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THE VISIBILITY PARADOX:
SOCIAL MEDIA USE AS A MANIFESTATION OF KNOWLEDGE, DISPARITY,
AND STATUS IN GLOBAL ORGANIZING

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ABSTRACT OF THE DISSERTATION

The visibility paradox:

Social media use as a manifestation of knowledge, disparity, and status

in global organizing

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This dissertation investigates the ways in which distributed workers in a global high-tech organization engage with the affordances of enterprise social media for their everyday knowledge sharing practices. Drawing on the scholarship of *process of knowing*, I elaborate on how communication visibility, enabled by the use of enterprise social media, is closely intertwined with the situational, relational, and material aspects of knowing. To generate an in-depth understanding of how visibility may shape the emerging processes of knowing among globally distributed workers, I employed a mixed-methods approach analyzing different types of data including quantitative, social network, and qualitative data. The findings shed light on *the visibility paradox*: communication visibility facilitates knowledge sharing, yet concurrently brings into high relief existing knowledge disparities among diverse groups and individuals, which in turn reproduces status hierarchies.

Elucidating the intended and unintended consequences of technology adoption, this study disentangles the complex interrelationships among visibility, status asymmetry, and process of knowing. Although the technology was implemented to improve knowledge sharing across borders, the emerging patterns of use ironically contributed to exacerbating knowledge disparities, which subsequently reinforced status differences in the organization. This study builds a granular understanding of the paradoxical influences of visibility on knowledge sharing by presenting three central themes: knowledge (*awareness of knowledge conversations* vs. *awareness of knowledge disparities*), connectivity (*connections as resources* vs. *connections as challenges*), and power (*leveraging panoptic effect* vs. *controlled by panoptic effect*). These three constructs of knowledge, connectivity, and power are important status signals that are shaped by the visibility effects. This study contributes to advancing the scholarship of organizational knowledge and paradox by revealing how visibility and status can jointly constitute process of knowing. The findings are further discussed with respect to their practical implications for the management of knowledge, technology, and diversity in a global high-tech organization.

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Chapter 1

Untangling the Challenges of Distributed Knowledge Sharing

The informed organization is a learning institution; (...) Learning is not something that requires time out from being engaged in productive activity; learning is the heart of productive activity. To put it simply, learning is the new form of labor.

- Shoshana Zuboff, *In the Age of the Smart Machine* (1989a)

Knowledge is integral to modern work. Since the rise of the so called “knowledge economy” (Drucker, 1969), a plethora of publications have addressed the nature of knowledge in the context of work and organizing. Despite the acknowledgement of the significance of knowledge among scholars and practitioners alike, executing and practicing knowledge however entail a number of efforts and obstacles. Highlighting the complexity of knowledge work, scholars now challenge a simplistic and functional approach that frames knowledge as an “asset” or “competitive advantage” (Argote & Ingram, 2000). Precisely because contemporary organizations need to draw on specialties (or specialized knowledge) for daily operations, knowledge either facilitates or hinders collaboration depending on the ways in which it is shared in a given setting. Namely, as a knowledge domain is often built upon a particular set of assumptions, conceptualizations, and practices, knowledge may occasion communication problems. As Carlile (2002) maintained, “knowledge is problematic; (...) knowledge is both a *source* of and a *barrier* to innovation” (p. 442, emphasis by the author).

One of the most prominent contexts in which knowledge becomes a source of challenge is a cross-boundary interaction, especially among globally dispersed workers. To implement knowledge that has been developed in another context, the representation,

enunciation, or transformation of knowledge may be required. However, such processes involve a range of practical challenges since boundary-crossing interactions require tremendous endeavors including time commitment, training, and negotiation of common ground. Particularly in global organizations, knowledge sharing is likely to occur across geographical, functional, and cultural boundaries; further, these boundaries overlap in many cases. Under dispersed conditions, knowledge is likely to be shaped by disparate practices within overlapped boundaries. Scholars who have examined a range of impediments to distributed knowledge work underscore this “mutual knowledge problem” (Cramton, 2001) to define and delineate the characteristics of knowledge embedded in a specific context. Studies have suggested that knowledge is *situated* (Lave & Wenger, 1991; Sole & Edmondson, 2002), *sticky* (Hippel, 1994; Szulanski, 2000), and localized, embedded, and invested in *practice* (Brown & Duguid, 2001; Carlile, 2002; Cook & Brown, 1999; Lave, 1988). Focusing on practice, these perspectives have provided a closer look at knowledge sharing across boundaries where different views collide or converge.

In recent years, the practice scholarship has been significantly advanced by a communicative view on *knowing*. The practice view on knowledge “prefers the term *knowing* (over knowledge) to highlight the performative, provisional, dynamic, ongoing, and often mundane production of a social practice” (Kuhn, 2014). The studies of knowing have encouraged scholars to revisit our understanding of the interpretation, sharing, and application of knowledge by acknowledging the importance of processes and actions. Organizational knowing has been increasingly discussed across diverse streams of literatures, yet communication scholarship made a distinct contribution to the

conceptual and empirical advancement of it. In what follows, I review the prior work on organizational knowledge and knowing to present a practice-based view on knowing as a guiding framework of the current study. Specifically, I elaborate on how this approach helped me advance my approach to the *processual*, *relational*, and *material* aspects of knowledge sharing and how this perspective is particularly beneficial for building a granular understanding of cross-boundary knowledge sharing in a global organization.

Knowing: A Communicative Perspective on Knowledge

The contested definitions of and alternative approaches to organizational knowledge that have appeared across literatures clearly indicate that knowledge is a central area of concern in management and organization communication studies (for a review, see, Brown & Duguid, 2001; Canary & McPhee, 2011; Kuhn, 2014). Early studies treated knowledge as a static entity, and scholars often used information and knowledge interchangeably (Kogut & Zander, 1992). Although scholars later started to distinguish knowledge from information, knowledge was conceived as a cognitive property that resides in brains and bodily skills of individuals (Ipe, 2003; Lam, 2000), as described in the argument that “all organizational learning takes place inside human heads” (H. Simon, 1991, p. 176). Further, researchers of a cognitive view extended the storage model even to an organizational level by proposing that knowledge can be stored in organizational structures, cultures, and external archives to preclude the inevitable information loss due to the finite storage capacity of human memory (Walsh & Ungson, 1991).

From this viewpoint, a key concern regarding organizational knowledge is the effective transfer of knowledge held by individuals, collectives, or databases.

Communication is used to encode knowledge in a transferrable form, convey codified knowledge, and again to store it as information. Thus, tacit or uncodifiable knowledge was naturally considered non-transferrable (Nonaka & Takeuchi, 1995; Zander & Kogut, 1995). As Kuhn and Porter (2011) state, this approach reduces the role of communication to “that which transmits the object of interest” (p. 17). In sum, a cognitive view of knowledge is tantamount to a container view of communication—both approaches fail to capture how communication *constitutes* organizational knowledge. In this respect, organizational communication scholars are well positioned to develop the studies of *constitutive construction of knowing*, inspired by the interpretive perspective (Putnam, 1983) and sensemaking approach (Weick, 1979).

