

**SEEKING AND SHARING KNOWLEDGE
USING SOCIAL MEDIA IN AN ORGANIZATION:
THE IMPACT OF SOCIAL INFLUENCE, ORGANIZATION
STRUCTURE AND SOCIAL CAPITAL**

A Dissertation
Submitted
to the Temple University Graduate Board

In Partial Fulfillment
Of the Requirements for the Degree of
Doctor of Philosophy

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August, 2013

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ABSTRACT

SEEKING AND SHARING KNOWLEDGE USING SOCIAL MEDIA IN AN ORGANIZATION: THE IMPACT OF SOCIAL INFLUENCE, ORGANIZATION STRUCTURE AND SOCIAL CAPITAL

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Temple University, 2013

The prolific use of social media tools such as blogs and wikis is leading several organizations to adopt these tools. However, success of social media depends on its use by employees to share and seek knowledge. Based on a unique data set obtained from a large multi-national corporation, I examined three different aspects of knowledge seeking and sharing. First, I investigated two-sided network externalities on seeking and sharing. My analysis shows that significant network externalities occur not only at the demand side, which has been the primary focus in prior literature, but also at the supply as well as cross-sides (from supply to demand as well as from demand to supply). Second, I also explored the impact of hierarchical and geographical distribution on knowledge seeking and sharing. My results show that how a firm is structurally organized can yield different influences on the use of corporate social media based on whether the employee is seeking or sharing. Finally, I investigated the impact of social capital. New insights are captured in how different dimensions of social capital influence employee use of corporate social media for seeking and sharing knowledge within the organization.

ACKNOWLEDGMENTS

I want to express my deep appreciation and gratitude to my advisory co-chairs of this dissertation, Dr. Munir Mandviwalla and Dr. Youngjin Yoo, for their invaluable mentorship. Dr. Mandviwalla not only made this research possible, but also helped me navigate through this process with vital feedback and key advice. Dr. Yoo provided inspiring and critical guidance throughout the development of this thesis, from the beginning to the end, with constant encouragement.

I would also like to thank my other committee members for their strong support. Dr. Sunil Wattal was a significant and patient source of feedback throughout my dissertation work. The insights from my external reader, Dr. Daniel Fesenmaier, were greatly appreciated.

Beyond my committee, I would like to thank Dr. Pei-yu Chen and Dr. Paul Pavlou for important concepts that I learned through their MIS seminars that directly helped me with my dissertation. In addition, I greatly appreciated key feedback from Dr. Chen that was incorporated into my thesis. My gratitude also goes to the other MIS faculty members for their insights that I have gained in seminars, including Dr. Steven Johnson, Dr. David Schuff, and Dr. Bin Zhang whom I first met at the ICIS Doctoral Consortium in Shanghai. I also appreciated the helpful input from Dr. Yuhei Inoue and Dr. Yong-Young Kim.

Finally, I am thankful for the friendship and support of the MIS Ph.D. students, the MIS Department staff, and my loyal friends both inside and outside of Temple's Fox School of Business.

*This dissertation is dedicated to,
Dr. Victor K. Schutz and Mrs. Helen E. Schutz*

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CHAPTER 1.

INTRODUCTION

1.1 Research Motivation

Organizations have recently been using social media for collaboration in order to share valued knowledge (Ransbotham and Kane 2011). Knowledge sharing and knowing happen “in everyday practice,” (Orlikowski 2002, pp. 252-253). Organizations, therefore, can anticipate that knowledge sharing through the use of corporate social media will enable employees to seamlessly engage and stay connected.

Social media is “...a new class of Internet-based collaborative tools...such as blogs, wikis, and social networks,” where the users are the producers of the content (Ransbotham and Kane 2011). The use of social media has emerged as the number one sector of overall consumer time spent on the Internet, ahead of even playing online games or using email (Martin 2010). As consumer applications and devices advance by getting smaller, cheaper, and more capable, IT consumerization, which is the using of these innovations within the organization, is becoming inevitable (Harris et al. 2012). Social media’s prolific use outside of the office for personal use, is helping spread the concept of using these tools from outside to inside the organization by employees for their work (Kudaravalli and Faraj 2008).

In addition to technology advances, demographic changes are also helping drive the IT consumerization of social media inside the workforce (Harris et al. 2012). The millennial generation, the first generation to grow up using PCs in their homes, now outnumbers the baby boomers, and as the baby boomers retire, much of their corporate knowledge may go away with them. At the same time, the tech-savvy younger workers

entering the workforce are more comfortable using public social media applications such as Facebook, Twitter, and YouTube (Harris et al. 2012). For example, Kumar et al. (2004) find that 75% of users on one of the most popular blogging sites in the world are under the age of 25. Furthermore, 45% of professionals in the millennial generation would be willing to work for a lower salary if their employers provided greater options for using social media (Kaneshige 2012). Hence, these demographic changes in the workforce further drive the need for promoting the use of social media for generating, sharing, and viewing knowledge with younger employees who "...want technology to keep up with their lifestyle" (Kaneshige 2012, p.1).

The use of corporate social media (i.e. social media used by employees inside the organization) is associated with increased innovation, enhanced morale, employee retention, and customer satisfaction through the creation, retention, and sharing of knowledge (Benbya and Van Alstyne 2011; Carroll 2010; Kane et al. 2009; Ransbotham and Kane 2011; Wagner 2004). Interestingly, 53% of small businesses now consider online networking via social media as important as networking in person (Garrity 2012). It should, therefore, be no surprise that in a recent survey, 87% of the responding firms have implemented some form of corporate social media for use inside their organizations (Healey 2012). Despite the potential benefits for employees and their firms, however, corporate social media use can have problems. Only 13% of firms that have implemented social media for internal use consider these efforts a "great success" (Healey 2012, pp. 8-9). Social media use tends to be limited to only "small pockets" of firms (Healey 2012). Even after a successful start, a relatively high "drop-out" rate can occur (Wattal et al. 2009).

1.2 Influences on the Use of Social Media in the Organization

While most companies are anxiously implementing social media for their organizations, these efforts will fail if not enough employees participate (Yardi et al. 2009). In reviewing IT use literature, there is a strong tradition of the antecedents and consequences of IT use (Davis 1989; Davis et al. 1989; Fichman and Kemerer 1999; Goodhue and Thompson 1995; Venkatesh et al. 2003b). However, the literature has primarily focused on IT use as one-dimensional “use” (Burton-Jones and Straub 2006; Taylor and Todd 1995b; Thompson and Higgins 1991). Further, while social influence, which is the impact other users have on individual IT use (Kraut et al. 1998), has been regarded as an important antecedent of IT use, the literature has mainly emphasized one-dimensional social influences such as subjective norm (Davis 1989; Davis et al. 1989; Fichman and Kemerer 1999; Goodhue and Thompson 1995; Venkatesh et al. 2003b) or network externality (Brynjolfsson and Kemerer 1996; Katz and Shapiro 1985; Kraut et al. 1998). In contrast to the use of other organizational IT such as ERP, corporate social media use is different in that use is multi-dimensional: users can generate (i.e. share) and/or consume (i.e. seek) knowledge.

An externality develops from an activity when there is a spillover effect that impacts other actors beyond the original purpose of the focal actor (Galunic et al. 2012). The impact of social influence in the forms of network externalities on the use of social media is first investigated, because the user benefits go beyond the utility of unilaterally using the intrinsic features of the medium out of contingency for performing tasks (Kraut et al. 1998). Since social media is interactive and since users generate the content for one another, social influences should play a more pronounced role compared to those

associated with the use of traditional IT systems of the past.

The theory of network externalities predicts that the utility provided by a good is determined by the number of other users of the good in the same network (Katz and Shapiro 1985). Since social media is interactive and requires user-generated content, its utility increases by being able to connect with others who use it (Kraut et al. 1998). Hence, it is proposed that the use of social media should be influenced by multi-dimensional social influences from the simultaneous direct and indirect network externalities developed by the use of others. Social media users are not passive recipients of top-down organizational knowledge or transactions (Kaplan and Haenlein 2010). In sum, it is expected that the social influence from network externalities developed from the use of the features of social media to increase (a) as more people join in (Gallaughier and Wang 2002; Katz and Shapiro 1985) and (b) through the benefits of interacting with others (Kraut et al. 1998).

In trying to rein in knowledge sharing benefits through the use of social media from outside to inside the organization, new problems emerge for firms, because the social influences from social media practices get more complicated. Users are producers and consumers, and these multi-dimensional uses of social media produce simultaneous direct *and* indirect social influences that firms need to realize. While IT use literature has recognized the social influence of network externality as an important antecedent in terms of IT use for the consumption (i.e. seeking, demand) of knowledge, knowledge sharing literature has emphasized IT use for the provision (i.e. sharing, supply) of knowledge with social capital as an important antecedent (Nahapiet and Ghoshal 1998; Nambisan and Baron 2010; Wasko and Faraj 2005; Wasko et al. 2009). Social capital is the

influence to participate from the sense of obligation and duty developed through the relations with others (Nambisan and Baron 2010). Social capital can, for example, develop from the relations that evolve from the greater centrality of an individual in the community due to a greater number of connections with others; this, in turn, positively impacts the sharing of knowledge (Wasko and Faraj 2005).

Taken together, both “posting and viewing are the fundamental elements in the ongoing life,” for using social media in the organization (Koh et al. 2007, p. 70).

Furthermore, large portions of online corporate social media users can consist of members who mainly view (i.e. seek), but do not post (i.e. share) content (Nonnecke and Preece 2000). It is therefore argued that, in addition to those that share knowledge, those that seek knowledge are also important participants that impact the corporate social media community by their viewing. In addition, many of these seekers are at the same time learning from the posting activity of others, and will likely share by posting their own contributions (Faraj et al. 2011). Drawing from Hansen and Haas (2001), the corporate social media platform is viewed as an internal knowledge platform where seekers and sharers respectively have simultaneous incentives in providing demand and supply of knowledge between one another within the organization. Further, it is proposed that there are cross-side influences between supply and demand where those that share are influenced by those that seek and vice-versa.

In sum, it is proposed that knowledge is both an input and an outcome of the continuous and simultaneous actions using social media for seeking and sharing. It is argued that measuring usage through the multi-dimensional uses of seeking on the demand side and sharing on the supply side better captures how knowledge sharing

through social media is actually influenced and enacted. Chapter 3 contributes to the IT use and to the knowledge sharing literature by modeling and empirically testing the antecedents of the social influence from the network externalities developed by others on individual seeking and sharing. The model is then further modified for comparison to capture the influences of social media use due to organization structure in Chapter 4, and social capital in Chapter 5. While the literature has recognized the importance of these antecedents on the use of IT, no prior research empirically determined which of these influences has a greater impact on the seeking and sharing of knowledge using social media within the organization.

1.3 Research Goal

Social media depends on user-generated content that is developed and “shared” by individuals for others that “seek” this knowledge (Kaplan and Haenlein 2010). In contrast with other organizational IT such as ERP, social media is unique in that users generate *and* also consume the content - they are not passive recipients of top-down organizational knowledge or transactions. Further, individual value is highly dependent on and increases (a) as more people join in (Gallaughar and Wang 2002; Katz and Shapiro 1985) and (b) through the benefits of interacting with others (Kraut et al. 1998).

The goal of this research is to make a contribution to the IS discipline by deriving a new theory on the uses of social media for seeking and sharing knowledge between employees in the organization. This research specifically seeks to empirically show how the uses of this new technology by others, results in new, simultaneous, social influences that, in turn, impact the behavioral use patterns of individuals (Majchrzak 2009). Knowing how and why individuals use social media will, in turn, help firms avoid

implementation and use problems so that they can realize positive benefits from their social media investments for knowledge sharing.

In developing the research model, “use” is broken down into the two dimensions of “seeking” and “sharing”. These two dimensions are further broken down into usage “tendency” (likelihood for an employee to start using social media) and usage “intensity” (frequency of usage) in order to measure and compare the probability for seeking and sharing with the number of times social media is used for seeking and sharing.

1.4 Research Theme and Scope

To understand the use of social media, prior literature on network externality is applied as an important social influence of use (Brynjolfsson and Kemerer 1996; Katz and Shapiro 1985; Kraut et al. 1998). Network externality has been shown to work on the demand (or consumption) side. This research investigates whether network externality also applies to the supply side, and estimates its magnitude compared to the demand side. The concept of multi-dimensional use of information systems (Burton-Jones and Straub 2006) is utilized to decompose social media use into two dimensions - knowledge sharing and knowledge seeking. These two complementary dimensions of social media use are integrated together with the concept of network externalities by drawing parallels from the literature on two-sided platforms. This is done by conceptualizing social media use in a firm as a two-sided network platform with knowledge ‘sharers’ on one side, and knowledge ‘seekers’ on the other side. This allows for applying cross-side network externalities from the two-sided network concept to study corporate knowledge use (i.e. seeking) and sharing. Through cross-side network externalities, the social media platform serves as an intermediary connecting those that seek knowledge, on the demand side,

with those that share knowledge, on the supply side (Parker and Van Alstyne 2005).

In the above relations, organizational social media use is conceptualized as an internal knowledge network that is “a forum within an organization that matches seekers with knowledge sources... that includes material or social incentive to encourage knowledge sharing,” (Benbya and Van Alstyne 2011, p. 66). Internal knowledge networks have the ability to encourage members to self-identify and actively participate from across the organization (Hansen and Haas 2001). This wide-spread, horizontal participation provides the “wisdom of crowds” in the relatively secure and controlled environment of the firm (Benbya and Van Alstyne 2011; Surowiecki 2004).

Unlike social networks where members usually connect with others whom they already know, knowledge networks are able to readily connect members with others whom they may not already know in order to transfer knowledge (Benbya and Van Alstyne 2011). The benefits include re-use of already existing knowledge, development of new knowledge, greater efficiency, and improved problem solving across gaps (Ransbotham and Kane 2011; Wagner 2004).

1.5 Research Questions, Why Important, and How Addressed

The main research questions addressed are:

RQ1: What is the impact of simultaneous direct and indirect network externalities on the intra-organizational uses of social media for seeking and sharing knowledge? How is this impact reflected by individual seeking and sharing in terms of usage tendency and intensity?

RQ2: How does organization structure in terms of hierarchical and geographical distribution influence the use of social media for seeking and sharing? How does the

impact from network externality compare to that of hierarchical and geographical distribution on the uses of social media for seeking and sharing?

RQ3: How do dimensions of social capital influence the uses of social media for seeking and sharing? How does the impact from network externality compare to that of social capital on the uses of social media for seeking and sharing?

These questions are important because the phenomenon of the IT consumerization of social media use is proliferating in organizations. There is a need for research that examines the factors that influence the successful use of social media so that firms can realize positive value from their investments. Chapter 3 empirically demonstrates the application of a powerful and parsimonious theory – two-sided platforms – as a lens to understand social media. Moreover, the theory is a simple and elegant model for managers to apply as a tool to actively influence use and eventual success. The influences from two-sided network externalities are then compared to the influences of organization structure in Chapter 4 and social capital in Chapter 5 to determine which social media usage antecedents have the biggest impact on seeking and sharing.

To address these questions, this thesis examines the usage of a social media platform inside a large multi-national organization based in the Northeastern United States. The organization wishes to remain anonymous as a precondition for sharing this data, so it is referred to as “Tech Corp.”. The employees of this organization include engineers, technicians, and project team members, who design, build, implement and maintain advanced technological systems for government and commercial organizations. The social media platform, implemented in 2007, was designed to increase knowledge

use and sharing across the organization. This implementation is different from many knowledge sharing implementations of the past by other organizations. Tech Corp. makes sure the employees not only know how to use the features of the new corporate social media platform, but to also gain an overall understanding of the value of sharing knowledge through it. The employees, in turn, demonstrate their understanding by continuing to widely use the corporate social media platform long after its implementation. Employees in over 60% of the firm's business units located world-wide use the platform's corporate blog which has had total averages of 808 and 931 posts per month respectively in the first and second years after being implemented.

1.6 Research Approach

1.6.1 Impact of Direct & Indirect Network Externalities on Social Media Use – Chapter 3

A field study is performed of an internal corporate social media platform used exclusively by the employees at Tech Corp. for seeking and sharing posted knowledge. The research approach of this thesis consists of analyzing the use of a social media platform inside the organization using archival and survey data. In Chapter 3, the social influences from network externalities are analyzed using computer log data on the employee use (seeking and sharing) of corporate blogs. Chapter 3 focuses on the use of the corporate blog since this is the main social media tool used by employees in this organization for viewing and posting knowledge.

1.6.2 Impact of Organization Structure on Social Media Use – Chapter 4

In Chapter 4, the influence of organization structure on the individual use of the corporate blog is tested for seeking and sharing knowledge. As in Chapter 3, computer log data is used to capture employee seeking and sharing, supplemented by feedback

from interviews with key managers and users of the social media platform. Organization structure is measured by the number of hierarchical levels in the business unit, and the geographical distribution measured by the diversification (i.e. entropy) of office locations by city where the employees are assigned. The impact of these antecedents is compared to that of the social influence of network externalities.

1.6.3 Impact of Social Capital on Social Media Use – Chapter 5

Chapter 5 uses survey data to triangulate the social influence investigation of Chapter 3 that uses archival data. The model is then expanded to take into account the influences of social capital on employees using corporate social media for seeking and sharing knowledge requiring survey data. The respondents have access to not only the social media platform's corporate blog, but also to the rest of the suite of corporate tools including wikis, tag and keyword supported reporting, social bookmarking, online forums, and internal corporate search engines for seeking user-generated content shared by other employees. The respondents are asked to answer the questions with respect to the use of the overall corporate social media platform for seeking and sharing knowledge within the firm. The research framework from Chapter 3 is tested using this survey data and compared with the results found using archival, log data. Finally, Chapter 5 tests to see which key antecedent in IS research, social influence or social capital, has a greater impact on individual employee use of corporate social media for seeking and sharing knowledge within the organization.

1.7 Contributions

The contributions of this thesis include the following: First, network externalities have positive, direct, same-side influences on the use of social media for both the demand and supply sides. Second, by applying a cross-side network externality model, significant indirect, cross-side network effects are revealed that provide new and interesting theoretical insights for studying social media use, as well as practical implications for managers. Third, organization structure hierarchical distribution has a negative impact on the employee use of corporate social media for seeking and sharing knowledge. Fourth, office geographical distribution has a positive impact on knowledge seeking and sharing. Fifth, cognitive social capital can have a positive influence for seeking and sharing knowledge through corporate social media.

Interestingly, the analysis from Chapter 3 reveals that while both direct same-side, and indirect, cross-side, network effects exist, they may have different impacts on how the use of social media is measured: seeking vs. sharing. The indirect, cross-side network effect has a greater impact on the likelihood of knowledge seeking, whereas the direct, same-side network effect has a greater impact on the likelihood of knowledge sharing. Overall, these results suggest that significant new insights can be gained by applying the multi-dimensional view of use. Practically, the results suggest that providing incentives for knowledge seeking can be as important as providing incentives for knowledge sharing. By understanding the magnitudes of the same-side and cross-side network externalities, one can more effectively determine the costs/benefits of any instrument aimed to promote the use of social media and to allocate resources accordingly.

The results of the analysis of the impact of organization structure in Chapter 4 show that hierarchical and geographical distribution can influence the use of corporate social media for seeking and sharing knowledge. The analysis in Chapter 5 using survey data validates the main findings from the analysis of two-sided network effects using archival data in Chapter 3. The results in Chapter 5 also show that social capital can have a positive impact of knowledge seeking and sharing, and the social influence from the critical mass of the use by other employees has an even stronger impact. These results imply that employees are more likely to use corporate social media for interacting with others for knowledge helpful in their work, versus for the collective goals and vision of the overall organization. These findings provide interesting and useful implications regarding the ongoing influences between employees using social media in multiple dimensions within the boundaries of the firm.

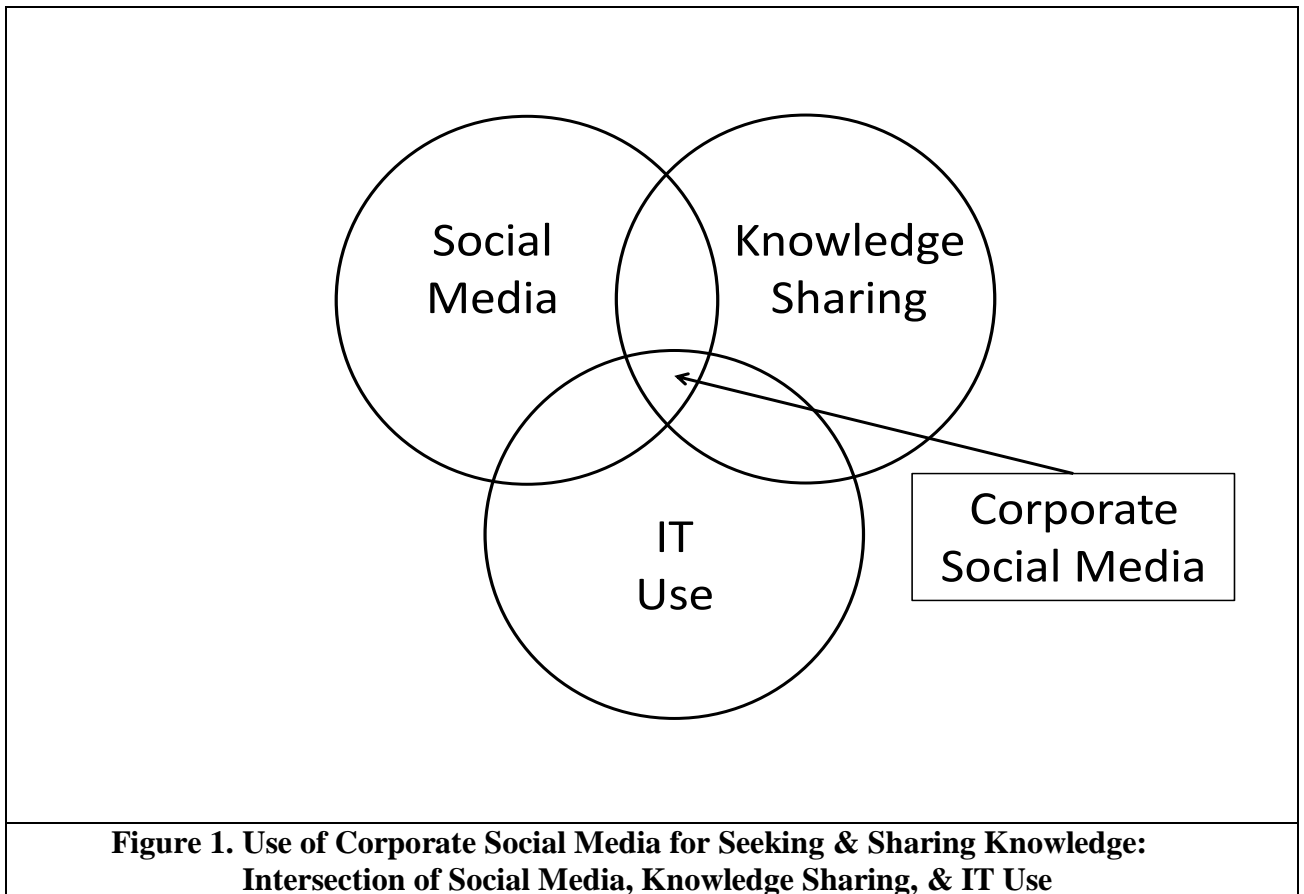
1.8 Summary

This thesis contributes to the network externality research stream for analyzing organizational social media use by (a) conceptualizing social media use as multidimensional: seeking and sharing knowledge, (b) applying a two-sided network approach to analyze how those who seek knowledge are influenced by others who share knowledge and vice-versa, (c) finding evidence of the existence of strong supply-side, demand-side and cross-side externalities on usage tendency and usage intensity, and finding evidence that the influence from network externalities on social media usage inside the organization is greater than that of (d) organization structure and of (e) social capital. These results provide new theoretical and practical implications for the use of corporate social media inside the organization.

CHAPTER 2.
REVIEW OF LITERATURE

2.1 Introduction

The use of corporate social media for seeking and sharing knowledge is found at the intersection of the three research streams of 1) social media, 2) knowledge sharing, and 3) IT use (Figure 1). Literature reviews are presented drawing from these three bodies of research and gaps are identified at these corporate social media crossroads.



**Figure 1. Use of Corporate Social Media for Seeking & Sharing Knowledge:
Intersection of Social Media, Knowledge Sharing, & IT Use**

2.2 Social Media

2.2.1 Introduction

Through the use of social media, the center of control of the creation of content on the Internet, "...has been shifting to the grassroots," (Parameswaran and Whinston 2007a, p. 337). Users of the Internet are no longer just unidirectional consumers of content that is created by a few "experts". Users are increasingly becoming providers of their own user-generated content (Agichtein et al. 2008).

There exists a rich stream of literature on technology adoption and use (Davis 1989; Davis et al. 1989; Fichman and Kemerer 1999; Goodhue and Thompson 1995; Venkatesh et al. 2003b). However, social media offers different technologies and attributes that afford different behaviors compared to the IT tools of the past (Parameswaran and Whinston 2007a). The use of social media has two main dimensions: 1) *seeking* of knowledge, such as when someone reads others' blogs or wikis, or seeks to find answers through online discussion boards (Koh et al. 2007), and 2) *sharing* of knowledge, such as when someone creates a blog post, answers a question on a discussion board, or edits a wiki.

Moreover, a key feature of social media is the value created through its interactive use with other users. For example, the value of using a blog lies not just with the provision of relevant technology, but with the fact that people use it to post, view, and answer questions. Therefore, the social influences surrounding technology adoption and use are likely to play an even stronger role in the use of social media systems compared to the use of unidirectional systems of the past (Venkatesh et al. 2003b). The social structures of these influences are, in turn, maintained by the sustained participation of

other individual users (Butler 2001) in either personal or corporate social media contexts of use which are discussed next (Venkatesh et al. 2003b).

2.2.2 Social Media for Personal Use

Using social media for personal use in the public domain, as well as for corporate use within organizations, is emerging as an important research topic among both IS and non-IS scholars (Adamic and Glance 2005; Furukawa et al. 2007; Lee et al. 2006).

Social media tools such as blogs, wikis, and video sharing sites are relatively inexpensive and easy to use, and they provide affordances for individuals to interact with others for their own personal use (Wagner 2004). Using social media to connect with others can be more than simply an efficient means for substituting face-to-face contact. Individuals are turning to these sociable innovations to try to balance their overscheduled and overworked lives that these personal tools have helped enable in the first place (Turkle 2011).

Prior literature has examined the use of personal social media in the public domain (Oreg and Nov 2008; Ransbotham et al. 2012; Schlosser 2005). Here, social media serves as an intermediary platform for enabling individual consumer-to-consumer (C2C) interactions for personal use outside the boundaries of organizations. For example, Ransbotham et al. (2012) show the effects of time on the value of collaborative, peer-generated content for a medical wiki contributed by users from the public. Oreg and Nov (2008) analyze the influences of open source software project content developed by peer contributors from the public. Zhang et al. (2012) compare the two-sided network externality influences of an online C2C auction platform between buyers, who view posted online content, and sellers who share online content of consumer goods for sale

such as books, DVDs, and home appliances.

The open structure of the Internet is such that nearly “anyone” from the public can post or view content (Hoffman and Novak 1996). Therefore, knowledge¹ that is posted through social media is normally not limited to one recipient and is accessible to the rest of the viewing community (Hsu and Lin 2008). The value of this shared, posted knowledge, in turn, can motivate individuals to seek this content. This is because knowledge seeking behavior is motivated by not only the need for task information or for making sense of the world, but also for the need for social information to help users socially integrate their roles and their work with others (Xu et al. 2010).

What other users express in the public domain can subsequently impact the opinions posted by individuals. For example, Schlosser (2005) analyzes the influence of negative movie reviews on movie review comments posted in public on a C2C platform. After reading a negative movie review, posters are more likely to exhibit negativity bias when they post their own movie review comments on the same movie in public (Schlosser 2005). In private, however, posters are less likely to exhibit a bias view, which is similar to what is observed by lurkers who are free from the social pressure of providing a response in public. Public postings, on the other hand, are influenced by the posters exhibiting self-presentation strategy. How social media platforms are being utilized within organizations is next examined showing how that can be different from using social media for personal use in the open public outside the boundaries of the firm.

¹ Since corporate social media content may consist of “information” and “knowledge”, drawing from Hansen and Haas (2001), these terms are used interchangeably; for clarification, data is numbers without any format, information is formatted data having meaning e.g. a social security number, and knowledge is data with meaning defined through relationships e.g. a social security number identifying a unique person “John Doe” (Hansen and Haas, 2001).

2.2.3 Corporate Social Media for Use by Organizations: External and Internal

Social media tools such as blogs, web forums, social bookmarking, photo and video sharing sites, and social networking are no longer being used for only personal reasons and are increasingly being used within organizations (Agichtein et al. 2008). Prior research suggests that social media provides many benefits to firms including innovation, enhanced morale, and improved customer satisfaction (Rizova 2006). Although prior literature has examined the use of personal social media in the public domain (Oreg and Nov 2008; Ransbotham et al. 2012; Schlosser 2005), little prior research has focused on the factors that influence the use of social media inside the organization. Arguably, the influences on employees using corporate social media for work (e.g. corporate blog, SharePoint) differ from the influences of consumers using personal social media (e.g. personal blog, Facebook, Twitter, LinkedIn) in the public domain.

Personal social media in the public domain draws on the unbounded and undefined public. Those that post content that can be viewable by the general public may try to satisfy “multiple audiences” where there is more than one point of view (Hoffman and Novak 1996). This desire for broad appeal can be attributed to a self-presentation strategy that influences those that post information to moderate their opinions for the diverse viewing public (Moe and Schweidel 2012; Schlosser 2005). Those that post public ratings have also been observed to even change their scores in order to conform to feedback received from the public, instead of standing by their originally posted opinions (Schlosser 2005). In addition, Faraj and Johnson (2011) find that public communities only demonstrate indirect reciprocity where favors are returned from third-party members

within the community; direct reciprocity is not observed.

Contrary to unbounded, public settings, internal organizational settings are likely to have more co-located and tenured users with similar views (Kane and Alavi 2008). As per social presence theory and social identity theory, offline face-to-face interactions have been found to have a positive influence on posting activity in online communities (Koh et al. 2007). Social capital through the direct connections of local networks is associated with greater posting and viewing intensity of user-generated content than from indirect connections of the overall global network (Schlosser 2011). From organizational motivation theories, employees in the same, large organization can be motivated to help each other and this motivation could substitute for close personal relations or direct incentives (Constant et al. 1996).

Therefore, insights from studies of the past based on C2C public social media for personal use may not generalize to organizational settings. Moreover, the methods that can be employed likely differ given the different contexts. Organizational data should give an empirical advantage because researchers can more easily segment the users from the non-users, because the set of non-users would be difficult to define in the open, public, social media context.

Organizations are using corporate social media externally and internally (Yardi et al. 2009). External corporate social media supports business-to-consumer (B2C) use which enables the business and consumers to interact with each other. External corporate social media displays content that is visible to the general public and is, therefore, carefully maintained and monitored by the organization's marketing or public relations departments (Yardi et al. 2009). In contrast to users within the same organization,

unaffiliated viewers from the general public do not have the same social pressures to respond (Schlosser 2005). Moe and Schweidel (2012) analyze the influences of customer ratings on individual posting intensity in the business-to-consumer (B2C) context for an online bath and home product retailer platform. The relation between customer postings and satisfaction is nonlinear: customers are more likely to post ratings if they are either more satisfied or less satisfied with the products that they have purchased (Moe and Schweidel 2012). Albuquerque et al. (2012) use multisided (two-sided) platforms for analyzing the B2C influences between content creators and consumers of online magazines. Online magazine content providers are more likely to produce content when it is more likely that there are buyers for their content. Similarly, buyers tend to be more likely to purchase content that is more recent and plentiful (Albuquerque et al. 2012).

Internal corporate social media supports employee-to-employee (E2E) use which enables employees within the organization to interact as an efficient means for sharing knowledge (Singh 2010). Internal corporate social media such as blogs are only visible to the employees and this employee-to-employee generated content can be work and/or social related (Yardi et al. 2009). Normative models show that the strongest influences on individual employees are within their own work groups; the more integrated an employee is with his or her group, the more likely he or she will be influenced by the behavior of their co-workers (Kraut et al. 1998). Therefore, the social structures within an organization should have a strong influence on the individual use of social computing.

Social capital is the network of relations between connected individuals for collective actions and benefits (Woolcock 1998). Previous research shows that social capital is more likely to be developed in closed as opposed to open structures (Burt

1987). Social capital should, therefore, be expected to be higher inside the organization instead of outside where there are more diverse opinions. Social capital through the direct connections of local networks is associated with greater posting and viewing intensity of user-generated content than from indirect connections of the overall global network (Schlosser 2011). Heavy social media users have been found to share information with greater intensity internally where there are greater opportunities for direct reciprocity (Jackson et al. 2007; Wasko and Faraj 2005).

Examples of E2E corporate social media used between employees within the organization include Huang et al. (2011) that estimate a dynamic structural model for employee corporate blogging where there are positive spillover effects of leisure-related blogging with work-related blogging. This implies that companies should not prohibit leisure-related content creation by employees on corporate blogs. Aggarwal et al. (2012) find that allowing employees to post negative content can lead to an increase in readership of corporate blogs. Singh (2010) models the impact of textual content and blogger characteristics on the readership of corporate blogs of a large IT services and consulting firm leading to the following implications. Blog content with high quality should attract and retain readers. Employees that already read large amounts of work related posts should not be offered even more of these same types of content to read since that can lead to oversaturation for the reader. The characteristics of the bloggers, themselves, can also influence readership. Readers are more interested in reading content about “management” shared by executives and middle managers, while they are most interested in reading “technical” information posted by middle managers (Singh 2010). Yardi et al. (2009) conduct interviews to show that employees are motivated to contribute

to blogs if they perceive that other employees are reading their posts. Wattal et al. (2010a) measure the impact of network externalities on individuals' contributions to a corporate blog.

In short, an individual employee's decision to view or post content using corporate social media is likely to be influenced by how useful his or her peers within the organization find using the social media platform for their work (Moe and Schweidel 2012; Wattal et al. 2010a; Yardi et al. 2009). This analysis is unique because it empirically tests both the consumption and supply of user-generated content between employees using corporate social media inside the organization.

2.2.4 Summary of Social Media Literature Review

Given the lack of success of many organizational knowledge sharing implementation efforts, (a) social media with its ability to engender bottom-up and flat network connections could serve as the implementation engine for organizations to capture and manage their knowledge (instead of a top-down traditional knowledge management systems), and (b) the two-sided symbiotic network effects of seeking and sharing could serve as a relatively easy way to measure implementation and use. However, despite the recognized potential benefits for employees using social media in the organization, most implementations have not been considered successful (Healey 2012). Drawing from the social media literature stream, most research has focused on either the use of social media for personal use between consumers of the general public outside the bounds of the organization (C2C), or on the use of social media between the business and consumers outside the firm (B2C). There is a gap in that little is known how corporate social media is used internally between employees within the same

organization (E2E). A review of the literature on knowledge sharing is, therefore, presented next to draw greater understanding on the motivations for not only sharing knowledge, but also seeking knowledge between employees. The use of social media within the organization involves both of these key user activities.

2.3 Knowledge Sharing

2.3.1 Introduction

Knowledge is information that has been personalized through meaningful relations which can be useful (Alavi and Leidner 2001; Hansen and Haas 2001). The collective knowledge and the ability to know, in turn, represent the intellectual capital of a firm which is a source of competitive advantage (Nahapiet and Ghoshal 1997). It is, therefore, critical for firms to develop and share knowledge. Knowledge is created by combining elements that are previously unconnected, or by creating new ways for combining previously connected elements (Moran and Ghoshal 1996). Hence, intellectual capital is cultivated in the firm by combining knowledge in new ways from different stakeholders of varying expertise and experiences (Nahapiet and Ghoshal 1997). Seekers and sharers of an internal knowledge platform exchange and recombine elements of knowledge with one another (Hansen and Haas 2001). In this thesis the use of corporate social media serves as the intermediary for enabling the creation, combination, and sharing of knowledge for the intellectual capital of the firm.

Nonaka (1994) describes the two dimensions of knowledge as being either explicit or tacit. Explicit knowledge is codified and captured in archives and databases in discrete words or numbers. Tacit knowledge, on the other hand, provides the context for developing and understanding explicit knowledge (Alavi and Leidner 2001). Tacit

knowledge is not codified and is, therefore, harder to communicate. The development of tacit knowledge is a continuous activity between individuals sharing experiences for mutual understanding (Nonaka 1994).

