** Communities of Practice

**Research Approach:** Authors conduct an interpretive analysis of MetaFilter posts.

**Outcomes:** Cohesion arises from membership ground rules, moderators, profile information, good conduct, relevant posts, and group discipline.

**Future Research Questions:** Future research can study of same issues in a different environment or study the same issues with a different method.

Theme: Moderation

**Reference:** The Role of online Trading Communities in Managing Internet Auction Fraud (Chua et al., 2007)

**Problem:** Managing Fraud in online auction houses

**Importance of the Research:** Giving communities more effective ways of dealing with fraud

**Theory Base:** Social Disorganization theory: Crime occurs in "weak and disorganized" communities. Also members more attached to the community fight more crime. The theory delineates stages of community development and distinctions between formal and informal control.

**Research Approach:** The authors conduct a qualitative study of three case of online communities. The authors studied Internet forums and conducted some personal interviews of individuals fighting fraud.

**Outcomes:** Communities enforce rules differently from the authorities.

Interdependent, anticrime communities fight crime most effectively. Authorities should encourage cooperation and clan control.

**Future Research Questions:** What conditions lead to more advanced, interdependent communities? Future research should include longitudinal studies to confirm. Future research could apply more community theories to online communities.

#### **8.9** Networks of Practice

**Theme:** Network of Practice

**Reference:** Trans-situated Learning: Supporting a Network of Practice with an Information Infrastructure (Vaast & Walsham, 2009)

**Problem:** What learning dynamics emerge when people have similar jobs communicate in a community despite their separation by distance?

**Importance of the Research:** Important for the success of networks of practice

**Theory Base:** Situated learning, networks of practice, information infrastructures, practice-based perspective of learning, computer-mediated contexts

**Research Approach:** Authors prepared a case study of a web-based system in environmental health.

**Outcomes:** Model of trans-situated learning

**Future Research Questions:** How does model work when group members do not have close relationships or when practices of the community are more diverse? How does trans-situated learning affect other kinds of communities? What constructs could future researchers add to their model?

Theme: Networks of practice: Wikipedia

**Reference:** The Interplay between Digital and Social Networks (Arazy, Nov, Patterson, & Yeo, 2011)

**Problem:** What determines the quality of team-produced articles on Wikipedia?

**Importance of the Research:** Quality is crucial to the survival of that resource and similar resources.

**Theory Base:** Research on Wikipedia, which, since it is in the beginning stages, is largely without established theories.

**Research Approach:** Authors performed a quantitative study of Wikipedia articles.

**Outcomes:** Membership diversity, healthy intra-team conflict and membership administrative and content generating roles drives the quality of Wikipedia team-produced articles.

**Future Research Questions:** What are additional methods for measuring quality of the articles? The research used information available on Wikipedia, but cannot account for information not stored on Wikipedia. How do these findings compare with the quality of knowledge in a community of practice?

Theme: Networks of practice: Wikipedia

**Reference:** Decentralization in Wikipedia Governance. (Forte, Larco, & Bruckman, 2009)

**Problem:** How does an organization encourage and manage "Self" government?

**Importance of the Research:** This research may be illustrative of governance in other networks of practice.

**Theory Base:** Commons-based government.

**Research Approach:** The authors conducted qualitative research using interviews with Wikipedia workers.

**Outcomes:** Wikipedia uses highly organized norms, policies and rules. As it continues to grow, the governance becomes more decentralized.

**Future Research Questions:** What factors drive the choice of governance style of a community of practice?

# **8.10** Online Communities

Theme: Special Issue, Online Communities

**Reference:** The Interplay between digital and social networks (Agarwal, Gupta, & Kraut, 2008)

**Problem:** Editorial for special issue on digital and social networks.

**Importance of the Research:** Introduces topic and describes papers selected and the selection process.

**Outcomes:** Agarwal suggests three ways that digital social networks differ from real-world social networks: scale, communication dynamics, increase of user-generated content.

**Theme:** Online communities

**Reference:** The Impact of Community Commitment on Participation in Online Communities (Bateman et al., 2011)

**Problem:** Why do people participate in online communities?

**Importance of the Research:** Helps people understand why people do or do not participate in their community.

**Theory Base:** Organizational commitment research which describes continuance, affective and normative commitments.

**Research Approach:** The authors developed model and then created a survey to test it.

**Outcomes**: New model which shows how continuance, affective and normative commitment of members influenced thread-reading, posting and moderating behaviors in online communities.