In the late 1990s, an epistemological turn in the understanding of knowledge brought into relief the dynamic and interactional—rather than static—characteristics of knowledge. Cook and Brown (1999) called this framework an “epistemology of practice” while naming the cognitive view an “epistemology of possession.” The practice view on knowing typically suggests that knowing is *situated*, *relational*, and *processual* (Gherardi, 2001). The advocates of this perspective pay attention to the role of communication and cast practice as “the figure of discourse” that articulates knowing as historical, material, and indeterminate (Gherardi, 2000, p. 220). Also, to elucidate the situational, embedded nature of knowing, they consider both social and material contexts. In this vein, Blackler (1995) presciently proposed that knowing is *mediated*, especially discussing how the complex web of communication technologies and changing organizational environments would shape human actions. Hence it is important to examine the *contexts* within which individuals act. Extending this tradition of practice-

based knowing, Kuhn and Porter (2011) recently argued that the *processes of knowing* should be understood as “always embodied, embedded in *particular socio-historical settings and communities*, and intimately connected to the *material* factors through which they emerge” (p. 18, emphasis by the author).

The scholarship of knowing provides an undergirding framework that drives the core interests of the current study in three ways. First, the knowing approach foregrounds *situated social practices* to analyze how social actors within a particular context interact with others to create and negotiate knowledge. Scholars of knowing thus concentrate on context-specific communicative practices, for instance, shared repertoires among the members of a local community (Iverson & McPhee, 2002, 2008). As communities shape and structure the interpretations of events and actions, the members of different communities may have disparate assumptions about their work and products. As such, cross-boundary knowledge sharing requires the processes of enabling a shared language between different parties (Kuhn & Jackson, 2008).

The focus on situated practices is particularly beneficial for investigating distributed knowledge work—the processes in which workers attempt to share, understand, and generate knowledge across functional, geographical, and cultural boundaries. Since knowledge cannot be simply stored and transferred but it is embedded in routines, norms, and practices (Brown & Duguid, 2001), communicating knowledge beyond a given context can be especially difficult. The practice-based model of knowing helps identify and address the challenges of distributed knowledge work by offering a useful lens through which I can look into situational aspects of knowledge sharing. Indeed, scholars have examined situational invisibility and its influences on knowledge

sharing among dispersed employees (Cramton, Orvis, & Wilson, 2007; Sole & Edmondson, 2002). In this study, I also highlight the role of situated social practices in the processes of knowing. Specifically, I connect this approach to the area of *organizational awareness* to delve into how distributed workers can achieve situational awareness of day-to-day activities happening on the other side of boundaries and in turn support the processes of knowing. In doing so, this study reveals how shared contexts among remote workers can attenuate disparities in the awareness of others' work, which can facilitate knowledge sharing.

Second, the alternative view on knowing places *interactions and relationships* at the center of analysis; in other words, it proposes that knowledge is inherently relational. Since everyday interactions are considered the locus of knowledge-related practices, knowledge emerges through social relationships rather than residing in individuals. As such, the socially embedded nature of knowledge has been a major component of the practice research. Orlikowski (2002) claimed that the experience of building and sustaining interpersonal relationships in its own right constitutes the processes of knowing. Also, relational characteristics have been discussed as a core mechanism of knowledge sharing among practice scholars although specific analytical foci may vary (Østerlund & Carlile, 2005). Drawing on various concepts such as different group membership, identities, dependencies, and boundaries, prior work on knowing has argued that knowledge and relationships mutually shape each other.

This study also emphasizes the relational aspect of knowing to scrutinize how the characteristics of interpersonal connections are related to knowledge-sharing practices in a global organization. Specifically, this study employs a social network perspective to

generate an intimate understanding about the underlying social structures that may affect the processes of knowledge sharing. The social network approach enables researchers to investigate the communicative mechanisms by which network linkages are forged, maintained, or dissolved (Contractor & Monge, 2002). Communication scholars have emphasized emergent networks that represent dynamic communicative interactions and capture actual relationships not restricted by formal organizational structure (Monge & Contractor, 2003). Scholars of knowing also have adopted network concepts such as knowledge brokers, highlighting the influence of relational positions on knowledge sharing within or between boundaries (Hong, Suh, & Koo, 2011a). In this study, I draw on a number of network constructs to analyze the configuration of knowledge networks and their impact on the patterns of knowledge sharing. By directly engaging with the data on networks and ties, this study presents concrete findings on the role of relational factors in knowledge sharing.

Third, the processes of knowing are not only social but also *material* in two regards: (a) both knowledge and artifacts are interlocked with language and discursive practices, and (b) materiality also exerts its agency on human practices (Kuhn, 2014). Practice theorists have long advocated materialist approaches suggesting that the social is “a field of embodied, materially interwoven practices centrally organized around shared practical understandings” (Schatzki, 2001, p. 3). Extending this perspective to studies of knowledge, scholars have also averred that, through practices, knowledge is shaped by contingent conditions and materiality of the environment (Gherardi, 2001). The material entities encompass technological artifacts (e.g., communication technologies), objects (e.g., models), and environmental settings (e.g., floor plans). Hence, the practice model of

knowing considers material layouts in which knowledge-sharing practices occur since materiality and practices mutually constitute the processes of knowing.

Echoing this line of work, the central theme of this study revolves around the use of communication technology, and in particular, enterprise social media (ESM). Technology use is inextricably linked with communication practices especially in a distributed setting where workers rely heavily on digital tools to communicate, and in turn, the affordances of technology significantly affect the nature and forms of knowledge-sharing practices. This study will reveal the ways in which the use of ESM transforms the nature of communication and the patterns of knowledge sharing. Given the increased adoption and optimistic forecast by popular press, there is a pressing need for further examination of whether and how the use of ESM affords new ways of organizational knowledge sharing. In addition, I will demonstrate how the process of knowing shaped by the use of ESM can subsequently constitute individuals' perceptions of relationships, status differences, and knowledge disparities. Unpacking emerging practices after the implementation of ESM, I will discuss how organizational hierarchies—including both formal structures and informal status hierarchies—and processes of knowing recursively constitute each other.

Taken together, this study substantially benefits from employing the perspective on the processes of knowing in that this framework helps to articulate the key foci of the current study: the situational, relational, and material aspects of knowing in a global organization. Grounded in this scholarly advancement, this study aims to offer nuanced accounts on the processes of distributed knowing by focusing on situational awareness, network connections, and the use of communication technologies. More broadly, this

study seeks to shed light on the interrelationships of sociomaterial practices and the processes of knowing. In doing so, I will reveal the ways in which communicative practices among distributed workers constitute knowledge and global organizing. In the next section below, I will switch the focus of discussions to the use of ESM for distributed knowledge work in order to present the core context of this research project.