Knowledge needs to be continuously created in order for it to be continuously shared. Nonaka (1994) proposes that knowledge is created through the conversion between tacit and explicit knowledge via four modes in a continuous cycle: 1) socialization is creating tacit knowledge from other tacit knowledge through shared experiences; 2) externalization is converting tacit knowledge into explicit knowledge through codification; 3) combination is creating explicit knowledge from other explicit knowledge by sorting, adding, and categorizing from exchanges with others; 4) internalization is the converting of explicit knowledge into tacit knowledge for individual learning.

Knowledge can be viewed as an *object* in the sense that it can be gathered, stored, and transferred like an “object” (Alavi and Leidner 2001). Knowledge can also be viewed as a process in that it can be developed, shared, and distributed. Through the lens of *practice*, the understanding of knowledge extends beyond development or delivery, and can include the consumption and shared participation by employees and groups alike within the organization (Brown and Duguid 2001).

In short, the ongoing seeking and sharing of knowledge between consumers and producers of content via corporate social media supports the notion of the continuous conversions of tacit and explicit knowledge through practice (Nonaka 1994). Through practice, enabled by using corporate social media, knowledge as an object and as a process is developed, shared, viewed, and consumed which, in turn, can lead to the

development of new knowledge by interacting with others connected through the platform.

Empirical research in knowledge management has emphasized influences related to knowledge *sharing* at various levels of the organization (Constant et al. 1996; Jarvenpaa and Staples 2000; Kudaravalli and Faraj 2008; Wasko and Faraj 2005; Yoo et al. 2007) as well as at the intra-organizational level (Alavi and Leidner 2001; Hansen and Haas 2001; Yardi et al. 2009). Kankanhalli et al. (2005b) is a noted exception focusing on knowledge *seeking* (i.e. consumption). Successful knowledge sharing through the use of IT, however, requires *both* knowledge seeking and sharing of content in order to develop, view, use, share and reuse that content (Alavi and Leidner 2001; Kankanhalli et al. 2005b). This thesis addresses this gap that knowledge management research has not emphasized seeking.

Both knowledge seeking and knowledge sharing as well as their interdependencies through the use of a corporate social media platform are analyzed in this thesis. In order to gain deeper understanding of how seeking and sharing knowledge are different, yet interrelated activities, the next section draws from the knowledge sharing literature on how knowledge can be viewed both as an “object” and through “practice”.

2.3.2 Seeking vs. Sharing

Today many organizations are dependent on their intellectual capital which is the “knowledge and knowing capability” of the firm’s social networks (Nahapiet and Ghoshal 1998 , p. 245). Social media is being applied by organizations such as the technology firm in this thesis which is referred to as “Tech Corp.” to harness their

intellectual capital by enabling the seeking and sharing of knowledge to solve problems, generate ideas, nurture innovation, and maintain competitive advantage (Benbya and Van Alstyne 2011). The use of social media in Tech Corp. supports the corporate strategy to encourage the search, identification, and exchange of knowledge throughout the organization.

Reading comments that other employees post on a corporate blog, or searching to find answers in online discussion boards – *seeking*, is very different from contributing a blog post or providing an answer in an online discussion board – *sharing*. Further, to be successful and in order to be sustained, social media enables and depends upon members to *seek* knowledge, as well as members to post or *share* knowledge (Koh et al. 2007).

Knowledge seeking is the proactive viewing of knowledge in order to fulfill a need or goal (Wilson 1999; Wilson 2000). Knowledge seeking can occur when the individual realizes that others have knowledge of value that is available (Clarke 1973). “Knowledge seeking is a ubiquitous human activity. Whether we are gathering data for work or merely making sense of everyday life, looking for knowledge is a basic behavior that shapes our lives,” (Case 2007).

Knowledge seeking is an overall activity consisting of multiple features including “search” (Wilson 1999). In addition, lurking, defined as viewing without posting knowledge (Nonnecke and Preece 2000), is also a form of knowledge seeking. Lurkers may prefer to seek (only) due to time constraints, privacy concerns, shyness, and having no need to post (Nonnecke and Preece 2000). Lurking can also be a type of “shirking” where the user is motivated to apply less effort (Jones 1984). Knowledge seeking is motivated not only by the need for knowledge, but also by the need for social knowledge

(Xu et al. 2010), i.e., ‘who is doing what’.

Knowledge sharing in past research has been seen as the process of group members informing each other of missing content needed for making decisions (Miranda and Saunders 2003). More recently, sharing of knowledge is seen as a process of individual knowledge transmission which results in individual knowledge processing to generate cognitive understanding (Dennis et al. 2008; Miranda and Saunders 2003; Robert and Dennis 2005). Knowledge sharing is positively influenced by stronger network ties, colocation, and the tenure of group members working with one another (Kane and Alavi 2008). Knowledge sharing is considered more time-consuming and less anonymous than knowledge seeking (Nonnecke and Preece 2001).

The indiscriminate sharing of content that is neither useful nor solicited, decreases the quality of search results and has been referred to as spam (Gyongyi 2005; Kraut et al. 2005). In the context of using corporate social media, spamming can be a type of “free riding” where the user has no incentive to control production costs (Jones 1984). Applied to the use of corporate social media, the inability and/or costs for peers to effectively monitor individual contributions can have a negative impact on motivation and performance leading to lurking or spamming. This inability to monitor is due to “task invisibility” from redundancies that are more likely to occur in centrally controlled, functionalized organization structures, where group member expertise is more specialized and homogenized (Johnson et al. 2006; Jones 1984).

Prior research demonstrates that motivations for sharing knowledge can vary with context. For example, individuals sharing knowledge on open source software development projects have been found to be more motivated by reputation-building and

self-development motivations (Oreg and Nov 2008). On the other hand, those contributing to wikis, online forums, consumer reviews, and collaborative website tagging have been found to be more motivated by altruism (Oreg and Nov 2008). The context for knowledge sharing via social media can also vary in the organization. The reputation and altruism motivations assume that the knowledge shared by an individual will be consumed by others seeking that knowledge. Therefore, these influences are likely to be enhanced (or reduced) if an individual believes that other people are consuming the knowledge he or she creates.

In order to gain a deeper understanding of knowledge sharing with respect to knowledge seeking, two interrelated views from the literature are next described: knowledge as an object and knowledge as practice.

2.3.3 Knowledge as an Object and Practice

From past research, knowledge can be gathered, stored, and transferred as an “object” (Alavi and Leidner 2001). Knowledge can also be developed, shared, distributed, and consumed at various levels of the organization through “practice” (Brown and Duguid 2001). Knowledge considered as both object and through practice is combined within the overall concept of knowledge management which has been defined as, “...the generation, representation, storage, transfer, transformation, application, embedding, and protecting of organizational knowledge,” (Schultze and Leidner 2002, p. 218). Knowledge needs to evolve between being both an object and through practice in order to gain and sustain value that can and will be used. Knowledge management systems (KMSs) have been referred to in past literature as IT systems that enable firms to apply existing, stored knowledge as an object to create new knowledge through practice;

this can, in turn, be shared within the organization in order to help increase effectiveness, efficiency, and competitiveness (Alavi and Leidner 2001; Schultze and Leidner 2002). Through the use of a social media platform, seekers read knowledge as an “object”, and sharers develop and post knowledge through “practice”. This cycling of the symbiotic relation between knowledge as an object and through practice can now be more seamless than ever through the ongoing, active use of corporate social media by seeking and sharing where users are producers of their own content.

A centralized repository with stored knowledge that can be viewed and reused is an example of IT used as an “object” for knowledge codification (Markus 2001). However, knowledge is more than a static object for individual knowledge seeking. Knowledge is emergent through social practice by sharing with others (Brown and Duguid 2001).

While IT enabled knowledge management has been classified for supporting codification for explicit knowledge as an object, it also supports personalization for tacit knowledge through practice (Kankanhalli et al. 2005b). Despite codification and personalization being described as separate knowledge management processes, they are both interrelated through the conversion and sharing of tacit and explicit knowledge (Yoo et al. 2007). The sharing of explicit knowledge that has been codified from tacit knowledge also requires shared context to fill in the knowledge gaps. This is done through the personalization of tacit knowledge enacted among employees that has traditionally been done via such means as emails, phone calls, meetings, and interactions through centralized knowledge repositories (Hansen 1999; Yoo et al. 2007).

Employees can now use the corporate social media platform for supporting a community of practice for knowledge personalization where shared explicit knowledge is viewed in order to be converted to tacit knowledge for individual consumption through internalization (Kankanhalli et al. 2005b; Nonaka 1994). IT enabled knowledge sharing has also been used by organizations for enhancing absorptive capacity which is the firm's ability to seek and identify external knowledge, assimilate this new knowledge through a knowledge base, and apply this knowledge for innovation and competitive advantage (Alavi and Leidner 2001; Cohen and Levinthal 1990). Choi et al. (2010) show that IT systems consisting of knowledge repositories, search engines, and interactive bulletin boards can have a positive impact through practice on learning through knowledge seeking and sharing for resolving new problems.

From organizational theory, the creation of knowledge can positively impact organizational performance in such areas as innovation, product development, and competitive advantage (Nonaka 1994). As an object and through practice, IT enabled knowledge sharing can support such activities as combining of new sources of knowledge, inter-group access of stored knowledge, internal knowledge transfers, and the efficient application of new knowledge through workflow automation for multiple locations (Alavi and Leidner 2001).

Knowledge sharing can have a direct impact on knowledge application, which, in turn, can positively influence team performance. However, knowledge sharing may not have a direct influence on team performance if it is not effectively applied in practice (Choi et al. 2010). Knowledge is emergent, and communicating tacit viewpoints is, therefore, an important factor in the creation of knowledge that can be effectively applied

(Alavi and Leidner 2001; Orlikowski 2002). As an object, knowledge can be useable, and in practice, knowledge can be made useful and shared so that it can be effectively used. If knowledge did not evolve and remained just as the same object, it may be useable but not very useful. Alternatively, if knowledge was just enhanced through practice, it may be useful, but this would not matter if no one could use it.

. In sum, knowledge is a critical asset in an organization that needs to be efficiently collected and archived so that users through the corporate social media platform are able to seek knowledge as an object. At the same time, knowledge needs to be developed, updated, and shared through practice so that users of corporate social media are sharing knowledge that is useful and used by seekers in their work. Organizations need employees to share knowledge with one another; the next section reviews how this can be enhanced, and how this is tied to the seeking of knowledge.

2.3.4 Enhancing Knowledge Sharing

Drawing from the literature, four key concepts emerge that can lead to the successful participation of both seekers and sharers of knowledge through a corporate social media platform. First, there needs to be a balance between seekers and sharers of content. Second, seekers prefer quality over quantity and at low search costs. Third, sharers usually like to be recognized. Fourth, seeker ratings on sharers can help provide what both sides want for the mutual balance and benefit of a social media platform.

The ideal equilibrium point for collaborative IT is where there are enough sharers and seekers for sustaining the development and exchanges of information, without reaching the point of information overload (Ransbotham and Kane 2011). Social media platforms can in general initially benefit from the interactions of a larger number of

contributors, but too many contributors can lead to saturation and a decline in the number of seekers. Ransbotham et al. (2012) find a curvilinear (inverted U) relationship between viewership and the number of those that post user-generated content in a collaborative wiki. Viewership initially increases with an increased number of contributors, because larger volume of shared content can yield a greater likelihood of generated solutions that are more valuable, have higher quality, and are more diverse for various ability levels and contexts for particular situations (Constant et al. 1996). There is a point, however, where the marginal value of adding more contributors can be exceeded due to increased cognitive and coordination costs incurred in searching and combining the shared knowledge (Jones et al. 2004).

The perceived quality and usefulness of a solution can even decrease with a greater number of proposed solutions (Hansen 1999). High quality content can become hard to find when there is too much content of varying levels of quality. Seekers of shared knowledge prefer quality over quantity (Hansen and Haas 2001). Hansen and Haas (2001) ironically find that the less knowledge that a supplier shares in an internal, online corporate database, the more likely it is consumed. Suppliers that share less can establish reputations of quality and focus that attract the attention of knowledge seekers (Hansen 1999).

Faniel and Majchrzak (2007) recognize that a key reason why IT knowledge sharing platforms can fail is due to the difficulty in connecting seekers across the barriers of different perspectives and domains for effectively finding posted knowledge. Users often have trouble finding the right information they need for performing their tasks which can lead to poor decisions and, therefore, poor performance (Poston and Speier

2005).

In order to help overcome these barriers that prevent the effective seeking and application of knowledge, Faniel and Majchrzak (2007) surmise that IT knowledge sharing platforms need to assist seekers by lowering search costs, making content easier to understand, and allowing for the manipulation of content. Search costs can be lowered by providing the identities of those that post content which will also improve quality control. Having the knowledge presented at different levels of detail can promote greater understanding. Enabling seekers to manipulate and adapt the knowledge will help them better identify and apply the optimum solution for the particular situation (Faniel and Majchrzak 2007).

Tie strength can have varying influences in online knowledge exchanges between seekers and sharers. Weak ties with third parties can be beneficial for searching for knowledge due to their cheaper search costs compared to strong ties which encounter redundancies (Constant et al. 1996). Weak ties are also beneficial for sharing non-complex, explicit knowledge, however, they can slow down the transfer of complex, tacit knowledge that is not coded (Hansen 1999). Strong ties from frequent interactions are, thus, needed for efficient, sharing of complex knowledge between business units (Hansen 1999).

As per social presence theory and social identity theory, occasional offline face-to-face interactions have been found to have a positive influence on users for posting content to share (Koh et al. 2007). Face-to-face interactions, however, may not be a convenient option for members of many national and global organizations. Kudaravalli and Faraj (2008) find that collaborations through a distributed online bulletin board can

be effectively facilitated by proactively posting messages for initiating and for sustaining shared interactions between the participants.

Additional motivations for sharers to develop quality content include social capital and reputation (Wasko and Faraj 2005). Direct reciprocity, however, is not a motivation, and this may be due to individuals in online communities not usually expecting direct, personal reciprocations (Wasko and Faraj 2005). Reciprocity can occur indirectly through third parties (Faraj and Johnson 2011). Social capital through the direct connections of immediate local networks, however, is associated with greater posting and viewing intensity of user-generated content than from the indirect connections of the overall global network (Schlosser 2011).

Garud and Kumaraswamy (2005) observe that when employees are paid as an incentive for contributing knowledge to a shared, centralized knowledge portal at the global software services company Infosys, a “vicious cycle” of unintended consequences emerges. The paid incentive led to too much content shared, resulting in information overload for seekers, higher search costs, a shortage of content reviewers, lower quality documents, and ultimately, lower quality ratings which cannot be trusted, and fewer viewers (Garud and Kumaraswamy 2005). “Knowledge management involves more than just the sponsorship of initiatives at and across different organizational levels. It also involves the active process of steering around and out of vicious cycles that will inevitably emerge,” (Garud and Kumaraswamy 2005, p. 9).

Managers need to understand the differences between the barriers and opportunities between knowledge sharing and knowledge application which may require different incentives and IT tools (Choi et al. 2010). For example, Infosys has since been

able to manage its way to equilibrium with its knowledge sharing system by emphasizing personal recognition over monetary incentives for top knowledge sharers, and by improving the rating process of these contributions; the usefulness of the content is now emphasized. Further, those providing the ratings are seekers who are actually applying the shared knowledge in their work at the organization (Garud and Kumaraswamy 2005).

Rating validity influences the knowledge sharing search and evaluation process by employees looking for quality solutions which, in turn, can lead to successful decisions for application (Poston and Speier 2005). In addition, collaborative filtering from other employees in similar situations has a positive moderating influence on knowledge sharing system rating validity (Poston and Speier 2005). Users who do not frequently draw from others in similar situations run the risk of path dependency from the reinforcement of their own learning-by-doing (Garud and Kumaraswamy 2005; Levinthal and March 1993; Yoo et al. 2007). Online rankings based on user-generated content feedback can maximize expected consumer utility by being able to take into account the heterogeneity of user preferences for their situations (Ghose et al. 2012). Traditional rankings, on the other hand, tend to be based on a single characteristic (e.g. number of reviews, star ratings) (Ghose et al. 2012).

In sum, corporate social media knowledge sharing needs proactive monitoring not only for sharing, but also for seeking, so that both of these activities are balanced. Management should look for ways to keep seeker search costs low. For example, seekers can benefit by providing the identification of the sources of knowledge and allowing for the manipulating of posted knowledge so that it can be effectively applied to particular situations (Faniel and Majchrzak 2007). Incentives such as personal recognition can be

used to encourage knowledge sharing (Garud and Kumaraswamy 2005). However, while a larger number of knowledge contributors can be beneficial, the quality of the knowledge that is shared is more beneficial than the quantity (Hansen and Haas 2001; Jones et al. 2004). User-generated content, a key attribute of social media, can provide not only useful knowledge for solving problems, but also helpful feedback on the solutions that are shared, and on the sharers themselves (Garud and Kumaraswamy 2005). This can be managed through ratings that should be based on the usefulness of the solutions from the seekers who have actually applied the shared knowledge for their work (Garud and Kumaraswamy 2005). Hence, both seeking and sharing knowledge can be managed for balance as well as for ongoing opportunities for the employees and the organization.

2.3.5 Summary of Knowledge Sharing Literature Review

The role of knowledge sharing communities of practice is two-fold: enabling users to seek and share knowledge (Hansen and Haas 2001; Koh et al. 2007). Most prior work in these IT enabled communities examines the motivations of individuals to contribute by sharing knowledge (Kankanhalli et al. 2005a; Wasko and Faraj 2005). Factors such as reputation, altruism, reciprocity, and reward have been identified as determinants of individual motivation to share knowledge (Oreg and Nov 2008). Further, organizational structure and social capital, have been recognized as important antecedents for knowledge sharing, but their influences on knowledge seeking has not been emphasized (Wasko and Faraj 2005). With the exception of Kankanhalli et al (2005b), little prior research has examined the antecedents of knowledge *seeking* in these connected communities of practice. This is despite the fact that several antecedents for

knowledge *sharing*, such as reputation and altruism, are supported by *seekers* consuming content. In order to analyze the influences on the seeking and sharing of knowledge using social media and any interdependencies, a multidimensional view of IT use needs to be understood which is discussed next in the literature review.

2.4 IT Use

2.4.1 Introduction

Another stream of research that is helpful for gaining greater understanding regarding the use of corporate social media, is the IT use literature. IT use has been described as the utilization of IT by employees in support of operational or strategic work activities (Jarvenpaa and Ives 1991). An overview of the IT use literature is first presented of the chronological development in the identification of key antecedents of use. This is followed by reviewing the literature of social influence on IT use, where social influence is the impact other users have on individual IT use (Kraut et al. 1998). IT use and social influence are emphasized in this thesis because unlike the use of most corporate IT systems of the past, social media “use” has two dimensions: “seek” and “share”. The social influence in using social media, therefore, compounds beyond simply others influencing use. It includes sharers influencing seekers, and seekers influencing sharers. The background for how social influence plays a more critical role in the multi-dimensional use of social media over the unidimensional use of traditional IT is presented in this part of the literature review.

2.4.2 IT Use Overview

Predicting IT adoption and use has been a major focus of IS research since the earliest beginnings of the discipline (Burton-Jones and Hubona 2005). Research,

however, shows that most IT initiatives have been unsuccessful or underutilized, often resulting in major financial losses for the firm (Venkatesh et al. 2012; Wattal et al. 2010a). Past research shows that assimilation gaps occur when there is a difference between the cumulative acquisition curve and the cumulative deployment of an IT application (Fichman and Kemerer 1999). An acquired application by a firm needs to be deployed in order to be used. With social media in particular, the deployed platform needs to be not only used, but used in multiple dimensions. Measuring how IT innovations are used is, therefore, critical in understanding how to successfully design, build, operate, and maintain them (Davis et al. 1989).

Recent research suggests that little is known regarding what is involved in the effective use of information systems, what drives this, and how it can be improved (Burton-Jones and Grange 2010). For example, even though Goodhue and Thompson (1995) determined that task performance improves when the use of the IT system fits the task, systems are not meant to just be “used”, they are meant to achieve some sort of goal (Gasser 1986). Burton-Jones and Straub (2006) define system use involving a user, system, and task where the task is a user’s “goal-directed” activity. This task description has been further refined to a user’s “goal achievement”, where the goal is anything the user wants to achieve and can be measured through performance (Burton-Jones and Grange 2010).

TAM (Technology Acceptance Model) is the most widely-used model for explaining IT adoption and use (Burton-Jones and Hubona 2005; Venkatesh and Bala 2008). TAM draws from the Theory of Reasoned Action (TRA) and provides a proven means for predicting the usage of IT artifacts by individuals based on their cognitive

beliefs of perceived “ease of use” and “usefulness” of the innovation (Davis et al. 1989; Fishbein and Ajzen 1975). TAM, however, assumes that these two belief constructs fully mediate the effect of external variables on usage (Burton-Jones and Hubona 2005). TAM and TRA assume that when someone forms an intention to act, they will be free to act without any limits. In practice, however, constraints such as limited ability, time, environmental or organizational limits, and unconscious habits can impact the freedom to act (Wixom and Todd 2005). Further, since TAM measures intentions of user behavior, this does not necessary equate to user “acceptance” (Burton-Jones and Straub 2006).

Greater understanding of the antecedents and determinants of TAM’s constructs is needed (Venkatesh and Davis 1996). For example, knowing that ease of use is most affected by computer self-efficacy could mean that user training would be more effective for user acceptance compared to a simplified user interface design (Venkatesh and Davis 1996). Categories of external variables such as those related to the 1) specific task, 2) technology, and 3) individual user characteristics can effect user attitude for technology acceptance (Burton-Jones and Hubona 2005).

The uses of the functionalities of IT should fit the specific tasks needed to be performed (i.e. task-technology fit) for positive outcomes (Goodhue and Thompson 1995). Zigurs and Buckland (1998) extend task-technology fit from the individual to the group level through the use of group support systems.

Attitude for accepting and using IT for knowledge sharing can be influenced by individual user characteristics, tie strength, location, and history of prior relations (Wasko and Faraj 2005). Individual characteristics that can impact attitude and, therefore, IT use include gender, age, tenure, and hierarchical level in the organization (Morris et al.

2005; Venkatesh and Morris 2000; Wattal et al. 2009).

From socio-linguistic research, men and women have been shown to vary with respect to social norms in communication patterns; men are more hierarchy oriented, while women are more network oriented (Tannen 2001). Gefen and Straub (1997) find that women perceive the social presence and perceived usefulness of email higher than men, hence indirectly impacting use. Men tend to be more influenced by their own attitude toward the use of a new system, while women tend to be more influenced by the subjective norm of the perceived social pressure of others on whether to use the system or not (Morris et al. 2005). Men focus more on completion, competition, and independence in their conversations, while women focus more on cooperation, support, and consensus (Gefen and Straub 1997). Morris et al. (2005) find that gender differences in using technology further amplify with age, with older men placing greater emphasis on their own attitude toward use, while older women are more influenced by subjective norm and by the perceived behavior control of ease of use (Morris et al. 2005).

Research shows that age can influence attitude with respect to IT use. Older employees are more influenced by their perceived behavioral control of ease of use and, therefore, are less likely to use new technology (Morris and Venkatesh 2000). Younger employees, on the other hand, are more influenced by their own attitude toward using a new technology (Morris and Venkatesh 2000). For example, Kumar et al. (2004) find that 75% of users on one of the most popular blogging sites in the world are under the age of 25.

Tenure in the organization should have a positive impact on attitude and use of corporate IT for knowledge sharing. Employees with greater tenure in the organization

are likely to have greater understanding of “who knows what”, and “who does what”, which enhances knowledge coordination (Kanawattanachai and Yoo 2007, p. 786). The experience gained through tenure in user-generated open source communities helps teams anticipate and respond to problems quicker, thereby lowering the development time to market (Chandrashekar et al. 1999; Mallapragada et al. 2012).

Employees higher in hierarchical level have typically shown that they recognize the benefits of using new innovations (Agarwal and Prasad 2000). At the same time, other employees are more likely to seek information from these employees with higher hierarchical status since it is suspected that they have access to more useful information (Greve 2005).

The IT use literature also shows that social influence can also influence user attitude on IT use especially for social media, but are not included in the original version of TAM (Wattal et al. 2010a). Venkatesh and Davis (2000) extend TAM to TAM2 by incorporating antecedents to ease of use and usefulness such as voluntariness and the social influence of subjective norm and image. TAM3 shows how managers can intervene during pre- and post-adoption periods for generating greater IT adoption and use (Venkatesh and Bala 2008). For example, for a complex system, interventions for enhancing the perception of the ease of use (e.g. training, help from peers) should be beneficial for acceptance and use. For voluntary (i.e. nonmandatory) systems, interventions for improving the view of usefulness (e.g. incentives, design attributes) should help attract more users, because attitude has a strong impact on voluntary usage (Hartwick and Barki 1994)

Venkatesh et al. (2003b) developed the UTAUT (Unified Theory of Acceptance and Usage of Technology) model for predicting the antecedents of IT use for employees at work taking into account TAM2, motivation, and affect. Venkatesh et al. (2012) extend UTAUT with UTAUT2 adding the following antecedents for IT acceptance and use in a consumer context: hedonic motivation (for pleasure), price value (for consumer use setting), and habit (prior behavior that is automatic). These updated UTAUT antecedents for the consumer context coincide with the rise of experiential computing where everyday life is mediated by the use of everyday artifacts with digitally embedded capabilities such as using the applications (i.e. “apps”) of a consumer smart phone or tablet both for personal use and for work (Yoo 2010).

Innovation diffusion theory shows how innovations in organizations are spread through user communication and influence, implying that adoption follows the same patterns (Rogers 1983). In addition to this communications metaphor, the theory also has an economic metaphor where the speed of innovation adoption is related to perceived user costs and benefits. The higher the perceived costs from the innovation, the slower the diffusion, while the higher the perceived benefits, the quicker the diffusion (Attewell 1992). Drawing from these communication and economic metaphors of innovation diffusion theory, individual early adopters in the past were more likely to be members of larger firms which could benefit by starting to use the new innovation (Davies 1979). Innovation diffusion theory, applied specifically to IT innovations, has consistently shown that user rate of adoption is related to the following antecedents: relative advantage gained, technical compatibility, and technical complexity (Bradford and Florin 2003; Crum et al. 1996). These three antecedents are related to either “ease of use” or

“usefulness”.

Contextual factors can influence IT use; these factors include subjective norm such as managerial influence, and relational and spatial networks (Rogers 1983). Relational networks consist of people who the user directly interacts with, while spatial networks consist of people in the same physical spaces (Wattal et al. 2010a). Traditional innovation diffusion theory surmises that the speed of innovation diffusion is mainly due to the proximity of influence and information flow. At the organizational level, the speed of adoption of innovations is spatial with respect to the size of the population and the distance from the centers of population (Rogers 1983). Through structural equivalence, those who adopt at a given point in time are more likely to have similar structural situations with each other (Burt 1987). Firms may delay their adoption of new technologies until they gain sufficient in-house expertise through organizational learning or skills development, or hire the technical know-how from outside the company to lower the knowledge barriers (Attewell 1992). The implementation of new IT artifacts in organizations requires employees to not only learn how to use the material features, but to also learn how the new technologies manage knowledge (Leonardi 2007).

Spatial networks based on geographic distribution can influence IT diffusion through the observation of others (Rogers 1983). Through observation, a user’s beliefs and evaluations, based on the relative advantage and ease of use in using an IT innovation, can have a positive influence on attitude for adopting the new technology (Karahanna et al. 1999).

While, innovation diffusion theory is used to help explain how new IT use spreads throughout an organization, it focuses on the demand (i.e. user) side (Rogers 1995).

Supply-side (i.e. provider) strategies are typically not taken into consideration and other than the exception of the user level of innovativeness, users are assumed to have an equal opportunity to adopt (Attewell 1992). Further, innovation diffusion as well as IT innovation acceptance models in the past have recognized a post-acceptance stage when IT use goes from conscious behavior to routine activity (Rogers 1995). However, past research has primarily focused on the diffusion of “adoption” and not of “use” (Rogers 1995; Shih and Venkatesh 2004; Theotokis and Doukidis 2009). These acceptance models of the past have treated initial acceptance (i.e. upon implementation) and continuance (i.e. continuing to use after initial acceptance) as behaviors happening at the same time and having the same antecedents (Bhattacharjee 2001). Hence, the limitation of these models is the inability to account for why users continue or discontinue using IT innovations after initial acceptance.

Understanding IT use means understanding “effective” use, because organizations need to know how well their IT system investments are being used (Seddon 1997). While there has been much research in the past 20 years on “when” IT systems are used, there has been little research on “how” and “why” they are used (Burton-Jones and Grange 2010; Pavlou et al. 2008). These questions could be answered by using multiple measures for IT use. However, IT use literature has tended to treat IT “use” as unidimensional with little or no theoretical basis provided as to why the system usage measure was chosen for the research in the first place (Burton-Jones and Straub 2006). Most IS research measuring IT use only uses one or two usage measures out of more that could be used, and few studies use three or more use measures (Burton-Jones and Straub 2006).

Social media offers different technologies and attributes that afford different behaviors (Wattal et al. 2010b). Users are no longer unidirectional consumers of content; they are increasingly becoming providers of their own user-generated content (Agichtein et al. 2008). Social media affords interactive participation with the integration of various media (Wattal et al. 2010b). This can include blogs and web forums, social bookmarking sites, photo and video sharing sites, and social networking sites such as Facebook (Agichtein et al. 2008). Blogs, for example, are webpages designed to show frequent, interactive modifications in reverse chronological order (Herring et al. 2004). Social media tools such as blogs continue to advance enabling such IT services as archiving, tagging, RSS (Real Simple Syndication (RSS)), and notifications (Min et al. 2010). With such advances in an increasing variety of features, the successful use of social media is no longer limited to simply the volume of available content that is posted; posted content also needs to be read and understood so that it can be successfully applied to particular situations (Du and Wagner 2006).

Organizations are increasingly adopting corporate blogs and other social media tools. Yet these collaborative tools tend to be voluntary, as organizations are trying to find the proper balance between autonomy and control for optimizing employee adoption and use (Wattal et al. 2009). Employees need to use these tools in order for these tools to be useful. However, trying to control the behavior of individuals in order to increase participation can have a negative impact on intrinsic motivation (Deci 1996).

There is little understanding in how IT collaborative tools can be effectively used, for example, in influencing blog usage (Pavlou et al. 2008; Wattal et al. 2010b). Further, unidimensional “IT use” or “system use” is too general, and concluding that more use

will result in more benefits is not sufficient. Researchers need to take into account the “nature, quality, and appropriateness of system use,” (Delone and McLean 2003, p.16). For example, sharing too many low quality corporate blog postings could result in fewer people using the platform for seeking knowledge. In short, collaborative IT tools such as social media need to not only be collectively adopted, they also need to be effectively used (Pavlou et al. 2008).

The use of social media differs from traditional IT tools in that “use” has two main dimensions which are the seeking and sharing of knowledge (Koh et al. 2007). Users of social media not only benefit from the individual utility obtained by using the technology, but also from its use by and with others (Kraut et al. 1998). For example, the value of participating in an interactive discussion forum is not only from the provisioning of the technology, but also with the ability to interact with other users (Markus 1990).

Social media is not a restrictive top-down technology as in the traditional corporate IT systems of the past; it is a bottom-up technology where peers can seek and share knowledge with other peers (Wattal et al. 2009). Users develop relations by using social media and, therefore, use should take into account a relational view (Pavlou and Fygenson 2006; Theotokis and Doukidis 2009).

Social structures of these connected online users maintain and sustain their own participation (Butler 2001). Therefore the social influence associated with the adoption and use of social media are likely to play a stronger role than for traditional IT tools such as personal productivity applications as in word processing or spreadsheets (Venkatesh et al. 2003b). As one employee comments, “if others don't use it, there is no point in you using it”. In order for the use of these systems to be successful, users of social media

need not only the means, but also the motivation to participate (Koh et al. 2007).

In sum, prior literature on IT use has tended to treat technology use as one-dimensional (Burton-Jones and Straub 2006) and influenced by one-dimensional social influence such as subjective norm (Davis 1989; Davis et al. 1989; Fichman and Kemerer 1999; Goodhue and Thompson 1995; Venkatesh et al. 2003b). The use of social media differs from traditional IT in that “use” is multidimensional. Breaking down use from one dimension “use” into two dimensions “seek” and “share”, enables the development of research models that represent the ways social media is actually used and how this use is influenced in organizations. Not only is social media use multidimensional, so is the social influence on this use which is discussed next.

2.4.3 Social Influence on IT Use

2.4.3.1 Social Influence Introduction

Social influence from others has been recognized as an important antecedent on the individual use of IT (Agarwal et al. 2007; Lewis et al. 2003; Venkatesh et al. 2003b). Individuals who are members of groups are most likely impacted by the behavior of others in these groups (Liang and Xue 2009). A background on normative and informational social influence is presented first. This is followed by reviewing the social influence of network externalities and critical mass. This explains why this type of social influence is particularly critical for understanding how corporate social media is actually used in the organization. IS social influence research in the past has emphasized impact on the *unidimensional* use of IT (Kraut et al. 1998; Lewis et al. 2003; Liang et al. 2007; Liang and Xue 2009; Venkatesh et al. 2003b). However, since the use of social media is *multidimensional*, enabling the interactive seeking and sharing of knowledge between

users, there should be added utility from the social influence of network externalities developed by others (Kraut et al. 1998). Network externalities provide a mechanism for taking into account these social influence spillover benefits for new users due to the potential size of the connected user base (Katz and Shapiro 1985). Therefore, Chapter 2 of this thesis emphasizes this antecedent for understanding the use of social media for seeking and sharing knowledge.

2.4.3.2 Normative and Informational Social Influence

Prior IT use research has recognized the use of IT by others as a key determinant of individual use through normative and informational social influence (Agarwal et al. 2007; Liang et al. 2007; Liang and Xue 2009; Lou et al. 2000; Van Slyke et al. 2003). The background and limitations for normative and informational social influence are explained next. This is followed by an explanation of the social influence from the network externalities and critical mass and why this is needed for a complete understanding of how social media is used inside the organization.

Deutsch and Gerard (1955) break down the social influence of group norm between the 1) normative influence and the 2) informational influence. Normative social influence is, “the influence to conform to the positive expectations of another”, (Deutsch and Gerard 1955, p. 629). In the context of IT use, this is where the user feels he or she is obligated to use a new IT system that others are using. Normative influence is the “pull” of the individual to conform to his or her perceptions of the wishes of others in using a new system.

Informational influence, on the other hand, is “the influence to accept information obtained from another as evidence about reality” (Deutsch and Gerard 1955, p. 629). In

this situation, the user is influenced to use a new system by directly observing the benefits of information from the adoption and use of that system by others (Deutsch and Gerard 1955). Informational influence is the self-driven “push” by the user to attain the same perceived informational benefits. From social information processing models, an actor’s perceptions of the benefits of using new systems are shaped by the actor’s social networks (Brass et al. 2004). Positive communication about the use of a new IT system can positively influence an individual in the same social networks to use the new IT system (Lou et al. 2000). Informational influence also draws from the theory of social learning in that the individual learns how to use new systems from the experience of others, thus avoiding the opportunity costs of trying to learn on his or her own (Bandura 1977b).

Lewis et al. (2003) identify three factors of individual beliefs for using a new IT system: 1) individual, 2) institutional, and 3) social norm, which, in turn, are related to either informational or normative social influence. The individual factor includes computer self-efficacy that draws from social cognitive theory in that the informational influence from watching others perform a behavior, impacts the individual into thinking that he or she can also successfully perform that behavior (Bandura 1977a). The institutional factor includes top management commitment to a new IT system which can help legitimize the perception of usefulness for employees (Lewis et al. 2003). Social norm factors that Lewis et al. (2003) use include the normative influences from various groups including supervisors, senior leaders, professional peers, and informal circles.

The empirical results of Lewis et al. (2003), however, are mixed: individual and institutional factors significantly affect individual beliefs on IT use, however, social norm

does not. This may be due to the sample in Lewis's study which is university faculty members who have a high degree of autonomy and a low degree of hierarchy in their work. Further, the dependent variable used by Lewis et al. (2003) for the social norm antecedent is the overall perceived usefulness of using a new IT system which may be too broad of a measure to capture any significant underlying relation. This factor also does not take into account the perceived size of other users in these groups. This thesis avoids these limitations by measuring use at a granular level through "seek" and "share" and by measuring the actual size of the user base with respect to both of these dimensions.