Future Research Questions: Future research can examine synergy effects from different kinds of commitment, the progression of commitment over time. How does the commitment by the people fit in to the overall functioning of the community? How does commitment fit with Kim's core-periphery structure? Their research uses age, gender and tenure as moderating variables. Are there other variables which could moderate these relationships? How does the community socialize members? What are the antecedents for the various types of commitment? The authors suggest shared values, trust, and supportiveness from the previous research on community commitments, but do not attempt to support it.

**Theme:** Sustaining online communities

Reference: Understanding the Sustainability of a Virtual Community: Model

Development and Empirical Test (Cheung & Lee, 2009)

**Problem:** Why do people continue to use online communities?

**Importance of the Research:** Important for sustainability

**Theory Base:** Information Systems continuance model, relationship marketing, the uses and gratifications paradigm and social influence theory.

**Research Approach:** The authors conducted a survey.

**Outcomes:** The intention to continue using and the intention to recommend are driven by satisfaction, commitment and group norms. Purposive value, self-discovery, entertainment value, social enhancement, and maintaining interpersonal interconnectivity drive the antecedents to these intentions.

**Outcomes:** Intention to continue using and intention to recommend in virtual communities

**Future Research Questions:** A longitudinal study might provide more information about how these concepts interact over time.

**Theme:** Online Communities

**Reference:** Through a Glass Darkly: Information Technology Design, Identity Verification and Knowledge Contribution in Online Communities (Ma & Agarwal, 2007)

**Problem:** What makes members contribute knowledge in an online community?

**Importance of the Research:** Knowledge contribution is crucial to the success of online communities

**Theory Base:** Theory of perceived identity verification (which is taken from social psychology concepts of identity), Goffman's (1967) self-presentation theory, the theory of self-verification, the theory of attribution.

**Research Approach:** The authors conduct an empirical study by surveying community members in two communities. The authors created an excellent literature review summary and a good explanation of how they did surveys to account for validity. They used the twenty statements test (TST) created by Kuhn and McPartland, and knowledge contribution measures from Wasko and Faraj. They include many of their measures in the appendix.

**Outcomes:** Virtual presence, persistent labeling self-presentation and deep profiling all affect the perceived identity verification which impacts satisfaction and knowledge contribution

Future Research Questions: They only studied two online communities. Future research might include a wider scope. The cross-sectional study design does not reveal causation only correlation. A longitudinal study or an experimental design might bring out causal relationships. They suggest a long-term study connecting perceived identity verification to activity and behavior of long-term members. They suggest finding ways to more objectively measure deep profiling. They suggest future research might create better virtual co-presence tools. They also suggest that future researchers study the differences between online identity and real world identity and the differences between them.

**Theme:** Online communities

**Reference:** Usability and Sociability in Online Communities: A Comparative Study of Knowledge Seeking and Contribution (Phang et al., 2009)

**Problem:** How do usability and sociability affect knowledge contributing and knowledge sharing in online communities?

Importance of the Research: Community success depends on knowledge sharing.

**Theory Base:** Work on online communities by Preece.

**Research Approach:** The authors conducted a quantitative Survey

Outcomes: The authors create a good model and a good literature review.

**Theme:** Open Source Software Communities

**Reference:** An Empirical Study of the Driving Forces behind Online Communities (Toral et al., 2009)

**Problem:** What drives the success of communities?

**Importance of the Research:** What factors must be present for the success of online communities? How can researchers define success?

**Theory Base:** Social Network Analysis

Research Approach: The authors use social network analysis

**Outcomes:** Network cohesion, core of the community, network structure and network centrality drive success in online communities. The authors measured "success" by the number of active developers, community size and the number of "threads".

**Future Research Questions:** What is an appropriate definition of success for an online community of practice and how can it be measured?

**Theme:** Online communities Literature review

**Reference:** Virtual Worlds – Past, Present, and Future: New Directions in Social Computing (Messinger et al., 2009)

**Problem:** How can researchers classify "virtual worlds"? What is the existing literature on virtual worlds? How does Second Life exemplify a virtual world?

**Importance of the Research:** The authors argue for the pervasiveness and potential of virtual worlds. They project that in five years, virtual communities will become as important to organizations as the World Wide Web is now.

**Theory Base:** They are reviewing literature to find the existing theory base for research into virtual worlds.

**Research Approach:** The authors do a mixed method study using literature review, case study and survey.

**Outcomes:** Taxonomy of types of virtual worlds by Purpose, Place, Platform, Population and Profit model. The researchers include a list of important "virtual worlds" used in games.