The Use of Enterprise Social Media and Knowledge Sharing

The use of communication technologies in organizational settings has been examined predominantly in relation to its knowledge-sharing outcomes (Heinz & Rice, 2009). Typically, scholars have used the term *knowledge management* (KM) to theorize the knowledge-related implications of technology use. In line with this, the particular array of organizational technologies for the storage, transfer, retrieval, and application of knowledge was referred to as *knowledge management systems* (KMS). The abundant literatures on KM have identified three contribution areas of KMS including the coding and sharing of best practices, the creation of corporate knowledge directories, and the formation of knowledge networks (Alavi & Leidner, 2001). Drawing on these capabilities, scholars have claimed that the effective use of technologies can enhance KM outcomes, which in turn promote the performance of teams and organizations (Choi, Lee, & Yoo, 2010; Tanriverdi, 2005).

However, the research trend in KM and KMS has received some criticism due to its conceptual and methodological limitations. KMS research (a) inevitably reduces the complex nature of knowledge to a storable and transferrable form for the sake of efficiency; (b) primarily equates the source of knowledge with the individual; and (c) presumes that tacit knowledge is non-utilizable through technological means and

infrastructures (Flanagin, 2002). Addressing these issues, recent scholarly endeavor has shown how the processual, interactional, and relational nature of knowledge can go hand-in-hand with technological systems. The use of intranets, for example, does not simply reproduce or transfer knowledge within communities; rather, it helps members make sense of situated practices and sustain their relationships as well as communities (Vaast, 2004). Also, technological support significantly facilitates communicating context information and developing collaboration know-how among distributed workers especially when they exert non-routine tasks (Majchrzak, Malhotra, & John, 2005).

In general, however, research that examines the processes of knowing in tandem with communication technology use is still nascent. Given that a vast amount of knowledge-sharing activities transpire in technology-enabled contexts, scholarship on knowing must invest more in examining the use of communication technologies. Invoking the viewpoint of *processes of organizing* as a more appropriate frame for studying organizational knowledge, Flanagin and Bator (2011) suggest that the scholarly attention switch from KM and KMS to managing knowledge *processes*. Moreover, they maintain that technologies are critical in this approach and must be understood as “dynamic tools capable of supporting the rich and situated practice of co-creation required to generate knowledge and manage it within and across organizations” (p. 185). In this vein, they point out the emerging web-based, social technologies such as blogs and wikis as promising research domains. Other scholars also echo this idea by emphasizing the distinctive knowledge-sharing capabilities of conversational technologies (e.g., wikis, social media) that lubricate shared understanding and collaboration (Majchrzak, Faraj, Kane, & Azad, 2013; Wagner, 2006). This new class of communication technologies may

shape the processes of knowing, hence proposing a new research agenda for both researchers and practitioners.

Responding to this call, the current study delves into the use of ESM and its implications for knowledge sharing in a globally distributed organization. In this study, ESM refer to the platforms used for internal communication within an organization; thus, those geared toward external communication (with clients) or public relations management are not of analytical interest. Leonardi, Huysman, and Steinfield (2013) define ESM as “web-based platforms that allow workers to: (1) communicate messages with specific coworkers or broadcast messages to everyone in the organization; (2) explicitly indicate or implicitly reveal particular coworkers as communication partners; (3) post, edit, and sort text and files linked to themselves or others; and (4) view the messages, connections, text, and files communicated, posted, edited and sorted by anyone else in the organization at any time of their choosing” (p. 2). They emphasize the fourth point as the core nature of ESM; namely, ESM allow users to perform the other three activities all in one place, which will remain available for users to view (or even edit/share) at any time in the future.

Further explicating the characteristics of ESM, Treem and Leonardi (2012) suggest that ESM have the following four distinctive, and relatively consistent affordances¹ in comparison to other organizational communication tools: visibility, editability, persistence, and association. Visibility is related to the ability to make communication behaviors, knowledge, and network connections visible and easy to locate. Editability refers to the ability to craft a communicative act before (or after) publication; thus, ESM users have a greater level of control over their own content.

Persistence indicates that communications remain accessible and available in the original form once they are made viewable online. Finally, association is conceptualized as the visualized connections between users, or between users and content. These affordances may potentially alter the processes of organizing—including knowledge sharing—and provide useful starting points to explore the organizational consequences of ESM use.

The affordance approach to ESM use and its implications for knowledge sharing is a burgeoning area of organizational research. Building on prior work, numerous scholars have proposed that the use of ESM can help employees (especially distributed workers) accrue social capital to collect non-redundant information and easily locate expertise, find common ground with others, and engage in creating a public knowledge pool (Ellison, Gibbs, & Weber, 2015; Fulk & Yuan, 2013; Leonardi et al., 2013). In a study of a globally distributed organization, the use of ESM indeed demonstrated positive associations with relationship formation across the organization, ability to access expertise, and organizational engagement activities (Steinfeld, DiMicco, Ellison, & Lampe, 2009). More recently, researchers have offered detailed accounts on the emerging, complex patterns of knowledge sharing fostered by the use of ESM. Gibbs, Rozaidi and Eisenberg (2013) revealed that distributed workers strategically drew on the affordances of ESM to engage or disengage in knowledge sharing depending on their goals. Also, Leonardi and Treem (2012) delineated that individuals' expertise can be performed or constructed by selective self-presentation online; and in turn, others' perception of expertise may affect knowledge soliciting and exchanging behaviors. These studies imply that workers may actively harness the affordances of ESM to shape others' perceptions, control information access, and selectively provide knowledge. Given that

ESM affordances may significantly differ from those of traditional KM tools, the analyses of differential patterns of ESM use in a specific context can yield important insight into how workers develop new modes of knowledge sharing to better attend to their needs.

In this regard, the current study elucidates the ways in which distributed workers in a global high-tech organization engage with the affordances of ESM for knowledge sharing, particularly stressing the situational, relational, and material nature of the processes of knowing as described in the previous section. Specifically, this study places an emphasis on the affordance of visibility, and how it is linked to organizational awareness, knowledge-sharing networks, and the emerging practices of knowing. By examining these dynamics, this study generates an in-depth understanding of how workers' responses to the visibility affordance can lead to the changes in the patterns and outcomes of knowledge sharing, both intended and unintended. The findings will contribute to communication scholarship of organizational knowledge by articulating the complex ramifications of new technology use, dynamic knowledge-sharing practices to surmount the challenges of distributed work, and the interplay between global organizational structures and the processes of knowing. To accomplish this goal, I conducted a yearlong study that employs a mixed-methods approach in a global high-tech organization.