Compared to the normative social influence, fewer studies have included informational social influence and how it affects IT use (Salancik and Pfeffer 1978). Lou et al. (2000) and Liang and Xue (2009) are noted exceptions. While the need-satisfaction paradigm proclaims that individuals perform tasks based on their own personal disposition or attitude, people make sense of the world by finding out from others (Kennedy 2006). Individual attitudes and needs are, therefore, based on situational factors, which, in turn, are affected by informational social influence (Salancik and Pfeffer 1978).

Informational social influence can be manifest through informational cascades. Bikhchandani et al.(1992) describe informational cascades as sequential situations where it is optimal for the individual to follow the observed behaviors of others ahead of him or her, instead of autonomously relying just on one's own, privately-held information. Deutsch and Gerard (1955) empirically show that the more uncertain an individual is with how correct his or her own judgment is, the more likely he or she will use informational social influence when making decisions. While the information from

cascades can be limited in terms of diversity, cascades can be fragile and controlled through greater transparency (Bikhchandani et al. 1992). In politics, information cascades can occur during elections when individual voters are influenced by the political momentum created by earlier voters. In finance, the initial bid in a corporate takeover is often followed by other competing bids despite increases in cost compared to the initial bid (Bikhchandani et al. 1992).

In social circles, the impact of peer pressure is demonstrated by followers, especially those with less knowledge or experience, who prefer to conform to the decisions of their peers (Bikhchandani et al. 1992). Hence, the social influence for using a new IT system can be due to knowledge received from individual social networks, supported by social information processing theory (Fulk 1993). If an individual observes that others in his or her social network believe that a technology is useful, it is likely that the individual will also believe so (Lewis et al. 2003).

In addition to information cascades, informational social influence can be manifest through the internalization that occurs when an individual starts believing that a new IT system is really useful, because it is endorsed as being so by his or her peers or by a boss (Deutsch and Gerard 1955; Venkatesh and Davis 2000). Hence, internalization can be a means by which the subjective norm *indirectly* affects the perceived usefulness intention for using a new IT system. Internalization, from informational influence, can result in both voluntary and mandatory contexts of IT use (Venkatesh and Davis 2000). This is in contrast to the subjective norm that can *directly* affect intention to use out of compliance to someone who is considered important to the user (e.g. who can reward or punish), without perceiving the new IT system of being useful (Venkatesh and Davis 2000). In

this case, compliance from subjective norm can occur in mandatory, but not in voluntary contexts (Hartwick and Barki 1994; Venkatesh and Davis 2000).

Liang and Xue (2009) extend Deutsch and Gerard's social influence work (1955) in IS research to the context of IT threat avoidance of malicious viruses, email spam, and spyware. This extension of social influence provides both informational and normative guidance for users in evaluating and avoiding such malicious IT. Specifically, informational social influence affects how users *evaluate* malicious IT, especially if the user does not have much prior experience in this area. Normative social influence, on the other hand, influences how users *avoid* malicious IT (Liang and Xue 2009).

In sum, IS social influence research in the past has emphasized the social influence on the unidimensional use of IT (Kraut et al. 1998; Lewis et al. 2003; Liang et al. 2007; Liang and Xue 2009; Venkatesh et al. 2003b). Recent research has examined the importance of social influence in terms of normative or informational influences (Lewis et al. 2003; Liang and Xue 2009; Zeal et al. 2010). This research suggests that different social influences can operate depending on the context of IT use.

While normative and informational social influence from observing others can explain how the use by earlier participants can sequentially impact the use of those that participate later, there is little understanding how social influence impacts the use of social media. The multi-dimensional, interactive nature of social media, where users are producers of their own content, implies that users get more value out of using these platforms with others, beyond their individual utility of using the features out of contingency (Kraut et al. 1998). Therefore, the social influence associated with the use of social media to seek and to share knowledge should be even greater compared to the use

of IT systems of the past that are unidimensional and non-interactive (Markus 1987; Venkatesh et al. 2003b). This requires an understanding of the social influence through the mechanism of network externalities and critical mass where the value of use increases with the perceived, potential size of the user base, and where the use by both earlier, as well as later participants can quickly influence each other. This is explored in the next section.

2.4.3.3 Social Influence Spillover: Network Externalities and Critical Mass

While normative and informational social influences can impact individual use of social media, spillover effects from network externalities developed by the size of the user base can further amplify utility benefits for the user; hence, benefits for new users can be attained and sustained (Lou et al. 2000). Externalities develop when the impact of an activity “spills over” beyond the original intention of the user activity (Galunic et al. 2012). Social media users are producers of their own content and, therefore, gain greater value using these platforms by interacting with others beyond the individual utility of autonomously using the intrinsic features (Kraut et al. 1998). Further, the benefits from this social influence developed from the network externalities of other seekers and sharers can become even greater as the size of the overall user base increases, enabling access to more contacts and content with greater diversity. The impact of this social influence mechanism, the social influence of network externalities, is next discussed.

Social media is interactive through the two dimensions of seeking and sharing (Koh et al. 2007). Therefore, the social influence from other users goes beyond those that are sequential and limited in one direction and dimension where other users directly impact individual “use”. The social influence from other interacting users of social media

is also interdependent and indirect in two directions: seekers can influence sharers, and sharers can influence seekers, motivated by the mutual benefits from these social interactions.

Kraut et al. (1998) propose that the adoption and use of interactive IT systems in organizations have utility and normative social influence (Kraut et al. 1998). From the utility influence, individuals decide to adopt a new technology when the value of the benefits of adopting and using it exceed the costs (e.g. time, effort, money) (Rogers 1983). This utility based value, in turn, can be contingency driven due to the fit between the appropriations of the fixed, intrinsic IT features and the performance of knowledge related tasks (Kraut et al. 1998). The utility value can also be amplified from socially driven positive network externalities of the number of other users (Kraut et al. 1998). The total effect from the perception of the number of other users can even be greater than the effects from the perceived ease of use and usefulness on the intention of an individual to use IT that enables the interaction with others (Lou et al. 2000).

The theory of network externalities predicts that the utility provided by a good is determined by the number of other users of the good in the same network (Katz and Shapiro 1985). Here the “network” is determined by whether products or services from multiple firms are the same or are compatible with one another. Network externalities are based on the personal cost/benefit values of using an innovation that are influenced by the number of other users of the focal system. As the size of the network of users changes, the cost/benefit value changes, and hence the influence of utility changes for individual users (Kraut et al. 1998). More users should result in greater value, and therefore have a positive impact on individual use. In the context of social media, the network consists of

those who are able to interact with one another through the medium (Katz and Shapiro 1985). Markus (1987) suggests that network externalities play an important role in influencing people to use a technology, which resembles the informational influence as proposed by Deutsch and Gerald (1955).

A larger social media user base implies access to more abundant, heterogeneous sources of knowledge that are shared by others. A larger user base also implies that there should be more seekers of posted content, thereby, providing greater motivation for those that share their knowledge. Specifically, consumption externalities can lead to demand-side (i.e. seeker) economies of scale which, in turn, can result in multiple user expectations with respect to costs (e.g. opportunity or search costs) and benefits in acquiring knowledge that can be helpful for work (Katz and Shapiro 1985). While consumers can benefit from a surplus by joining a network as the size of the user base increases, consumers using products or systems that can yield utility over time, such as a social media platform, further benefit from the expected, future size of the network of connected users (Katz and Shapiro 1985). Since social media is interactive and dependent on other users generating and consuming posted content, social influences through network externalities should also play a particularly pronounced role compared to the use of non-interactive traditional IT systems (e.g. individual productivity software applications or top-down knowledge management systems) (Lou et al. 2000).

Critical mass falls under the overall concept of network externalities in that actions of individuals are dependent on the actions of others (Oliver and Marwell 2001). In the literature, network externalities have been used to explain the increased benefits of participants of interactive media as the number of users increases, and that these benefits

are sustained when a critical mass is attained (Katz and Shapiro 1985; Kraut et al. 1998; Markus 1987). The term “critical mass” has been used in nuclear physics to describe the minimum point where there is enough fissionable material for a sustained chain reaction. Critical mass has been used in the social sciences to describe some minimum threshold that needs to be crossed in order for a social movement to take hold and to be sustained (Oliver et al. 1985). Critical mass draws from collective action theory where individuals are mobilized into sharing the costs, in order to mutually benefit from the resulting public good of their combined effort (Oliver et al. 1985). For example, it has been observed that a certain minimum “critical mass” or number of individuals are needed in order to enable creative group problem-solving (Licklider and Taylor 1968).

Critical mass theory has been applied to IS research in that “information” is viewed as a “public good” where contributors do not directly benefit from their own information that they share; they benefit from the information that is shared by others (Oliver and Marwell 2001, p. 300). Critical mass has been used as a key criteria for explaining the successful diffusion of innovations in the organization (Markus 1987). Critical mass has been tested using such interactive systems as the telephone, email, voicemail (Markus 1987), video telephone systems (Kraut et al. 1998), electronic bulletin boards, and group support systems (Lou et al. 2000). IS researchers have regarded critical mass in terms of numbers of users (Hiltz 1984; Markus 1987), or as a percentage of users where diffusion accelerates (Markus 1987; Rogers 1986).

Interactive IT systems such as blogs, email, and video conferencing “enable and constrain multidirectional communication flows among the members of a social unit with two or more members,” (Markus 1987). These systems have two differentiating

characteristics that sets them apart from personal productivity tools: 1) *universal access* which is the potential to reach all members of a community where everyone can benefit and 2) *reciprocal interdependence* where early user participation influences later user participation, and vice-versa (Markus 1987).

Since the use of interactive IT systems in organizations is often voluntary, reaching a critical mass of users is a vital requirement for successful implementations (Adams et al. 1992; Turoff and Hiltz 1978). While adoption of simpler interactive IT systems such as email in the past has been successful, the adoption of more complex interactive systems such as group support systems and Lotus notes were not widespread (Lou et al. 2000). Unlike personal productivity IT applications, social media is designed for communication and collaboration with others who need to be connected and to use the system. Also, unlike personal productivity applications designed for specific tasks, social media tools are more open-ended and can be appropriated by group members in various ways not previously defined; this in turn, requires a different way of thinking and more time and effort for learning and experimenting (Lou et al. 2000).

A critical mass threshold occurs when diffusion accelerates. This is when critical mass overtakes start-up costs, which encourage others to participate (Oliver and Marwell 2001). This contrasts conditions of decelerating diffusion where early participants contribute, but later participants free-ride (e.g. lurkers) without contributing (Oliver and Marwell 2001). Therefore, a sufficient number of early adopters is needed to be active in order to spread the innovation to others through their observations and through word of mouth. Due to the reciprocal interdependence characteristic of interactive systems such as social media, critical mass should be attained early during these implementations (Lou et

al. 2000). If later adopters start rejecting the innovation, earlier adopters may no longer use the system if they think they will not get benefits from their initial, relatively higher opportunity costs (Markus 1987).

Social media implementations, therefore, require new incentives provided by the organization to encourage collaboration among their employees. Work normative social influences and procedures likely need to change to encourage a more collaborative, learning organizational culture. Since the use of collaborative systems such as blogs can influence how knowledge and work is distributed, and potentially the very balance of power in the way organizations have been structured (e.g. centralized vs. decentralized), there may be some added resistance from those employees who prefer to maintain the status quo (Lou et al. 2000). The social influence from the network externalities from the size of the social media user base becomes all the more critical in helping motivate new users to participate.

Social learning theory also shows the need to extend the analysis of social influence of corporate social media beyond those that are normative and informational, and to include those developed from network externalities and critical mass. From social learning theory, human behavior is described as an ongoing interaction among cognitive, behavioral, and environmental factors (Bandura 1977b). One learns how to execute new behaviors by observing others, which enables individuals to model this information for their own subsequent actions (Bandura 1977b). Employees in distributed teams mimic the successful, observed behaviors of others for finding expertise and coordinating knowledge with others (Kanawattanachai and Yoo 2007). Developing and sharing innovative ideas is mainly a reciprocal, social activity relying on the interactive linking of

ideas between individuals and collective knowledge (Bento 2004). Learning would take much more effort if it was limited to one's own autonomous actions (Bandura 1977b).

Research in distributed learning classifies individuals as “active learners” when interacting both with posted content and with other learners (Bento et al. 2011). Interacting with posted content is referred to as “interaction with content”, while interacting with other learners is classified as “interpersonal interaction” (Berge 1998; Moore 1989). Individuals that both seek content and share content with others through corporate social media are, therefore, the most active learners. This is in contrast to other social media users that just seek information without sharing (e.g. lurkers) and those that just share information without seeking (e.g. spammers). Those that neither seek nor share content are “missing in action” and do not learn or contribute through the platform (Bento et al. 2011). Individuals, as well as the corporate social media platform itself, should gain by a balance in both seeking and sharing knowledge, so that the benefits from individual participation exceed the (opportunity and search) costs. Corporate social media users that resemble “lurkers”, “spammers”, or are “missing in action” provide opportunities for managers to determine why these employees are not “active learners”, by both seeking *and* sharing knowledge with others. Neither seekers nor sharers benefit when shared content is not read, or if seekers waste time reading content of no value (Kraut et al. 2005)

The potential added value from the social influence of network externalities of a user base of active participants from the business unit and overall organization should further motivate users beyond normative and informational social influence. The social influence of the network externalities of others using social media for the reciprocal

seeking and sharing of knowledge through interpersonal interactions should, therefore, extend beyond unidirectional normative or informational influences. Hence, the social influence from network externalities and critical mass need to be considered in order to fully understand and take into account how and why individuals are motivated from the benefits of using corporate social media for exchanging knowledge.

In sum, the interactive nature of the use of corporate social media in the firm for both seeking and sharing is different from the use of traditional, personal productivity IT of the past. Social media typically has both universal access in the organization and reciprocal interdependence (Markus 1987; Ransbotham et al. 2012). The social influence of network externalities and critical mass, therefore, provide a mechanism for taking into account the increased potential benefits that “spill over” to new users due to the increased size of the user base which is actually using the social media platform (Katz and Shapiro 1985; Kraut et al. 1998; Lou et al. 2000). Users of corporate social media in the organization for active learning are not just unidirectional consumers, they are also producers of their own content (Agichtein et al. 2008; Bento et al. 2011). Network externalities and critical mass extend beyond normative and informational social influence that is sequential, focusing on unidimensional use (Deutsch and Gerard 1955; Liang et al. 2007; Liang and Xue 2009). Network externalities and critical mass enable the understanding of social influence that is also reciprocal (i.e. in both directions), between the multiple dimensions of seeking and sharing and vice-versa, which, in turn, can quickly lead to greater benefits among the participants.

2.4.4 Summary of IT Use Literature

The literature on IT use has tended to view “use” as one-dimensional, and influenced by one-dimensional social influence such as subjective norm (Burton-Jones and Straub 2006; Davis 1989; Davis et al. 1989; Fichman and Kemerer 1999; Goodhue and Thompson 1995; Venkatesh et al. 2003b). Unlike the use of IT systems of the past, the use of social media involves the two interdependent dimensions of “seek” and “share”, where content is posted to share with viewers that seek this information (Agichtein et al. 2008; Koh et al. 2007). Social media platforms in general can benefit from the interactions of a larger number of contributors providing solutions. However, seeking and sharing should be in balance with a sufficient number of seekers and sharers for sustaining the development and exchange of knowledge, without reaching the point of information overload or compromising quality (Garud and Kumaraswamy 2005; Jones et al. 2004; Ransbotham and Kane 2011). Individuals who are members of groups are most likely impacted by the behavior of others in these groups (Liang and Xue 2009). Since the use of social media is multidimensional, enabling the seeking and sharing of knowledge between users, there should be added utility due the social influence of network externalities, and this should extend beyond that from the autonomous appropriation of the intrinsic features (Kraut et al. 1998; Lou et al. 2000). Network externalities provide a mechanism for taking into account these reciprocal, social influence spillover benefits for new users. This is due to the potential size of the connected user base, where sharers can influence seekers, and seekers can influence sharers (Katz and Shapiro 1985; Ransbotham et al. 2012).

Having reviewed the literature, a summary of the identified gaps is next presented. This lays the foundation for understanding the use of corporate social media for seeking and sharing knowledge at the intersection of the literature streams of 1) social media, 2) knowledge sharing, and 3) IT use. It is at this crossroads where critical, new opportunities are identified and addressed in this thesis.

2.5 Summary of Review of Literature: Gaps that this Thesis Addresses

2.5.1 Gaps Identified from the Literature

To summarize, the literature review identifies several major gaps out of the three streams: 1) social media, 2) knowledge management, and 3) IT use. First, in the social media literature stream, research has primarily focused on either the use of social media for personal use between consumers (C2C) in the general public outside the firm, or between the business and consumers (B2C) outside the firm. There is a gap in that little research has focused on the exclusive internal use of corporate social media between employees (E2E) within the same organization, despite the fact that organizations are using these platforms for internal knowledge sharing.

Second, from the knowledge sharing literature stream, with Kankanhalli et al (2005b) being an exception, few prior studies have examined the antecedents of knowledge seeking in connected communities of practice. This is surprising since several motivations of knowledge sharing (reputation, altruism) are derived from the fact that people are consuming the content that an individual creates.

Third, from the IT use literature stream, most research relies on unidimensional “use” as a dependent variable. This is perhaps a reason why no research has yet empirically field tested two-sided network effects simultaneously for seeking and sharing

knowledge through a social media platform. Research in the past analyzing the social influence of network externalities and critical mass emphasize the impact on unidimensional and unidirectional consumption (i.e. seek) of IT content or services, while neglecting to capture the reciprocal spillover impact on the supply (i.e. share) of content or services (Kraut et al. 1998; Lou et al. 2000). Relying on unidimensional IT use as the dependent variable has also limited findings with respect to other antecedents including those measuring organization structure and social capital (Wasko and Faraj 2005).

2.5.2 How the Gaps are Addressed

The major gaps identified from the three literature streams are addressed in this thesis as follows. First, this thesis addresses the gap in the social media literature which has no prior empirical study performed in a purely E2E environment. This is accomplished by conducting a field study measuring the use of this platform internally between employees within the same organization. Neither external customers nor business partners from outside organizations have access to the corporate social computing platform.

Second, knowledge sharing research tends to focus on sharing and the motivation to share, but not on seeking and the motivation to seek, which this research addresses. This is done by breaking down “use” into the multiple dimensions of “seek” and “share” as the dependent variables.

Third, this research addresses the gap in the IT use literature stream that there are no prior studies that have empirically field tested two-sided network effects simultaneously for seeking and sharing knowledge through a social media platform. This research addresses this gap by analyzing both of these types of uses, seeking and sharing.

Unlike previous one-sided network effect research, the analysis of the social influence of network externalities on the supply (i.e. share) side can be included with the consumption (i.e. seek) side. In addition, both “seek” and “share” are further broken down into binary and count measures. This enables this thesis to be the first to model both the probability (tendency) and intensity for these two dependent variables, further revealing the real use of the social media platform in the organization.

Furthermore, measuring the use of the corporate social media platform in terms of seeking and sharing enables new insights for measuring the impact of the antecedents of organization structure and social capital. Comparisons are made to show how these antecedents influence use and which antecedents have the greatest impact.

2.5.3 Overview of Chapters 3, 4, and 5

Drawing from the literature review, the next three chapters describe the theoretical development, hypotheses, measures, and methods for empirically addressing the following research questions of this thesis:

- What is the impact of simultaneous direct and indirect network externalities on the individual use of social media for seeking and sharing knowledge within the organization? How is this impact reflected by individual seeking and sharing in terms of usage tendency and intensity? These questions are empirically addressed using archival data in Chapter 3.
- How does organization structure with respect to the hierarchical and geographical distribution of the business units influence the individual use of social media for seeking and sharing knowledge within the organization? How do these two antecedents compare to the antecedent of the social influence of network externality on

individual seeking and sharing of knowledge? These questions are empirically addressed using archival data in Chapter 4.

- How do social capital dimensions influence the individual use of social media for seeking and sharing knowledge within the organization? How does this antecedent compare to the antecedents of the social influence of perceived critical mass on individual seeking and sharing of knowledge using corporate social media? These questions are empirically addressed using survey data in Chapter 5.

The individual employee use of corporate social media in the organization is typically voluntary as is the case with the firm in this field study. Managers therefore need to be aware, more than ever, of various antecedents where they may be able to positively influence (directly or indirectly) the successful use of these platforms among their employees for sharing knowledge. Chapter 3 is next presented for understanding the impact of direct and indirect network externalities on the use of social media by employees within the organization.

CHAPTER 3.

IMPACT OF DIRECT & INDIRECT NETWORK EXTERNALITIES

3.1 Introduction

Drawing from the literature review of the previous chapter, instead of analyzing “use” as being unidimensional, Chapter 3 takes a more granular approach by analyzing use as being multidimensional consisting of the two dimensions needed to sustain the use of corporate social media: seeking (i.e. viewing) knowledge and sharing (i.e. posting) knowledge (Koh et al. 2007). In the context of this research, corporate social media serves as an intermediary platform connecting those that seek knowledge with those that share knowledge (Parker and Van Alstyne 2005). Employees can act as producers and also consumers of knowledge by seeking content produced and shared by other employees who are usually their peers (Benbya and Van Alstyne 2011). This multidimensional view of IT use is measured and modeled to understand how social media is used and how knowledge disseminates among employees within the organization using this platform. The social influence of network externalities is next expanded for the context of the individual use of social media as an intermediary platform for seeking and sharing knowledge through two-sided, direct and indirect network effects. The theoretical development presented next lays the foundation for developing the research framework, hypotheses, and models for understanding the impact of direct and indirect network externalities on the use of social media.

3.2 Theoretical Development

3.2.1 Network Externalities and Two-sided Platforms

In order to gain greater understanding in the antecedents of the use of corporate social, this chapter focuses on the social influence of network externalities through the multiple dimensions of seeking and sharing knowledge in a two-sided platform. There are two types of network externalities or network effects: direct (or same-side) and indirect (or cross-side) network externality, depending on whether an individual is influenced by users of the “same” or “different” type. For example, a telephone network is subject to *direct* network externality, as an individual’s utility depends on how many other people joining the *same* telephone network. On the other hand, a buyer on eBay is likely to care more about the number and diversity of sellers using the platform. This is an example of *indirect* network externality. However, since sellers do care about the number of buyers on the platform, a buyer also benefits from a larger buyer network. The eBay example illustrates how two-sided platforms are often subject to indirect network effects, i.e., two-sided network externality, in which the value for joining the platform increases with the size of the “other side.”

Most empirical research on network externalities has focused on one-sided network effects, and mostly on the consumption or demand side (Brynjolfsson and Kemerer 1996; Kraut et al. 1998) (e.g., increase in the number of people consuming a product such as playing a video game, encourages others to join in). A few studies have modeled two-sided network effects in the context of transactional markets (Musacchio et al. 2009; Parker and Van Alstyne 2000; Rochet and Tirole 2001; Ye et al. 2012).

Gallaugher and Wang (2002) empirically found that browser market share impacts the price of web servers due to network externalities. Studies in marketing have shown the existence of indirect network effects in two-sided markets such as Yellow pages (Rysman 2004), user created online magazines (Albuquerque et al. 2012), and digital television (Gupta et al. 1999). The concept of network externalities is next extended with respect to a two-sided internal knowledge seeking and sharing platform for the theoretical development of Chapter 3.

Drawing from Hansen and Haas (2001), Chapter 3 treats intraorganizational knowledge dissemination as an internal knowledge market joined by a common platform by expanding analysis from supply-side processes, to include the demand-side. This approach is similar to how previous research has analyzed internal labor and capital within the organization (Althausen 1989; Hansen and Haas 2001; Stein 1997). In Chapter 3, corporate social media is viewed as an internal platform where seekers and sharers, respectively, have simultaneous incentives in providing demand and supply of knowledge between one another within the organization (Hansen and Haas 2001). Further, it is proposed that there are cross-side influences between supply and demand where those that share, are influenced by those that seek, and vice-versa.

A platform is a “set of stable components that supports variety and evolvability in a system by constraining the linkages among the other components,” (Gawer 2009, p. 19). A two-sided platform which is also known as a two-sided network is typically defined as a platform which connects and enables the convergence of interactions between two user groups (Parker and Van Alstyne 2005). Examples of two-sided platforms abound: videogame console sellers need to attract gamers and game

developers; eBook readers (e.g., Amazon Kindle) need to attract publishers and readers; eBay needs to make sure enough buyers and sellers are on board to ensure platform sustainability; open source software has developers on one side and users on the other.

The distinctive feature of two-sided platforms is that success depends on *enough* of both sides joining and participating. How to get the two sides “on board” by appropriately charging or offering proper incentives to each side is critical to the survival of a two-sided platform and a key research question both in practice and in theory (Rochet and Tirole 2004). As a result, it is highly related to the theory of network externality. The literature on two-sided markets is still emerging, and mostly focuses on how to “price” to sustain a successful market. However, pricing alone does not address dynamic platform issues among complementary participants such as how to sustain incentives for innovation or how to coordinate agreement in the design of interface rules (Gawer 2009).

The concept of two-sided platforms readily applies to Chapter 3 – seekers on one side and sharers on the other - where the context of organizational knowledge sharing and use is different from a typical “market” setting. In organizational knowledge sharing and use, there are typically no transactions, formal pricing, or clear distinction between the users of the two sides. An example of a classic two-sided market, on the other hand, is the Apple AppStore which is transactional, includes formal pricing, and has a clear demarcation between the developers and the users (even though some users may be developers and vice versa). Research in marketing has also examined two-sided markets (Gupta et al. 1999), and demonstrated the existence of two-sided network effects in online markets (Albuquerque et al. 2012; Zhang et al. 2012).

However, the essence of a two-sided platforms lies in the key feature that there exists a common mechanism connecting two user groups; therefore, there should be value in applying the insights from the two-sided platform literature to organizational knowledge sharing and use. In particular, given that both seeking and sharing are important to successful implementation of social media, the two-sided concept provides a useful theoretical lens to study the influences and interdependencies. This research not only builds upon the literature of platforms but also contributes to it by providing an empirical investigation of how the two-sides of a knowledge sharing platform are interdependent on each other.

Few studies, with a noted exception (Lou et al. 2000), have taken into account how network externalities develop multidimensional group social norm influences which, in turn, impact individual use for interactive technologies. Further, no studies are known to have analyzed how these influences from the seeking and sharing of others affect the individual seeking and sharing of knowledge through emerging social media tools in the organization.

Having described how network externalities can be applied to a two-sided platform, next is discussed how social media serves as an intermediary platform between seekers of knowledge on one side of the platform and sharers of knowledge on the other side.

3.2.2 Social Media as an Intermediary Platform

An intermediary platform can provide services that help consumers find products or services from producers (Gawer 2009). In order for information mediation to happen in knowledge sharing, the two sides, producers and consumers, need to be able to access

and use the same platform in order to meet and interact (Jullien 2005). This describes a two-sided platform providing intermediary services connecting the two groups or sides (Parker and Van Alstyne 2005).

Social media in general and blogs in particular are similar to intermediary platforms in several ways. First, social media supports multiple sides: a seekers side and a sharer side (Ye et al. 2012). While there should be complementarities between seekers and sharers of knowledge, seekers are not always sharers and vice-versa. As is common in most organizational blogs, individuals in Tech Corp. can perform either or both roles. This is no different than other two-sided networks where the same individual can act at each end of the market such as an Ebay auction seller and buyer.

Second, as with multisided platforms, social media joins both sides: seekers and sharers. This is done by the platform's combination of stability for efficient reuse, and flexibility for adaptability to changing environments (Gawer 2009).

Third, similar to platforms supporting multiple sides, social media at Tech Corp. has an architecture and a set of rules (Gawer 2009; Tiwana and Konsynski 2010). The architecture is the design and infrastructure that enable the interactions between the members. The rules are the protocols, rights (e.g. security), and pricing, controlling these transactions (Eisenmann et al. 2006). In the context of Tech Corp., "pricing" takes the form of employee opportunity costs for accessing and using the intermediary platform for searching and posting knowledge (Jullien 2005). So even though there is no formal economic transaction in knowledge sharing and use, there are definite and valuable costs to the organization and individual.

Fourth, similar to a platform, social media has stable, standardized, reusable interfaces for seeking and sharing. It also has evolvable, modularized contributions of knowledge through these interfaces that can support heterogeneous needs that are adaptable to changing environments (Gawer 2009; Tiwana and Konsynski 2010).

Fifth, as with platforms, social media can experience economies of scale from the spillover of network effects (Parker and Van Alstyne 2005). Furthermore, the concept of network externalities have been applied to many situations (e.g., open source) that do not neatly fit traditional transactional markets. The theoretical conceptualization of network externalities in general as well as two-sided network effects in particular, as originally conceived, fit the notion of organizational knowledge bases that depend on both creation and consumption.

Table 1 summarizes the key points how social media is similar to a platform.

Table 1. Social Media as an Intermediary Platform	
<u>Characteristics of Platforms</u> <small>(Boudreau 2012; Eisenmann et al. 2011; Gawer 2009; Parker and Van Alstyne 2005; Tiwana and Konsynski 2010; Ye et al. 2012)</small>	Platform Similarities with Social Media
1. Multisided	Seeker side & sharer side
2. Joining both sides	Seekers (sharers) joined with sharers (seekers)
3. Architecture & rules for interactions	Between seekers & sharers
4. Evolvable	Stable attributes that can be reused, and versatile interfaces supporting heterogeneous consumption in changing environments
5. Network Effects	Depends on “enough” seekers and sharers

Drawing from Hansen and Haas (2001), the social media intermediary platform can serve as an internal knowledge network where users exchange knowledge with other

employees within the organization. Through such a platform, employees can benefit from wide-spread, horizontal participation of heterogeneous sources of knowledge in the relatively secure and controlled environment of the firm (Surowiecki 2004). Participants are able to self-identify and actively participate from across the organization (Hansen and Haas 2001). The participants who connect with one another may not know each other as is the case in social networks (Hansen and Haas 2001). Firms, in addition to the one in this field study, that have implemented internal knowledge markets for sharing knowledge between their employees include IBM, Infosys, Samsung Life Insurance, Siemens, and McKinsey (Benbya and Van Alstyne 2011). The benefits from participation can include greater efficiency, improved problem solving, re-use of already existing information, and the development of new information (Ransbotham and Kane 2011; Wagner 2004).

Because internal knowledge sharing platforms can be so effective in facilitating new ideas through collaboration, this brings with it the increased risk that these ideas could be discovered by the competition (Benbya and Van Alstyne 2011). Tech Corp. manages the security access and rules of the platform that are designed to help maintain balance between *outside* competition and internal collaboration. In addition, while all employees have access to the social computing tools supported by the platform, there are internal security rules that can further limit access to more sensitive internal information. This can be controlled through the management of permissions on who *inside* the organization can have access to various types of shared content be that through documents, blogs, wikis, or discussions at individual, group, or executive levels.

Recent research suggests that different social influences can operate depending on the context of technology use (Zeal et al. 2010). This applies even more so in the case of technologies such as the social media platform that can be used in multiple ways (e.g., sharing and seeking). Next is shown how the social media intermediary platform has both direct and indirect network externality influences, based on whether the impact of use is same-side (i.e. direct) or cross-side (i.e. indirect).

3.2.3 Direct and Indirect Network Externality Social Influence

By drawing from the literature review and by combining the theoretical concepts of network externalities with social media as an intermediary, two-sided platform, the research framework is developed next. This framework will test how the social influence of network externality impacts individuals using social media for seeking and sharing knowledge. Same-side network effects are direct and occur when growth in the user base on one side of the platform influences the value on the same side (Eisenmann et al. 2006). Previous research suggests that positive network effects exist in corporate technology use due to objective (i.e. utility) benefits as well as due to normative influences (Kraut et al. 1998).

Prior research also considers the importance of technology use by others as a determinant of one's own technology use (Van Slyke et al. 2003). Van Slyke et al. (2003) suggest that individuals try to conform to the behavior of a group due to their desire to be identified with the group. This is similar to the informational influence proposed by Deutsch and Gerald (1955). Employees can be influenced into using the system by observing others that find the system useful which is an informational influence (Lou et al. 2000; Venkatesh and Davis 2000).

In Table 2, the selected knowledge management literature in IS is framed based on the emphasis of the influences between consumers and suppliers of knowledge with one another. There are two same-side influences that are direct between consumers or suppliers of knowledge. Conversely, there are two cross-side influences that are indirect between knowledge suppliers and consumers and vice versa. Literature that can specifically be applied to same-side *seeking* (demand) in the upper left-hand corner of the table is the least represented area out of these articles. This is not surprising since knowledge management literature has emphasized *sharing* and its antecedents.

Through a practice view, knowledge seeking in addition to knowledge sharing can be taken into account (Brown and Duguid 2001). The practice view breaks down the classification boundaries between explicit and tacit knowledge, showing how individual learning goes beyond simply obtaining facts (i.e. “objects”) and is manifest through a social, interactive experience (i.e. “practice”) (Brown and Duguid 2001).

Table 2. Classification of Selected Knowledge Management Literature in IS		
	Direct Influence	Indirect Influence
Social Influences of Others:	1. Seek by Individual	3. Share by Individual
Seeking by Others	Nonaka (1994) Schultze and Leidner (2002) Ransbotham et al. (2012)	Nonaka (1994) Constant et al. (1996) Hansen (1999) Jarvenpaa and Staples (2000) Wasko and Faraj (2000) Brown and Duguid (2001) Hansen and Haas (2001) Alavi and Leidner (2001) Markus (2001) Schultze and Leidner (2002) Wasko and Faraj (2005) Garud and Kumaraswamy (2005) Schlosser (2005) Adamic and Glance (2005) Koh et al. (2007) Yoo et al. (2007) Kanawattanachai and Yoo (2007) Kudaravalli and Faraj (2008) Yardi et al. (2009) Schlosser (2011) Ransbotham et al. (2012) Moe and Schweidel (2012)
	2. Share by Individual	4. Seek by Individual
Sharing by Others	Nonaka (1994) Schultze and Leidner (2002) Wasko and Faraj (2005) Garud and Kumaraswamy (2005) Yoo et al. (2007) Kudaravalli and Faraj (2008) Wattal et al. (2010a) Choi et al. (2010) Faraj and Johnson (2011) Ransbotham et al. (2012)	Mason and Mitroff (1973) Nonaka (1994) Constant et al. (1996) Goodman and Darr (1998) Hansen (1999) Alavi and Leidner (2001) Markus (2001) Schultze and Leidner (2002) Kankanhalli et al. (2005b) Poston and Speier (2005) Garud and Kumaraswamy (2005) Schlosser (2005) Yoo et al. (2007) Kanawattanachai and Yoo (2007) Koh et al. (2007) Faniel and Majchrzak (2007) Kudaravalli and Faraj (2008) Choi et al. (2010) Schlosser (2011) Ransbotham et al. (2012)

Since “use” of social media can be manifest by either “seeking” or “sharing”, it would be interesting to examine whether the same effects exist for both seeking and sharing. This is explored in this chapter. In the case of corporate social media, employees

using the platform for seeking content constitute the demand side of the network, and the employees using the platform for sharing content constitute the supply side of the network. The research framework of Chapter 3 is illustrated in Figure 2. It shows the proposed influences of direct network externality influences for both the demand and supply-side externality influences on usage. Specifically, Chapter 3 tests to see if and how other seekers influence individual seekers, and if and how other sharers influence individual sharers.