Future Research Questions: How does the appearance of the Avatar affect the interactions within the virtual world? How do people behave differently online than they do in the real world? How does an organization market to people in a virtual world? How should organization differentiate between marketing to the avatar and marketing to the real person behind it? How can organizations employ the best business models for virtual worlds? How can organizations conduct market research within and about virtual worlds? How can organizations market virtual services? How will retailing and ecommerce strategies differ between virtual worlds and the Internet? How can organizations manage their customer relationships within a virtual world? How can organizations use virtual worlds to enhance communication between employees? Can a community of practice exist in a virtual world? If so, how would it differ from a more traditional format?

**Theme:** Online community success, online community life cycle

**Reference:** A Life-cycle Perspective on Online Community Success (Iriberri & Leroy, 2009)

**Problem:** What critical success factors drive community success in each stage of online community development?

**Importance of the Research:** What are the critical factors for creating self-sustaining communities?

**Theory Base:** Thorough literature review of articles and the theories used in online community research.

**Research Approach:** The authors conduct a very thorough literature review.

Outcomes: Literature review for online communities.

**Future Research Questions:** Future research could create an empirical test to determine if their guidelines fit the life-cycle stages. Do different types of users have different needs? How can communities implement these factors to ensure optimal development and success?

**Theme:** Online community success

**Reference:** Sociability and Usability in Online Communities: Determining and Measuring Success (Preece, 2001)

**Problem:** How can people measure success in online communities?

**Importance of the Research:** Success must be clearly defined in order to set goals for achieving success in online communities.

**Theory Base:** Human Computer Interaction

**Research Approach:** The authors conduct a thorough literature review.

**Outcomes:** The authors create sociability and usability metrics for online communities.

**Future Research Questions:** Future research might compare success measures to perception of success. Future researchers might compare success and the perception of success across several communities.

**Theme:** Open source software projects

**Reference:** Understanding Sustained Participation in Open Source Software Projects (Fang & Neufeld, 2009)

**Problem:** Why do people participate in Open Source Software (OSS) projects?

**Importance of the Research:** Participation is crucial for successful OSS projects.

**Theory Base:** Legitimate Peripheral Participation (LPP), situated learning, and identity formation

**Research Approach:** The researchers did qualitative research by conducting a longitudinal case study using multiple documents.

**Outcomes:** The factors that encourage members to join a group are different from the factors that make them stay. Situated learning and identity construction lead to sustained participation making conceptual and practical contributions.

**Future Research Questions:** Future research could empirically test the model or collect additional primary data by interviewing programmers. Future research could use quantitative surveys to make the results more generalizable. Future research might add community level factors to the model or examine how power and roles factor into participation. Future research might also use Bourdier's theory of practice.

# 8.11 Reviews

**Theme:** Reviews

**Reference:** Informational Cascades and Software Adoption on the Internet: an Empirical Investigation (Duan et al., 2009)

**Problem:** How do Informational cascades affect software adoption? Users must often make adoption decisions without full information. When they do so by adopting someone else's decision, researchers call this an informational cascade.

**Importance of the Research:** Informational cascades can explain why online user reviews do not always work as well as why the user may make sub-optimal decisions.

**Theme:** Reviews

**Reference:** Examining the Relationship between Reviews and Sales: The Role of Reviewer Identity Discloser in Electronic Markets (Forman et al., 2008)

**Problem:** How does the disclosure of a reviewer's identity influence the perception of the review?

**Importance of the Research:** Electronic commerce is greatly influenced by online reviews.

**Theory Base:** Research on Information Processing

**Research Approach:** The authors conduct a quantitative evaluation of Amazon data.

**Outcomes:** Customers viewed reviews with identity information more positively. Customers more positively viewed Reviews from a closer geographical location were more positively viewed.

**Future Research Questions:** Researchers found it difficult to measure member level identification. Future research might evaluate identity perceptions and use alternative analysis techniques or analyze the text of reviews. Future research might also use different data, a different vendor, or a different product.

## 8.12 Social Network Analysis

**Theme:** Social Bookmarking

**Reference:** Innovation Impacts of using Social Bookmarking Systems (P. H. Gray, 2011)

**Problem:** How can social bookmarking systems increase employee innovativeness? **Importance of the Research:** Essential to know if social bookmarking systems have value.