Organization of the Dissertation

The structure of this manuscript is as follows. Chapter 2 reviews relevant literatures with a specific focus on organizational awareness, knowledge-sharing networks, and status differences in global organizing. Building on prior work, I propose

my research questions and hypotheses in this chapter. Chapter 3 presents the details about the field site and methods. I introduce the research context as well as participants, and describe data collection and analysis procedures. The explanations of the measures including a newly developed scale will be also included. Chapter 4 is the first of my three findings chapters. This chapter illustrates how distributed workers leverage organizational awareness, supported by the affordance of visibility, which in turn promotes knowledge sharing. Next, Chapter 5 presents the findings on the impacts of visibility on the characteristics of knowledge networks, which subsequently affects the acquisition of useful knowledge. Chapter 6 offers in-depth stories about the contradictory influences of visibility on knowledge work by critically examining how emerging communication practices on ESM shape and are shaped by status hierarchies. This chapter delineates how the affordance of visibility can occasion the reproduction of a knowledge gap, despite positive knowledge-sharing outcomes. Finally, Chapter 7 synthesizes the findings of the current study. This chapter culminates with a general discussion of the connections to the prior work, theoretical contributions, practical implications, and limitations as well as future directions.

Note.

¹ The concept of affordance was originally suggested by Gibson (1977, 1979). The affordance of an artifact is “a specific combination of the properties of its substance and its surfaces taken with reference to an animal” (p. 67). Bringing the notion of affordances of material objects into an understanding of human perception, the theory of affordances stresses the relational nature of human-object interactions. Hutchby (2001) later expanded the discussion and defined affordances as “functional and relational aspects which frame, while not determining, the possibilities for agentic action in relation to an object” (p. 444). Thus, an affordance exists relative to the action capabilities of a particular actor.

Chapter 2

Literature Review

To understand visibility as a field entails essentially two things. First, visibility is always intervisibility, it is a relational and positional quality. Second, visibility is an aspect of social life that enables us to introduce thresholds of relevance and selective attention (inscribing or projecting them).

- Andrea Brighenti, *Visibility in Social Theory and Research* (2010)

Although the notion of visibility may be theorized as a distinct analytic category only recently (Brighenti, 2007; Flyverbom, Leonardi, Stohl, & Stohl, 2016), visibility has attracted substantial scholarly attention by virtue of its profound effects on social, interactional, and power dynamics (Ball, 2009; Crossley, 2001; Foucault, 1978; Gordon, 2002; Leonardi, 2014; B. Simon, 2005). In recent years, a number of scholars in management and organizational communication began to revisit the construct of visibility to refine its meaning and role in organizing, especially in the age of digital communication. This burgeoning line of research pursues its inquiries based on the fundamental proposition that new modalities of visibility afforded by digital technologies may alter the organizational dynamics of seeing and knowing (Flyverbom et al., 2016; H. Hansen & Flyverbom, 2015). For instance, as communications increasingly occur in a digital form, the ways in which individuals seek and share knowledge will also be likely to change. Further, since digital forms of communications are often accompanied by other contextual information and metadata, both individuals and organizations need to revamp their knowledge management strategies. For contemporary workers, therefore,

visibility management is more important than ever given the unprecedented range of visible information not merely about their work but also about themselves.

Reflecting this trend, scholars have strived to expand our understanding of the nature of visibility. The recent advancement in the theorization of visibility has informed the current study in three ways. First, researchers propose that, among many ESM affordances (Treem & Leonardi, 2012), the visibility affordance supersedes the rest (Flyverbom et al., 2016). Indeed, the affordance of visibility can be conceived as a root affordance that subsequently enables persistence, association, editability, and other affordances because such affordances can operate when having visibility as a preexisting condition. The outcomes of the visibility affordance are thus intertwined with the activation, utility, and influence of other types of affordances. In the current study, for example, employees' communicative acts on ESM could remain persistently available and thereby could be maintained, edited, and updated, which was enabled by the fact that previously invisible communications became visible.

Second, drawing on prior work, Stohl et al. (2016) synthesize that visibility consists of three empirical dimensions: (a) the availability of information, (b) approval to share information, and (c) the accessibility of information to third parties. According to these criteria, the public newsfeeds of ESM can be regarded as a digital communication platform that affords high visibility. However, visibility should not be equated with transparency—The authors further argue that the fact that all three attributes are marked at high levels does not necessarily guarantee greater access to information and knowledge. Moreover, the social effects of visibility are not linearly correlated to the technical degree of visibility since its social functions are shaped by contextual factors

(Brighenti, 2010). In line with this, the current study underscores the social and organizational dynamics around visibility. Contrary to Stohl et al.'s limited focus on *information* availability and accessibility, I switch the research concern to knowledge, examining *process of knowing* and its interrelationships with status hierarchies in global organizing. In doing so, I will reveal that an elevated level of visibility does not necessarily promote knowledge sharing but brings asymmetrical consequences to the groups and individuals in different status.

Lastly, visibility is always a relational and positional quality; hence, it should be understood as *intervisibility* (Brighenti, 2010). Being visible presupposes the existence of a counterpart—once something is made visible, it is situated in a relationship. In this aspect, visibility is inextricably linked to power and control (Brighenti, 2007; Foucault, 1978; Lyon, 2006). I aim to expand this perspective to the context of global organizing to delve into how visibility is intimately connected to social status and knowledge disparity among geographically dispersed workers. I examine the relational nature of knowledge sharing by employing multiple theoretical and methodological approaches such as a social network perspective and a practice framework. The findings will provide nuanced accounts of the mutual constitution of communication visibility and social status, and how their interplay shapes the processes of knowledge sharing in a global organization.

On the whole, connecting these discussions to the scholarship of organizational knowledge and communication technology, this study highlights the interrelationships between visibility and knowledge in organizations; and in turn, I also look into how the new condition that makes previously invisible communications visible can shape extant hierarchical relations among globally distributed employees. In what follows, I present

my key hypotheses and research questions drawing on prior research. This chapter consists of three sections that review the consequences of communication visibility afforded by the use of ESM: (a) organizational awareness, (b) social connectivity, and (c) disparity in knowledge and status among distributed workers. Specifically, this study concentrates on the public (i.e., company-wide) communication on ESM to investigate the ways in which increased communication visibility makes an impact on the three elements above in the context of a global high-tech organization.

Organizational Awareness as Groundwork for Knowledge Sharing

Scholarship on *organizational awareness* (Dourish & Bellotti, 1992; Gutwin & Greenberg, 2002; Leonardi & Meyer, 2014; Weisband, 2002) provides a useful lens through which researchers can articulate the role and effects of visibility in the workplace settings. Particularly in global organizations, one's ability to stay abreast of others' activities beyond the immediate team or location can be significantly shaped by the extent of communication visibility. A number of scholars have paid their attention to this visibility problem in distributed work settings to discuss its implications for organizational awareness and knowledge sharing. Specifically, the construct of *situational invisibility* (Cramton et al., 2007) effectively captures such knowledge-sharing challenges in a dispersed condition. Cramton, Orvis, and Wilson (2007) define invisibility as "little opportunity to observe proximal environmental stimuli" (p. 528), emphasizing the importance of visible cues and ambient information that can increase contextual knowledge about others and their work. Researchers further argue that situational invisibility can make a multipronged impact on knowledge work, situation perceptions, as well as behavioral interpretations. For example, situational invisibility can

distort the processes of attribution by making individuals draw on dispositional explanations for others' behaviors rather than situational explanations (Cramton, 2002; Gilbert & Malone, 1995). In other words, as people are not aware of the current events at remote sites, they are more likely to ascribe coordination problems to their co-workers' lack of commitment or responsibility. Thus, invisibility can make a profound impact on further collaboration and task coordination.