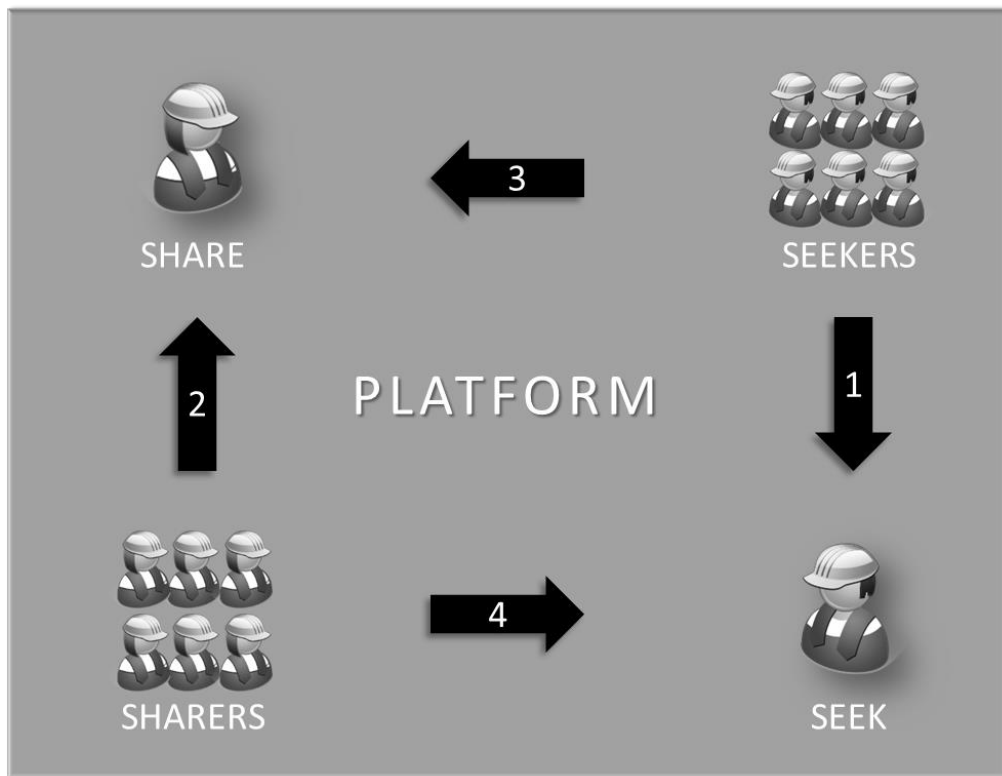


Figure 2. Research Framework of the Social Influence of Two-sided Network Effects through a Social Media Platform

From Figure 2, first, positive one-sided network externalities should be *directly* related to the number of users as illustrated in the relations shown between 1) other seekers and an individual, who seeks, and 2) other sharers and an individual who shares.

Second, Katz and Shapiro (1985) also identify network effects that are *indirectly* related to complementary use by others. For example, a smart phone purchase may also be influenced by the availability of compatible software applications (i.e. “apps”) developed by others. This indirect effect is referred to as a two-sided *cross-side* network effect. More formally, two-sided effects typically cross the network, are indirect, and occur when growth in the user base on one side of the platform influences the value on the other side (Eisenmann et al. 2006; Sundararajan 2008).

Employees that “seek” knowledge are consumers on one side of the internal knowledge network, seeking knowledge from other employees that “share” knowledge on the other side. Connecting the seekers with the sharers of knowledge in the middle is social media which acts as the intermediary platform enabling the interactions between and among both sides of this knowledge centric network.

To understand whether a one-sided or a two-sided network applies, the Coase theorem can be used to “rule out” networks that are strictly one or same-sided (Parker and Van Alstyne 2005). When one side of the network influences the value of another, property rights, symmetric information, and the absence of transaction costs, are not enough to be able to negotiate an efficient outcome (Parker and Van Alstyne 2005).

In contrast to one-sided networks, the platform in a two-sided network can be managed to influence the volume of transactions by reducing pricing on one side, and increasing pricing on the other side (Rochet and Tirole 2006). Hence, two-sided platforms are able to take into account both sides of the network to manage efficient outcomes (Rochet and Tirole 2006).

In the context of Chapter 3, the number of knowledge sharers should influence the value of employees using the social media platform to seek knowledge, and the number of knowledge seekers should influence the value for those sharing knowledge. The Coase theorem, therefore, is not supported signifying that the platform is not limited to one-sided network effects. Two-sided network effects are, therefore, referenced for capturing cross-side network influences for the proposed relations in the rest of the research framework. Therefore, in addition to direct, positive one-sided network externalities between 1) other seekers and individual seekers, and 2) other sharers and individual sharers, there should also be two-sided (i.e. cross-side) network externalities in Figure 2. Cross-side network effects are indirect and are usually positive (Eisenmann et al. 2006)². It is, therefore, proposed that the cross-side network effects shown in Figure 2 will be positive since 3) an individual sharer should benefit from more seekers interested in their content and 4) an individual seeker should benefit from more content from more sharers. Previous two-sided network research has also shown that actors from one side of the platform gain value and want to participate with increased numbers of participating actors from the complementary side (Baskerville and Myers 2009; Belleflamme and Toulemonde 2004; Jullien 2005).

In sum, the proposed research framework of this chapter illustrates how cross-side network externality influences individual usage through seeking and sharing as shown in Figure 2. Using the basis of this framework, hypotheses and models are developed with the goal of determining if and how other seekers influence individual sharers, and if and how other sharers influence individual seekers of knowledge using

² A negative effect example is TV programming: Too much growth in the number of advertisements for a program would likely reach a point where the value of the program for viewers decreases, resulting in fewer viewers (Gabszewicz et al. 2006).

social media within the organization.

3.3 Research Setting and Design using Archival Data

3.3.1 Introduction

In this thesis one implementation of a corporate social media platform that provides access to such tools as blogs, wikis, and forums, in a large multi-national technology organization (Tech Corp.) is intensely studied. 5,543 employees in over 60% of the firm's business units located world-wide use the platform's corporate blog. The employees seek posted blog content an average combined total of over 33,000 times per month. They share content through the corporate blog and the rest of the social media tools supported by the platform an average total of 3,850 times per month. Furthermore, the employees demonstrate that they know the platform's tools and value the benefits by continuing to use them. In the first and second years after the implementation of corporate social media tools such as blogs, wikis, and forums, employees have averaged a total number of posts of content per month of 3,710 and 3,990 respectively.

There are several key reasons why employees at this firm understand and continue to use corporate social media from this implementation. First, through "ambassadors", Tech Corp. provides a mentoring approach in promoting, communicating, and supporting its employees in using corporate social media. Second, unlike many other early adopting Fortune 500 companies, Tech Corp. successfully uses a bottom-up (instead of a top-down) strategy through a common platform in its implementation. All employees are provided access to post content which is unfiltered. Third, the use of corporate social media at Tech Corp. is voluntary benefitting employee intrinsic motivation (Deci 1996). Fourth, Tech Corp. incorporates and the employees leverage multiple key social media

tools such as blogs and wikis with design features that enable easier and more useful seeking and sharing of posted content. These features include tags, customized RSS (“Really Simple Syndication”) feeds, and vote count feedback. These four practices used by the firm for its implementation of corporate social media are described next in greater detail.

3.3.2 Technology Environment

Tech Corp. management recognizes a demographic shift in their employee workforce in which they are facing massive “baby boomer” retirements of experienced employees and large new influxes of relatively inexperienced new employees. Corporate social media can enable a community of users to collectively communicate and share knowledge helpful for their work (Nardi et al. 2004). Hence, the project at Tech Corp. is envisioned to enable knowledge use and sharing across the organization and particularly among the above two groups. The firm has invested more than \$10 million in social media since 2007 and is moving to its third major revision of the concept. This social media system provides a suite of tools including corporate blogs, wikis, tag and keyword supported reporting, social bookmarking, online forums, and internal corporate search engines for seeking knowledge shared by employees using the social media tools. Tech Corp. promotes the vision that by individuals sharing their knowledge, everyone in the organization should collectively benefit.

Knowledge management systems of the past, such as Lotus Notes, however, often experienced unsuccessful implementations despite having executive support and being deployed to large numbers of desktops (Olesen and Myers 1999; Orlikowski 1992). Obstacles have typically been related to cognitive and structural organizational elements

(Orlikowski 1992). For example, user cognitive issues were not adequately managed through communications and training. Structural issues such as professional norms, rigid hierarchies, and design standard limitations often impeded the use of these systems for the benefits of sharing knowledge (Mandviwalla and Olfman 1994; Olesen and Myers 1999; Orlikowski 1992). While employees that used these systems may have benefited individually through improved efficiency and effectiveness, they often did not realize the collective benefits through the use of these systems for the mutual sharing of knowledge with others in the organization (Halloran et al. 2002; Olesen and Myers 1999).

More recently, despite the potential benefits of sharing knowledge, the implementation of social media within the organization is often not successful, being limited to “small pockets” of the firm and experiencing high drop-out rates (Healey 2012; Wattal et al. 2009). The implementation of corporate social media by Tech Corp., however, is different. The key reasons for this include: 1) effective communication and support, 2) bottom-up strategy through a common platform, 3) voluntary use, and 4) the integration and use of social media design features benefiting seeking and sharing.

First, Tech Corp. provides “ambassadors” who communicate and support their fellow employees in learning how to appreciate and most effectively use corporate social media for sharing knowledge. The benefits for individuals, teams, and managers are communicated. Research shows that users with increased perceived value of the anticipated benefits of switching to using new IT innovations should pose less resistance to IT implementations and the ambassadors help address these needs (Kim and Kankanhalli 2009). Ambassadors are volunteer mentors throughout the organization who have an overall knowledge of the value and of how to use the social media platform for

assisting their fellow employees. Ambassadors are provided documented guidance to 1) positively communicate the value of using corporate social media, 2) be active social media users, and 3) help users most effectively apply these tools for their work.

Ambassadors are encouraged to use the corporate social media tools to help them convey their value and best practices to their fellow employees.

Ambassadors not only address user cognitive issues for understanding how to use corporate social media and why. They also address structural issues by promoting needed changes in professional norms for valuing the sharing of knowledge and by showing that this is enabled through the use of corporate social media. Ambassadors have access to “productivity coaches” who can provide advanced expertise to employees in the uses and configurations of the various tools and their functionalities for optimizing benefits for particular organizational contexts. Employees can use the social media platform’s forum to view and participate in discussions on how to best use the system as well as search the corporate wiki for solutions. Additional online references available to the employees include FAQs (frequently asked questions), videos, and manuals. However, Tech Corp.’s ambassadors ensure employees throughout the organization are mentored before, during, and after the implementation.

Tech Corp.’s implementation of corporate social media as well as the work by the ambassadors in particular likely benefit from changing workforce demographics and the consumerization of IT at the firm. The tech savvy Millennial and Generation X generations at Tech Corp. are replacing the retiring members of the Baby Boom generation, and the consumerization of IT is resulting in the use of consumer devices and applications such as social media at the office (Harris et al. 2012; Kaneshige 2012;

Kudaravalli and Faraj 2008; Kumar et al. 2004; Martin 2010). Younger employees that are more comfortable using social media and are positioned to help the ambassadors break down barriers related to cognitive and structural organizational elements.

Second, Tech Corp. successfully uses a bottom-up strategy through a common platform in its implementation. Most early adopting Fortune 500 firms favored a top-down strategy (Lee et al. 2006). Corporate social media blogs and wikis are dynamic with hyperlinking cross-references along with tags and ratings where popular content that also has high quality should dominate (Parameswaran and Whinston 2007b). These social media authoring tools are designed to be distributed and flexible through, seamlessly benefiting the peer-to-peer sharing of bottom-up user-generated content by all employees (Benbya and Van Alstyne 2011; Oreg and Nov 2008; Wattal et al. 2009). Social computing is helping shift the focus of computing from centralized repositories to the “edge” of the network where users are now have the computing power and are able to stay connected to seek and share knowledge (Parameswaran and Whinston 2007b).

Through Tech Corp.’s bottom-up strategy, all employees are provided access to post content to a common platform. Using such a strategy, firms favor autonomy over content control with all employees provided unfiltered access to share content on blogs or wikis. Allowing employees to post negative content can even lead to an increase in readership of corporate blogs (Aggarwal et al. 2012). In a bottom-up strategy, the user base determines the structure which is constantly evolving (Parameswaran and Whinston 2007b). Hence employees of every level and location are able to help narrow the assimilation gap of the implementation by voluntarily sharing knowledge which can be viewed by anybody else in the firm. The social influences developed by other seekers and

other sharers are likely to be greater when everyone has access to participate.

In a top-down strategy, on the other hand, firms favor uni-directional content control over interactive employee autonomy by allowing only a few top executives or selected employees to share a limited amount of content which is controlled (Lee et al. 2006). However, collective knowledge from distributed sources tends to be more useful and be of higher quality than knowledge provided by only a few, more centralized sources (Parameswaran and Whinston 2007b). It is, therefore, not surprising that individual corporate blogs following a top-down, content-controlled strategy experience relatively lower levels of use (Lee et al. 2006).

Third, the use of corporate social media at Tech Corp. is voluntary as the organization balances between autonomy and control for optimizing employee adoption and use (Wattal et al. 2009). Even though employees need to use these tools in order for these tools to be useful, trying to directly control the behavior of individuals in an effort to increase participation can have a negative impact on intrinsic motivation (Deci 1996).

Fourth, Tech Corp incorporates key social media tools and features in its platform design that enable easier and more useful seeking and sharing of knowledge which are described next. Corporate social media provides benefits beyond the legacy knowledge sharing systems of the past such as Lotus Notes or static intranet sites by incorporating tools and functionalities that enhance seeking and sharing. Through its implementation of corporate social media based on SharePoint and customizations made to SharePoint, Tech Corp. provides profiles for all of its employees and the authoring tools of blogs, wikis, and forums. Furthermore, Tech Corp. enhances the use of these tools by improving the seeking of their content by incorporating such attributes as: tags, customized RSS

(“Really Simple Syndication”) feeds for new posts, and vote count feedback.

These tools and attributes are incorporated in Tech Corp.’s implementation of corporate social media to enable organizational knowledge use and sharing in support of the three major components of its corporate collaboration strategy:

1) *Express*: Employees (and teams) establish, maintain, and share their own profiles including their areas and levels of expertise, links to documentation, and recent blog posts. Also included is the activity stream showing content created and shared by the user and responses from others.

2) *Discover*: Employees seek user-generated content provided by corporate social media such as corporate blogs and wikis for helpful information for their work.

3) *Connect*: Employees connect with other employees seeking and sharing interactive ideas advanced by using such social media tools as corporate blogs, social bookmarking, and forums.

The corporate social media platform consists of personal and team spaces that are designed to be collaborative environments. In these environments, individual employees as well as teams maintain their own profiles, monitor activity streams, and have access to their own respective blogs, wikis, and documents for authoring and sharing. These personal and team spaces tools are the most heavily used by the employees. Capabilities enabled through the use of these tools include those that are directly provided by SharePoint, and those that are customized by Tech Corp. beyond SharePoint.

Compared to traditional top-down corporate knowledge sharing systems and mass media, social media blogs have been viewed as a means for democratic self-expression where “ordinary” individuals can easily share information on certain topics providing the

opportunity for others to read and respond (Nardi et al. 2004). Blogs primarily support 1-to-many communications, however they are easily scalable for the support of many-to-many users (Wagner 2004). Blogs have “posts” in reverse chronological order with the newest posts at the top followed by older posts beneath (Wagner 2004). “Comments” to posters by readers, on the other hand, are listed in chronological order under the respective blog posts. Blogs typically use hyperlinking for providing references to other sites on the Internet (Wagner 2004).

Blogs at Tech Corp. are primarily focused on employee seeking and sharing of knowledge. Most blogs maintained by individuals support smaller audiences, however individual sites within organizations such as at Tech Corp. comprise an overall blog aggregator site supporting a large number of users (Lee et al. 2006). Tech Corp lowers search costs and supports expertise location for blog posts and wikis by incorporating key capabilities provided through SharePoint such as indexed archives, tags, RSS feeds, and vote count feedback. In addition, Tech Corp. has customized and developed additional capabilities beyond those provided by SharePoint including activity streams, enhanced search, and streamlined security. Indexed archives enable seekers to search posted content by month and year as well as by topic. Tags enable users to customize attributes of posted content for organized archiving by topic and efficient seeking (Parameswaran and Whinston 2007b). RSS feeds also provide the option for seekers to subscribe to monitoring the latest updates.

Vote count feedback supports both seekers and sharers. Employees are motivated to contribute to blogs if they perceive that other employees are reading their posts (Yardi et al. 2009). However, viewers that read blog posts may not leave any traces in the form

of comments since this takes more energy and time and is not anonymous. Tech Corp. addresses these potential issues by including vote count functionality for viewers to easily and anonymously inform sharers there are interested seekers “out there”. This, in turn, should encourage the posting of quality content.

Voting also informs other seekers that the posted information has been consumed and is recognized as being helpful. This is important, because for voluntary (i.e. nonmandatory) systems such as the corporate social media platform at Tech Corp., improving the perception of usefulness by e.g. votes should help attract more users, because attitude has a strong impact on voluntary usage (Hartwick and Barki 1994).

Tech Corp.’s customizations include activity streams which enable users to view and monitor the activities of others through the platform such as recent blog posts and comments to blog posts. Tech Corp. enhances search capability by enabling users to search for content across all of the tools supported by the platform. User-focused permissions are also developed by Tech Corp. for the platform. Through this customized feature, security is more efficiently and effectively controlled for sensitive content. This is a particularly important option for this firm since many of its projects require security clearances.

Broadcasting information via blog posts is in general perceived to be easier and less intrusive than email (Nardi et al. 2004). Email as well as instant messaging are considered channels of communication which have low commonality (McAfee 2006). While content can be created and distributed by anyone, it can only be read by those whose email addresses are included in the message thread.

Social media authoring tools such as blogs and wikis, on the other hand, are supported on a common platform which has high commonality (McAfee 2006). Therefore, content can be created and distributed by anyone, and it can also be viewed by anyone with access to the platform. Sharers do not need to maintain distribution lists, and seekers are not obligated to read or respond (Nardi et al. 2004). Sharers can use links instead of attachments for sharing additional information, and Tech Corp.'s platform even provides a tool designed for the easy sharing of videos.

In addition to blogs, Tech Corp.'s personal and team spaces also support wikis which are able to leverage the platform's features previously described. Wikis have shared pages that enable posted comments and updates. Compared to blogs, wikis primarily support many-to-many communications and Tech Corp. uses wikis for collaboration and sharing where content is collectively authored. Multiple users maintain quality control and provide incremental updates over time (Wagner 2004). Tech Corp.'s corporate social media platform also enables employees to easily share documents such as those produced in Word, Excel, or PowerPoint and to organize them into folders in personal and team spaces. Permissions for access can be managed at the document level if needed.

In addition to the personal and team spaces tools, Tech Corp.'s platform supports additional knowledge seeking and sharing tools including forums, reporting, suggestions, and social bookmarks. Forums support enterprise-wide discussions of ideas and suggestions through the posting of questions and responses. Forums support both seekers and sharer of knowledge of interest throughout the firm. The platform's reporting tool enables a transparent means for providing project status updates for monitoring and

coordination. Permissions for the level of viewing transparency can also be managed for projects requiring greater security. The suggestion tool enables users to easily provide direct feedback on the corporate social media platform itself. This user feedback includes helpful suggestions for enhancements for continuing to improve the tools and capabilities supported by the corporate social media platform. Social bookmarks reduce search costs by enabling employees to save helpful websites for future reference and by making them available to share. Tech Corp.'s bookmarks can also be tagged by topic. Counts keep track of the number of times other employees save an individual's bookmarks, and the most popular bookmarks in the firm are displayed for all users to view under "Popular Bookmarks".

In sum, the implementation of corporate social media at Tech Corp. is different from many knowledge sharing implementations of the past. The firm provides opportunities for its employees to understand the value of seeking and sharing knowledge and to learn how to leverage the corporate social media platform's advanced tools and attributes, which can easily and effectively enable this. The employees demonstrate their understanding by continuing to use social media in their organization.

3.3.3 Data

In this chapter and in the next chapter, archival, web server access log data is collected and analyzed from 52,256 employees of Tech Corp. using the same social media tool, the corporate blog. Employees can use the social media platform to create and post on blogs (sharing), as well as access and read the blogs (seeking). Key managers and users of the platform are also interviewed. Data on knowledge seeking and sharing was collected over a six week period. In order to avoid single source bias and

obtain more robust results, the archival data collected in this chapter is tested by analysis of the research framework using data collected by survey in Chapter 5.

The focus of usage is placed within an employee's department, because the influence from positive network externalities should be stronger from people within one's own immediate work group compared to others who are not (Monge and Contractor 2003). Those who start using the social media platform at a given point in time are more likely to have similar structural situations with one another (Burt 1987). Tenure, gender, level, and age of an employee are controlled (Kane and Alavi 2008). Table 3 shows how these control variables are defined and measured. The hypotheses and the research models for this chapter are next developed and tested.

3.4 Hypotheses

Drawing from the theoretically developed relations previously described and illustrated in Figure 2, the hypotheses for direct and indirect network effects are developed next. Direct network effects can be easily applied to the demand-side (i.e. knowledge seeking), and most literature also documents positive demand-side network externality. For example, as more people in one's own work group or business unit use the blog for seeking knowledge, local externalities and word of mouth will convey ease of use and/or usefulness in finding knowledge, and thereby strengthen positive externalities. It is therefore expected that a user will be more likely to seek knowledge if he or she believes that other employees in their organization also seek knowledge through the platform.

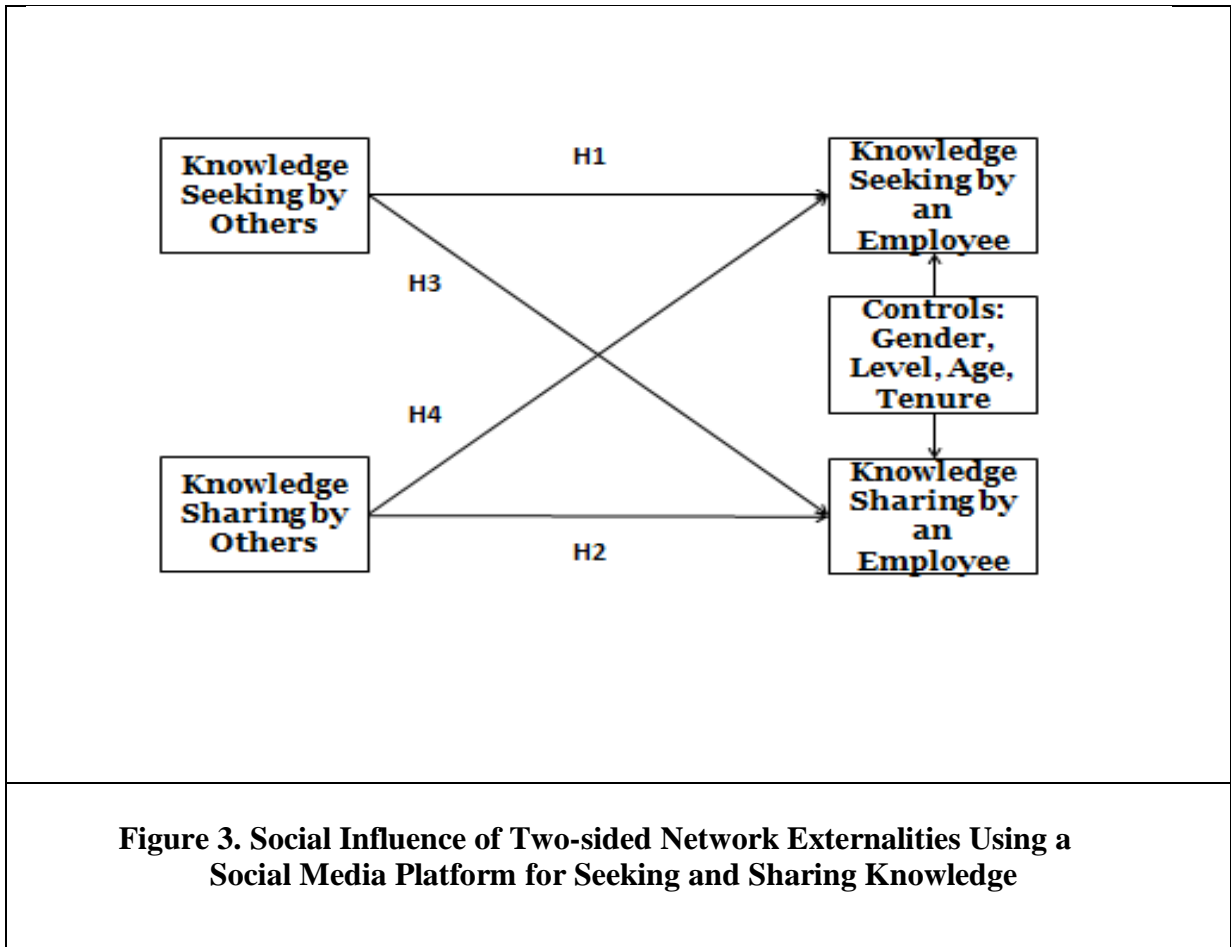
Similarly, positive network effects are expected to apply to the supply side of the platform. In other words, a user will be more likely to share knowledge if he or she

believes that others in the organization share knowledge on the platform. As in the demand-side effect, a larger base of sharers will convey the ease of use of sharing knowledge as well the usefulness in terms of enhanced reputation and visibility in the organization. However, counter arguments also exist that suggests that there could be competition or crowding effects on the supply side. This would be an interesting empirical question to answer.

Further, use can be conceptualized in various ways e.g. usage *tendency* in terms of the probability that an employee uses the social media platform; or the usage *intensity* in terms of number of times an employee uses the social media platform. Therefore the following hypotheses related to the impact of same-side network effects (demand-side and supply-side) on usage of corporate social media are proposed as shown in Figure 3:

Hypothesis 1 (demand-side externality on seeking tendency): *Knowledge seeking by others through corporate social media will have a positive influence on the usage tendency of an employee's use of corporate social media for seeking knowledge.*

Hypothesis 2 (supply-side externality on sharing tendency): *Knowledge sharing by others through a corporate social media will have a positive influence on the usage tendency of an employee's use of corporate social media for sharing knowledge.*



Having developed hypotheses for direct or same-side network effects, hypotheses for indirect or cross-side network effects are next developed. In organizational social media, a user is more likely to share if he or she believes that other people are using the technology for seeking knowledge. According to the literature, these influences should further enhance altruistic and/or reputational incentives for individuals to share knowledge by making them realize that there are others within the organization that seek this knowledge (Kankanhalli et al. 2005a).

At the same time, the value to a user for seeking knowledge will likely increase when more individuals share knowledge (Katz and Shapiro 1985). When more individuals share, a seeker is more likely to find what he/she finds. More sharers also

provide more variety which is also what seekers want (Brynjolfsson et al. 2010; Dixit and Stiglitz 1977).

It may be possible that more posts shared by employees may increase evaluating costs by seekers (e.g., it may take more time to filter out the solutions wanted), and thereby decrease the value of more sharers. However, as long as search is efficient and effective, the benefits of more sharers are expected to outweigh the evaluation costs. Therefore, a user is more likely to seek knowledge if he or she believes that other people are sharing knowledge. Hence, the following hypotheses regarding the impact of cross-side network effects on usage of corporate social media are proposed:

Hypothesis 3 (cross-side externality on sharing tendency): *Knowledge seeking by others through social media will have a positive influence on an employee's usage tendency of corporate social media for sharing knowledge.*

Hypothesis 4 (cross-side externality on seeking tendency): *Knowledge sharing by others through corporate social media will have a positive influence on an employee's usage tendency of corporate social media for seeking knowledge.*

3.5 Measures

The key measures of Chapter 3 are defined in Table 3. Usage tendency is measured by the variable *USE*, which denotes whether an employee uses the blog for seeking or sharing.

Table 3. Variables, Definitions, and Measures for the Social Influence of Network Externalities		
Variable	Definition	Measurement
<i>USE</i>	Whether an employee uses the blog to seek or share knowledge.	Binary (0/1) – 1 denotes if an employee either viewed a blog or posted to a blog.
<i>SEEK</i>	Whether an employee uses the blog to seek knowledge	Binary (0/1) – 1 denotes if an employee viewed knowledge on the blog.
<i>SHARE</i>	Whether an employee uses the blog to share knowledge	Binary (0/1) – 1 denotes if an employee posted knowledge on a blog.
<i>USE_OTHERS</i>	Number of other employees viewing or posting knowledge on the blog (normalized by size of the department)	Number of other employees in ones' department reading or posting a blog/ Total number of employees in one's department
<i>SEEK_OTHERS</i>	Number of other employees in one's department viewing knowledge on the blog (normalized by size of the department)	Number of other employees in ones' department seeking knowledge on the blog/Total number of employees in one's department
<i>SHARE_OTHERS</i>	Number of other employees in one's department posting knowledge on a blog (normalized by size of the department)	Number of other employees in ones' department posting knowledge on the blog/Total number of employees in one's department.
<i>TENURE</i>	Employee's Tenure in the Organization	<i>TENURE</i> = Number of years employee has worked at the organization.
<i>GENDER</i>	Gender of an employee	<i>GENDER</i> = 0/1 where 0 = Female, 1 = Male
<i>LEVEL</i>	The level of an employee in the organizational hierarchy	<i>LEVEL</i> = 1/2/3/4 where <i>LEVEL1</i> = Junior Level; <i>LEVEL2</i> = Supervisors; <i>LEVEL3</i> = Managers; <i>LEVEL4</i> = Executives, Highest Level
<i>AGE</i>	Generation to which an employee belongs	<i>AGE</i> = 1/2/3 where 1 = Millennial, 2 = Gen. X, 3 = Baby Boomer

The variable *SEEK* denotes whether an employee uses the blog for viewing knowledge, and is an indicator of seeking tendency (or probability). (Kankanhalli et al.

2005b; Lou et al. 2000). Similarly, *SHARE* denotes sharing tendency and is measured as to whether an employee posts knowledge on the blog. The use of the blog by other employees is denoted by the variables *SEEK_OTHERS* and *SHARE_OTHERS*, which are measured as the number of other employees in one's department (normalized by the size of the department) who use the blog for seeking and sharing respectively (Lou et al. 2000). This is in line with prior work where network externalities are measured as the number of people in the network.

Table 4. Robustness Test Variables, Definitions, and Measures		
Variable	Definition	Measurement
<i>USE_INT</i>	Number of times the employee uses the blog to seek or share knowledge	Number of blogs viewed by an employee + Number of blog posts made by an employee
<i>SEEK_INT</i>	Number of times the employee uses the blog to seek knowledge	Number of blogs viewed by an employee
<i>SHARE_INT</i>	Number of times the employee uses the blog to share knowledge	Number of blog posts made by an employee
<i>HUSE</i>	Whether an employee is a heavy user of the blog to seek or share knowledge	Binary (0/1) – 1 denotes if an employee either viewed blogs ≥ 10 times or posted to blogs ≥ 2 times
<i>HSEEK</i>	Whether an employee is a heavy user of the blog to seek knowledge	Binary (0/1) – 1 denotes if an employee viewed blogs ≥ 10 times
<i>HSHARE</i>	Whether an employee is a heavy user of the blog to share knowledge	Binary (0/1) – 1 denotes if an employee posted to blogs ≥ 2 times
<i>LUSE</i>	Whether an employee is a light user of the blog to seek or share knowledge	Binary (0/1) – 1 denotes if an employee viewed blogs ≤ 2 times or posted to blogs < 2 times
<i>LSEEK</i>	Whether an employee is a light user of the blog to seek knowledge	Binary (0/1) – 1 denotes if an employee viewed blogs ≤ 2 times
<i>LSHARE</i>	Whether an employee is a light user of the blog to share knowledge	Binary (0/1) – 1 denotes if an employee posted to blogs < 2 times

For robustness testing of the models of the hypotheses, the intensity (i.e. number of times) of usage, seeking, and sharing is measured as defined in Table 4. The variable *USE_INT* measures usage intensity, and denotes the number of times an employee uses the social media blog for seeking or sharing. The intensity of seeking is measured by the variable *SEEK_INT* which is the number of times an employee views the blog. Similarly *SHARE_INT* denotes the intensity of sharing, which is the number of times an employee

contributes a post on the blog.

Robustness is further tested by analyzing the models for “heavy” and “light” blog usage, seeking, and sharing and these measures are included in Table 4. Heavy individual blog users are measured by the variable *HUSE* for seeking ≥ 10 times or sharing ≥ 2 times. Heavy individual blog seekers are measured by the variable *HSEEK* for seeking ≥ 10 times. Heavy individual blog sharers are measured by the variable *HSHARE* for sharing ≥ 2 times. Alternatively, light individual blog users are measured by the variable *LUSE* for seeking ≤ 2 times or sharing < 2 times. Light individual blog seekers are measured by the variable *LSEEK* for seeking ≤ 2 times. Finally, light individual blog sharers are measured by the variable *LSHARE* for sharing < 2 times.

The method for Chapter 3 is presented next, followed by the results.

3.6 Method

Tables 5 and 6 show the descriptive statistics and the correlation matrix respectively for the archival (log) data. The largest age group of employees consists of the “baby boomer” generation, 71% are male, and have an average tenure with the firm of nearly nine years. Most of these employees are individual contributors from the lower to mid-levels of the organization’s hierarchical job structure.

To establish a baseline for testing the models, first the single view of use is analyzed. Accordingly the one-sided network effect through the generic “use” of corporate blogs is employed by combining the seeking and sharing data. The data is then analyzed to determine if there is any more to be gained in using the two-sided network effects view by breaking down “use” into “seeking” and “sharing” for testing the hypothesized relations of the research model in Figure 3.

First, the effect on usage tendency is studied. Usage tendency measures the probability that an individual uses the corporate social media platform to seek or share knowledge. As a result, the dependent variables in this case are binary measures so the models are tested by using the binary logistics regression statistical analysis technique.

Table 5. Descriptive Statistic for Network Externalities (Archival Data)				
	Mean	Minimum	Maximum	Std. Deviation
<i>USE</i>	.051	0.0	1.0	.2208
<i>SHARE</i>	.002	0.0	1.0	.0405
<i>SEEK</i>	.051	0.0	1.0	.2208
<i>USE_INT</i>	.405	0.0	3,212	13.5612
<i>SHARE_INT</i>	.005	0.0	39.0	.2360
<i>SEEK_INT</i>	.400	0.0	3,212	13.5220
<i>USE_OTHERS</i>	0.0513	0.0	0.3297	0.0626
<i>SHARE_OTHERS</i>	0.0018	0.0	0.0117	0.0036
<i>SEEK_OTHERS</i>	0.0513	0.0	0.3297	0.0626
<i>TENURE</i>	8.894	0.0	58.0	9.1017
<i>GENDER</i>	.71	0.0	1.0	.453
<i>LEVEL1</i>	0.45			
<i>LEVEL2</i>	0.42			
<i>LEVEL3</i>	0.09			
<i>LEVEL4</i>	0.04			
<i>MILLENNIAL</i>	0.07			
<i>GENX</i>	0.17			
<i>BOOMER</i>	0.25			

Table 6. Correlation Matrix for Network Externalities (Archival Data)

		V1	V2	V3	V4	V5	V5	V7	V8	V9	V10	V11	V12	V13	V14	V15	V16
V1	<i>USE</i>	1.0000															
V2	<i>SEEK</i>	1.0000	1.0000														
V3	<i>SHARE</i>	0.1804	0.1804	1.0000													
V4	<i>USE_INT</i>	0.9838	0.9838	0.1887	1.0000												
V5	<i>SEEK_INT</i>	0.9838	0.9838	0.1878	0.9999	1.0000											
V6	<i>SHARE_INT</i>	0.1803	0.1803	0.9996	0.1887	0.1878	1.0000										
V7	<i>USE_OTHERS</i>	0.2135	0.2135	0.0477	0.2108	0.2108	0.0477	1.0000									
V8	<i>SEEK_OTHERS</i>	0.2135	0.2135	0.0477	0.2108	0.2108	0.0477	1.0000	1.0000								
V9	<i>SHARE_OTHERS</i>	0.1609	0.1609	0.0449	0.1593	0.1593	0.0449	0.5097	0.5097	1.0000							
V10	<i>TENURE</i>	0.0107	0.0107	-0.0031	0.0098	0.0098	-0.0031	-0.0135	-0.0135	-0.0058	1.0000						
V11	<i>GENDER</i>	-0.0305	-0.0305	-0.0019	-0.0302	-0.0302	-0.0019	-0.0266	-0.0266	-0.0082	0.0390	1.0000					
V12	<i>GENEX</i>	0.0421	0.0421	0.0153	0.0419	0.0419	0.0153	0.2133	0.2133	-0.0057	-0.1535	-0.0476	1.0000				
V13	<i>BOOMER</i>	0.0424	0.0424	-0.0053	0.0414	0.0414	-0.0053	0.2553	0.2553	-0.0159	0.3384	0.0384	-0.2598	1.0000			
V14	<i>LEVEL2</i>	0.0826	0.0826	0.0076	0.0815	0.0815	0.0076	0.3317	0.3317	0.0591	0.1905	0.0706	0.1606	0.3720	1.0000		
V15	<i>LEVEL3</i>	0.1014	0.1014	0.0181	0.1001	0.1001	0.0181	0.1614	0.1614	0.0714	0.1349	0.0748	-0.0180	0.2029	-0.1273	1.0000	
V16	<i>LEVEL4</i>	-0.0065	-0.0065	-0.0021	-0.0064	-0.0064	-0.0021	0.0416	0.0416	-0.1834	0.0383	0.0626	0.0661	0.0541	-0.0893	-0.0367	1.0000

Model 1 analyzes the social influence of the network externalities of the use by others on individual tendency to use.

$$\text{Model 1: Logit } (USE) = USE_OTHERS + TENURE + GENDER + LEVEL + AGE$$

The individual user characteristics of *TENURE*, *GENDER*, *LEVEL*, and *AGE*, are controlled in this model as well as the rest of the models.