**Theory Base:** Social Networking Analysis

**Research Approach:** The authors conducted a Social Network Analysis of a social bookmarking system used by a company.

**Outcomes:** When someone is exposed to more information from different sources, they will see more novel information. The shape of a member's network determines the amount of novel information they see. "Bridges" over structural "holes" have an advantage.

Future Research Questions: The authors assumed that more bookmarks accessed led to more novel information, but future research might enable them to more directly measure novelty. Future research may link use of social bookmarking to other outcomes besides innovation or review the impact of information "silos" on the efficacy of social bookmarking. Future researchers could study additional factors in social bookmarking behavior such as: culture, roles, motivation, reputation, and benefits or find other ways to measure innovation. How can communities of practice draw in new members with information to share? How can communities draw information out of current members?

Theme: Social Network Analysis, Open Source Software

**Reference:** Emergence of New Project Teams from Open Source Software Developer Networks: Impact of Prior Collaboration Ties (Hahn et al., 2008)

**Problem:** What motivates developers to join Open Software Development teams? How do they choose which ones to join?

**Importance of the Research:** Uncovers the factor that drive the formation of new OSSD teams.

**Theory Base:** Social Network Analysis

**Research Approach:** Authors analyzed real OSSD projects.

**Outcomes:** Developers join projects when they have ties with the initiator of the project. Developers join projects that have teams of developers of high status.

**Future Research Questions:** What role do the initiators and developers play in recruiting new developers? How does the joining process change over the life-cycle of the project? How does the process of developers joining a team change the structural characteristics of the network? How does the process of team formation affect the overall success and sustainability of the project? Future research might use data from a different OSS development area.

**Theme:** Social Network Analysis

**Reference:** Casting the Net: A Multimodal Network Perspective on User-System Interactions (Ransbotham & Kane, 2011)

**Problem:** How can the user-system relationship best be described?

**Importance of the Research:** Research should explain the user interaction with the system. All prior research focused on "didactic" system usage instead of multi-modal networks.

**Theory Base:** Social Network Analysis

**Research Approach:** Authors conducted a survey of healthcare systems users

**Outcomes:** The centrality of the information system within the social network positively influences the efficiency and quality of information system. Information system centrality has to do with the indirect effect of the system on people who do not use the information system. The aggregated strength of the users' interactions with the information system does not have an effect on efficiency or quality.

**Future Research Questions:** Future research could test the same theories in other environments. Longitudinal studies could study these relationships over time. This study assumes identical nodes on the network. How might the type of task or system affect the structure?

Theme: Social Network Analysis, Email

**Reference:** Towards Dynamic Visualization for Understanding Evolution of Digital Communication Networks (Trier, 2008)

**Problem:** Social Network Analysis has shortcomings and does not tell the whole story.

**Importance of the Research:** Allows for dynamic analysis of social networks.

**Theory Base:** Social Network analysis, Dynamic network Analysis

**Research Approach:** Authors Conducted a Longitudinal Study of Enron E-mail

**Outcomes:** Authors created an event-based dynamic network visualization protocol using Social Network Intelligence software ("Commetrix") and Graphvis (an open source graphics software package).

Future Research Questions: Future research might identify people of importance on the network by their activities and impact or study "catastrophes" and how they affect networking to form predictive models. Future research might create a new methodology for dynamic networking to generate new insights or algorithms to automatically detect community formation. Future researchers might combine network analysis with content analysis to study innovation diffusion in online communities. The software developed could be used to analyze communities of practice. Additional methods to show network change over time could be proposed.

### **8.13** Trust

**Theme:** Individual motivation: Trust

**Reference:** Establishing Online Trust Through a Community Responsibility System (Ba, 2001)

**Problem:** What online social structures promote trust?

**Importance of the Research:** Trust enables transactions between members

**Theory Base:** Game Theory

**Research Approach:** Authors use Game Theory to prescribe social structures which promote trust between members.

**Outcomes:** New community responsibility system allows impersonal anonymous transactions. The buyer trusts the community, not the seller. The community takes action against the people who break the rules

**Future Research Questions:** What control structures work best? How does the structure impact the agent's trust of the community? What is the life-cycle of a community? How does it begin, evolve and die? What attributes lead to a successful community?