The influences of situational invisibility (or lack thereof) have been studied mostly in relation to knowledge sharing. In a geographically distributed organization, it is difficult to achieve a shared understanding among members who often rely on *situated knowledge* (Sole & Edmondson, 2002), which is embedded and constructed in different social and physical contexts. As situated knowledge is not readily available or visible to workers in other locations, it could reinforce knowledge division between spatial boundaries unless workers engage actively in co-creating common ground and reconciling local differences (Bechky, 2003). To address this challenge, scholars and practitioners alike have explored innovative ways to share contextual information and promote awareness across locations as well as functions, particularly harnessing the affordances of communication technologies.

In the current study, I expand this line of work to the area of technology-enabled organizational awareness. Awareness research has also a shared emphasis on situatedness—it stresses that the up-to-the-moment understanding of coworkers' activities and situations is crucial for successful completion of collaborative work. Early studies in this area defined awareness with respect to knowing social contexts and organizational environments; namely, awareness indicates “knowledge about the state of

an environment bounded in time and space” (Gutwin & Greenberg, 2002, p. 416).

Considering the role of awareness in collaborative work, Dourish and Bellotti (1992) proposed a more concrete definition of awareness. According to them, awareness refers to “an understanding of the activities of others, which provides a context for your own activity” and this context is used to “ensure that individual contributions are relevant to the group’s activity as a whole” (p. 107). As such, achieving a high level of awareness can facilitate goal alignment as well as effective sharing and coordination among group members.

Awareness, however, can be seen as an umbrella term that encompasses numerous different domains. Tackling this issue, Weisband (2002) conceptualized awareness as a multidimensional construct and proposed a typology of awareness, particularly examining its implications for distributed work. Inspired by her approach, this study suggests the following three dimensions of awareness: (a) availability awareness is knowledge about whether others are available to participate in an activity; (b) task awareness¹ is knowledge about project-related activities of other organizational members (e.g., knowing what actions others are doing for their tasks at any given moment); and, (c) social awareness is knowledge about members’ social or personal situations that may include information about their life outside of the workplace. These categories can be applied to both team and organizational settings. If a team operates independently, the members of a team will benefit from achieving a high level of team awareness even without knowledge about how other teams proceed with their tasks. However, given that most teams in knowledge-intensive organizations are required to engage in inter-team collaboration, *organizational awareness* across functional and

geographical boundaries can be a decisive factor of successful knowledge sharing. For instance, an elevated level of organizational awareness beyond the respective team can help organizational members locate potential knowledge sources outside of their team and contact them in the right timing to solicit advice.

As aforementioned forms of organizational awareness are the building blocks of distributed knowledge sharing, awareness research has been further expanded to the design and development of *awareness systems* using digital technologies (Carroll, Neale, Isenhour, Rosson, & McCrickard, 2003; Gutwin & Greenberg, 1999, 2002). Although the features of awareness systems may vary, they are essentially geared towards making invisible information visible. They consist of various functions that gather and disseminate contextual information across different groups (e.g., sending notifications, projecting real-time videos of dispersed offices, visualizing presence information or current status). Early endeavors focused particularly on restoring missing visual or contextual cues to synchronize the activities of distributed workers. Yet scholars later examined more unobtrusive ways of maintaining awareness across locations through sharing status updates rather passively or simply making mundane conversations publicly available through newsfeeds (Leonardi & Meyer, 2014).

Communication technologies, typically, can transform situated knowledge more readily available to the third parties and keep organizational members informed of recent updates (Malhotra & Majchrzak, 2014). In particular, communication visibility achieved by the use of ESM can enable distributed workers to increase their awareness of work practices in different locations. For example, the public newsfeeds on ESM may provide workers with a persistent stream of daily activities, in which they may find chances to

share or solicit knowledge in an unobtrusive way. Workers can also get exposed to others' workplace routines on a regular basis and engage in less-disruptive communication with their coworkers. In fact, the use of ESM can enhance the awareness of others' knowledge and relationships, which in turn helps employees avoid duplication and combine existing knowledge more efficiently to foster innovation (Leonardi, 2014). Placing an emphasis on the pervasive and persistent nature of newsfeeds on social media (Hampton, Lee, & Her, 2011), a number of scholars suggested that ESM can provide awareness streams that enable ambient awareness of dispersed others (Leonardi & Meyer, 2014). The visible communications on ESM can significantly increase the accuracy of employees' knowledge of "who knows what" and "who knows whom" through *technologically enabled ambient awareness* of their coworkers' communicative activities (Leonardi, 2015). Given the communication visibility afforded by the use of ESM, I also posit that the public (i.e., company-wide) use of ESM can increase organizational awareness. The relationship is proposed in the following hypothesis:

H1: The public use of ESM is positively associated with organizational awareness.

In turn, organizational awareness offers a host of advantages for knowledge sharing, particularly for dispersed workers who experience a range of difficulties sharing their quotidian activities, situational knowledge, and changes in everyday routines (Cramton, 2001). By providing contexts and visualizing interactions, awareness can facilitate collaboration and reduce coordination efforts (Gutwin & Greenberg, 2002; Leinonen, Järvelä, & Häkkinen, 2005). Additionally, increased awareness about others' day-to-day activities, situational information, and workplace relationships can reduce

ambiguity surrounding knowledge transfer (Leonardi & Meyer, 2014) and support timely acquisition of knowledge (Birnholtz, Bi, & Fussell, 2012). Along these lines, Leonardi (2015) proposed that awareness is a significant antecedent for knowledge acquisition drawing on his comparative study of ESM users and non-users in a financial services firm: only the group that used ESM showed improvement in its members' metaknowledge ("who knows what" and "who knows whom").

Particularly in a distributed organization, enhanced awareness supported by the use of communication technologies can reduce cost of knowledge sharing since the technological infrastructure enables ongoing and unobtrusive collection of knowledge, avoidance of duplicated work, and easier discovery of relevant knowledge (Dourish & Bellotti, 1992). In this study, I argue that employees who have a high level of awareness of their colleagues' activities beyond the immediate team are more likely to obtain the knowledge in need. Based on their awareness of others' availability, task progress, and social activities, dispersed workers may be allowed to locate better knowledge sources who are available at the moment and can provide useful knowledge as well. In this respect, organizational awareness may serve as a scaffold that helps dispersed workers acquire knowledge beneficial to them. Therefore, the second hypothesis is proposed as follows:

H2: Organizational awareness is positively associated with the acquisition of useful knowledge.