Models 2 and 3 analyze the social influence of two-sided network externalities of the seeking and sharing by others on individual tendency to seek or share.

$$\text{Model 2: logit } (SEEK) = SEEK_OTHERS + SHARE_OTHERS + TENURE + GENDER + LEVEL + AGE$$

$$\text{Model 3: logit } (SHARE) = SEEK_OTHERS + SHARE_OTHERS + TENURE + GENDER + LEVEL + AGE$$

The effect on usage intensity is also analyzed as a robustness test measuring the number of times an individual uses corporate social media. In this case, the estimation with *USE_INT* is replaced by *SHARE_INT* and *SEEK_INT* as the dependent variables. The dependent variables are, therefore, count data and Models 1, 2, and 3 are tested using the negative binomial regression statistical analysis technique which uses maximum likelihood parameter estimation. This is used instead of a Poisson distribution since the count data is over dispersed and a parametric model that is more dispersed than the Poisson is required. In other words, the distribution is not normal and the mean and variance are not the same value: the variance is greater than the mean (Morrison and Schmittlein 1981).

Model 1 below is tested for robustness by analyzing the social influence of the network externalities of the use by others on individual intensity of use.

$$\text{Model 1: ln } (USE_INT) = USE_OTHERS + TENURE + GENDER + LEVEL + AGE$$

Models 2 and 3 below are tested for robustness by analyzing the social influence of two-sided network externalities of the seeking and sharing by others on individual seek or share intensity.

Model 2: $\ln(SEEK_INT) = SEEK_OTHERS + SHARE_OTHERS + TENURE + GENDER + LEVEL + AGE$

Model 3: $\ln(SHARE_INT) = SEEK_OTHERS + SHARE_OTHERS + TENURE + GENDER + LEVEL + AGE$

3.7 Results

The results of the analyses of the impact of network externalities are summarized in Table 7.

Table 7. Regression Results for Individual Seeking and Sharing Tendency: The Impact of the Social Influence of Network Externalities & Individual Characteristics			
	ONE-SIDE	TWO-SIDE	
	Model 1	Model 2	Model 3
VARIABLES	USE	SEEK	SHARE
Constant	-3.2905***	-3.3385***	-7.5588***
USE OTHERS	11.6144***		
SEEK OTHERS		10.1788***	12.0080***
SHARE OTHERS		39.2659***	131.1818***
TENURE	-0.0137***	-0.0135***	-0.0003
GENDER	-0.3100***	-0.3172***	-0.0703
LEVEL2	0.2953***	0.2952***	-0.2678
LEVEL3	1.0389***	1.0133***	0.4099
LEVEL4	0.2722**	0.3436***	-0.3921
GENX	-0.3809***	-0.3697***	-0.3859+
BOOMER	-0.5294***	-0.5272***	-1.3873***
Observations	52,256	52,256	52,256
Pseudo R2	0.1347	0.1368	0.1442
*** p<0.001, ** p<0.01, * p<0.05, + p<0.10			

The column for Model 1 shows that the use (combination of seek and share) of corporate social media is significantly influenced by others' use of social media, as one would have

expected. Namely, more colleagues (within the same department) using social media makes one more likely to use it too. However, it is not clear how people “use” social media, i.e. share or seek knowledge. To get a better understanding, use is decomposed into seek and share, which also allows one to study the influences of both demand-side and supply-side externalities. The coefficient of *SEEK_OTHERS* on *SEEK* is found to be positive and significant (Model 2 column) thereby providing evidence of significant demand-side externality and offering support for hypothesis H1. This means that an individual is more likely to use corporate social media to seek knowledge when more colleagues are using it to seek knowledge; this is likely due to word of mouth.

Significant evidence is also found of supply-side externality because the coefficient of *SHARE_OTHERS* on *SHARE* is positive and significant (Model 3 column); therefore, hypothesis H2 is supported. That is, an individual is more likely to share knowledge on corporate social media when his/her colleagues are sharing on the same platform; this may be due to mutualism. To test these cross-side network effects hypotheses, the coefficients of *SEEK_OTHERS* in the Model 3 column (H3) and *SHARE_OTHERS* in the Model 2 column (H4) are observed to be significantly positive.

This provides support for the prediction that an individual is more likely to use corporate social media to seek knowledge when more of his/her colleagues are posting knowledge. This makes sense because more posts suggest that it is more likely to find the knowledge the individual is seeking for. It is also found that an individual is more likely to share knowledge on corporate social media when more of his/her colleagues are seeking knowledge. This also makes sense because the value from sharing increases from the readership of others. An individual is more likely to share, when the value *from*

sharing, outweighs the opportunity costs *for* sharing. This finding points out the importance of “seeking” on the use of social media.

The marginal effects of models 1, 2, and 3 after logit are reported in Table 8.

Table 8. Marginal Effects After Logit for Models 1, 2, and 3			
	Model 1: <i>USE</i>	Model 2: <i>SEEK</i>	Model 3: <i>SHARE</i>
Variable	dy/dx	dy/dx	dy/dx
<i>USE OTHERS</i>	0.5669***		
<i>SEEK OTHERS</i>		.4857***	.0092***
<i>SHARE OTHERS</i>		1.874***	.1006***
(+) dy/dx is for discrete change of dummy variable from 0 to 1 *** p<0.001, ** p<0.01, * p<0.05			

For knowledge seeking (Model 2), the marginal effects results show that a one percentage point increase above the mean of “seek others” is associated with a same-side 0.4857 percentage point increase in the probability that an individual will “seek” (H1). Hence, an increase by 5 of the number of other seekers is associated with a 2.5% increase in the probability that an individual employee will use the social media platform to seek.

The cross-side influence that an individual will “seek” is even greater; a one percentage point increase above the mean of “share others” is associated with a 1.874 percentage point increase in the probability of seeking (H4). Therefore, an increase by 2 of the number of other sharers is associated with a 4% increase in the probability that an individual employee will use social media to seek. For information seeking, the complementary influences from cross-side network externalities are more likely to be positive compared to same same-side network externalities (Eisenmann et al. 2006).

For knowledge sharing (Model 3), a one percentage point increase above the mean of “share others” is associated with a same-side 0.1006 percentage point increase in the probability that an individual will “share” (H2). Therefore, an increase by 2 in the

number of other sharers is associated with a 0.2 % increase in the probability that an individual employee will use social media to share. Moreover, a one percentage point increase above the mean of “seek others” is associated with a cross-side 0.0092 percentage point increase in the probability that an individual will share (H3). Hence, an increase by 5 in the number of other seekers is associated with a 0.05 % increase in the probability that an individual employee will use social media to share. This suggests that same-side effects are likely to be a stronger influence for information sharing than the cross-side effects from other seekers.

Negative binomial regression is next performed as a robustness test for measuring intensity for the three models for their respective dependent variables: *USE_INT*, *SEEK_INT*, and *SHARE_INT*. The results reported in Table 9 with the marginal effects shown in Table 10 support the hypotheses.

Table 9. Robustness Test: Negative Binomial Model for Individual Seeking and Sharing Intensity			
	ONE-SIDE	TWO-SIDE	
	Model 1	Model 2	Model 3
VARIABLES	<i>USE_INT</i>	<i>SEEK_INT</i>	<i>SHARE_INT</i>
Constant	-1.7399***	-1.7740***	-7.1230***
<i>USE OTHERS</i>	18.0313***		
<i>SEEK OTHERS</i>		14.8228***	12.8106***
<i>SHARE OTHERS</i>		60.7255***	169.1053***
<i>TENURE</i>	-0.0339***	-0.0361***	0.029
<i>GENDER</i>	-0.1893***	-0.1735***	-0.2468
<i>LEVEL2</i>	0.3542***	0.3266***	-0.0563
<i>LEVEL3</i>	1.0291***	0.9494***	1.0826*
<i>LEVEL4</i>	0.011	0.0129	-1.4612
<i>GENX</i>	-0.8104***	-0.7360***	-0.2867
<i>BOOMER</i>	-1.2029***	-1.0954***	-1.8613***
Observations	52,256	52,256	52,256
Pseudo R2	0.0608	0.0621	0.0976
*** p<0.001, ** p<0.01, * p<0.05, + p<0.10			

Table 10. Marginal Effects After Negative Binomial Model Robustness Test			
Dependent Variable →	Model 1: <i>USE_INT</i>	Model 2: <i>SEEK_INT</i>	Model 3: <i>SHARE_INT</i>
Variable	dy/dx	dy/dx	dy/dx
<i>USE OTHERS</i>	4.31***		
<i>SEEK OTHERS</i>		3.45***	.02***
<i>SHARE OTHERS</i>		14.12***	.25***
(+) dy/dx is for discrete change of dummy variable from 0 to 1 *** p<0.001, ** p<0.01, * p<0.05, + <0.1			

Comparing both the results of usage tendency (Tables 7 and 8) with usage intensity (Tables 9 and 10), while others' seeking is important to one's use of social media, it is revealed that others' sharing plays an even greater role to an individual's

tendency and intensity to use social media. That is the cross-side externality is more important than the demand-side externality on seeking tendency and intensity.

Furthermore, the supply-side externality is more important than the cross-side externality on sharing tendency and intensity. These findings are consistent through the testing and suggest that others' sharing has a greater impact than others' seeking on individual seeking and sharing probability and intensity.

The control variables *GENDER*, *LEVEL*, *TENURE* and *AGE* have varying influences. Women are more likely than men to use social media for seeking knowledge. Gender, however, has no significance on the probability or intensity of sharing. Compared to job *LEVEL1* (the reference category), the probability of knowledge seeking is higher in job levels 2, 3, and 4, with job *LEVEL3* being the highest; knowledge sharing, on the other hand, is only higher in job *LEVEL3* intensity. Job *LEVEL3* consists of mid-level managers who are young enough to be able to readily embrace using new social media, and experienced enough to share helpful knowledge with others.

Compared to the *AGE* group *MILLENNIAL* (the reference category), the probability of knowledge seeking and sharing is lower in the other age groups *GENX* and *BOOMER*, with *BOOMER* being the lowest. In sum, both the probability and intensity of blog usage decreases with age group; this relation is monotonically decreasing, since the given order is preserved. While the younger two age groups embrace social media the most, the older age group *BOOMERS* is less active. This should be of concern since the nearly retired *BOOMER* age group is the largest in the organization and a key driver for why the firm is implementing social media. Finally, the probability in the number of times of knowledge seeking (but not sharing) decreases with employee tenure in the firm.

Overall, these results suggest that user characteristics can play different roles in one's seeking and sharing. Therefore, valuable insights can be lost if: 1) analysis is limited to the unidimensional view of social media "use" and 2) user demographics such as age and hierarchical level are not taken into account.

From the marginal effects results after negative binomial regression (Table 10), it is revealed that one percentage point increase above the mean of *SEEK_OTHERS* (*SHARE_OTHERS*) increases the sharing intensity of an employee by 0.02 (0.25) shares. In other words, sharing by others has a higher impact on sharing intensity as compared to seeking by others. On the other hand, one percentage point increase above the mean of *SEEK_OTHERS* (*SHARE_OTHERS*) increases the seeking intensity of an employee by 3.45 (14.12) seeks. Sharing by others has a higher impact on seeking intensity as compared to seeking by others. Also, the sharing and seeking by others have a greater impact on individual employee seeking than sharing. These intensity results are qualitatively similar to the tendency results in Table 8.

To validate the results, the following robustness tests for the models are performed in addition to the negative binomial regression intensity analysis. Multicollinearity is tested by measuring the variance inflation factor (VIF) for each independent variable. The VIF's for the independent variables are all below 5 which is well under the threshold of 10, indicating that multicollinearity is not an issue with the data (Belsley et al. 2005). Also, one can argue that the error terms in Models 2 and 3 are correlated. Therefore, the models are estimated using seemingly unrelated regression and biprobit, and qualitatively similar results are found. The models are analyzed for both heavy and light users as another robustness test.

Additional robustness tests were conducted analyzing the models for heavy and light social media users. The regression and marginal effect results of other users on individual heavy seekers and heavy sharers in Tables 11 and 12 support the findings of all four hypotheses. *SEEK_OTHERS* (*SHARE_OTHERS*) has a positive impact on *HSEEK* (*HSHARE*).

Table 11. Robustness Test: Logit for Individual Heavy Seeking and Heavy Sharing Tendency			
	ONE-SIDE	TWO-SIDE	
VARIABLES	<i>HUSE</i>	<i>HSEEK</i>	<i>HSHARE</i>
Constant	-5.0995***	-5.3914***	-8.7275***
<i>USE OTHERS</i>	12.28105***		
<i>SEEK OTHERS</i>		9.4270***	12.7789***
<i>SHARE OTHERS</i>		98.7777***	154.9345***
<i>TENURE</i>	-0.0208***	-0.0204***	0.0025
<i>GENDER</i>	-0.2814***	-0.2996***	-0.4356+
<i>LEVEL2</i>	0.0488	0.0737	0.0557
<i>LEVEL3</i>	0.6213***	0.5931***	0.5901
<i>LEVEL4</i>	-0.4854	-0.1779	-
<i>GENX</i>	-0.6369***	-0.6021***	-0.0682
<i>BOOMER</i>	-0.9838***	-0.9565***	-1.3168***
Observations	52,256	52,256	49,834
Pseudo R2	0.1155	0.1241	0.1367
*** p<0.001, ** p<0.01, * p<0.05, + p<0.10			

Table 12. Marginal Effects After Logit for Robustness Test of Individual Heavy Seeking and Heavy Sharing			
	Model 1: HUSE	Model 2: HSEEK	Model 3: HSHARE
Variable	dy/dx	dy/dx	dy/dx
<i>USE OTHERS</i>	0.0672***		
<i>SEEK OTHERS</i>		.0447***	.0039***
<i>SHARE OTHERS</i>		.4683***	.0476***
(+) dy/dx is for discrete change of dummy variable from 0 to 1 *** p<0.001, ** p<0.01, * p<0.05			

The regression and marginal effect results of other users on individual light seekers and light sharers in Tables 13 and 14 also support the findings of all four hypotheses.

SEEK_OTHERS (*SHARE_OTHERS*) has a positive impact on *LSEEK* (*LSHARE*).

Consistent with the previous marginal effects results, sharing by others has a bigger impact on individual seeking and sharing compared to the impact of seeking by others.

The marginal effects results show that the seeking and sharing by others has a greater impact on light seekers/sharers (who seek less) (Table 14) compared to heavy seekers/sharers (who seek more) (Table 12) with one exception. Other seekers have a greater impact on heavy seekers compared to light seekers. In other words, those that use social media more often to seek, are more likely to be influenced by others seeking, compared to those that use social media less often. In addition to supporting the hypotheses, these heavy and light user results again show the importance of understanding individual seeking and sharing by analyzing the social influence of others beyond their “use” or “sharing” through social media. The impact of others “seeking” also needs to be understood.

Table 13. Robustness Test: Logit for Individual Light Seeking and Light Sharing Tendency			
	ONE-SIDE	TWO-SIDE	
VARIABLES	<i>LUSE</i>	<i>LSEEK</i>	<i>LSHARE</i>
Constant	-3.9196***	-3.9914***	-8.0093***
<i>USE OTHERS</i>	10.2481***		
<i>SEEK OTHERS</i>		9.2625***	11.4354***
<i>SHARE OTHERS</i>		22.9114***	114.0015**
<i>TENURE</i>	-0.0100***	-0.0099***	-0.002
<i>GENDER</i>	-0.2603***	-0.2782***	0.307
<i>LEVEL2</i>	0.3072***	0.3352***	-0.6112+
<i>LEVEL3</i>	0.9936***	1.0034***	0.2364
<i>LEVEL4</i>	0.2769*	0.3410**	-0.0547
<i>GENX</i>	-0.3027***	-0.2720***	-0.6584*
<i>BOOMER</i>	-0.3654***	-0.3218***	-1.3872***
Observations	52,256	52,256	49,834
Pseudo R2	0.0987	0.0967	0.1324
*** p<0.001, ** p<0.01, * p<0.05, + p<0.10			

Table 14. Marginal Effects After Logit for Robustness Test of Individual Light Seeking and Light Sharing			
	Model 1: LUSE	Model 2: LSEEK	Model 3: LSHARE
Variable	dy/dx	dy/dx	dy/dx
<i>USE OTHERS</i>	0.3000***		
<i>SEEK OTHERS</i>		.0262***	.0052***
<i>SHARE OTHERS</i>		.6481***	.0517**
(+) dy/dx is for discrete change of dummy variable from 0 to 1			
*** p<0.001, ** p<0.01, * p<0.05			

In summary, the research model analysis and robustness tests show strong, consistent support for the hypotheses. Furthermore, the social influence of sharing by others has a stronger impact on individual employees than seeking by others. However, seeking by others also plays an important role in the use of social media to seek and to share knowledge in the organization.

3.8 Discussion

The statistically significant results demonstrate the value of applying two-sided network effects to study social media. The model is parsimonious and can generate interesting insights. For example, the conventional wisdom in social media, online community, knowledge management, and collaboration research is that sharing is the most important determinant of success. The results support this wisdom that sharing has the highest marginal effect on influencing others' decision to use the system.

However, the literature has not sufficiently focused on the complementary effects that can influence both consumption and availability of content in a knowledge sharing network. Namely, an increase in the number of people sharing content (*SHARE_OTHERS*) also positively and significantly influences individuals to generate content (*SHARE*). This is the traditional network externality effect but it has primarily been empirically analyzed on the consumption (demand) side (e.g., increase in the number of people consuming a product such as playing a video game, encourages others to join in). The results from this chapter show that the traditional network effect operates for both consumption (demand) *and* production (supply) of content.

The traditional externality effect of consumption also holds true in the results from H1, in that individual consumption (*SEEK*) is positively influenced by others' seeking (*SEEK_OTHERS*). It is interesting to note that this effect is quite powerful and almost on par with the effect of availability of content (*SHARE_OTHERS*) on one's tendency to seek knowledge through social media.

While promoting knowledge sharing is important, one should not underestimate the importance of knowledge seeking. The comparison suggests the following: in most

organizations, identifying and specifying knowledge, i.e., generating content, is inherently more expensive than persuading people to use a resource, and managers in the future could ‘choose’ which effect they want to emphasize. In addition, an effective strategy to use is to publicize the number of people seeking knowledge. Further, the opportunity to compare the same-side and cross-side effects on consumption (*SEEK*) (as well as content) provides researchers with a basis to probe the underlying mechanisms, ‘prices’ and ‘incentives’ that govern each effect, and any potential inter-dependencies.

In the same vein, it is also interesting to note that the influence on individual sharing (*SHARE*) is much greater on the same side from others (*SHARE_OTHERS*) (H2) than cross-side (*SEEK_OTHERS*) (H3). There are several possible explanations. (a) It is possible to anonymously consume content in the focal social media platform – the sharer is not directly informed as to who views their content. The effect may be less powerful than in other platforms where it is more obvious to sharers as to who consumes their content. (b) It is much easier to consume than to generate content, so it may be that the marginal effect that is measured and the relative ratios are ‘correct’ and represent reality. In other words, all things being equal, it may always require many more consumers to motivate sharing.

The results also demonstrate the additional benefits of breaking down social media “use” into “seek” and “share”. Model 1 suggests that “use” is higher among individuals who are in job *LEVEL4* (executives). Model 2 further supports this relation for “seek”. However, Model 3 shows no significant increase for executives for “share” compared to junior level employees. This suggests that although *LEVEL4* employees are using the platform more than *LEVEL1* employees, the increase in use is driven primarily

by these employees seeking more information than *LEVEL1* employees. There is no difference between the two groups in terms of knowledge sharing.

The results of Chapter 3 also provide insights on how organizations can sustain their social media efforts. For example, seekers could be encouraged to provide feedback to sharers, because this has been found to positively influence individual use (Wattal et al. 2009). Beyond seekers being able to provide comments, Tech Corp.'s social media platform also enables seekers to vote on posted content. These votes are counted and the vote count totals are displayed next to the shared posts. Through the use of this attribute, sharers are motivated to post quality content by being aware that seekers are benefitting from consuming their content. At the same time, seekers benefit from vote counts by being able to know that others who have voted have not only used this content, but have also found it to be useful.

In the next chapter, the focus of analysis shifts from the impact of the social influence of network externalities to the impact of organization structure on the use of social media for knowledge seeking and sharing within the organization. Organization structure is captured by extending the models used in Chapter 3 to include the influences of hierarchical and geographical distribution.

CHAPTER 4.

IMPACT OF ORGANIZATION STRUCTURE

4.1 Theoretical Development

The transformation to today's knowledge-based, service economy, along with the convergence of computing and communications technologies, are enabling employees in firms to share knowledge through their hierarchical structures and across their geographic locations (Van de Ven 2005). Research shows that organization structure in terms of both vertical, hierarchical level and horizontal, geographic distribution can impact the individual use of IT (Agarwal and Prasad 2000; Constant et al. 1996; Greve 2005; Gupta et al. 2009). Yet, even though firms are able to directly modify one or both of these parameters, little is known how organization structure can influence the seeking and sharing of knowledge by employees using corporate social media within the organization.

In order to gain greater understanding in how organization structure impacts the use of corporate social media by employees, the research model from Chapter 3, is extended in Chapter 4. Organization structure can vary vertically in terms of hierarchy, and it can vary horizontally, in terms of geographic distribution (Orton and Weick 1990). In this chapter, first, the influence of organization structure by number of vertical hierarchical levels on the individual use of corporate social media is developed. This is followed by investigating the influence of use due to the horizontal geographic distribution of the employee users.

Advances in IT such as corporate social media are allowing firms to have more flexible, distributed control and coordination among employees at lower costs (Yoo et al. 2008). Through the use of these tools, employees are able to gain greater autonomy

without being restricted to traditional top-down, co-located, “command and control” organization structures (Wagner 2004).

Burns and Stalker (1961) describe organizational topology or structure as being mechanical or organic. Wagner (2000) refers to these terms as centralized or decentralized. These variations in topology have been used for contingency predictions with the understanding that there is no one optimal way for firms to organize (Fiedler 1964).

The parameter centralization ranges from centralized and decentralized and describes how vertical in structure decision-making authority is spread in an organizational group (Johnson et al. 2006). In centralized groups, decision-making authority is concentrated vertically in higher hierarchical levels. In decentralized groups, this authority is distributed horizontally and lower across more autonomous employees having similar hierarchical levels in flatter topologies (Johnson et al. 2006). Centralized and decentralized topologies, have their own strengths and weaknesses, with the former being more stable, and the latter being more flexible (Pennings 1992).

Hierarchical levels have less vertical influence on each other in decentralized groups since there may be multiple and even conflicting goals between them (Orton and Weick 1990). Decentralized structures enable greater lateral communication and interaction conducive for adapting to innovations as a continuous process (Giessner and Schubert 2007). While decentralization can mean less integration and control within *local* processes, a stable equilibrium can be reached over time leading to greater overall integration and use of new IT tools at the organization-wide process level (Berente and Yoo 2012).

Since the authority for making decisions in centralized structures is concentrated towards the top, leaders are positioned “higher” in hierarchy in these structures (Giessner and Schubert 2007). Communication and interaction among employees in centralized topologies are typically vertical with tasks assigned via command and control from the top-down to functional specialists in lower hierarchical levels (Burns and Stalker 1961). These hierarchical structures are able to achieve efficient processing through policies and goals that standardize information (Weber 1922/1978). Decision-making contingency theories in the past have proposed that centralized decision making by a leader is more efficient, compared to decision making in decentralized structures among different team members by consensus (Hollenbeck et al. 2011). The speed of adoption and use of new IT systems within the organization has been traditionally viewed as spatial with respect to the size of the population and distance from its centers (Rogers 1983). From social cognitive theory, individual behavior is influenced by personal cognitions impacted by social influences and structures of the environment (Bandura 1986). Social structures are groups based on differentiated parameters such as hierarchical level and office location with social relations through interaction and communication (Blau 1974).

The use of internal corporate social media is an efficient means for employee-to-employee (E2E) interaction supporting geographic diversification (Singh 2010). Corporate social media platforms such as blogs and wikis are ideally suited for developing and sharing conversational knowledge with other users. These platforms are relatively cheap and easy to use and to implement, while providing affordances for distributed environments where knowledge is not centralized (Wagner 2004).

In summary, the research model is extended to include the structural influences of organization hierarchical levels and geographic distribution. Using collaborative IT tools such as social media through practice makes decentralization of control and the diversification of employee location possible in the first place. Firms need to know how organization structure, which they can control, impacts the way employees acquire and share knowledge through the use of corporate social media, and what can be done to most effectively manage this.

4.2 Research Setting and Design using Archival Data

As in the previous chapter, archival data is used from the same successful implementation of social media inside a large multi-national technology organization (Tech Corp.). This social media system provides a suite of tools including corporate blogs, wikis, tag and keyword supported reporting, social bookmarking, online forums, and internal corporate search engines for seeking knowledge generated by employees using the social media tools.

The archival, web server access log data is collected and analyzed from 52,256 employees of Tech Corp. who are using the same social media tool, the corporate blog. Employees can use the social media platform to create and post on blogs (sharing), as well as access and read the blogs (seeking). Key managers and users of the platform are also interviewed. As in Chapter 3, the data on knowledge sharing for Chapter 4 was collected over a six month period, and data on knowledge seeking was collected over a one month period.

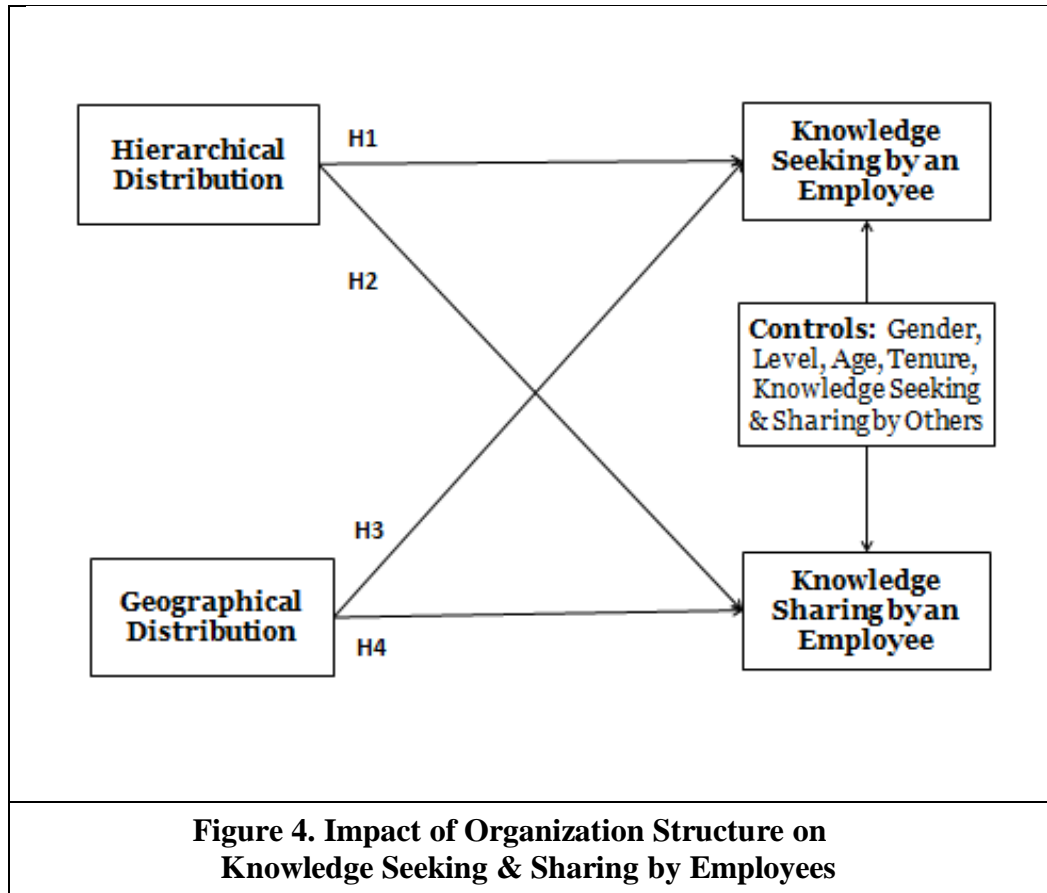
Since the focus of Chapter 4 is on the impact of organization structure, the social media use by others for seeking and sharing is controlled along with employee tenure,

gender, level, and age (Kane and Alavi 2008). Table 3 shows how these control variables are defined and measured. Measures are taken with respect to employee department for capturing the impact of variations in department structure with respect to hierarchy and geographic distribution. The research framework for Chapter 4 is presented next through the development of hypotheses that include the predictors of organization structure shown in Figure 4.

4.3 Hypotheses

Search is motivated by increased visibility of content, and the ability to easily find what one is seeking (Cyert and March 1963). Employees that use IT tools to seek information are influenced by their attitude on usefulness (e.g. relative advantage) and ease of use (Hartwick and Barki 1994). In sum, users are more likely to view posted content and view this content more often, when they perceive this information to be of greater use (Koh et al. 2007).

Seekers also prefer reading a variety of content (Brynjolfsson et al. 2010; Dixit and Stiglitz 1977; Hansen and Haas 2001). Learning from diverse views improves decision making and performance, especially when facing uncertain environmental demands (Van de Ven et al. 2008). However, vertical groups are beneficial for sharing “depth” and not “breadth” of knowledge with implicit coordination (Giessner and Schubert 2007; Johnson et al. 2006). Past research shows that top management support can lead to greater IT system use in the firm (Hartwick and Barki 1994; Robey 1979). Employees may also be motivated to seek information from other employees with higher hierarchical status perceived to have access to useful information (Greve 2005).



However, employees prefer reading technical posts from mid-level, instead of higher level employees (Constant et al. 1996; Singh 2010). For example, technical knowledge provided by upper level management performing managerial duties may no longer be up to date (Constant et al. 1996). Employees with greater tenure should have the experience to be able recognize the benefits of the use of new innovations for the firm (Hartwick and Barki 1994). However, greater tenure can also lead to resistance to change and, therefore, not perceiving the relative advantage for using new innovations (Agarwal and Prasad 2000; Wattal et al. 2010a).

Management and organizational structure have been identified as obstacles to the greater sharing of knowledge within firms (Jarvenpaa and Staples 2000; Morishima 1991; Ruggles 1998). Further, experience within the organization, mainly in management, may

not relate to being able to provide helpful technical advice for employees that seek this information (Constant et al. 1996).

Vertical, highly functional team members are likely to produce knowledge that may be less useful due to greater redundancies from being developed by the same, homogenous group (Bunderson and Sutcliffe 2002). In sum, research shows that technical knowledge provided by employees in more vertical organization structures is perceived to be less useful (Bunderson and Sutcliffe 2002; Constant et al. 1996; Singh 2010).

Self-contained, horizontally differentiated work units decrease the perception of group size (Galbraith 1973; Weick 1976). In such organizational structures, task visibility can increase, enhancing the ability of individual tasks to be monitored by co-workers (Jones 1984). Alternatively, in tightly coupled, vertical work groups with many hierarchy levels, task visibility decreases, making it more difficult for co-workers to monitor for mutual quality control (Jones 1984). Task visibility decreases as the number of hierarchical levels continues to grow, and individual employees reach a point where they have less autonomy and decision making authority for performing their own, discrete tasks.

From the transaction cost view, employees will be less motivated to improve discrete performance by sharing contributions where they are not recognized or rewarded (Williamson 1975). Employees in vertical business units with less task visibility should, therefore, be less motivated to share useful content compared to those in flatter, decentralized groups (Jones 1984). Furthermore, content provided by sharers of knowledge with a greater diversity of hierarchical levels is perceived to be less useful for

seekers (Constant et al. 1996).

In crowded and centralized work environments, there is likely to be greater overlap of the same type of content that is shared (Hansen and Haas 2001). Redundant content increases search costs which, in turn, have a negative impact on employee attitude for ease of use for seeking. Similarly, low quality content has a negative impact on employee attitude for usefulness (Hartwick and Barki 1994). Hence, the marginal value of sharing can be exceeded by increased cognitive and coordination costs for seeking (Jones et al. 2004). Seekers have to spend more time and effort trying to search and combine helpful knowledge that is posted (Jones et al. 2004). Seekers may even stop reading corporate blog posts that are not only redundant, but are also low in quality (Singh 2010). In addition, past research shows that employees with greater tenure in higher hierarchical levels in the organization can be resistant to change and, therefore, not embrace the use of new innovations for sharing knowledge (Agarwal and Prasad 2000; Wasko and Faraj 2005; Wattal et al. 2010a).

Taken together, the following hypotheses regarding the impact of the number of hierarchical levels on the usage of corporate social media for seeking and sharing knowledge are proposed:

Hypothesis 1 (hierarchy impact on seeking tendency): *The higher the number of hierarchical levels in the business unit, the greater will be the negative influence on the tendency of an employee to use corporate social media for seeking knowledge.*

Hypothesis 2 (hierarchy impact on sharing tendency): *The higher the number of hierarchical levels in the business unit, the greater will be the negative influence on the tendency of an employee to use corporate social media for sharing knowledge.*

The impact of horizontal, geographic distribution on the use of corporate social media is next discussed. The use of IT enables collaboration between employees physically separated by geographic location (Berente and Yoo 2012). Organizational group members who are not physically co-located rely upon the use of IT tools to seek and share knowledge with one another (Koh et al. 2007). The use of IT collaborative tools enables the separating of digital representations of people, processes, and objects from their physical counterparts to travel across geographic distance and time (Bailey et al. 2012). Hence, those that are physically separated in the organization, use IT to become virtually united for collaboration.

IT enabled geographically distributed employees within the organization are typically weak-tied between locations. They are relatively more likely to exchange technical information compared to managerial or personal information (Constant et al. 1996). Intergroup relations may rely on weak ties, because these interactions between members span beyond the strong ties of their primary groups (Blau 1974; Granovetter 1973).

Geographic distribution provides horizontal differentiation in organizational groups (Orton and Weick 1990). Members of these organization structures tend to be more divisionalized, autonomous, and generalists that reach out to one another in order to share expertise and to make decisions (Johnson et al. 2006). While horizontal differentiation can mean less integration and control within local processes, a stable equilibrium can be reached leading to greater overall integration and use of new IT tools at the organization-wide process level (Berente and Yoo 2012).

Research shows that the weak ties from geographic distribution can have a positive impact on knowledge seeking. Weak ties benefit seeking knowledge because they are less costly than strong ties which are prone to redundancy (Constant et al. 1996). Furthermore, past studies show that business units with members, who are also members of other internal or external groups, consider a greater variety of alternatives and ideas (Hoskisson et al. 2002; Valacich et al. 1995). Using knowledge from diverse sources as opposed to the same source is more conducive to ideation through the mixing of diverse knowledge sources (Wegner 1987). Cognitively, heterogeneous teams tend to retain multiple interpretive schemes that enable them to consider additional perspectives (Boland and Tenkasi 1995; Kilduff and Tsai 2003). Research using entropy as a measure of diversification reveals that firms that provide more diverse product or service offerings related to their respective industry segments, tend to be more profitable (Jacquemin and Berry 1979; Palepu 1985). Similarly, diversity in countries of knowledge sharers has been shown to have a positive impact in resolving technical problems for knowledge seekers (Constant et al. 1996).

Firms can benefit from the synergies of transferring knowledge in one segment to other related segments (Ansoff 1965). Organizations with greater diversity of sources of knowledge are better able to apply knowledge in one area and reapply it to new areas for resolving problems and creating new opportunities (Salter and Weinhold 1978).

Distributed teams that use knowledge from diverse sources, as opposed to the same source, help generate more innovative ideas and solutions (Maznevski and Chudoba 2000; Wegner 1987). Cognitively heterogeneous teams tend to retain multiple interpretive schemes that enable them to consider additional perspectives (Boland and

Tenkasi 1995; Kilduff and Tsai 2003).

Knowledge seeking behavior is motivated by not only the need for task information or for making sense of the world, but also for the need for social information to help users socially integrate their roles and their work with one another (Xu et al. 2010). Seekers, separated by physical distance, need to know “who knows what”, but may not personally know who is providing them information (Constant et al. 1996). Reading others’ posts and profiles, however, can help seekers determine this (Xu et al. 2010).