**Theme:** Trust

**Reference:** What Does the Brain Tell Us about Trust and Distrust? Evidence from a Functional Neuroimaging study (Dimoka, 2010)

**Problem:** How can researchers describe the nature of trust and distrust in impersonal E-commerce?

**Importance of the Research:** Knowing what makes people trust each other enables them to do business online.

**Theory Base:** Theories on trust. The authors found little research on distrust because researchers define distrust as the opposite end of the trust continuum

**Research Approach:** Authors performed an experiment measuring brain activity with functional neuroimaging tools.

**Outcomes:** Trust and distrust generate activity in different areas of the brain

**Future Research Questions:** The Seller profiles used do not represent real-world profiles. Further research might use real-world examples. What elements make up trust and distrust? Future researchers might use better technology to sense brain activity.

**Theme:** Trust, Interorganizational Systems

**Reference:** The Impacts of Competence-trust and openness-trust on interorganizational systems (Ibrahim & Ribbers, 2009)

**Problem:** How do competence trust and openness trust affect the use of interorganizational systems?

**Importance of the Research:** Trust is crucial to the success of interorganizational systems. When investments outweigh resources, interorganizational relationships fail.

**Theory Base:** Resource-based view, Transaction-cost economics

**Research Approach:** Authors conducted three case studies of interorganizational relationships.

**Outcomes:** Openness trust and competence trust positively influence the use of human knowledge and organizational domain knowledge resources. Competence trust positively influences the usage of resources related to interlinking business processes.

**Future Research Questions:** Future researchers might use a quantitative approach with a survey, rather than a qualitative approach. Trust research delineates many different kinds of trust besides those studied. Additional research might cover credibility, benevolence and affect. Future research might also cover intraorganizational relationships or online communities.

#### 8.14 Turnover

**Theme:** Turnover, Sustainable communities

**Reference:** Membership Size, Communication Activity and Sustainability: A Resource-Based Model of Online Social Structures (Butler, 2001)

**Problem:** How do communities create sustainable online social structures? How do size and communication activity influence each other?

**Importance of the Research:** Turnover is an important factor in the long-term success of online communities.

**Theory Base:** Resource-based theory of sustainable social structures. Membership size and communication activity interact to create sustainable communities

**Research Approach:** Author performed a quantitative analysis of Listserv information.

**Outcomes:** Size and communication activity can have positive or negative effects on the success of the online community. Communities must balance the two of these.

**Future Research Questions:** Future researchers might study the new theory outside of an online community or compare online community results to other types of communities. Researchers might develop the theory as an organizational theory using demographics, group composition and structure and communication processes. Researchers might conduct similar studies in differing environments. Would "pull" or "push" technology make a difference? Would using moderators or screening members have an impact? Researchers might review communities which operate within a larger organization – such as a community of practice at an organization.

**Theme:** Turnover

**Reference:** Membership Turnover and Collaboration Success in Online Communities: Explaining Rises and Falls from Grace in Wikipedia (Ransbotham & Kane, 2011)

**Problem:** How can Wikipedia authorship teams generate collaborative efforts by reducing turnover?

**Importance of the Research:** Managing turnover is crucial to the success of any group activity. At first, turnover in a group improves knowledge creation and retention, but turnover inhibits the group after it reaches a certain threshold.

**Theory Base:** Kane's two stage collaboration model: creation stage and retention stage.

**Research Approach:** The authors performed a quantitative analysis of featured articles on Wikipedia

**Outcomes:** The authors found support for hypothesis and two stage model. The community's needs in each of the two stages can vary widely. Moderate levels of turnover helps the community – but communities typically get more turnover in the retention phase than they need.

**Future Research Questions:** Whether the group operates in creation or retention stage may change the characteristics which foster collaboration.

## **8.15** Virtual Communities and Virtual Teams

**Theme:** Virtual communities

**Reference:** Encouraging Participation in Virtual Communities through Usability and Sociability Development (Lu et al., 2011)

**Problem:** Why do people continue to use online communities?

**Importance of the Research:** Unless a community knows what factors drive its sustainability, it cannot hope to manage those factors.

**Theory Base:** Usability and sociability research, Technology Acceptance.

**Research Approach:** The authors created a quantitative survey.

**Outcomes:** Enjoyment and sense of belonging drive the intent to continue to participate. The research did not support usefulness. Information service quality, interaction support quality incentive policy, event organization and leaders' involvement influence enjoyment and a sense of belonging.