Lastly, this study aims to ascertain the indirect effect of ESM use on knowledge sharing. Although the public use of ESM may facilitate knowledge sharing, it is not entirely clear that the ESM use can promote knowledge sharing in its own right. Rather, I

propose that the use of ESM can contribute to organizational awareness, which subsequently increases the acquisition of useful knowledge as discussed in the foregoing paragraphs. To confirm these relationships, I propose the third hypothesis that examines the mediating role of organizational awareness:

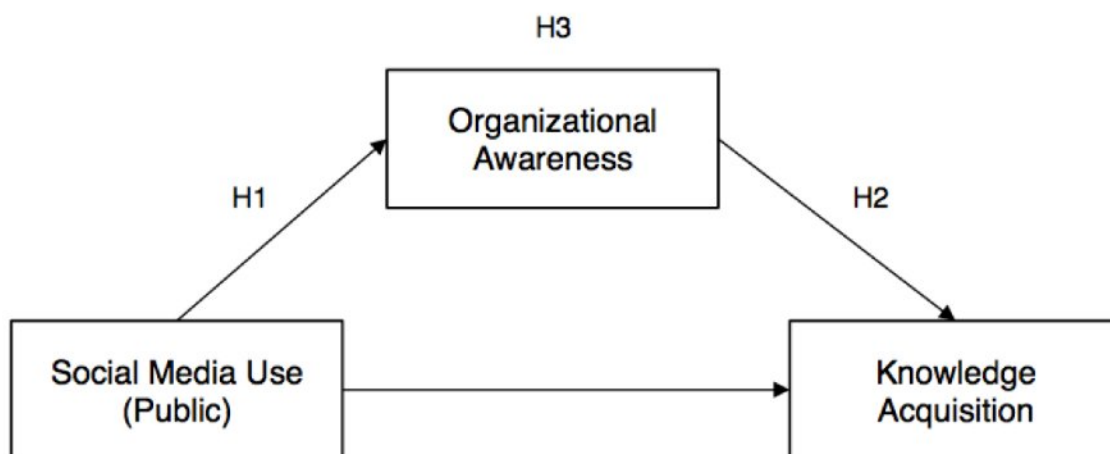
H3: The effect of ESM use on the acquisition of useful knowledge is mediated by organizational awareness.

In addition to ascertaining the proposed relationships above (for a hypothesized model, see Figure 2-1), this study seeks to scrutinize the mechanisms through which the use of ESM for public communication promotes organizational awareness. As company-wide use of ESM is a relatively recent phenomenon, the examination of emerging usage patterns can shed light on our understanding of how web-based, conversational technologies can shape the construction of organizational awareness. By illustrating such emerging practices, I aim to offer a granular understanding of *situational and material aspects of knowing* in a global organization. To pursue this goal, I will take a closer look at how dispersed workers utilize the affordances of ESM to communicate and collaborate with others. Focusing on the affordance of visibility, this study will examine how communication visibility transforms the nature of communication within a global organization, which in turn ultimately contributes to promoting organizational awareness. By delineating usage practices in detail, this study will provide in-depth accounts of different types of organizational awareness facilitated by the use of ESM. The research question is proposed as follows:

RQ1: In what ways does communication visibility promote organizational awareness?

Figure 2-1

Hypothesized Model for the Mediating Effect of Organizational Awareness



Cross-boundary Connections and Knowledge-Sharing Challenges

The Use of ESM and Network Characteristics

The social and structural effects of technology adoption has been a core concern among management and organizational communication scholars; however, the accumulation of research has shown conflicting findings on social network outcomes of technology implementation (for a review, see Borgatti & Foster, 2003; Carpenter, Li, & Jiang, 2012). While technological change may occasion a reconfiguration of organizational structures, such structural changes do not always occur and the ramifications of technology adoption have been found incongruent across organizational contexts (Barley, 1986). For example, Burkhardt and Brass (1990) demonstrated that one's adoption of a new technology often resulted in a gain in centrality and power. In their study, early adopters were more likely to increase their centrality and power to a greater degree than late adopters although many central figures maintained their position. Robey (1981), by contrast, found that the introduction of a new information system either reproduced or reinforced the extant organizational structure. Grappling with these contradictory outcomes, Leonardi (2013) provided an insightful account of *when* network changes are likely to occur after the implementation of a new technology within an organization. His analysis revealed that not merely the adoption of technology but a shared appropriation of technological affordances should be realized to result in changes in social networks. To better understand the social dynamics surrounding technology adoption, it is thus important to look into the interactions among actors and technologies. Researchers also must take into account contextual influences to examine how the use of

the very same class of technologies may bring about similar or different changes in workers' social relationships.

With respect to the use of ESM, communication scholars have made a distinct contribution to advancing our understanding of relational outcomes of technology use. The impact of communication technologies on social connectivity effects (Haythornthwaite, 2005) has been a long-standing interest among communication scholars since the appearance of the Internet (Doerfel & Moore, 2016; Ellison, Steinfield, & Lampe, 2007; Wellman et al., 1996; D. Williams, 2006). The relationships between communication technology use and network effects become particularly salient in the context of social media, which visualize and articulate the connections among individuals (boyd & Ellison, 2007) as well as the connections between people and content (e.g., tags in their posts or profiles, the groups they joined, or their "likes"). Social media users can utilize such visible information to forge new connections and learn about others' relationships with each other. In interpersonal communication contexts, scholars have shown that the use of social media can promote individuals' perceived social capital and access to various social resources (Ellison et al., 2007; Ellison, Steinfield, & Lampe, 2011; Hampton et al., 2011; Kim, 2014; Steinfield, Ellison, & Lampe, 2008).

In organizational contexts, ESM also display established or potential connections of individuals and afford them to build and cement their social networks, which may lead to reconfiguration of existing networks among employees (Treem & Leonardi, 2012). Particularly for distributed workers who do not have regular opportunities to interact with people in other locations, visualized connections and interactions may function as a springboard to expand their relationships and locate new knowledge sources. Indeed,

global organizations have increasingly implemented ESM to improve peer engagement across dispersed locations, anticipating that enhanced connections will facilitate knowledge sharing and innovation (M. Weber & Kim, 2015).