At the firm level, IT enabled communication and coordination facilitates the geographic distribution of problem solving and innovation activities (Yoo et al. 2012). For example, advances in IT enable offshore teams to provide IT services which can be at lower costs (Gupta et al. 2009). Geographically dispersed organizational group members without opportunities for face-to-face interactions depend upon the use of IT tools for collaboration (Kanawattanachai and Yoo 2007). Furthermore, members of weakly structured, globally distributed teams need to use IT tools for frequent seeking of knowledge to develop mutual trust for cooperation and performance (Jarvenpaa and Leidner 1998; Jarvenpaa et al. 2004; Jarvenpaa et al. 1999). In sum, the use of IT collaborative tools enables the separating of digital representations of people, processes, and objects from their physical counterparts to travel across geographic distance and time (Bailey et al. 2012). Hence, those that are physically separated in the organization, use IT to seek knowledge to become virtually connected.

While individuals may exchange knowledge with others in their same office location group, they also need to maintain close relations with employees in their same

business unit diversified by different office locations (Constant et al. 1996). Further, the greater the diversity of office locations for their respective business unit, the more likely employees will need to seek knowledge for maintaining increased relations remotely. Therefore, the greater the horizontal diversification of business unit office locations, the greater is the need for employees to use corporate social media to seek knowledge from one another.

Taken together, the following hypothesis regarding the impact of geographic distribution on the usage of corporate social media for seeking knowledge is proposed:

Hypothesis 3 (geographic distribution impact on seeking tendency): *The greater the geographic distribution of the business unit, the greater will be the positive influence on the tendency of an employee to use corporate social media for seeking knowledge.*

Geographically distributed employees depend upon collaborative IT tools for sharing problem solutions and innovation tasks (Bailey et al. 2012; Kanawattanachai and Yoo 2007; Kudaravalli and Faraj 2008; Yoo et al. 2012). Employees who work offsite tend to be generalists that reach out to share expertise with others (Johnson et al. 2006). Members of virtual teams develop mutual trust by sharing frequently (Jarvenpaa et al. 2004; Jarvenpaa et al. 1999). The use of IT is enabling employees to successfully share knowledge without face-to-face meetings (Maznevski and Chudoba 2000).

Taken together, the following hypothesis regarding the impact of geographic distribution on the usage of corporate social media for sharing knowledge is proposed:

Hypothesis 4 (geographic distribution impact on sharing tendency): *The greater the geographic distribution of the business unit, the greater will be the positive influence on the tendency of an employee to use corporate social media for sharing knowledge.*

The measures for Chapter 4 using archival data are described next.

4.4 Measures

Organization structure is measured in terms of *HIERARCHICAL_DISTRIBUTION* and *GEOGRAPHIC_DISTRIBUTION* as defined in Table 15.

Table 15. Variables, Definitions, and Measures for Organization Structure		
Variable	Definition	Measure
<i>HIERARCHICAL_DISTRIBUTION</i>	Number of hierarchical levels per respective business unit.	The difference between the maximum and minimum employee hierarchical levels for the respective business unit.
<i>GEOGRAPHIC_DISTRIBUTION</i>	Geographic distribution of employees per respective business unit.	The distribution of the number of employees in each different city for the respective business unit.

The variable *HIERARCHICAL_DISTRIBUTION* measures the height of the *vertical* span of the control structure for each business unit (Pugh et al. 1968). Demographics from the archival data provide the hierarchical levels for each employee and their respective business units. *HIERARCHICAL_DISTRIBUTION* is calculated by taking the difference between the highest and lowest employee hierarchical level for each business unit in the organization as follows:

$$\text{HIERARCHICAL_DISTRIBUTION} = \text{Maximum Employee Hierarchical Level} - \text{Minimum Employee Hierarchical Level}$$

The variable *GEOGRAPHIC_DISTRIBUTION* measures the *horizontal* geographic diversification of each business unit based on how dispersed the employees are in different office locations by city. *GEOGRAPHIC_DISTRIBUTION* is measured through entropy or diversification which is the inverse of concentration and is calculated per the following formula (Jacquemin and Berry 1979):

$$ENTROPY = \sum P_i \log (1/P_i) \text{ where } P_i \text{ is the business unit share of the } i^{\text{th}} \text{ office location by number of employees} = (\text{Number employees of a particular business unit in a particular location} / \text{Total number of employees of a business unit in all of its locations})$$

For example, a business unit with all of its employees co-located in the same office location would have a *GEOGRAPHIC_DISTRIBUTION* measure of “0”. Alternatively, an evenly distributed business unit with the same number of employees in each of its separate office locations would have a *GEOGRAPHIC_DISTRIBUTION* measure of “1”. The logarithm of (1/p_i) is the weight of the geographic distribution (inverse) of the share of each office location applied to itself (Jacquemin and Berry 1979).

4.5 Method

Tables 16 and 17 show the descriptive statistics and the correlation matrix respectively for the archival (log) data including hierarchical and geographic distribution. From Table 16, the *HIEARACHY_DISTRIBUTION* of the business units at Tech Corp. ranges from a minimum of 0 to a maximum of 9. The former indicates a completely flat, decentralized structure with all of the business unit employees being members of the same hierarchical level. The latter indicates a highly vertical, centralized structure with business unit employees being members of the highest senior executive level to lowest entry level. The *HIERARCHICAL_DISTRIBUTION* mean is 8.06 which implies that Tech Corp.’s business units are on average very vertical which is not surprising for a very large organization. Also from Table 16, *GEOGRAPHIC_DISTRIBUTION* ranges from 0

where all business unit employees are co-located to 4.58 where they are very unevenly distributed since a measure of 1 would indicate even distribution.

Table 16. Descriptive Statistics for Organization Structure (Archival Data)				
	Mean	Minimum	Maximum	Std. Deviation
<i>HIERARCHICAL DISTRIBUTION</i>	8.06	0.0	9.0	0.995
<i>GEOGRAPHIC DISTRIBUTION</i>	2.03	0.0	4.58	1.539
<i>USE</i>	.051	0.0	1.0	.2208
<i>SHARE</i>	.002	0.0	1.0	.0405
<i>SEEK</i>	.051	0.0	1.0	.2208
<i>USE_INT</i>	.405	0.0	3,212	13.56
<i>SHARE_INT</i>	.005	0.0	39.0	.2360
<i>SEEK_INT</i>	.400	0.0	3,212	13.522
<i>USE_OTHERS</i>	0.0513	0.0	0.3297	0.0626
<i>SHARE_OTHERS</i>	0.0018	0.0	0.0117	0.0036
<i>SEEK_OTHERS</i>	0.0513	0.0	0.3297	0.0626
<i>TENURE</i>	8.894	0.0	58.0	9.1017
<i>GENDER</i>	.71	0.0	1.0	.453
<i>LEVEL1</i>	0.45			
<i>LEVEL2</i>	0.42			
<i>LEVEL3</i>	0.09			
<i>LEVEL4</i>	0.04			
<i>MILLENNIAL</i>	0.07			
<i>GENX</i>	0.17			
<i>BOOMER</i>	0.25			

Table 17. Correlation Matrix for Organization Structure (Archival Data)

		V1	V2	V3	V4	V5	V5	V7	V8	V9	V10	V11	V12	V13	V14	V15	V16	V17	V18
V1	<i>USE</i>	1.000																	
V2	<i>SEEK</i>	1.000	1.000																
V3	<i>SHARE</i>	0.180	0.180	1.000															
V4	<i>USE_INT</i>	0.984	0.984	0.189	1.000														
V5	<i>SEEK_INT</i>	0.984	0.984	0.188	1.000	1.000													
V6	<i>SHARE_INT</i>	0.180	0.180	1.000	0.189	0.188	1.000												
V7	<i>USE_OTHERS</i>	0.214	0.214	0.048	0.211	0.211	0.048	1.000											
V8	<i>SEEK_OTHERS</i>	0.214	0.214	0.048	0.211	0.211	0.048	1.000	1.000										
V9	<i>SHARE_OTHERS</i>	0.161	0.161	0.045	0.159	0.159	0.045	0.510	0.510	1.000									
V10	<i>TENURE</i>	0.011	0.011	-0.003	0.010	0.010	-0.003	-0.014	-0.014	-0.006	1.000								
V11	<i>GENDER</i>	-0.031	-0.031	-0.002	-0.030	-0.030	-0.002	-0.027	-0.027	-0.008	0.039	1.000							
V12	<i>GENEX</i>	0.042	0.042	0.015	0.042	0.042	0.015	0.213	0.213	-0.006	-0.154	-0.048	1.000						
V13	<i>BOOMER</i>	0.042	0.042	-0.005	0.041	0.041	-0.005	0.255	0.255	-0.016	0.338	0.038	-0.260	1.000					
V14	<i>LEVEL2</i>	0.083	0.083	0.008	0.082	0.082	0.008	0.332	0.332	0.059	0.191	0.071	0.161	0.372	1.000				
V15	<i>LEVEL3</i>	0.101	0.101	0.018	0.100	0.100	0.018	0.161	0.161	0.071	0.135	0.075	-0.018	0.203	-0.127	1.000			
V16	<i>LEVEL4</i>	-0.007	-0.007	-0.002	-0.006	-0.006	-0.002	0.042	0.042	-0.183	0.038	0.063	0.066	0.054	-0.089	-0.037	1.000		
V17	<i>HIER_DIST</i>	-0.076	-0.077	-0.076	-0.077	-0.014	-0.014	-0.044	-0.044	0.094	-0.179	-0.022	0.103	0.064	-0.093	-0.013	0.168	1.000	
V18	<i>GEO_DIST</i>	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	0.220	0.220	0.221	-0.272	-0.048	0.048	-0.085	0.000	-0.029	-0.127	0.354	1.000

Models 1, 2, and 3 are next presented for analyzing the impact of organization structure hierarchical and geographic distribution on the use of social media to seek and share knowledge. A baseline is initially established through the single view of use via one-sided network effects by combining the seeking and sharing data. The two-sided network effects view is then analyzed by breaking down “use” into “seeking” and “sharing” for testing the hypothesized relations previously shown (Figure 4).

First the effect on usage tendency (i.e. probability) is studied. The dependent variables for these equations are binary measures. The models are, therefore, tested by using the binary logistics regression statistical analysis technique. Model 1 analyzes the influence of hierarchical and geographic distribution on individual *tendency* to “use” social media while controlling for the network externalities of others and demographics.

$$\text{Model 1: } \text{logit} (USE) = HIERARCHICAL_DIST + GEOGRAPHIC_DIST + USE_OTHERS + TENURE + GENDER + LEVEL + AGE$$

Models 2 and 3 analyze the influences of hierarchical and geographic distribution controlling for two-sided network externalities and demographics on individual *tendency* to “seek” or “share”.

$$\text{Model 2: } \text{logit} (SEEK) = HIERARCHICAL_DIST + GEOGRAPHIC_DIST + SEEK_OTHERS + SHARE_OTHERS + TENURE + GENDER + LEVEL + AGE$$

$$\text{Model 3: } \text{logit} (SHARE) = HIERARCHICAL_DIST + GEOGRAPHIC_DIST + SEEK_OTHERS + SHARE_OTHERS + TENURE + GENDER + LEVEL + AGE$$

These organization structure models are next tested for robustness by measuring intensity in terms of the number of times an individual uses, seeks, or shares corporate social media. Negative binomial regression is, therefore, the statistical analysis technique used. Model 1 is now used to analyze the individual *intensity* of use from the influences of hierarchical and geographic distribution while controlling for network externalities and

demographics.

$$\text{Model 1: } \ln(\text{USE_INT}) = \text{HIERARCHICAL_DIST} + \text{GEOGRAPHIC_DIST} + \text{USE_OTHERS} + \text{GENDER} + \text{LEVEL} + \text{AGE} + \text{TENURE}$$

Models 2 and 3 are now used to analyze individual *intensity* to seek and share from the influences of hierarchical and geographic distribution while controlling for network externalities and demographics.

$$\text{Model 2: } \ln(\text{SEEK_INT}) = \text{HIERARCHICAL_DIST} + \text{GEOGRAPHIC_DIST} + \text{SEEK_OTHERS} + \text{SHARE_OTHERS} + \text{TENURE} + \text{GENDER} + \text{LEVEL} + \text{AGE}$$

$$\text{Model 3: } \ln(\text{SHARE_INT}) = \text{HIERARCHICAL_DIST} + \text{GEOGRAPHIC_DIST} + \text{SEEK_OTHERS} + \text{SHARE_OTHERS} + \text{TENURE} + \text{GENDER} + \text{LEVEL} + \text{AGE}$$

4.6 Results

The results of the analyses of the impact of organization structure are summarized in Table 18. The Model 1 column shows that the use (combination of seek and share) of corporate social media is significantly influenced by both hierarchical and geographic distribution. Being in a business unit with a greater number of hierarchical levels makes one less likely to use social media. On the other hand, those in business units that have employees more geographically distributed are more likely to use social media.

Decomposing “use” into seek and share enables one to gain further insights in how the actual use of social media is impacted by organization structure. The coefficient of *HIERARCHIAL_DISTRIBUTION* on *SEEK* is found to be negative and significant (Model 2 column) thereby offering support for hypothesis H1. This means that an individual is less likely to use corporate social media to seek knowledge in vertical business units with more hierarchical levels; this may be due to the perception that the information is less useful.

Table 18. Regression Results for Individual Seeking and Sharing Tendency: Impact of Organization Structure & Individual Characteristics			
	ONE-SIDE	TWO-SIDE	
	Model 1	Model 2	Model 3
VARIABLES	<i>USE</i>	<i>SEEK</i>	<i>SHARE</i>
Constant	-1.8871***	-1.0447***	-5.0222***
<i>HIER. DIST.</i>	-0.2668***	-0.3733***	-0.6388***
<i>GEO. DIST.</i>	0.2283***	0.2230***	0.7094***
<i>USE OTHERS</i>	11.339***		
<i>SEEK OTHERS</i>		8.9218***	13.6588***
<i>SHARE OTHERS</i>		58.6007***	140.9396***
<i>TENURE</i>	-0.0094***	-0.0109***	0.0033
<i>GENDER</i>	-0.3047***	-0.3195***	-0.0924
<i>LEVEL2</i>	0.2654***	0.2669***	-0.1942
<i>LEVEL3</i>	1.0270***	1.0097***	0.4430
<i>LEVEL4</i>	0.6265***	0.7837***	0.4127
<i>GENX</i>	-0.3797***	-0.3600***	-0.4366*
<i>BOOMER</i>	-0.5369***	-0.5269***	-1.4236***
Observations	52,256	52,256	52,256
Pseudo R2	0.1390	0.1480	0.1525
*** p<0.001, ** p<0.01, * p<0.05, + p<0.10			

Significant evidence is also found that vertical business units have a negative impact on the use of social media to share knowledge, because the coefficient of *HIERARCHIAL_DISTRIBUTION* on *SHARE* is negative and significant (Model 3 column); therefore, hypothesis H2 is supported. That is, an individual is less likely to share knowledge on corporate social media when his/her business unit colleagues have greater hierarchical level disparity; this may be due to “task invisibility” from redundancies which are more likely in highly centralized business structures (Johnson et al. 2006; Jones 1984).

To test the geographic distribution hypotheses, the coefficients *GEOGRAPHIC_DISTRIBUTION* in the Model 2 column (H3) on *SEEK* and on the Model 3 column (H4) on *SHARE* are observed to be significantly positive. This provides

support for the predictions that an individual is more likely to use corporate social media to seek and share knowledge in business units with employees in more geographically distributed locations.

Distributed employees typically have fewer opportunities to meet face-to-face, so they should be more likely to rely on using collaborative IT tools such as corporate social media. From a sharing point of view, an employee is more likely to use corporate social media to share knowledge as distances between them increase and the benefits from using the platform overcome the opportunity costs. From a seeking point of view, employees who are not co-located should be more likely to rely on the use of corporate social media to ask questions and to seek solutions. Hence, both seekers and sharers should have greater reasons to use social media as the distances between them increase.

The marginal effects after logit of models 1, 2, and 3 are reported in Table 19.

Table 19. Marginal Effects After Logit for Models 1, 2, and 3: Impact of Organization Structure			
	Model 1: <i>USE</i>	Model 2: <i>SEEK</i>	Model 3: <i>SHARE</i>
Variable	dy/dx	dy/dx	dy/dx
<i>HIER. DIST.</i>	-.0114***	-.0154***	-.0003***
<i>GEO. DIST.</i>	.0100***	2.421***	.0003***
(+) dy/dx is for discrete change of dummy variable from 0 to 1 *** p<0.001, ** p<0.01, * p<0.05			

For knowledge seeking with respect to hierarchical distribution (Model 2), the marginal effects results show that a one percentage point increase above the mean of *HIERARCHICAL_DISTRIBUTION* is associated with a -0.0154 percentage point decrease in the probability that an individual will “seek” (H1). For knowledge sharing with respect to hierarchy (Model 3), a one percentage point increase above the mean of *HIERARCHICAL_DISTRIBUTION* is associated with a -.0003 percentage point

decrease in the probability that an individual will “share” (H2). Hence, hierarchical distribution has a greater negative marginal effect on seeking compared to sharing.

For knowledge seeking with respect to geographic distribution (Model 2), a one percentage point increase above the mean of *GEOGRAPHIC_DISTRIBUTION* is associated with a 2.42 percentage point increase in the probability that an individual will “seek” (H3). For knowledge sharing with respect to geography, a one percentage point increase above the mean of *GEOGRAPHIC_DISTRIBUTION* is associated with a 0.0003 percentage point increase in the probability that an individual will “share” (H4). This suggests that as with hierarchical distribution in the negative direction, the geographic distribution of employees is likely to have a stronger influence on knowledge seeking compared to sharing in the positive direction.

Negative binomial regression is next performed as a robustness test for the three models measuring the impact of hierarchical and geographic distribution on the intensity for the dependent variables: *USE_INT*, *SEEK_INT*, and *SHARE_INT*. The intensity results reported in Table 20 with the marginal effects shown in Table 21 support hypotheses H1 and H3. In other words, the tendency results (Tables 18 and 19) and intensity results (Tables 20 and 21) consistently show that both hierarchical and geographic distribution have significant, opposing influences on an employee’s use of social media for seeking knowledge.

Table 20. Robustness Test: Negative Binomial Model for Individual Seeking and Sharing Intensity from the Impact of Organization Structure			
	ONE-SIDE	TWO-SIDE	
	Model 1	Model 2	Model 3
VARIABLES	USE	SEEK	SHARE
Constant	-1.8871***	-1.0447***	-5.0222***
HIER. DIST.	-0.2668***	-0.3733***	-0.6388***
GEO. DIST.	0.2283***	0.2230***	0.7094***
USE OTHERS	11.339***		
SEEK OTHERS		8.9218***	13.6588***
SHARE OTHERS		58.6007***	140.9396***
TENURE	-0.0094***	-0.0109***	0.0033
GENDER	-0.3047***	-0.3195***	-0.0924
LEVEL2	0.2654***	0.2669***	-0.1942
LEVEL3	1.0270***	1.0097***	0.4430
LEVEL4	0.6265***	0.7837***	0.4127
GENX	-0.3797***	-0.3600***	-0.4366*
BOOMER	-0.5369***	-0.5269***	-1.4236***
Observations	52,256	52,256	52,256
Pseudo R2	0.1390	0.1480	0.1525
*** p<0.001, ** p<0.01, * p<0.05, + p<0.10			

From the marginal effects after negative binomial regression in Table 21, it is revealed that for every increase by one above the mean of *HIERARCHICAL_DISTRIBUTION (GEOGRAPHIC_DISTRIBUTION)*, the number of seeks by an employee decreases (increases) by -0.0855 (0.0397) or by -8.6% (3.97%). In other words, the hierarchical distribution of a business unit has a higher negative impact on seeking intensity as compared to the positive impact of geographic distribution. The seek intensity marginal effects results in Table 21 are qualitatively similar to the seek tendency marginal effects results in Table 19.

On the other hand, neither *HIERARCHICAL_DISTRIBUTION* nor *GEOGRAPHIC_DISTRIBUTION* is found to have a significant impact on sharing

intensity. This may be related to sharing typically requiring more energy and time to perform compared to seeking. This may also be related to seeking being able to done anonymously through the corporate social media platform.

Table 21. Marginal Effects After Negative Binomial Model Robustness Test			
Dependent Variable →	Model 1: <i>USE_INT</i>	Model 2: <i>SEEK_INT</i>	Model 3: <i>SHARE_INT</i>
Variable	dy/dx	dy/dx	dy/dx
<i>HIER. DIST.</i>	-.084***	-.0855***	-0.0004
<i>GEO. DIST.</i>	.0416***	.0397***	0.0002
(+) dy/dx is for discrete change of dummy variable from 0 to 1 *** p<0.001, ** p<0.01, * p<0.05, + <0.1			

The control variables *GENDER*, *LEVEL*, *TENURE*, *AGE*, as well as the additional control variables *SEEK_OTHERS*, and *SHARE_OTHERS* show qualitatively similar results compared to the models of the previous chapter. For example, other seekers and sharers have significant same-side and cross-side influences on individual seeking and sharing through corporate social media. Women are more likely than men to use social media for seeking knowledge, but gender has no impact on sharing. Knowledge seeking is highest in Level 3 which includes mid-level managers. Employee tenure has a negative impact on seeking, and age has a negative impact on seeking as well as sharing.

In addition to the negative binomial regression intensity analysis, the following robustness tests are conducted to validate the results. The variance inflation factor (VIF) for each independent variable is measured, and the VIF's are all below 5 which are well under the threshold of 10. This indicates that multicollinearity is not an issue (Belsley et al. 2005). Furthermore, since it can be argued that the error terms in Models 2 and 3 are correlated, the models are estimated using seemingly unrelated regression with qualitatively similar results.

In summary, the results support the hypotheses. Less organization structure with respect to hierarchical and geographic distribution can lead to a greater probability that an individual employee will use corporate social media to seek and to share knowledge within the firm.

4.7 Discussion

The significant results of the four hypotheses show that organization structure influences the use of corporate social media in the organization. Drawing from social cognitive theory, human behavior is an interaction between personal factors and the environment that includes social influences and social structures such as hierarchy and location (Bandura 1986; Blau 1974).

The organization structure parameters of the vertical number of hierarchical levels and the horizontal distribution of employees in the business units are elements of the environment which organizations can control. At the same time, many organizations are trying to implement corporate social media with mixed results. Managers, therefore, need to be aware of how the structure of their business units can impact the use of social media by their employees. However, IS literature has primarily focused on the impact of organization structure with respect to the unidimensional use of IT (Agarwal and Prasad 2000; Constant et al. 1996; Greve 2005; Gupta et al. 2009).

By breaking down “use” into “seeking” and “sharing” the results in this thesis better capture how social media use is being influenced by organization structure. *HIEARCHICAL_DISTRIBUTION* has a negative influence on the tendency of employee seeking (H1) and *GEOGRAPHIC_ DISTRIBUTION* has a positive impact employee seeking tendency (H3). However, the respective negative and positive influences of these

two parameters are weaker with respect to the tendency of employee sharing (H2, H4). Furthermore while the organization structure antecedents impact seeking tendency and intensity, these parameters only impact sharing tendency and not sharing intensity (Table 21). These disparities likely reflect that compared to seeking, sharing through the corporate social media tends to take less effort and can be done anonymously.

Furthermore, the negative impact of *HIEARCHICAL_DISTRIBUTION* is greater than the positive impact of *GEOGRAPHIC_DISTRIBUTION* on seeking *intensity* (Table 21). Hence, employees in more vertical, centralized business units are less likely to try social media to seek. Centralized business units are more likely to have redundancies, and, therefore, the knowledge that is shared can be perceived to be less useful. However, for seeking *tendency*, *GEOGRAPHIC_DISTRIBUTION* has a greater positive impact, compared to the negative impact of *HIEARCHICAL_DISTRIBUTION* (Table 19). Hence, an employee in a more geographically distributed business unit is more likely to try social media to seek knowledge. Geographic distribution limits face-to-face meeting opportunities so distributed employees are likely to be more dependent using social media to find out what they need to know for their work. Furthermore, there should be fewer redundancies of shared content so it should be more useful.

In the next chapter, the focus of analysis shifts from the impact of organization structure to the impact of social capital on the use of social media for knowledge seeking and sharing within the organization. Social capital is broken down into multiple dimensions to gain greater understanding of how it impacts both seeking and sharing. Also, the social influence of the critical mass of others is compared.

CHAPTER 5.

IMPACT OF SOCIAL CAPITAL

5.1 Theoretical Development

The theoretical development of social capital is next presented. How this antecedent differs from the social influence of network externalities on the use of corporate social media is also discussed. Social capital in general has been recognized as the goodwill (e.g. sympathy, trust) derived from social relations that can be used to support action (Adler and Kwon 2002). In addition to the social influence of network externalities and organization structure, social capital has been recognized in IS research as a key antecedent influencing the use of IT (Nahapiet and Ghoshal 1998; Peng et al. 2011; Tsai and Ghoshal 1998; Wasko and Faraj 2005).

Social capital is associated with greater posting and viewing intensity of user-generated content for personal use in the public consumer-to-consumer (C2C) domain for movie reviews (Schlosser 2011). Social capital can also have a positive impact in not only knowledge sharing, but also knowledge seeking in the business-to-consumer (B2C) domain in, for example, for job searches (Granovetter 1973). Little is known, however, what the influences of the various dimensions of social capital are on both the seeking and sharing of knowledge in the employee-to-employee (E2E) domain within the organization for work.

Social capital has been viewed as an *external* asset maintained by an individual's "bridging" relations with others that enable access to resources (Adler and Kwon 2002; Granovetter 1995; Moran 2005). Social capital has also been viewed as an *internal* structure of "bonding" relations enabling people to collaborate so that their unit can

collectively benefit (Coleman 1988; Putnam 1995). While research has primarily focused on either the external or internal views of social capital, these views are not mutually exclusive. Therefore, some researchers have taken a third view by combining the two (Adler and Kwon 2002; Nahapiet and Ghoshal 1998; Woolcock 1998). This thesis takes this combined view of social capital where relations serve as an individual asset and a collective unit (Nahapiet and Ghoshal 1998). The advantage of this view is that it can take into account individuals forming their own *external* relations with others that are collectively *internal* to the firm (Adler and Kwon 2002).

Social capital relies on the individual perception of collective benefits through the quality of a network of current or potential *relations*. This is different from the social influence of network externalities that relies upon the perception of individual benefits through the quantity of the current or potential *user base of connections*. In order for organizations to effectively promote the use of corporate social media, they need to understand why employees voluntarily participate and which influences have the greatest impact. Chapter 5 helps to provide these insights by comparing the impact of social capital to the social influence of network externalities on the seeking and sharing of knowledge.

Social capital benefits from learning which is the production of human capital (Bento 2004). Organizations that emphasize learning have been termed “learning organizations” and tend to demonstrate positive performance and innovation which, in turn, is enhanced through interactions with others (e.g. employees, customers, suppliers, learning institutions) (Bento 2004). These interactions with others, in turn, can be enabled by the use of corporate social media. Learning organizations have been characterized as

having decentralized organizational responsibility, mobile employees, and collective teamwork which facilitate interactions for acquiring new knowledge (Lundvall and Nielsen 1999). Strong social capital developed from the sharing of knowledge among peers risks the loss of power of traditional top-down, centralized organizational structures at the expense of information (Adler and Kwon 2002). Employees with many close contacts among their peers should be able to rely more on each other for information and less on higher hierarchical level focal actors.

The social capital benefit of acquiring knowledge has been viewed as mainly a social activity involving “learning-before-doing” (e.g. seeking) and “learning-by-doing” by interacting with others (e.g. sharing) (Bento 2004). Learning-before-doing includes seeking explicit knowledge which is knowledge that is “out there”, external to the focal actor and can be codified into software. Tacit knowledge, on the other hand, is internal to the focal actors and consists of “know-how” and “know-who” knowledge of who knows what (also referred to as “expertise location”) (Foray and Lundvall 1996). Tacit knowledge can be acquired by informal learning by doing (Bento 2004). In the context of social media, learning by doing “know-how” tacit knowledge can be advanced by the individual by going beyond the passive viewing of content to the active sharing through postings.

The learning process involves the informal procedure of learning-by-interacting for combining parts of explicit knowledge on the outside with internal tacit knowledge (Malerba and Orsenigo 2000). For example, in innovative product development work by distributed teams, knowledge needs to be taken into account for both design and practice experiences due to the simultaneous duality between both the users and the producers of

these designs. In this example, learning-before-doing is mainly involved in first individually acquiring explicit knowledge for the product development process. Learning-by-doing is then mainly involved in building a collective, social network for learning by interacting with others for acquiring tacit knowledge through practice (Bento 2004).

Both learning-before-doing and learning-by-doing can be manifest by using corporate social media from passively viewing knowledge to actively interacting with others by requesting and sharing knowledge. Users, however, need incentives for participating in this process. Incentives from the social influence of network externalities are based on the perceived benefits of participating from the spillover effects of the current and future size of the connected user base. In general, a larger user base should yield greater value for a new user to participate (Ransbotham et al. 2012). The network externality benefits to the individual user are with respect to the size of the active user base for “learning-before-doing” viewing and/or “learning-by-doing” interactive posting. Hence, individual benefits are acquired by the participation of others.

Social capital, on the other hand, can provide incentives to use corporate social media through such social network characteristics as trust, reciprocity, and a collective sense of mutual benefit (Parameswaran and Whinston 2007a). Hence, internal group collective benefits are acquired by the participation of individuals. Alternatively, individual external benefits are acquired with respect to the collective participation of the group. As with network externalities, social capital should provide incentives for using social media for “learning-before-doing” seeking and “learning-by-doing” sharing once it is collectively developed between individuals in the group (Schlosser 2011).

In order to gain greater understanding in how social capital impacts the use of corporate social media for seeking and sharing knowledge for learning, this thesis breaks down social capital into multiple dimensions. This multidimensional approach also enables the analysis to take into account the combined view of social capital where relations serve as an external individual asset as well as an internal collective unit (Nahapiet and Ghoshal 1998).

While there is general, overall agreement of the concept of social capital, there are differences among researchers on how social capital is measured through various dimensions (Adler and Kwon 2002). Researchers therefore focus on different pieces of social capital. For example, social capital has been modeled as three dimensions: structural, cognitive, and relational which can be interrelated with one another (Peng et al. 2011; Tsai and Ghoshal 1998). Alternatively, social capital has also been modeled using these three dimensions *independent* from one another (Nahapiet and Ghoshal 1998; Wasko and Faraj 2005). Moran (2005) uses two of these dimensions, relational and structural, independent from one another, to represent social capital. Laursen et al. (2012) take into account one dimension: structural capital.

Structural social capital, describes the pattern of linkages of the network configuration between actors (Nahapiet and Ghoshal 1998). The network locations of actors and the patterns of interactions between them contribute to this dimension (Nahapiet and Ghoshal 1997). Research shows that those that use innovations at a given point in time are more likely to have similar structural situations with each other (Burt 1987). The structural dimension can be developed in the design of reporting structures and work groups emphasizing opportunities for interactions and collocation (Chua et al.

2012). Strong influences on individual employees have been found to be within employee work groups (Kraut et al. 1998). This dimension is also characterized by the informal interactions between individuals (Laursen et al. 2012).

Structural capital can have a higher influence on routine, execution-related tasks (Moran 2005). Therefore, in collaborating for performing different, routine tasks, the breadth of “who one knows” from structural capital can be more important than the depth of “how well” one knows these contacts. Wasko and Faraj (2005) find that compared to the other dimensions of social capital, structural capital has the most significant influence on sharing knowledge in online communities. Those with greater centrality in the community have more connections with others through which critical mass can be achieved for sustaining these links (Wasko and Faraj 2005).

Cognitive social capital provides common understandings and systems of meanings (of intellectual capital) through such shared resources as language, code, narratives, and tacit knowledge (Nahapiet and Ghoshal 1998). Hence, structural capital of “who knows what” should have a positive impact on cognitive social capital (Nahapiet and Ghoshal 1997). Similar to network externalities, collective action from cognitive social capital is more likely to occur with heterogeneous varieties of interest and available resources between the actors (Markus 1987). If all members of the network valued knowledge the same way, there would be no incentive for individuals to pay more through, for example, higher search costs than others (Markus 1987). In addition, members of an organization with the shared vision and goals of cognitive capital are more likely to recognize the collective value of sharing and exchanging knowledge with one another (Tsai and Ghoshal 1998).

Social interactions between individual actors from structural capital can lead to common values and a shared vision of cognitive capital as well as the trusting relations of the relational social capital dimension (Tsai and Ghoshal 1998). Furthermore, cognitive social capital manifests itself from common values and shared vision, which, in turn, can facilitate the creation of closer, trusting relations of relational social capital (Tsai and Ghoshal 1998).

Increases in trust over time can lead to increased individual contributions (Monge et al. 1998; Williamson 1998). Relational capital has been found to have a stronger influence on internally performing new, innovation-related tasks (Moran 2005). Therefore, in the collaboration performance of these internal and more innovative tasks, “how well” one knows their contacts through relational capital can become more important than “who they know” through structural capital.

The various dimensions of social capital can have similar influences on the organization. For example, Peng et al. (2011) find that cognitive capital, as well as relational capital, have positive influences on local management’s commitment for using a new IT system in the organization. Moran et al. (2005) find that both structural and relational capital have a positive impact on managerial performance.

However, the different dimensions of social capital can also lead to different outcomes in the organization. For example, relational capital, which focuses on the quality of relations in terms of “how well” one knows others in their network, has a greater impact on innovation-related tasks (Moran 2005, p. 1129). Structural capital, on the other hand, which focuses on the overall network configuration of the network’s actors, has a greater impact on routine, executable tasks (Moran 2005).

While both network externalities and social capital should have a positive impact on the seeking and sharing of knowledge using corporate social media, there are, however, key differences. Network externalities are based on the user's perception of the overall observed behavior of connected users of the same user base "out there" accessing, obtaining, and developing useful knowledge posted by others that may or may not be known personally. Network externalities should be a particularly beneficial mechanism for "learning-before-doing" viewing of posted social media knowledge within the organization since there may already be helpful content posted by others that the user does not yet know personally.

Social capital, on the other hand, is based on the individual user (or social unit) developing a network of cognitive and trusting relations with other users that he or she usually knows. Social capital evolves from the perspective of the user's relations of not only "who one knows" but also "how well" one knows those contacts (Moran 2005). While, the benefits of network externalities are not dependent on "close" relations developed between users to interact with one another, network externalities do require the social media user base to not only be established but to also be maintained by a balance of seekers and sharers of knowledge. Social capital relies upon the cultivation of such network member dimensions as trust, reciprocity, willingness to participate for collective benefits, and social norms for implementing and sustaining social media usage (Parameswaran and Whinston 2007a). In sum, social capital emphasizes the development of quality relations, while network externalities emphasize quantity of connections.

Despite the potential risks, higher levels of cognitive and relational social capital should in general be beneficial for learning-before-doing viewing and learning-by-doing posting through social media between contacts at cognitive and trusting levels (Nahapiet and Ghoshal 1998; Peng et al. 2011). Social capital requires time to develop and to grow through the cultivation of trusting relations and the establishment of cognitive feelings of mutual benefits for those connected. The social influence of network externalities, on the other hand, requires time for the critical mass of early users to be connected in order for later users to receive spillover benefits for interacting with others who they may or may not know.

Developing and sharing innovative ideas is mainly a social activity relying on the linking of ideas between individuals and collective knowledge (Bento 2004). Chapter 5 examines the influences of both network externalities and social capital because both antecedents provide different incentives for the use of corporate social media for developing and sharing knowledge in the organization. In short, social capital relies on the individual perception of collective benefits through the quality of a network of current or potential relations. Conversely, the social influence of network externalities relies upon the perception of individual benefits through the quantity of the potential user base of connections.

In summary, social capital has dimensions that need to be collectively optimized and not necessarily maximized (Adler and Kwon 2002). Despite the importance of social capital in IS literature for knowledge sharing, no prior research has emphasized the effects of dimensions of social capital with respect to the multidimensional use of corporate social media for both seeking and sharing knowledge. The dimensions of social

capital can have varying influences. It is, therefore, critical to analyze the impact of social capital in terms of its dimensions (Woolcock 1998).

The analysis of the influences of social capital in this thesis focuses on the cognitive and relational dimensions since the interrelations with structural capital have been already analyzed in previous research (Peng et al. 2011; Tsai and Ghoshal 1998). Furthermore, there has been no other empirical field study comparing the social influences of the size of the user base with the influences of social capital on individual employee E2E seeking and sharing within the organization. The analysis of survey data in Chapter 5 addresses these gaps. The research setting and design, hypotheses, measures, and methods for this chapter are presented next.