**Theme:** Virtual Teams, Technology supported teams

**Reference:** Team Size, Dispersion, and Social Loafing in Technology-Supported Teams (Alnuaimi, Robert, & Maruping, 2010)

**Problem:** What factors drive "social loafing" in virtual teams?

**Importance of the Research:** Virtual Teams must manage "social loafing" to be effective.

**Theory Base:** Moral Disengagement

**Research Approach:** The authors conducted a laboratory study. They assigned students to different groups and had them use group support software.

**Outcomes:** Team size and dispersion influence social loafing. Mediating factors include responsibility, blame, and dehumanization.

**Future Research Questions:** Future researchers could examine other tasks than brainstorming or not use students as subjects. Additional experiments might disperse teams geographically or use more than just a chat-based system. Social Loafing and Lurking behaviors impact online communities of practice. Future research might add other constructs such as self-efficacy to their model. How does social loafing behavior change over time?

**Theme:** Virtual Teams

**Reference:** Cognitive Conflict and Consensus Generation in Virtual Teams during Knowledge Capture: Comparative Effectiveness of Techniques (Chiravuri, Nazareth, & Ramamurthy, 2011)

**Problem:** How can virtual teams best capture knowledge and resolve conflicts between subject matter experts?

**Importance of the Research:** Effective knowledge management begins with knowledge capture. Virtual teams cannot use inconsistent knowledge.

**Theory Base:** Repertory Grid, Delphi

**Research Approach:** The authors conducted a field experiment with real subject matter experts.

**Outcomes:** In the short run, Delphi performed better at reducing conflict and increasing consensus. However in the long run the Repertory Grid system outperformed Delphi.

**Future Research Questions:** How do online communities of practice resolve conflicts?

**Theme:** Virtual Teams, Knowledge Integration

**Reference:** Social Capital and Knowledge Integration in Digitally Enabled Teams (Robert, L.P., Jr., A.R. Dennis, 2008)

**Problem:** How does social capital behave differently in face-to-face and online settings?

**Importance of the Research:** Social capital affects the success of virtual teams.

Theory Base: Social Capital, Knowledge Integration

**Research Approach:** The authors conducted an experiment. They took forty-six teams which had worked together before and tracked how they performed face-to-face and over the Internet. The article lists the questions they asked.

**Outcomes:** Virtual teams found structural and cognitive social capital more important. Relational capital did not change between the environments. Knowledge integration affected the quality of the team's decisions.

Future Research Questions: Why do team members not integrate knowledge from other team members? The authors suggest that social capital plays a part. Future research might use non-student subjects. Future researcher might find another way to operationalize cognitive capital. Future researchers might use a similar experimental research method with a different theory. Future research might compare how teams with and without a history together perform. This experiment could have subjects interact online first and then face-to-face and vice versa.

**Theme:** Virtual Teams, Trust

**Reference**: The Role of Communication and Trust in Global Virtual Teams: A social Network Perspective (Sarker, Ahuja, Sarker, & Kirkeby, 2011)

**Problem:** What theories links performance, communication and trust in virtual teams?

**Importance of the Research:** Virtual teams need trust to function efficiently.

**Theory Base:** Trust theory: additive, interaction and mediation trust.

**Research Approach:** The researchers did a social network analysis in an experimental environment. They created groups that worked together over time.

**Outcomes:** Trust concerns relationships more than individuals. Social network approaches to trust work better than individual attribute approaches.

**Future Research Questions:** Future research might use non-student subjects. The social network analysis only looked at degree centrality. Additional research could review other SNA roles. How would results differ if project team managers assigned reviews?

**Theme:** Virtual Teams

**Reference:** Vital Signs for Virtual Teams: An Empirically Developed Trigger Model for Technology Adaptation interventions (Thomas & Bostrom, 2010)

**Problem:** How can leaders of virtual teams know when they need to change the way they use technology?

**Importance of the Research:** Keeping up with technology is important for the success of virtual teams.

**Theory Base:** Adaptive Structuration Theory, Team Information Communication Technology (ICT) adaptation. The authors create a five trigger model and the VT Leader ICT-Intervention conceptual framework.

**Research Approach:** The authors conducted interviews with practicing virtual team leaders using the critical incident technique.

**Outcomes:** The authors create a model with the following triggers: external and internal constraints, inadequate information communication technology, inadequate information communication technology knowledge skills and abilities, inadequate trust and inadequate relationships.

Future Research Questions: Future research could extend existing work on conflict resolution and participation in information systems projects. How can team leaders assess the knowledge, skills and abilities of their team members when they never see them? Future researchers could create a list of the different types of contexts where combinations of triggers combine to initiate intervention. How do managers respond when multiple triggers present themselves? How does the critical incident interview technique apply to communities of practice? What critical triggers cause leaders in online communities of practice to change the way they use technology? Future research could survey members of communities of practice to see if they can confirm similar triggers.