The relationships between the use of ESM (as well as other communication technologies) and network characteristics have received a great deal of scholarly attention. Steinfield et al. (2009) claimed that the use of ESM helped globally distributed workers increase their social capital, interests in global connections, and access to new people and expertise. However, they failed to examine actual network configurations and their impacts since their scale items inquired about individual perceptions of social capital and networking abilities (e.g., “When I feel lonely, there are several people at IBM I can talk to.”). Although examining employees’ subjective belief about their networking and knowledge-sharing capabilities was still important, it was not evident that to what extent such perceptions were associated with the properties of their social network. Brzozowski (2009) analyzed the content of ESM (i.e., clicks and comments) within a global corporation to reveal that the employees’ network formed through ESM was spread across different groups, in comparison with the networks observed in other online platforms. Based on the findings, he suggested that the use of ESM could redistribute employees’ attention outside their own team or division, which implied that ESM could support the formation of a cross-boundary network. Nonetheless, his study did not investigate actual communication networks among distributed workers that could differ from online content network. Given that organizations have increasingly adopted ESM to encourage workers to connect with their peers and exchange ideas, there still is a

pressing need to delve into how the use of ESM is associated with the configuration of employees' informal social network.

Despite the paucity of empirical research analyzing the interrelations between ESM use and organizational network structures, scholars have proposed that the distinctive affordances of ESM may yield a number of advantages for expanding social networks among dispersed workers. Enhanced identity information (e.g., profile information, visible contributions, group membership) may assist distributed workers to better locate experts in a specific domain and initiate spontaneous interactions in a more efficient way (Ellison et al., 2015). Scholars have also reported that the users of ESM in a global corporation felt that they developed a better understanding of their coworkers' personality, social life, and interests through observing newsfeeds and member profiles, thereby heightening relational closeness (DiMicco, Geyer, Millen, Dugan, & Brownholtz, 2009; Geyer et al., 2008). A test of recommendation algorithms in a global high-tech organization showed that visualizing potential connections (e.g., suggesting new members or groups) could enhance betweenness centrality of employees although the effects of such features were not consistent (Daly, Geyer, & Millen, 2010). In aggregate, however, the relationships between ESM use and social network connectivity have not been fully examined and the findings are not in complete agreement (M. Weber & Kim, 2015).

The current study expands this line of research by analyzing the associations between the different types of ESM use and network characteristics within a global high-tech organization. To examine how the ESM usage levels are associated with the nature of one's network, I focus specifically on two key constructs that explicate individuals'

network properties: *range* and *cohesion*. The range of one's network can be determined by employing various measures such as in-degree centrality, out-degree centrality, and betweenness centrality, all of which indicate the extent of one's connectedness. In-degree centrality is assessed by the total number of direct links from other actors to the focal actor (i.e., incoming direct ties). Out-degree centrality is measured by the total number of direct links from the focal actor to others (i.e., outgoing direct ties). Although both centrality concepts draw on the number of direct connections and determine the overall popularity of individuals, they differ in that in-degree centrality represents others' nomination of the focal actor, which implies interpersonal influence (Wasserman & Faust, 1994). Typically, in-degree and out-degree centralities do not hold the same value because not all contacts are reciprocated by their counterparts. Betweenness centrality refers to the degree to which a focal actor creates the geodesic paths between all pairs of the actors within the whole network (Freeman, 1979). Betweenness centrality is an effective measure to weigh in one's general influence within the network since it denotes other members' reliance on the focal actor who lies in the middle (Carpenter et al., 2012).

Next, cohesion can be examined by employing two different network constructs. With respect to the network level, cohesion generally refers to the extent to which a relationship is surrounded by strong third-party connections (Reagans & McEvily, 2003). In this sense, cohesion can be assessed based on the density of the focal actor's neighborhood, namely, the degree of clustering within the whole network (i.e., transitivity). Also, the overall tie strength of one's network portrays closeness of the focal actor's relationships as it shows that a given actor is embedded in stronger connections than others. Numerous scholars have investigated the impacts of network range and

cohesion since these two characteristics are often conceived as trade-offs, generating contrasting work outcomes (Burt, 1992; Coleman, 1988; Reagans & Zuckerman, 2001). In sum, the concepts of cohesion and range provide useful ways to capture and compare individuals' network properties.

In this study, I investigate the ways in which the *public* (i.e., company-wide) use of ESM are linked to a group of network measures that represent the degrees of range and cohesion. As discussed above, scholars have posited that the affordances of ESM may help distributed workers reach out to more people through interacting on the public newsfeeds and locate new knowledge sources with relatively less effort. Employees can also locate other kindred workers who have shared interests or backgrounds, which may lead to spontaneous discussions on product ideas. Despite the potential networking benefits of public communication on ESM, a lack of empirical study that ascertains the direct relationships between ESM use and network configurations calls for more examinations in this area. Responding to this call, this study seeks to interrogate how the characteristics of dispersed employees' networks are related to the company-wide communications through ESM. Hence, I propose the following research question:

RQ2: What are the relationships between the engagement in public communications on ESM and (a) in-degree centrality, (b) out-degree centrality, (c) betweenness centrality, (d) density, and (e) tie strength?

In tandem with this, I also look into the ways in which *private* communications on ESM are associated with the organizational members' network characteristics. Whereas prior scholarship focused primarily on ESM-enabled public communications (e.g., company-wide newsfeeds, publicly available member profiles, and public data), most of

ESM also offer specific features to create private groups by inviting a select number of people. Such private groups are not searchable in the system, and the access is granted only to invited members. Employees can utilize this function to facilitate within-team communication (e.g., an official group managed by the team supervisor), yet anyone can create a new group to start an online community based on interests, job roles, or relational closeness. Although the role of private groups on ESM has not been explored much, one can postulate that, in contrast to public newsfeeds, private groups may exert different influences on social interactions by supporting the formation of cliques, and the maintenance of existing social groups as well as strong ties. To examine the relationships between private communications on ESM and one's network structures, I propose another research question as follows.

RQ3: What are the relationships between the engagement in private communications on ESM and (a) in-degree centrality, (b) out-degree centrality, (c) betweenness centrality, (d) density, and (e) tie strength?

Given the limitations of a cross-sectional study, this study does not argue that the use of ESM is a precursor of network changes in an organization; rather, this study aims to look into the constellations of nodes to explore how the two disparate types of ESM use are related to dispersed workers' networking patterns. In particular, the introduction of ESM can be more valuable to distributed workers who are not provided with regular interaction opportunities with people in different locations. As ESM can be a unique platform that affords forging and maintaining far-reaching networks, employees may harness the affordances of ESM for their social network management. Further, having another communication tool that lubricates unobtrusive exchanges and rich, multimedia-

based conversations may enhance relational strength and peer engagement (Haythornthwaite, 2002, 2005). Drawing on the full network data of a global high-tech organization, this study elaborates on how network configurations can differ depending on the usage patterns of ESM that enable workers to leverage their social connectivity across locations. In turn, I scrutinize how such network properties are associated with knowledge acquisition. Extant research in this area will be reviewed in the following section.