5.2 Research Setting and Design using Survey Data

The analysis in Chapter 3, which uses archival data, is triangulated with the analysis of survey data in Chapter 5, collected from the same large multi-national organization (Tech Corp.) for the implementation and use of corporate social media within that organization. The survey data used in this chapter is collected from 145 employees using various corporate social media tools such as corporate blogs, wikis, and social networking tools via a survey instrument. Through this instrument, first the impact of social influence is tested using survey data on individual employee seeking and sharing as per the research framework in Figure 2. This is the same research framework tested in Chapter 3 using archival data. Because a survey instrument is being used in Chapter 5, the model can be extended to measure the impact of social capital on individual use.

The variables *Attitude Toward Using* and the *Subjective Norm* are controlled since these influences are not the focus of the analysis. *Attitude Toward Using* is drawn from Davis (1989) with the construct consisting of perceived usefulness and perceived ease of use. Subjective Norm for Technology Usage is a measure for social influence when it has a direct influence on user intentions to use a system that is manifest by the behavior of people who the employee considers influential or important (Venkatesh et al. 2003b).

The hypotheses for this chapter are initially drawn from the proposed research framework from Chapter 3 for the impact of the social influence of the user base. Additional hypotheses are then developed for the extension of the model taking into account the influences of social capital on the seeking and sharing of knowledge by individual employees in Figure 5.

5.3 Hypotheses

Using the collected survey data, the impact of social influence of the perceived critical mass on individual employee use of corporate social media for seeking and sharing knowledge is first tested. Drawing from the four proposed relations of the research framework and the social influence hypotheses developed in Chapter 3, the first four hypotheses of Chapter 5 in Figure 5 are as follows:

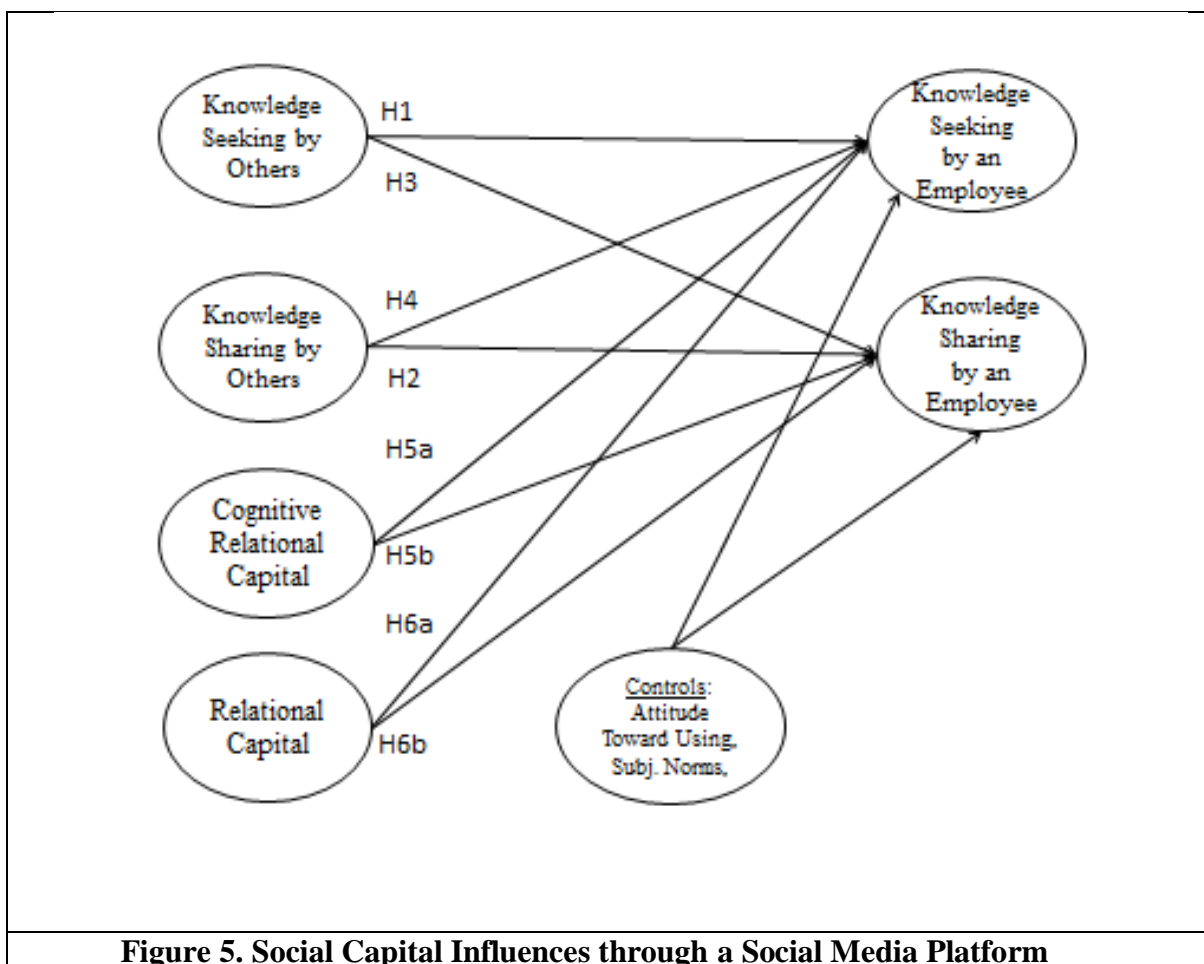
Hypothesis 1 (demand-side externality on seeking): *Knowledge seeking by others through corporate social media will have a positive influence on an employee's use of corporate social media for seeking knowledge.*

Hypothesis 2 (supply-side externality on sharing): *Knowledge sharing by others through a corporate social media will have a positive influence on an employee's*

use of corporate social media for sharing knowledge.

Hypothesis 3 (cross-side externality on sharing): Knowledge seeking by others through social media will have a positive influence on an employee's usage of corporate social media for sharing knowledge.

Hypothesis 4 (cross-side externality on seeking): Knowledge sharing by others through corporate social media will have a positive influence on an employee's usage of corporate social media for seeking knowledge.



Next, hypotheses are developed to empirically test the influences of the cognitive and relational dimensions of social capital on employee use of social media for seeking and sharing knowledge (Figure 5). The cognitive dimension of social capital takes into

account shared understandings and systems of meanings (of intellectual capital) through such shared resources as language, code, narratives, and tacit knowledge (Nahapiet and Ghoshal 1998). A shared vision can facilitate the integration of different, heterogeneous members of an organization (Markus 1987). Cognitive capital as well as relational capital can have positive influences on the local commitment by management for using a new enterprise system in the organization (Peng et al. 2011). Furthermore, members of an organization with the shared vision and goals of cognitive capital are more likely to recognize the collective value of sharing and exchanging knowledge (Tsai and Ghoshal 1998). Hence, a user is more likely to seek or share knowledge with others with whom they have a shared, collective view. Therefore, the following hypotheses are proposed regarding the impact of cognitive capital on the usage of corporate social media within the organization for seeking and sharing:

Hypothesis 5a (cognitive capital influence on seeking): *Cognitive capital will have a positive influence on an employee's usage of corporate social media for seeking knowledge.*

Hypothesis 5b (cognitive capital influence on sharing): *Cognitive capital will have a positive influence on an employee's usage of corporate social media for sharing knowledge.*

The relational dimension of social capital takes into account trust, norms, sanctions, obligations, expectations, and identity (Nahapiet and Ghoshal 1997; Nahapiet and Ghoshal 1998). This dimension focuses on the quality of relations in terms in terms of "how well" one knows others in their network (Moran 2005, p. 1129). Relational capital describes the ongoing personal relations actors have with one another that can, in

turn, affect their social motives such as prestige or approval (Nahapiet and Ghoshal 1998). In the collaboration of more innovative tasks, “how well” one knows their contacts can be even more important than “who they know” (Moran 2005). Hence, a user should be more likely to seek or share knowledge with others with whom they trust and know well. Therefore the following hypotheses are proposed regarding the impact of relational capital on the usage of corporate social media for seeking and sharing within the organization:

Hypothesis 6a (relational capital influence on seeking): *Relational capital will have a positive influence on an employee’s usage of corporate social media for seeking knowledge.*

Hypothesis 6b (relational capital influence on sharing): *Relational capital will have a negative influence on an employee’s usage of corporate social media for sharing knowledge.*

5.4 Measures

For Chapter 5, constructs from prior literature are identified and a survey instrument is developed as shown in Table 22 using a ten-point Likert scale. The survey research is combined with semi-structured interviews for content validity. The unit of analysis is an employee in the large multi-national technology organization Tech Corp. with access to a system of corporate social media tools. The survey is voluntary and 152 surveys were returned for a 31% response rate. Seven returned surveys were eliminated because they had more than 10% missing data (Hair 2010). This resulted in 145 respondent cases for analysis which is 29%. Data was collected within a two month period via survey.

The measurement items are listed in Table 22. The definitions of the constructs are as follows. *Knowledge Seeking and Sharing by Others* is the point where a user perceives that many other employees are using the system. Drawing from Lou et al. (2000), the items for seeking and sharing knowledge are modified from a 7-point to 10-point Likert scale. *Knowledge Seeking and Sharing by Employee* are the two types of uses that are captured. Knowledge seeking is using social media independently for mainly gaining knowledge e.g. reading, searching, or posting questions. Knowledge sharing is using social media for exchanging information with others e.g. interacting on blogs and wikis or responding to questions that others have posted.

Social capital is measured by the cognitive and relational dimensions in this thesis, because it is hypothesized that they should have a positive influence on social media knowledge seeking and sharing. *Cognitive Capital* measures shared vision and the motivation derived from collective goals (Tsai and Ghoshal 1998). *Relational Capital* takes into account norms for collaboration, cooperation, and sharing within the organization (Kankanhalli et al. 2005a).

Table 22. Measurement Items for Impact of Social Capital		
Constructs	Descriptions	References
Knowledge Seeking by an Employee	1) I often use Tech Corp. system for seeking information. 2) I regularly use Tech Corp. system for seeking information.	(Kankanhalli et al. 2005b)
Knowledge Sharing by an Employee	1) I often use Tech Corp. system for sharing information. 2) I regularly use Tech Corp. system for sharing information.	(Kankanhalli et al. 2005a)
Knowledge Seeking by Others (Perceived Critical Mass)	1) Many people in my department / workgroup use Tech Corp. system for seeking information. 2) Many people in my department / workgroup will use Tech Corp. system for seeking information in the future.	(Lou et al. 2000)
Knowledge Sharing by Others (Perceived Critical Mass)	1) Many people in my department / workgroup use Tech Corp. system for sharing information. 2) Many people in my department / workgroup will use Tech Corp. system for sharing information in the future.	(Lou et al. 2000)
Relational Social Capital: Information Sharing Norm	1) There is a norm of collaboration in my organization. 2) There is a norm of cooperation in my organization. 3) I believe that people in my organization share the best knowledge that they have.	(Kankanhalli et al. 2005a)
Cognitive Social Capital: Shared Vision	1) Our unit shares the same ambitions and vision with other units at work. 2) People in our unit are enthusiastic about pursuing the collective goals and missions of the whole organization.	(Tsai and Ghoshal 1998)
Attitude Toward Using Social Media: Perceived Usefulness	1) Using Tech Corp. system makes it easier to do my job. 2) Using Tech Corp. system enhances my effectiveness on the job. 3) Using Tech Corp. system increases my productivity.	(Davis 1989; Venkatesh et al. 2003b)
Attitude Toward Using Social Media: Perceived Ease Of Use Technology Complexity	1) Using Tech Corp. system takes too much time from my normal duties. 2) Working with Tech Corp. system is so complicated; it is difficult to understand what is going on. 3) It takes too long to learn how to use Tech Corp. system to make it worth the effort.	(Thompson and Higgins 1991; Venkatesh et al. 2003b)
Subjective Norms for Technology Usage	1) People who influence my behavior think that I should use Tech Corp. system. 2) People who are important to me think that I should use Tech Corp. system.	(Ajzen 1991; Davis 1989; Venkatesh and Davis 1996)

The following variables are used as control variables since these influences are not the focus of this thesis: *Attitude Toward Using* and *Subjective Norms for Technology Usage*. *Attitude Toward Using* is drawn from Davis et al.'s (1989) construct from the technology acceptance model (TAM) consisting of *Perceived Usefulness* and *Perceived Ease of Use*. Ease of use is the extent to which an employee perceives that using an IT innovation (e.g. corporate social media) will improve job performance; this construct captures the perceived lack of effort needed to use the innovation (Davis 1989). These two unique constructs, in turn, are the first-order constructs forming the second order

construct *Attitude Toward using* (Chin 1998). Using PLS, the second order construct is measured directly with the two first-order constructs as per Chin (2003). The survey items for this construct are from the unified theory of acceptance and use of technology (UTAUT) converting the 7-point Likert scale, to a 10-point scale (Venkatesh et al. 2003a).

Subjective Norms for Technology Usage is another control variable and is a measure for social influence when it has a direct influence on user intentions to use a system (Venkatesh et al. 2003a). Subjective norms in an organization are manifest by the behavior of people who employees consider influential or important. The survey items for this measure are drawn from the literature and convert the 7-point Likert scale into a 10-point scale (Venkatesh et al. 2003a). Both *Attitude Toward Using* and *Subjective Norms for Technology Usage* are expected to have a positive influence on the use of social media for seeking and sharing knowledge.

5.5 Method

5.5.1 Overall Design Approach and Data Collection

The overall research design combines survey research with semi-structured interviews for content validity. The unit of analysis is an employee at Tech Corp. who has access to the corporate social media platform (referred to as “Tech Corp. system” in the survey items). Three items in the survey were reverse coded to control the risk of social desirability bias. All employees surveyed had access to the corporate social media platform and the actual use of the system was voluntary. The descriptive statistics are shown in Table 23.

Table 23. Descriptive Statistics (Survey Data)		
Construct	Mean	Standard Deviation
Knowledge Seeking by an Employee	5.42	2.23
Knowledge Sharing by an Employee	6.03	2.62
Knowledge Seeking by Others (Social Influence of Perceived Critical Mass)	5.49	2.20
Knowledge Sharing by Others (Social Influence of Perceived Critical Mass)	5.59	2.30
Relational Social Capital: Knowledge Sharing Norm	7.31	1.50
Cognitive Social Capital: Shared Vision	7.24	1.49
Attitude Toward Using Social Media: Perceived Usefulness	5.93	2.03
Attitude Toward Using Social Media: Perceived Ease Of Use (Tech. Complex.)	6.55	2.15
Subjective Norm for Technology Usage	5.30	2.43

5.5.2 Measurement Model Analysis

The reliability and validity of the measurement model are tested as per the procedures outlined by Hulland (1999) for PLS (Partial Least Squares) which involve testing: 1) individual item reliabilities, 2) convergent validity of individual constructs, and 3) discriminant validity. Item reliabilities or loadings should at the minimum be above 0.5 and those in the model are above the general rule of thumb of 0.70 except for one of the items for relational capital which is 0.69 (Hair et al. 1998). Since loadings are correlations, item reliabilities greater than 0.70 imply that greater than 50% of the observed variance is due to the measure of the construct and not due to error; the square root of 0.5 is 0.7 (Hulland 1999).

The composite reliability for each construct is above the 0.70 cutoff as shown in Table 24 (Bagozzi et al. 1998; Fornell and Larcker 1981). Convergent validity for the individual constructs is demonstrated by each having an average variance extracted (AVE) greater than 0.5. Discriminate validity is further checked by verifying that

diagonal square root of each AVE is greater than the correlations that are off of the diagonal (Fornell and Larcker 1981). The results of these tests are shown in Table 24. Common method bias is tested using Harman's one factor test. No single factor emerged accounting for the majority of the covariance among measures (Podsakoff et al. 2003).

Table 24. Correlations and AVE of Constructs												
		Composite Reliability	AVE	V1	V2	V3	V4	V5	V6	V7	V8	V9
V1	Cognitive Cap.	0.81	0.68	0.82								
V2	Relational Cap.	0.89	0.67	0.69	0.82							
V3	Seeking by an Employee	0.92	0.85	0.33	0.23	0.92						
V4	Seeking by Others	0.87	0.77	0.33	0.28	0.75	0.88					
V5	Sharing by an Employee	0.93	0.87	0.30	0.18	0.76	0.82	0.93				
V6	Sharing by Others	0.92	0.84	0.34	0.26	0.72	0.81	0.81	0.92			
V7	Subjective Norm	0.95	0.90	0.18	0.16	0.58	0.66	0.64	0.59	0.95		
V8	PEOU	0.89	0.72	0.07	0.01	0.40	0.43	0.47	0.47	0.29	0.85	
V9	PU	0.95	0.87	0.23	0.09	0.63	0.66	0.71	0.70	0.59	0.47	0.93

5.6 Results

Structural and Competing Model Analysis

The component-based PLS (Partial Least Squares) structural equation modeling technique is used for performing the analysis. PLS is well suited for handling complex models with relatively small sample sizes (Chin 1998). The research framework shown in Figure 2 is first tested using the survey data by measuring the impact of the perceived critical mass of other employees using social media in the organization for seeking and sharing knowledge. Same-side as well as cross-side social influences are tested to triangulate the findings in Chapter 3 in order to verify whether the sharing/seeking of knowledge by others has a significant influence on seeking/sharing by individuals. The impact of social capital broken down by its cognitive and relational dimensions is then tested.

A step-wise manner is used for analyzing these influences on the individual use of corporate social media. The R^2 measures of these competing influences are compared with respect to individual employee usage of corporate social media to seek and to share knowledge. Through this analysis, the antecedents with the greatest impact on employee seeking and sharing of knowledge in the organization can be determined. Tables 25 and 26 compare the results of four models for the impact of individual knowledge seeking and knowledge sharing within the firm. Model 1 estimates a model with just the control variables where the impact of attitude towards using a technology on actual technology usage and subjective norm are measured. Model 2 includes critical mass with the control variables. Model 3 includes social capital with the control variables. Model 4 includes both critical mass and social capital.

Table 25 shows the results where knowledge seeking is the dependent variable. The R^2 measure increases after Model 1 beyond attitude and social norms for using social media. Cohen's (1988) formula is used to calculate the effect size (f^2) changes in the models due to the added predictors (Pavlou and Fygenon 2006):

$$f^2 = (R^2 \text{ included} - R^2 \text{ excluded}) / (1 - R^2 \text{ included})$$

In Table 25, Model 1 explains only 46.6% of the variation for knowledge seeking by an employee. Adding critical mass results in Model 2 that explains 62% ($f_2 = 0.41$) of the variation. Substituting social capital for critical mass in Model 3 explains 51.2% ($f_2 = 0.10$) of the variation. Model 4 expands Model 3 by adding critical mass with social capital explaining 62.8% ($f_2 = 0.31$) of the variation for knowledge seeking by an employee.

Adding critical mass (*knowledge seeking by others* and *knowledge sharing by others*) results in significantly higher predictive validity of Model 2 for individual *seek*. Replacing critical mass with social capital in Model 3 explains more variance than Model 1, and the effect size is at the threshold of significance using Cohen's (1988) formula. Adding critical mass (*knowledge seeking by others* and *knowledge sharing by others*) to Model 3 results in significantly higher predictive validity of Model 4 for individual *seek*.

Table 25. Knowledge Seek Results: Impact of Social Capital				
	Model 1	Model 2	Model 3	Model 4
Knowledge Seek by Employee	Attitude & Subjective Norm	Attitude, Subjective Norm, & Critical Mass	Attitude, Subjective Norm, & Social Capital	Attitude, Subjective Norm, Critical Mass, & Social Capital
Attitude Toward Using	0.435***	0.128*	0.42***	0.13*
Subjective Norms	0.342***	0.092+	0.30***	0.09+
Knowledge Seeking by Others	X	0.404***	X	0.39**
Knowledge Sharing by Others	X	0.252*	X	0.21*
Relational Social Cap	X	X	0.06 (NS)	-0.01 (NS)
Cognitive Social Cap	X	X	0.16 *	0.11 (NS)
R²	0.466	0.620	0.512	0.628
*** p<0.001, ** p<0.01, * p<0.05, + p<0.10				

Table 26 shows the results where knowledge sharing is the dependent variable. The R² measure increases after Model 1 for knowledge sharing are qualitatively similar to those in Table 25 for knowledge seeking for the respective four models. However, the R² measures for the knowledge sharing models are consistently higher than those for the models where knowledge seeking is the dependent variable.

In Table 26, Model 1 explains 59.1% of the variation for knowledge sharing by an employee. Adding critical mass results in Model 2 that explains 76.4% ($f_2 = 0.73$) of the variation. Substituting social capital for critical mass in Model 3 explains 61.5% ($f_2 = 0.06$) of the variation. Model 4 expands Model 3 by adding critical mass with social capital explaining 76.8% ($f_2 = 0.66$) of the variation for knowledge sharing by an employee.

	Model 1	Model 2	Model 3	Model 4
Knowledge Share by Employee	Attitude & Subjective Norm	Attitude, Subjective Norm, & Critical Mass	Attitude, Subjective Norm, & Social Capital	Attitude, Subjective Norm, Critical Mass, & Social Capital
Attitude Toward Using	0.514***	0.178***	0.50***	0.16**
Subjective Norms	0.358***	0.101*	0.33***	0.10**
Knowledge Seeking by Others	X	0.325***	X	0.38***
Knowledge Sharing by Others	X	0.375***	X	0.32**
Relational Social Cap	X	X	0.02 (NS)	-0.06 (NS)
Cognitive Social Cap	X	X	0.12*	0.07 (NS)
R²	0.591	0.764	0.611	0.767
*** p<0.001, ** p<0.01, * p<0.05, + p<0.10				

Adding critical mass (*knowledge seeking by others* and *knowledge sharing by others*) results in significantly higher predictive validity of Model 2 for individual *share*. Replacing critical mass with social capital in Model 3 explains more variance than Model 1, but the effect size is not significant using Cohen's (1988) formula. Finally, adding critical mass (*knowledge seeking by others* and *knowledge sharing by others*) to Model 3 results in significantly higher predictive validity of Model 4 for individual *share*.

From Tables 25 and 26, the results of the hypotheses testing are as follows. *Knowledge seeking by others* has a positive influence on knowledge seeking by an employee as predicted by H1. Similarly, *Knowledge sharing by others* has a positive influence on knowledge sharing by an employee as predicted by H2. H3 is supported in that knowledge seeking by others has a positive influence on knowledge sharing by an

employee. Further, support is found for H4 in that knowledge sharing by others has a positive influence on knowledge seeking by an employee. The test results for Model 3 show that cognitive social capital has a positive influence on knowledge seeking and sharing, but it does not have a significant impact when critical mass is added in Model 4. Hence, there is partial support for H5a and H5b. No significant relation is found between relational social capital and knowledge seeking and sharing. Therefore H6a and H6b are not supported. Finally, the control variables *attitude toward using social computing* and *subjective norms* have a significant impact on the use of social media for knowledge seeking and sharing as expected.

5.7 Discussion

Social capital is the social capability of people to collaborate for collective benefit (Coleman 1988; Nambisan and Baron 2010; Woolcock 1998). Social capital is a key antecedent influencing the use of IT (Nahapiet and Ghoshal 1998; Wasko and Faraj 2005). However, no prior research has focused on the impact of the dimensions of social capital within the organization for seeking and sharing through corporate social media.

The results in this chapter first triangulate the results in Chapter 3 confirming using survey data of both same-side as well as cross-side social influences from others using social media as predicted (H1-H4). Next, social capital is broken down by dimension and positive influences are found between cognitive social capital and knowledge seeking and sharing as predicted (H5a, H5b).

However, no positive relation is found between relational capital and knowledge seeking and sharing. Hence, the motivation from the collective values and goals of cognitive capital has a greater positive impact than the norms of cooperation and

collaboration from relational capital. In the context of using corporate social media within this large organization, these results imply that relational capital is not needed.

Finally, the social influence of the critical mass of others is found to have a stronger impact on knowledge seeking and sharing compared to the social capital dimensions. These results indicate that organizations implementing corporate social media should focus on increasing the user base of seekers and sharers compared to facilitating quality relations between employees.

In the next chapter, the contributions, implications, and limitations of the three parts of this thesis are presented: the impact of the social influence of indirect and direct network effects, organization structure, and social capital. Both theoretical and managerial implications are provided.

CHAPTER 6.

CONTRIBUTIONS, IMPLICATIONS, LIMITATIONS, AND CONCLUSION

6.1 Contributions to the IT Use, Social Media and Knowledge Sharing Literature Streams

This thesis makes specific contributions to the IT use, social media, and knowledge sharing literature streams. These findings provide new insights as to why employees seek as well as share knowledge through corporate social media in the organization. These contributions to the three literature streams are discussed next.

First, in the IT use literature stream, network externalities theory is recast by identifying cross-side in addition to same-side network externalities in the use of corporate social media to seek and to share knowledge. By extending two-sided network effects with respect to multidimensional use, the findings in this thesis reveal new and interesting patterns in the multidimensional manner in which social media is being used. Previous IT use literature has focused on one-dimensional “use” as opposed to use that is multidimensional (Burton-Jones and Straub 2006; Taylor and Todd 1995b; Thompson and Higgins 1991). This literature stream has also primarily emphasized unidimensional social influence such as subjective norm (Davis 1989; Davis et al. 1989; Fichman and Kemerer 1999; Goodhue and Thompson 1995; Venkatesh et al. 2003b) or network externality (Brynjolfsson and Kemerer 1996; Katz and Shapiro 1985; Kraut et al. 1998). There has been less focus on the impact of multidimensional social influences.

Corporate social media is different than other organizational IT (e.g. ERP) because use is multi-dimensional: users generate (i.e. share) and/or consume (i.e. seek) knowledge with and from others. They are not constrained to being just passive recipients. Furthermore, since social media is interactive with users generating content

for one another, social influences should play a more pronounced role compared to those associated with the use of traditional IT systems of the past. Hence, user benefits should go beyond the utility of unilaterally using the intrinsic features of the medium out of contingency for performing tasks (Kraut et al. 1998). Users should benefit from externalities that develop from other employees using social media.

This thesis contributes new knowledge to the IT use literature stream by empirically revealing that the individual use of corporate social media to seek and to share knowledge is influenced by the number of other employees that use social media to seek and to share. The analysis captures as hypothesized that seekers and sharers of knowledge develop not only direct, same-side network externalities, but also simultaneous indirect, cross-side network externalities. This is new. Previous research on the influences of network externalities on IT use in the organization has been limited to same-side, network effects on the demand (i.e. seeking, consumption) side and not on the supply (i.e. sharing) or cross side (Brynjolfsson and Kemerer 1996; Katz and Shapiro 1985; Kraut et al. 1998). However, the use of social media requires individuals to not only seek, but to also share knowledge (Koh et al. 2007). This thesis shows for the first time that the user base of seekers and sharers can develop separate, simultaneous social influences through network externalities which, in turn, can impact both individual seeking and sharing.

Specifically, the findings reveal that employees in the organization are more influenced by the network externalities of other sharers followed by the network externalities of other seekers. These findings validate the intuition that since employees are able to observe when posts are shared by others, they are more likely to be socially

influenced by the externalities developed from sharing compared to seeking. However, the results also show that individual employees are more likely to use social media to seek instead of to share knowledge. This validates the intuition that an employee is more likely to use social media to seek than to share since the former typically takes less time and effort and can be done anonymously (Nonnecke and Preece 2000). All of these findings are new since previous network externalities research on the use of corporate social media has not broken down use into seeking and sharing. Finally, it is also empirically demonstrated that other seekers can develop network externalities which, in turn, can impact individual seeking as well as individual sharing. This implies that managers promoting the use of corporate social media in the firm should consider incentives for not only sharing, but also for seeking.

Second, this thesis contributes new knowledge to the social media literature stream by capturing how employees are influenced to use social media within the bounds of the organization. Using objective log data from the field, this thesis is one of the first empirical studies to investigate the implementation and employee-to-employee (E2E) seeking and sharing of knowledge through social media within a firm.

The social media research stream has primarily focused on either the consumer-to-consumer (C2C) or the business-to-consumer (B2C) domain. Social media C2C research has analyzed how social media is used for personal use in the public domain (Oreg and Nov 2008; Ransbotham et al. 2012; Schlosser 2005). Social media B2C research, on the other hand, has analyzed how social media is used between businesses with consumers (Albuquerque et al. 2012; Moe and Schweidel 2012; Yardi et al. 2009). For example, online B2C magazine content providers are more likely to produce content

when there are content buyers, and content buyers are more likely to purchase content that is more recent and plentiful (Albuquerque et al. 2012). Those that share content that is viewable by the public may try to satisfy “multiple audiences” and moderate their opinions for the diverse viewing public (Hoffman and Novak 1996; Moe and Schweidel 2012; Schlosser 2005).

The prolific use of social media outside the firm is leading many organizations to start to implement these tools within the firm. However, there has been less focus on the social media literature stream on the intra-organizational use of these tools for internal business use, employee-to-employee (E2E) (Aggarwal et al. 2012; Huang et al. 2011; Singh 2010). Employees with the same, large firm can be motivated to help each other from organizational motivation theories that can take the place of close personal relations or direct incentives (Constant et al. 1996). Competition can develop for blogger readership within firms since employee time for reading is limited; bloggers with higher reputations are likely to attract greater readership (Huang et al. 2011). Yardi et al. (2009) use interviews to find out that users are willing to contribute to blogs if they perceive that others are viewing their posts. While the impact of the social influence of network externalities developed from employee blog usage has been analyzed, this has been with respect to unidimensional “use” measured by posts that are shared (Wattal et al. 2010a). However, it is not known how these social influences impact individual employees to use corporate social media, to seek and share knowledge, within the bounds of the organization. This is important since user generated social media content is maintained and sustained by the viewing and posting by others (Koh et al. 2007; Ransbotham et al. 2012).

By viewing corporate social media as a two-sided platform between seekers and sharers and by applying the concepts of internal knowledge management and network externalities, new understandings are contributed by this thesis to the social media literature stream (Boudreau 2012; Gawer 2009; Parker and Van Alstyne 2005; Tiwana 2010; Tiwana and Konsynski 2010; Ye et al. 2012). Since this thesis determines that the network externalities from others sharing have greater influence than from others seeking, and since individuals are more likely to seek, than to share, additional new insights can be uncovered. Specifically, the strongest social influences from network externalities are cross-side or indirect and develop across the social media platform between other sharers on one side, and individual seekers on the other side. The weakest social influences from externalities, on the other hand, are also indirect, and develop between other seekers on one side, and individual sharers on the other side. The strength of the direct, same-side influences are found to be in-between these strongest and weakest influences. Specifically, the supply side externalities between sharers are found to be stronger than the demand side externalities between seekers.

Overall, these findings point out the importance of understanding the influences of both the seeking of knowledge on one side of the social media platform, and the sharing of knowledge on the other side. These findings imply the importance for other seekers to provide feedback to individual sharers that they are “out there” through comments or feedback votes. This should, in turn, help ensure that seeker critical mass, in addition to sharer critical mass, is developed and sustained across the social media platform.

Another contribution in the social media literature stream is made by empirically extending knowledge with respect to how individual characteristics influence use, broken down by both seeking and sharing (Wattal et al. 2009). Organizations need to be aware of not only if their employees are using these tools, but how. The results empirically confirm that younger employees in the millennial generation who grew up with PCs in their homes are more likely to be comfortable using corporate social media to both seek and share compared to employees from older generations (Kaneshige 2012; Kumar et al. 2004; Lee et al. 2006). This supports past research that shows that younger employees are more influenced by their own attitude toward using a new technology, while older employees are more influenced by their perceived behavioral control of ease of use, and therefore, are less likely to use new technology (Morris and Venkatesh 2000). Similarly, tenure at the firm in this study has a negative impact on the likelihood for seeking.

However, with respect to hierarchical level, members of the middle manager hierarchical level have the greatest probability to not only to seek, but to share with intensity. This finding supports the intuition that by the nature of their leadership role, managers will more frequently need to share information that they want their employees to view. This finding also complements the results from Singh (2010) that employees are most interested in reading technical information posted by middle managers as opposed to higher level executives. Similarly, Constant et al. (1996) find that seekers consider shared information more useful from less hierarchical diverse ties. From socio-linguistic research, women tend to be more network oriented compared to men in their communications patterns (Tannen 2001). The results in this thesis find that female employees are more likely to use social media to seek. This finding supports what is

occurring with social media outside of the office with women being more active users than men (Fitzgerald 2012). From past collaborative system research, women have been found to perceive the social presence and perceived usefulness of email higher than men (Gefen and Straub 1997).

Despite these potential benefits, however, corporate social media implementations are often not successful due to such issues as high “drop-out” rates, adoptions in small pockets of the firm, and difficulty in facilitating collaborative processes (Healey 2012; Ransbotham and Kane 2011; Wattal et al. 2009). A challenge in sustaining the use of these two-sided platforms is that viewers may not leave any traces or take the time or effort to post any comments to shared posts that they read (Yardi et al. 2009).

The implementation of corporate social media by the firm in this study, however, is different and the insights gained include several key managerial contributions. The results in this thesis show that critical mass is achieved by not only sharers, but also by seekers of knowledge across the social media platform of the organization. The firm addresses the challenge of seekers not leaving any traces or comments for sharers by including vote count feedback functionality for viewers to easily, yet anonymously inform sharers when they find their posted content helpful. Use of this social media feature also provides greater task visibility which, in turn, should encourage the posting of higher quality content (Jones et al. 2004). Vote counts can also inform other seekers of helpful content while lowering their search costs. Furthermore, for voluntary systems implementations such as the corporate social media platform in this thesis, improving the perception of usefulness can attract an even greater number of seekers since attitude can have a strong impact on voluntary use (Hartwick and Barki 1994). In addition to vote

count feedback, the social media platform implemented by the firm in this thesis includes additional social media design features for enhancing both the seeking and sharing of knowledge including social bookmarks, tags, RSS feeds, and customized activity streams.

Employees may not share knowledge as much as technology can enable them to do so, and organizations cannot force employees to share (Constant et al. 1994). Employees need to internalize the motivation to share knowledge as attitudes, and, therefore firms can try to promote and support a culture of the benefits of sharing knowledge (Constant et al. 1994). The firm in this thesis made sure the corporate social media implementation had effective communication through employee volunteers called “ambassadors” in every business unit. Research shows that an employee’s decision to use corporate social media is likely to be influenced by how useful his or her peers within the organization find using the platform for their work (Moe and Schweidel 2012; Wattal et al. 2010a; Yardi et al. 2009). These ambassadors not only showed their peers how to use the social media platform and its various design features, they also communicated the benefits for embracing a culture of sharing knowledge with one another. The employees were informed that the use of the corporate social media platform enables easier seeking and sharing of useful knowledge which, in turn, should benefit their work individually as well as collectively in their business units and throughout the rest of the firm. Hence, unlike many collaborative systems implementations in the past, both cognitive and structural challenges of the firm are actively addressed for this implementation (Orlikowski 1992).

The implementation analyzed in this thesis also employs a bottom-up strategy through one common platform instead of top-down strategy. All employees are provided

unfiltered access through the same platform, not just high level managers. Seekers want a variety of useful, quality, content; a greater number of sharers from throughout the firm should provide this compared to only a few, more centralized top-down sources (Brynjolfsson et al. 2010; Dixit and Stiglitz 1977; Parameswaran and Whinston 2007a). In a bottom-up strategy, the user base determines the structure which is constantly evolving (Parameswaran and Whinston 2007b). Allowing employees to post negative content can even lead to an increase in readership of corporate blogs (Aggarwal et al. 2012). Individual corporate blogs following a top-down, content-controlled strategy, on the other hand, experience relatively lower levels of use (Lee et al. 2006). Furthermore, use of the corporate social media platform is voluntary; trying to mandate participation can have a negative impact on intrinsic motivation (Deci 1996). Finally, the implementation benefits from an overall supportive shifting of demographics with new, younger employees who are more comfortable using social media joining the organization, and older employees who are less comfortable retiring (Kaneshige 2012; Kumar et al. 2004; Lee et al. 2006).

Finally, this thesis makes contributions to the knowledge sharing literature stream. The use of corporate social media is enabling the distributed control and coordination of employees in the organization (Yoo et al. 2008). This is enabling firms to share knowledge through hierarchical structures & across geographic locations (Van de Ven 2005; Wagner 2004; Yoo et al. 2008). From past research, organization structure has been found to impact the use of unidimensional IT (Agarwal and Karahanna 2000; Constant et al. 1996; Greve 2005; Gupta et al. 2009).