**Theme:** Virtual teams and Social Networks

**Reference:** The Influence of Virtuality on Social Networks within and Across Work Groups (Suh, Shin, Ahuja, & Kim, 2011)

**Problem:** How does virtuality affect one's social network in a virtual workgroup? The authors define virtuality as using individual and group communication technologies. How does virtuality affect group connectedness and the communication of tacit knowledge?

**Importance of the Research:** Knowledge sharing is crucial to the success of virtual teams.

**Theory Base:** Computer-mediated communication theory, Proximity Theory, Social network theory

**Research Approach:** The authors surveyed global business consulting firms and did hierarchal linear modeling

**Outcomes:** Virtuality at the individual level increases the strength of intra-group ties and the network range of the extra-group. The level of group virtuality, dispersion and support affect virtuality on the individual level.

**Future Research Questions:** Future researchers could create a more detailed understanding of what virtuality means. The research used knowledge-intensive firms. Less knowledge-based firms might give different results. Future researchers might find a better way to measure social network bridges to other groups or examine how social networks relate to team performance. Future research might add more constructs to their model.

**Theme:** Virtual teams, trust

**Reference:** Individual Swift Trust and Knowledge-based Trust in Face-to-face and Virtual Team Members (Robert, Denis, & Hung, 2009)

**Problem:** What causes people to trust each other in virtual teams?

**Importance of the Research:** Trust is essential to functioning in virtual teams.

**Theory Base:** Theories about different types of trust: cognitive, initial, knowledge-based, presumptive, and swift

**Research Approach:** The authors conducted an experiment to see how trust formed.

**Outcomes:** The authors created a two-stage model of how trust forms: Member characteristics and team member individual factors drive swift trust. Knowledge trust builds and swift trust fades as a members behaviors drive trust. Virtual teams failed more often, which meant that people were less likely to extend trust to future activities.

**Future Research Questions:** How does team diversity affect trust? What is the tipping point between swift trust and knowledge-based trust? How can one reduce the perceived risk of a virtual team? How do different media types affect knowledge-based trust?

#### **8.16 Virtual Worlds**

**Theme:** Virtual Worlds, Intention to purchase virtual products

**Reference:** An Odyssey into Virtual Worlds: Exploring the Impacts of Technological and Spatial Environments on Intention to Purchase Virtual Products (Animesh, Pinsonneault, Yang, & Oh, 2011)

**Problem:** What makes consumers want spend real money to buy "virtual" products in a virtual world?

**Importance of the Research:** Virtual worlds must have some way of making money.

**Theory Base:** Stimulus Organism Response (S-O-R). Virtual Experience (telepresence, social presence, and flow) drive intent to purchase. Technological and spatial environments drive experience.

**Research Approach:** The authors conducted a quantitative survey.

**Outcomes:** Interactivity drives telepresence and flow. Sociability drives social presence. Density and stability drive virtual experiences.

**Future Research Questions:** Future research might include more types of virtual worlds than Second Life. Researchers could use an experiment to determine if volunteer users differ from mandatory users. Intention to buy virtual goods may not represent the actual purchasing behavior, so future research could measure the difference between intention and action. Future research could examine trust, exploration, creativity, and learning and how the purchase of real goods differs from the purchase of virtual goods.

**Reference:** Arguing the Value of Virtual Worlds: Patterns of Discursive Sensemaking of an Innovative Technology (Berente, Hansen, Pike, & Bateman, 2011)

**Problem:** How do business professionals "make sense" of the usefulness of virtual worlds?

**Importance of the Research:** Good initial research to predict how organizations will use virtual world technology. The researchers apply grounded theory methodology and go into detail about the coding process.

**Theory Base:** Sensemaking and Touliminian analysis

**Research Approach:** Business professionals spent a dozen hours on Second Life and then wrote essays which the authors analyzed qualitatively

**Outcomes:** Authors found the following themes: "Confirmation, open-ended Rhetoric, demographics and control". The Touliminian method successfully analyzed responses.

**Future Research Questions:** The study used business professional students who wrote the essays to complete an assignment. Most essays generalized Second Life to the broader community of virtual worlds. Future research might apply this methodology to online communities of practice. Can an organization run a community of practice in a virtual world? Would the advantages of the virtual world be worth the additional overhead?