This thesis contributes to the knowledge sharing research stream by applying concepts of network exchange theory and social cognitive theory to determine how hierarchical and geographic distribution impacts the collective seeking and sharing of knowledge through corporate social media. From network exchange theory, even though individuals may have various intrinsic motivations to act, when they are under similar structural constraints, they can act in aggregate with collective, predictable, outcomes (Faraj and Johnson 2011; Monge and Contractor 2003). From social cognitive theory, human behavior is an interaction between personal factors and the environment which, in turn, consists of social influences and structures such as hierarchical and geographic distribution (Bandura 1986).

The knowledge sharing research stream has primarily emphasized knowledge sharing and not knowledge seeking (Adamic and Glance 2005; Moe and Schweidel 2012; Wasko and Faraj 2000; Wasko and Faraj 2005). Kankanhalli et al. (2005b) and Koh et al. (2007) are a noted exceptions. Koh et al. (2007) find that occasional face-to-face meetings can have a positive impact on the posting activity of employees in virtual teams and that perceived usefulness can have a positive impact on viewing activity. However, it is not known what the impact of organization structure is with respect to geographic and hierarchical distribution on the use of social media to seek and share knowledge within the firm.

The findings in this thesis suggest that less organization structure with respect to geographical and hierarchical distribution leads to greater seeking and sharing through corporate social media. These findings suggest that the seeking and sharing of knowledge through social media can be sustained by a critical mass of distributed and decentralized

employees who are not collocated. This implies that the leveraging of social media attributes such as profiles, ratings, and comments can help provide identity and social presence in support of the sharing of knowledge that is useful. This, in turn, should help employees overcome the missed benefits of identity and social presence from being able to meet face-to-face.

Another opportunity in knowledge sharing research is to clarify the role of social capital. Past knowledge sharing research has had mixed results with respect to the impact of the dimensions of social capital on the sharing of knowledge. For example, Kankanhalli et al. (2005a) find that relational capital can have a positive influence on sharing through an electronic network, because sharers are more likely to trust the seekers whom they share their knowledge with. Moran (2005) finds that relational capital has a positive influence for sharing information for innovative tasks, but not for routine tasks. Wasko and Faraj (2005) find that cognitive social capital has positive influences on knowledge sharing volume through electronic networks, and relational capital (reciprocity and commitment) does not. This implies that relational capital is not required for knowledge sharing in electronic networks. This is likely due to members of online communities not usually expecting direct, personal reciprocities, even though generalized reciprocity can occur indirectly through third parties. However, Wasko and Faraj (2005) find an unexpected *negative* relation between relational capital and the helpfulness of the knowledge shared. The authors speculate that this may be due to recipients (i.e. seekers) of knowledge being more committed from relational capital compared to sharers. However they suggest that this would be an interesting area to analyze for future research (Wasko and Faraj 2005).

In short, it is not known what the impact of cognitive and relational social capital is on the seeking of knowledge through corporate social media in the firm. This thesis clarifies the role of social capital for this context. It extends the knowledge sharing literature stream by finding as hypothesized that cognitive social capital dimension can have a positive impact on not only sharing, but also on the seeking of knowledge. No significant relation, positive or negative, is found from the impact of relational capital with respect to not only knowledge sharing but also knowledge seeking. These results validate that employees can be motivated to use corporate social media to not only share but to also seek knowledge based on a shared vision and collective goals. Relational social capital, on the other hand, is found to have no impact, on seeking or sharing. This implies that neither recipients nor suppliers of knowledge through corporate social media in the firm rely on relational social capital. Hence, employees in this organization are more interested in seeking and sharing knowledge through corporate social media in order to meet their collective work unit and organizational goals without expecting direct, personal reciprocities. This is new, because the findings in this thesis take into account knowledge seeking as well as knowledge sharing through the use of corporate social media for the first time. The results also show that the positive influences of cognitive social capital are no longer significant when the critical mass of other seekers and sharers are taken into account. This implies that once critical mass is achieved, social capital does not play a significant role compared to the size of the user base in the seeking and sharing of knowledge through social media in the firm. This is also new because no previous known study has directly compared these two major antecedents, critical mass and social capital, in the same model.

Finally, this thesis points out new findings for extending the literature stream of knowledge sharing in the domain of computer-mediated communication. Computer-mediated communication includes CSCW, collaborative systems, virtual teams, and GDSS. Computers were originally mainly used as “single-user” systems to support an individual user’s isolated tasks for personal productivity applications (e.g. word processing, spreadsheets, and slide presentations). Then multi-user systems emerged via Computer-Supported Cooperative Work (CSCW). CSCW provides support for groups for communicating. Virtual collaborative environments is a major area of CSCW where such issues as the importance of shared online activity and the sharing of knowledge between strangers are analyzed (Brown and Bell 2004). Groupware is the software that supports group work (Greenberg 1991).

Jarvenpaa and Staples (2000) describe collaborative systems as systems such as intranets, email, and list serves for sharing knowledge within and between organizations. The labels for groupware vary and can include collaborative computing, CSCW applications, workgroup computing, and multiuser applications (Grudin 1994). Examples of groupware include such systems as email, bulletin boards, desktop conferencing systems, video conferencing, coauthoring applications, meeting support systems, workflow systems, voice applications, and group calendars (Grudin 1994).

Knowledge sharing is a key component of a group process (Greenberg 1991). However, initial computer –mediated knowledge sharing was largely constrained to local computer networks supported by an institution with individuals accessing common data files. These locally networked computers did not readily support the loosely-coupled sharing of knowledge across social groups. Groupware was considered too rigid and

needed to become more flexible in allowing the group members to define their own changing constraints for interacting with others (Greenberg 1991). Ljungberg (2001), for example, suggests flexible mechanisms to enable mobile employees to know when one another is available or not for synchronous knowledge sharing.

Groupware systems of the past, such as Lotus Notes, however, often experienced unsuccessful implementations despite having executive support and being deployed to large numbers of desktops (Olesen and Myers 1999; Orlikowski 1992). Employees may have gained individually through greater efficiency and effectiveness by using these tools. Design limitations along with top-down generated content and non-sharing cultures, however, contribute to them not fully receiving the collective benefits by using these systems for sharing knowledge peer-to-peer with other employees in their business units and overall organization (Halloran et al. 2002; Mandviwalla and Olfman 1994; Olesen and Myers 1999).

Constant et al. (1996), on the other hand, find that employees in a large, global, Fortune 500 technology company are more likely to share knowledge through the collaborative system of email for organization benefits over personal benefits. Because of interdependencies, employees can act above self-interest and share knowledge (Jarvenpaa and Staples 2000). Hence an open information culture should have a positive influence on the sharing of knowledge. Jarvenpaa and Staples (2000) extend Constant et al. (1994)'s model by applying it to the sharing of knowledge through collaborative systems in the field (a university) and by testing additional antecedents. The researchers collect data via a survey instrument and find as predicted that the propensity to share, task interdependence, computer comfort, and a positive perception of computer-based

information have positive influences on an employee's use of collaborative systems to share knowledge.

Collaborative systems and groupware (i.e. email, phone, and computer conferencing systems) are designed to be interactive among users. The social influences from an individual's work group to use collaborative systems to share knowledge can even be greater than the social influences from the ego-network (supervisor and those that they communicate with most often) for those that have closer relations with their work groups (Fulk 1993).

Interactive systems such as corporate social media have the attributes of universal access through usage and interdependence where later users are impacted by earlier users and vice-versa (Markus 1987). These attributes, in turn, can amplify the benefits of network externalities when critical mass is attained (Katz and Shapiro 1985; Kraut et al. 1998; Markus 1987). Attaining the critical mass for the spillover benefits can be a challenge especially since earlier adopters do not enjoy the same benefits as later adopters (Markus 1987). As content shared through these interactive computer-mediated communication system becomes more bottom-up and less top-down, the social influences of the spillover effects developed by other interactive users should become even more pronounced.

Advances in collaborative and groupware systems are enabling the sharing of knowledge across geographic locations with distributed control & coordination in virtual teams (Van de Ven 2005; Wagner 2004; Yoo et al. 2008). Kanawattanachai and Yoo (2007), for example, find that the knowledge shared in virtual teams via electronic media is initially task-oriented for forming expertise location and cognition-based trust for work

on a project. Task-knowledge coordination then becomes the focus towards the end of the project once expertise location and trust is developed. The researchers also determine that virtual teams that are high performing are able to establish and maintain trust better than the lower performing teams (Kanawattanachai and Yoo 2007). Constant et al. (1996) find that sharers of knowledge from diverse countries responding to broadcast email questions are more likely to solve problems for knowledge seekers due to the inherent diversity of this shared knowledge. In distributed learning environments, seekers of knowledge have been found to learn more by using a simple email and a listserv compared to those using a sophisticated GSS (Alavi et al. 2002). Users of the simpler system learned more and exchanged more learning-related messages, while users of the more complex GSS learned less due to having to exchange more technology sense-making messages (Alavi et al. 2002). Hence the cognitive effort needed to use the more sophisticated GSS has a negative impact on the learning task. Taken together, successful virtual teams using collaborative and groupware systems for sharing knowledge establish trust early and maintain it, have access to diverse sources of knowledge that are identified, and use computer-mediated communications which are easy to use so they can focus on their work. The corporate social media platform used by the firm in this thesis also enables employees to easily identify and interact with expertise that they can trust from diverse sources throughout the organization. This implies that virtual teams should benefit from using this corporate social media platform for seeking and sharing knowledge.

Collaborative systems also include GDSS (Group Decision Support Systems) (Greenberg 1991; Mandviwalla and Olfman 1994). GDSS or GSS (Group Support

Systems) are systems that integrate communications, computer, and decision technologies for sharing knowledge for supporting group tasks. These group tasks can include problem identification and solutions development by sharing knowledge at meetings in collocated or distributed environments (Desanctis and Gallupe 1987; Zigurs and Buckland 1998). EMS (Electronic Meeting System), for example, was designed to improve group meetings with respect to efficiency, effectiveness, and satisfaction for sharing knowledge independent of time and space (Nunamaker et al. 1991).

Zigurs and Buckland (1998) extend task-technology fit from the individual to the group level through the use of GSS. The technical structures involved with GDSS or GSS can be configured in multiple ways resulting in emergent structures of social actions (DeSanctis and Poole 1994). However, task-technology fit for GDSS or GSS does not take into account the social influences of the critical mass of others.

DeSanctis and Poole (1994) draw from structuration theory in the interactions between technology and social processes can result in different outcomes even through the same implemented technology. There is a duality between the interaction of technologies such as GDSS and the structures that emerge from the use of these technologies (Orlikowski 1992). Through adaptive structuration theory (AST), structuration is applied to the use of GDSS where group outcomes such as the sharing of knowledge depend upon how the available features are appropriated, the group's willingness to believe in the critical mass developed by others employees, and the structural environment of the organization (DeSanctis and Poole 1994). This thesis incorporates the theoretical concepts of AST by drawing from the four main sources of structure: technology (social media), task (seeking and sharing knowledge), environment

(organizational structure), and the group's internal system (acceptance of the critical mass of other employees) that influence social interaction for social outcomes such as the sharing of knowledge throughout the business unit and organization (DeSanctis and Poole 1994).

Past collaborative systems and groupware research has pointed out that not attaining critical mass is a key reason why employee adoptions is difficult (Grudin 1994). The implementation of personal productivity applications such as word processing or spreadsheet applications is easier, because employees are already familiar with this software. There are some collaborative and groupware systems in that past that have been successfully implemented in organizations such as email, list serves, and bulletin boards (Grudin 1994). In addition to being able to achieve critical mass, email systems, for example, have the following favorable characteristics: roughly equitable balance between sharer and seeker "costs", compatible for changing social situations, asynchronous flexibility, frequently used and relatively simple to learn, and wide-spread acceptance originating from the public and academia, and not from marketing or sales (Grudin 1994). Corporate social media has similar characteristics and greater capabilities without much added complexity which should similarly assist in attaining critical mass.

Despite the challenges to achieve, previous collaborative system and groupware research has identified that the perceived critical mass of other users can have a greater impact than attitude (perceived usefulness and ease of use) on the individual intention to use for sharing knowledge (Lou et al. 2000). However, this analysis has been performed with respect to generic unidimensional use. It is not known how the critical mass from others seeking and sharing compare to attitude on individual seeking and individual

sharing through corporate social media. Furthermore, it is not known how the impact of the critical mass of others compares to that of social capital on individual seeking and sharing (Lou et al. 2000). Previous collaborative system knowledge sharing research that only measures knowledge that is shared (i.e. “knowledge contribution”), assumes that this knowledge is consumed (Kankanhalli et al. 2005a; Wasko and Faraj 2005). The results of this thesis show that the social influences of the critical mass developed from other seekers *and* from other sharers, have *greater* effects on *both* individual seeking *and* sharing, compared to the influences from social capital and from individual attitude to use. This is new, because previous research has focused on the antecedents of either critical mass *or* social capital on knowledge sharing *or* knowledge seeking (Kankanhalli et al. 2005a; Kankanhalli et al. 2005b; Lou et al. 2000; Wasko and Faraj 2005).

Unlike many computer-mediated communication implementations such as groupware and collaborative systems (e.g. Lotus Notes) of the past, through today’s consumerization of IT, employees are starting to use social media from outside to inside the office (Harris et al. 2012; Kudaravalli and Faraj 2008). Consumers already spend more time online using social media compared to playing online games and using email (Martin 2010). Furthermore, the millennial generation, which is becoming the largest workforce demographic, is the most comfortable generation using social media (Harris et al. 2012; Kaneshige 2012; Kumar et al. 2004; Lee et al. 2006). Taken together, the critical mass for both seeking and sharing through corporate social media should become even more attainable and sustainable within organizations.

6.2 Additional Contributions and Implications

As corporate IT increasingly invests in social media it becomes paramount for organizations to understand employee use so that the benefits of these investments are realized (Lewis et al. 2003; Taylor and Todd 1995a). The two-sided network effects theory is a simple and elegant model to proactively manage social media implementation and to facilitate continued use in organizations. This is further enhanced by extending the model in this thesis to understanding how organization structure and social capital can also influence the use of social media. This, in turn, enables the comparison between the antecedents and their various dimensions to determine which has the greatest impact on seeking and sharing.

This dissertation makes several key theoretical contributions. The literature streams of network externalities is extended by applying and empirically testing two-sided network externalities theory on employee seeking and sharing of knowledge using corporate social media as an intermediary platform. The theory can be a powerful and parsimonious lens to empirically understand social media and extends this understanding by incorporating and comparing the influences of organization structure and the dimensions of social capital. The analysis is conducted using unique data sets. Prior research has not fully empirically tested and demonstrated and compared these antecedents through the use of social media for seeking and sharing knowledge in the organizational context.

Organizations present a bounded environment that is different from the unbounded and undefined population for most public social media. As a result of this bounded environment, this thesis is able to look at how others' use of social media,

organization structure, and social capital influence individual employee use of social media. This would not be possible in an unbounded environment where researchers cannot properly identify a set of non-adopters.

In two-sided platforms, where externalities from one side of the platform can influence the other side and vice versa, there can be greater risks for platform participation failure due to internal use that is not sustained (Jullien 2005). In other words, employees will likely not share information, without other employees seeking this user-generated content and vice versa. Important insights can be obtained on what influences social media use by distinguishing creation (i.e. sharing) and consumption (i.e. seeking). These multiple dimensions of usage provide richer understanding than just “use” (Burton-Jones and Straub 2006).

This thesis contributes to the literature on technology use by going beyond measuring one-dimensional “use”. The relative lack of multidimensional system-use measures have been impeded by IS research focusing on upstream antecedents where the downstream dependent variable is just a one-dimensional proxy for implementation “success”; this can imply that there is no theoretical basis regarding the decision behind the system usage measure (Burton-Jones and Straub 2006). The study responds to the “need to re-conceptualize system usage,” by identifying multiple dimensions of “use” as advocated by Burton-Jones and Straub (2006, p. 230).

This improvement in explanatory power in breaking down “use” into the multiple dimensions of “seeking” and “sharing” is manifest by being able to analyze: (a) in one dimension, same-side, and in another complementary and adjacent dimension, cross-side, network effects, (b) how multiple dimensions of organization structure influence multiple

dimensions of use, and (c) how multiple dimensions of social capital influence multiple dimensions of use.

The results demonstrate the improved explanatory power of analyzing the use of social media in terms of how social media is actually being used which is for seeking and sharing knowledge. The empirical results show for the first time: (a) cross-side *and* same-side network effects (both demand and supply side) on usage tendency in the organizational context, (b) less organization structure influencing greater seeking and sharing, and (c) the cognitive dimension of social capital having a positive influence on the use of corporate social media for seeking and sharing.

This thesis also contributes to the literature on knowledge management and social media. By empirically demonstrating two-sided network externalities effects using organizational data from the field while taking into account the impact of organization structure, a different way is provided to describe the use of social media in the organization, i.e. as an instance of knowledge use and sharing. It is not that difficult to envision a conceptualization of organizational knowledge management as being highly intertwined with social media.

Another contribution to the network externalities literature is made by employing objective log file data instead of relying on perceptions, simulations, or analytical modeling. Objective log data is also used for measuring the impact of organization structure on seeking and sharing knowledge through corporate social media. Finally, this thesis also contributes to the overall IS discipline by bringing parsimonious and powerful theory to explain employee behavior related to the set of capabilities associated with social media (Pavlou and Fygenson 2006).

There are several major theoretical implications drawn from this thesis where corporate social media is viewed as an intermediary platform for seeking and sharing knowledge in the organization (Gawer 2009; Tiwana and Konsynski 2010). First, there is empirical confirmation of the importance of not only strong same-side, but also strong cross-side network effects, on both the demand and supply side usage tendency and intensity. Prior IS research on network externalities has focused on the demand side (not on the supply-side) and on the direct, same side (and not on indirect, cross-side network effects (Brynjolfsson and Kemerer 1996; Katz and Shapiro 1985; Kraut et al. 1998).

Second, the results empirically confirm that employees in more geographically distributed and hierarchical decentralized business units are more likely to use seek and share knowledge through corporate social media. These findings related to the impact of organization structure on the use of IT support prior research, but is applied to the use of corporate social media within the organization in this thesis (Bunderson and Sutcliffe 2002; Constant et al. 1996; Hartwick and Barki 1994; Xu et al. 2010). Past research has shown that the social influences on employee use of innovations is greater in more vertical business units with superior/subordinate structures (Hartwick and Barki 1994). It is also interesting to note from prior research that collocated, face-to-face meetings can have a positive impact on the sharing through IT (Koh et al. 2007).

However, the social communities of today's firms tend to be more decentralized and dynamic with fluid boundaries (Parameswaran and Whinston 2007a). Maintaining tight control via complex, hierarchical organization groups takes relatively more energy (Hollenbeck et al. 2011). Hence, it is easier for organizational structures over time to evolve from tighter, more organized and complex structures, to looser, more fluid and

simple structures (Johnson et al. 2006). Employees in most of today's organizations need to contribute to heterogeneous networks of knowledge under greater distributed as opposed to centralized control (Yoo et al. 2008). The results in this thesis show that the use of such social media can be sustained by a critical mass of distributed and decentralized employees. The sustained use by these employees in this firm imply that the leveraging of social media attributes such as profiles, ratings, and comments can help provide identity and social presence in support of the sharing of knowledge that is useful. This, in turn, can help overcome employees not being able to receive the benefits from meeting face-to-face.

A third key theoretical implication is that this thesis empirically confirms that the cognitive social capital dimension has a positive impact on the use of corporate social media in this organization for knowledge seeking and sharing. In general, high levels of social capital can have a positive impact in terms of access and support of resources. By breaking down social capital into multiple dimensions, this thesis empirically proves the importance of a shared vision for sustaining participation in a social media platform through seeking and sharing (Kim 2000; Koh et al. 2007; Williams and Cothrel 2000). However, the results do not show relational social capital having a positive impact on knowledge seeking and sharing. This implies that the collective ties from cognitive social capital are more important than the closer, more individual ties from relational social capital for influencing the use of corporate social media.

From the literature, "too much" or "too little" social capital can have a negative impact on efficient exchanges between group members (Woolcock 1998, p. 158). While there can be information benefits drawn from the closer relations of high social capital,

these advantages come with the added costs to establish and maintain these relations (e.g. time, effort) (Woolcock 1998). Furthermore, stronger ties compared to weaker ties have a greater risk of redundancies which, in turn, can increase search costs. High levels of social capital can also be constraining to group members, as well as increase the risks of free-riding and the weakening of the perceived benefits from individual effort (Woolcock 1998).

As a collective good, knowledge that is shared by an individual can benefit everyone, not just the individual who contributes the knowledge (Adler and Kwon 2002). Hence, employees may be more likely to *view* than to *share* knowledge, or share knowledge that is redundant and/or of less quality. Furthermore employees may choose to exchange knowledge with specific individuals whom they have close relations without posting through corporate social media that can be viewed by any employee in the firm. Aggregated, high levels of social capital could result in negative externalities for the overall organization (Adler and Kwon 2002). In short, it is possible for the risks from the stronger ties of “too much” social capital to override their benefits (Adler and Kwon 2002; Hansen et al. 2001). Despite this paradox, most prior research on social capital has focused on its benefits and not its risks (Adler and Kwon 2002).

A fourth theoretical implication is that the social influence of network externalities is found to have a greater impact than the impact of organization structure and social capital on the use of social media to seek and share knowledge. This implies that the critical mass developed by others has likely been achieved and the spillover effects from the size of the user base go beyond the individual utility benefits from using social media. Furthermore, the size of the user base is more important than how the

organization is structured. The size of the user base is also more important than the collective quality of the relations.

The creation and consumption of knowledge in an organization exhibits some of the characteristics of a Greek Agora - the agora was a central spot in ancient Greek city-states – an assembly – and it was the public center of artistic and political life. A social media platform provides organizations for the first time with an open forum in which knowledge can “change hands”.

The flat nature of social media affords environments where knowledge is decentralized (Wagner 2004). Instead of just pushing a narrow range of knowledge from a few “experts” top-down, social media affords the ability to pull a broad variety of knowledge bottom-up among peers throughout the organization (Benbya and Van Alstyne 2011). However, these exchanges are not frictionless, they are difficult to accomplish and to sustain.

Social media with its ability to engender bottom up and horizontal network connections can serve as the implementation engine for organizations to capture and manage their knowledge (instead of top-down traditional knowledge management systems). Tech Corp. has already gone through this thought process and has discarded their internal portal and knowledge management efforts in favor of implementing knowledge management through a social media approach.

In addition to the theoretical implications, the empirical results provide several key managerial implications for facilitating the use of corporate social media to seek and share knowledge in the firm. These practical implications are especially critical given the lack of success of many organizational knowledge management implementation efforts of

the past.

First, both same and cross-side externalities play important roles in promoting the use of social media inside the organization. Organizations, therefore, need to manage the equilibrium balance between both sides. Incentives and the use of social media design attributes should be leveraged to help reduce search and opportunity costs. The two-sided symbiotic network effects of seeking and sharing in this model could serve as a relatively easy to measure and manage use from social media implementations.

Second, managers should be aware of assimilation gaps between the implementation and the actual use, and the ongoing use of corporate social media. Furthermore, managers need to know employee “use” in terms of “seek” and “share”. For example, the empirical results show that employees with greater tenure are less likely to seek information through corporate social media, but tenure is found to have no significant relation on the probability to share information.

Third, organizations should aggregate and analyze demographic data related to the use of corporate social media. For example, the demographic data in this thesis shows that the baby boom generation is the least likely age group to use social media to seek or share. This age group is retiring and they are taking with them valuable knowledge with them despite younger generations at the firm having a greater probability to seek and share through the platform.

Fourth, this thesis finds that employees in more hierarchically decentralized and geographically distributed business unit structures are more likely to seek and share knowledge. This implies that managers in especially more centralized or co-located business units should monitor posted content for redundancies where the risks for

occurrence are greater. This also implies that knowledge sharers should be aware of “hidden” seeker demand especially in more geographically distributed business units where opportunities for “face-to-face” meetings are less likely to occur.

Fifth, employee motivation based on the shared ambitions and visions of the business unit and the collective goals and mission of the organization (i.e. cognitive social capital) are found to have a positive impact on seeking and sharing knowledge through corporate social media. Managers should, therefore, focus on communicating a clear vision for their business units related to the need to share knowledge.

This also implies that managers and the overall organization should provide a shared collective view for the employees of how the use of corporate social media can benefit their own work for their business units and the overall organization. Tech Corp. provides this collective view for employees throughout the organization through its ambassador program before, during, and after the implementation. If too much social capital results in a negative impact on knowledge seeking or sharing, managers need to determine how to *optimize*, instead of *maximize*, at the social capital dimensional level for the particular situation, for the best outcome (Woolcock 1998).

A sixth managerial implication from the empirical results of this thesis is that managers should be aware that the spillover benefits of network externalities from the size of the social media user base have a greater impact than the influence of organization structure and social capital. This implies that with respect to the use of social media, organizations should focus more on facilitating and sustaining the quantity of user connections compared to changing organization structures or even trying to facilitate environments of close cooperation and collaboration.

Beyond the contributions with respect to the *implementation* of social media, this thesis provides insights on how organizations can *sustain* their social media efforts. Tech Corp. users continue to use the corporate social media platform two years after its implementation. Seekers in addition to sharers at Tech Corp. influence individual sharing. Therefore, seekers should be encouraged to provide feedback to sharers, because this has been found to positively influence individual use (Wattal et al. 2009).

The concepts and findings from the two-sided platform approach can be applied to ease and understand any friction in using corporate social media. The concepts can be used to improve organizational knowledge retention and transfer by explicitly managing the “seeker” and the “sharer” sides of the knowledge platform. The “subsidy” side (or price sensitive side) in this thesis consists of the seekers, while the “money side” consists of the sharers. This is because growth in the seeker side should add value faster to the sharer side (Eisenmann et al. 2006). However, the results in this thesis reveal a weaker influence between seeking by others and sharing by individuals, compared to the same-side effects. This suggests that Tech Corp. should provide incentives not only to the seeker side of the platform, but also to the sharer side. In other words, incentives for two-sided internal knowledge platforms should be provided to both sides of the platform (Ye et al. 2012).

Organizations can start managing the equilibrium balance – the supply and demand for units of knowledge - between the seeker and sharer sides to optimize quality and quantity. Managers may need to think beyond a “black box” view of “use” and directly manage the underlying knowledge platform. For example, a near real-time dashboard that displays seeking and sharing behavior by division could be used to assess

the “health” of collaboration and knowledge management initiatives. Integrating aggregated employee demographic data such as the one used in this thesis into such a dashboard could provide further insights on the success of various pricing, subsidy, or seed strategies.

Opportunity and search costs are the “prices” of the platform and thus can be manipulated (Hansen and Haas 2001). Traditional incentives to encourage knowledge use and sharing in organizations include performance reviews, and creating visibility for top performers such as publicizing “hit” count (Hansen and Haas 2001).

Based on the results of this thesis, the social media attributes used by Tech Corp. encourage knowledge use and sharing through the platform by lowering search costs and knowledge barriers. For example, costs for seeking information can be decreased and incentives can be provided to sharers by providing the identity of the content supplier through profiles. Ratings and voting mechanisms are also used to evaluate and identify valuable content. Hence, through the use of these attributes, Tech Corp. reduces search costs by providing this “who knows what” information on individuals, teams, and the content that they share.

Tech Corp. also lowers knowledge barriers (Fichman and Kemerer 1999) and decreases opportunity costs by making it easier for their employees to learn how to access, operate, and efficiently use the corporate social media tools and their attributes. The firm accomplishes this through communications, training, and support. For example, Tech Corp. provides a central collaboration group to provide assistance and training, online self-help, company conferences for spread the word face-to-face, and assistance for users via its “ambassador” program with representatives at the local business unit

level throughout the organization. Firms can further lower opportunity costs for employees by having a seamless, single sign-on link from a widely-used corporate application such as email, to the new corporate social media (Healey 2012). Finally, organizations can conceive of subsidies to "buy" the participation of the "price sensitive" (seeker) side of the two-sided platform (Eisenmann et al. 2006).

Overall, a two-sided network approach can help organizations discover new insights on how to lower use costs and generate greater variety of content. This approach can lead to the seeking and sharing of more heterogeneous content between peers helping peers through highly focused and useful content for their work (Brynjolfsson et al. 2003; Oestreicher-Singer and Sundararajan 2012). While the social influence of the network externalities of others is found to have the greatest impact on employee seeking and sharing, organization structure and cognitive social capital can also have significant influences.

The impact of the use of social media for seeking and sharing knowledge within the organization is just being realized. The employees at Tech Corp. know how to use the platform, understand its importance for their work, and continue to use it long after its implementation. These theoretical and managerial implications provide insights on this use through the analysis of a unique dataset. The limitations and directions for future research are discussed next.

6.3 Limitations and Directions of Future Research

A limitation of this thesis is that archival seeking data from just *one* type of social media, the corporate blog, was available from the firm for analysis. It would be interesting to compare the two-sided network effect results of this study with the analysis of seeking and sharing data from other social media such as social bookmarks, wikis, and online discussion boards. Further the two “sides” of each type of social media can be tested to see which sides of the platform have the greatest influences on seeking and on sharing. This thesis provides a general research framework that can be applied to these other settings.

Six weeks of overlapping archival data was available from the firm for both seeking and sharing of the corporate blog. Future research should test the hypotheses longitudinally and take into account the impact of shared posts on comments. Also, data is collected from only one firm. It would be interesting to compare and identify ‘baseline’ measures of each effect across industries or platforms. This research could help reveal optimal ‘inflection points’ of the same-side and cross-side network effects to identify the place in the curve where the marginal utility of additional sharers or additional seekers starts plateauing, or climbing up/down at a higher rate.

This thesis shows that positive two-sided network externalities impact knowledge seeking and sharing. It is assumed that greater seeking and sharing through corporate social media is beneficial. However, there could also be a risk of negative externalities if, for example, too much content is shared. Hansen and Haas (2001) found that sharers of information compete for the attention of those that seek information. When does this content become overwhelming to seekers and demand start to decrease? It would be

interesting to find the minimum amount of shared content on one side of the platform needed to attain a critical mass of seekers on the other side of the platform to sustain participation.

While the results of this thesis show that less organization structure and greater cognitive social capital can lead to greater seeking and sharing of knowledge through corporate social media, this raises new questions. The proposed analysis of inflection points can also be applied to the impact of organizational structure and social capital on the use of social media to seek and share knowledge. For example, is there a point where less organization structure leads to a negative impact on knowledge seeking or sharing?

In contrast to centralized structures, decentralized structures enable greater lateral communication and interaction conducive for adapting to innovations as a continuous process (Giessner and Schubert 2007). Advances in IT such as corporate social media are allowing firms to have more flexible, distributed control and coordination among employees at lower costs (Yoo et al. 2008). Through the use of these tools, employees are able to gain greater autonomy without being restricted to traditional top-down, co-located, “command and control” organization structures (Wagner 2004). While decentralization can mean less integration and control within *local* processes, a stable equilibrium can be reached over time leading to greater overall integration and use of a new IT tools at the organization-wide process level (Berente and Yoo 2012). This leads to the question whether there a point where an organization can become too distributed and decentralized to collectively support the effective use of social media within the firm?

With respect to social capital, at the aggregate level, high levels of social capital could result in negative externalities for the overall organization (Adler and Kwon 2002). The risks from the stronger ties of “too much” social capital could override their benefits (Adler and Kwon 2002; Hansen et al. 2001). Despite this, most prior research on social capital has focused on the benefits and not the risks (Adler and Kwon 2002). This is another opportunity for further research.

Another question related to the impact of organizational structure that this thesis raises is with respect to social presence and identity. Face-to-face meetings can facilitate social presence and identity which, in turn, can have a positive impact on sharing knowledge through postings (Fulk et al. 1990; Hogg and Terry 2000; Koh et al. 2007). However, the results in this thesis show that greater geographic distribution can have a positive impact on sharing. The opportunities for offline meetings should decrease with increased geographic distribution. A possible explanation for this apparent paradox is that face-to-face meetings may serve as a substitute in organizations where the quality of IT infrastructure is low (Koh et al. 2007).

Further research is needed to provide clarification since low quality IT infrastructure is not an issue for the firm analyzed in this thesis. It is likely that the more geographically distributed employees at Tech Corp. need to rely even more on using their social media platform’s tools and attributes. Examples of such tools and attributes include profiles for every employee with their areas and levels of expertise, links to documentation and recent blog posts, activity streams showing content created and shared, and responses from other employees. Tech Corp.’s platform also supports the easy sharing of videos. Hence, it is likely that the use of such tools and their attributes

provided by the firm's social media platform can substitute for the social identity and presence benefits of offline meetings for employees in business units that have greater geographic distribution. In short, it appears using corporate social media at Tech Corp. can help promote employee awareness of their own social identities as well as the awareness of other employees and their relations needed to encourage the sharing of knowledge (Fulk et al. 1990; Hogg and Terry 2000; Koh et al. 2007).

The results in this thesis reveal new opportunities for future research related to the strategy-structure paradigm with respect to the impact of the CIO reporting structure (Chandler 1962). Prior research has determined that a CIO-CEO reporting structure benefits firms following a differentiation strategy (e.g. innovating new products and services), while a CIO-CFO reporting structure benefits firms following a cost leadership strategy (e.g. achieving cost efficiencies) (Banker et al. 2011). Drawing from the results of this thesis, a flatter organization structure (e.g. CIO-CEO) should have a greater influence on the seeking and sharing of knowledge by the employees in the business unit. Greater knowledge seeking and sharing between these employees may help support why CIO-CEO organization structures outperform more vertical CIO-CFO structures for organizations following differentiation strategies.

Another limitation of this thesis is that the content of employee postings is not available from the firm. Hence, a shared blog post could be a question from an employee seeking a solution. However, enterprise-wide questions from employees at Tech Corp. are more likely posted in forums which also enable comments and are supported by the corporate social media platform. Tech Corp.'s social media platform also supports keywords and tagging which further research could use for gaining greater understanding

on content with respect to the seeking and sharing of knowledge and the theories developed in this thesis.

Analyzing the shared content would provide additional insights with respect to the seeking and sharing of knowledge. Dixit and Stiglitz (1977) found that users prefer content with greater variety. It would, therefore, be interesting to find out what the optimum variety of content is needed to reach steady state consumption. This question has been posed in the context of advertising (Anderson and Gabszewicz 2006) and other areas, but are also relevant to the organizational knowledge context.

Furthermore, it may be possible to model “rates” for increasing content and consumption. For example, simultaneously stimulating two-sided platform effects through a “seed” *and* “subsidize” strategy (Ye et al. 2012). In Tech Corp. the stage is set for applying such a strategy. The reliance on a few “experts” from the top levels of the firm is reduced by the peer-to-peer sharing of knowledge via a social media platform. Knowledge use and sharing is transformed to a bottom-up knowledge platform that includes a greater variety of content, from a larger number of sharers, reaching a larger number of seekers.

6.4 Conclusion

Social media continues to expand in organizations and its success depends on employees to use it to seek and share knowledge. There is, therefore, a need for research that examines the factors that influence the successful use of social media so that firms can realize positive value from their investments.

This thesis contributes to the overall IS discipline by providing powerful and parsimonious theory to explain employee behavior related to the multidimensional use of corporate social media within the firm (Pavlou and El Sawy 2006). The knowledge network research approach for analyzing organizational social media use is still emerging. This thesis contributes to this stream by (a) conceptualizing social media use as multidimensional: seeking and sharing information and by (b) empirically demonstrating three different aspects of knowledge seeking and sharing within a firm.

First, network externalities on seeking and sharing are applied to a two-sided platform as a lens to understand social media by (a) analyzing how those who seek knowledge are influenced by others who share knowledge and vice-versa, and by (b) finding evidence of the existence of strong supply-side, demand-side and cross-side externalities on seeking and sharing tendency.

Second, the model is extended to understand the impact of organization structure on social media seeking and sharing by: (a) analyzing the influences of hierarchical and geographical distribution, (b) finding evidence that less organization structure yields greater seeking and sharing, and (c) finding evidence that network externalities have a greater impact than organization structure.

Third, the model is extended to understand the impact of social capital on social media seeking and sharing by (a) analyzing the influences of the dimensions of cognitive and relational social capital, by (b) finding partial support that cognitive social capital influences seeking and sharing, and by (c) finding evidence that network externalities have a greater impact than social capital.

In addition, these results also provide practical implications for the implementation and use of social media in the organization.

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