**Reference:** Design Principles for Virtual Worlds (Chaturvedi, Dolk, & Drnevich, 2011)

**Problem:** Virtual Words comprise a new class of information system. What design principles can guide the development of such system?

**Importance of the Research:** Virtual Worlds are an emerging field and it is difficult to know how to construct them.

**Theory Base:** Information Systems Design Theory (Updated for virtual worlds.)

**Research Approach:** Information Systems Design Science Instantiated by "Sentient World" agent based virtual world system.

**Outcomes:** The authors suggest characteristics of agent-based virtual worlds. The design principles of virtual worlds involve deep structures similar to modeling and simulation designs as well as emergent structures describing unknown user-system knowledge-sharing relationship.

**Future Research Questions:** How can designers combine analytical, computational, semantic and empirical research methods to appropriately study virtual communities?

**Reference:** From Space to Place: Predicting Users' Intentions to Return to Virtual Worlds (Silva et al., 2009)

**Problem:** What factors cause consumers to return to virtual worlds?

**Importance of the Research:** Virtual worlds fail if members do not come back after an initial visit.

**Theory Base:** The interactionist theory of place attachment.

**Research Approach:** The authors performed a lab "Quasi-Experiment". Groups of students performed a complex task in Second Life and the responded with their intention to return.

**Outcomes:** A meaningful experience, or deep involvement, known as a state of cognitive absorption drives the intention to return. When a person loses track of time, they are likely to come back.

**Future Research Questions:** Future experiments could control aspects of focus, nimbus, etc. or test tasks of varying levels of complexity. How do users' intentions to return change after a longer exposure to the virtual world. Future research might try to control for participants already familiar with 3-D environment

**Reference:** Co-creation in Virtual Worlds: The Design of the User Experience (Kohler, Fueller, Matzler, & Stieger, 2011)

**Problem:** Virtual worlds that allow the members to create and enhance the experience for other members use co-creation systems. What principles can designers use to create successful co-creation systems?

**Importance of the Research:** Success of virtual worlds depends largely on the ability of the members to enhance the environment with their own creations

**Theory Base:** Information Systems Design theory

**Research Approach:** The authors conducted action and design research and created, implemented, evaluated, and improved their "Ideation Quest" software.

**Outcomes:** Authors suggest a framework of design guidelines for co-creation systems.

**Future Research Questions:** Do any of the particular guidelines result in increases in use of the virtual world? How do virtual co-creation compare with other types of co-creation on the web? How does Second Life differ from other virtual communities? Other than idea generation, how can designers create systems to support other co-creation tasks?

**Reference:** Enhancing Brand Equity through Flow and Telepresence: A comparison of 2-D and 3D Virtual Worlds (Nah, Eschenbrenner, & DeWester, 2011)

**Problem:** Do three dimensional virtual worlds affect consumer behavioral intentions more than two dimensional worlds?

**Importance of the Research:** Important for design of virtual worlds. How can organizations make sure their environment does not detract from the communication of product information?

**Theory Base:** Flow (Cognitive Absorption), telepresence (the user forgets they are in a virtual world), and positive emotions, distraction – conflict theory (the environment can overpower the product information).

**Research Approach: Reference:** Author conducted an experimental design where they created similar two dimensional and three dimensional virtual worlds.

**Outcomes: Problem:** Three dimensional environments have some advantages over two dimensional environments but the three dimensional environment has some drawbacks as well.

**Future Research Questions:** Future research might use non-students as subjects or subjects who have more virtual world experience. Future research could test to see if results from the first study apply outside of Second Life. Would the three dimensional environment overpower the ability of the members of an online community of practice to interact?

**Reference:** Control Over Virtual Worlds by Game Companies: Issues and Recommendations (Roquilly, 2011)

**Theory Base: Problem: Research Approach:** What is a sustainable model for how gaming companies can control the development of their virtual world?

**Importance of the Research: Outcomes:** Important for the commercial success of video games

**Theory Base:** 5Cs Model

**Research Approach:** Multidisciplinary literature review and review of contracts from virtual worlds.

**Outcomes:** Virtual worlds currently use copyright, codes, creativity, community and contracts also known as the "5Cs". The authors make recommendations for contract modification.

**Future Research Questions:** Future research could define a consistent, valid, international, legal framework. Future researchers could trace the evolution of end user license agreements. Future research could examine how crafting differs from co-creation and user-created content.