Network Effects on Knowledge Acquisition: Range vs. Cohesion

The rapid growth of social network research in organizational contexts has significantly advanced our understanding of the influences of relationships on myriad organizational outcomes (Borgatti & Foster, 2003; Carpenter et al., 2012). Especially in modern, knowledge-intensive organizations, individual members form and maintain connections within and beyond the assigned team as inter-team collaboration has exponentially increased (e.g., task coordination between offshore and headquarter employees in a global organization). Moreover, scholars have put a spotlight on informal connections, in addition to formal and bureaucratic relationships, since such organic interactions can facilitate knowledge exchange and collaboration as well as intensify relational closeness (Ellison et al., 2015). As social network analysis is conducive to capturing individuals' actual communication patterns beyond their respective team, it provides a unique advantage that enables a deeper understanding of organizational members' social relationships and how those relationships condition members' work experiences (C. Gibson, Huang, Kirkman, & Shapiro, 2014).

Since the inception of social network scholarship, a number of researchers have described the benefits and constraints that can be engendered by the topology of social networks. For instance, numerous studies have maintained that an actor's performance can be affected by the quality and quantity of resources controlled by the actor's alters (Anand & Khanna, 2000; Borgatti & Cross, 2003; Oliver, 2001). Also, the positional characteristics within a network can shape employees' attitudes toward their work and organization such as turnover intention as well as perceptions on the adequacy of the information that they receive (Susskind, 2007). Homophily (i.e., the tendency to connect with similar others) and heterogeneity of social networks have been found as critical factors that account for individual and team performance although the direction and size of effects may vary (Ibarra, 1992, 1995; Reagans, 2012; Reagans & Zuckerman, 2001). In sum, prior work clearly shows that differential properties of social networks can make an impact on a range of behavioral outcomes at multiple levels.

Among other topics, knowledge sharing in workplace settings is one key area that has attracted a great deal of attention from social network researchers. Specifically, two contrasting—but not always mutually exclusive—network attributes, range (e.g., centralities, diversity) and cohesion (e.g., density, tie strength) have been core concerns among organization researchers since such characteristics may show distinct effects on knowledge-sharing outcomes. As knowledge, concepts, and practices can emerge from the relationships upheld by a joint enterprise (Borgatti & Foster, 2003; Contractor & Monge, 2002), examining the impacts of far-reaching (i.e., range) or tightly-knit (i.e., cohesion) communication networks can yield critical insight into the relational and interactional aspects of knowledge processes (see also, Reagans & McEvily, 2003). In

this vein, I concentrate on in-degree centrality, out-degree centrality, and betweenness centrality to look into the range of one's network, along with density and tie strength to investigate the level of cohesion.

Centrality measures have been vastly studied since their introduction to the field (Freeman, 1979). The centrality of a focal actor's network position spawns a host of advantages since the actor is likely to secure greater access to distinct knowledge and information (Ibarra, 1993; Powell, Koput, & Smith-Doerr, 1996). As actors occupying a central position can tap into wider social circles, they can locate different knowledge sources to obtain critical information from diverse groups, which subsequently helps them gain competitive advantage (Tsai, 2001). Indeed, employees with higher centralities in the knowledge flow network of a global organization were able to garner knowledge in need beyond their co-located colleagues (Teigland & Wasko, 2009); hence, the authors suggested that multinational organizations should provide systematic support to enhance employees' connectivity to diverse knowledge sources. Moreover, betweenness centrality can offer a unique vantage point for collecting and controlling the flow of knowledge (Borgatti, 2005). Individuals with a higher betweenness centrality, which reflects that their networks span different boundaries and social groups, can utilize more relevant expertise and thereby acquire more useful information even from distant regions (Cross & Cummings, 2004). All in all, holding a central position in the network can contribute to the acquisition of useful knowledge, particularly in a distributed organization.

Next, a cumulative body of literatures has documented the critical role of cohesion in knowledge processes. Notwithstanding contradictory findings, prior research has built a granular understanding of the impacts of tie strength and social embeddedness

on knowledge sharing in a variety of organizational environments. In his seminal work, Granovetter (1973) proposed that weak ties can offer distinctive advantages for knowledge sharing by virtue of their ability to bring non-overlapping contacts and information. Since then, scholars have built more textured accounts of the differential impacts of strong and weak ties, and how such impacts can be also shaped by other external factors. Invoking the effects of knowledge complexity, Hansen (1999) convincingly argued that the efficacy of strong and weak ties can differ according to the degree of knowledge complexity. Whereas weak ties facilitated the transfer of codified (i.e., less complex) knowledge across different units, they actually impeded the knowledge process when requested to share highly complex knowledge. The findings thus implied that strong ties could be more advantageous when handling complicated tasks. Other scholars also suggested that strong ties could lubricate knowledge sharing since the shared language and relationship-specific heuristics among strong ties are conducive to exchanging complex ideas (Uzzi, 1997, 1999). Also, strong ties typically exhibit greater motivation to be of assistance when needed (Granovetter, 1983), especially in uncertain and intricate situations (Krackhardt, 1992a). Overall, although weak ties can be sources of new knowledge, strong ties are likely to generate productive knowledge-sharing outcomes (M. Hansen, 2002).

With respect to cohesion, scholars have suggested that tie strength and social cohesion, by and large, tend to go hand in hand (Reagans & McEvily, 2003). Individuals embedded in cohesive networks—namely, surrounded by strong third-party connections—tend to enact and conform to cooperative norms, which ensure other network members' responses to knowledge-sharing requests (Granovetter, 1992; Uzzi,

1997). Social embeddedness plays an especially powerful role in sharing and learning tacit knowledge, and such tacit learning processes in turn undergird the exchanges of explicit knowledge afterwards (Dhanaraj, Lyles, Steensma, & Tihanyi, 2004). Also, a greater extent of cohesion (e.g., density, transitivity) can reduce the costs of knowledge sharing within the network (Tallman, Jenkins, Henry, & Pinch, 2004) and promote access to useful knowledge resources that enhance performance (Uzzi & Gillespie, 2002). In particular, distributed workers can benefit substantially from having stronger and denser connections since those ties are likely to have established common ground and a shared language with each other. A mutual understanding helps individuals reduce their effort to disambiguate meanings between engaged parties, and it has been conceived as a fundamental condition for effective knowledge sharing (R. Weber & Camerer, 2003). Given that dispersed employees often face knowledge-sharing challenges that stem from a lack of shared routines and contextual information, embeddedness in strong and cohesive networks may be more helpful than maintaining widely spread networks.

Drawing on prior work, the current study pursues a research question that inquires how range (e.g., in-degree centrality, out-degree centrality, betweenness centrality) and cohesion (e.g., density, tie strength) are linked to the acquisition of useful knowledge within the network of a global organization. Range and cohesion can sometimes be at odds, yet both types of attributes can also jointly contribute to promoting knowledge sharing, depending on environmental factors (Reagans & McEvily, 2003). As range and cohesion can yield differential benefits for dispersed workers, this study delves into the ways in which both attributes are associated with knowledge acquisition, considering the

nature of distributed work and contextual influences within the global high-tech organization. The research question is presented below:

RQ4: What are the relationships between (a) in-degree centrality, (b) out-degree centrality, (c) betweenness centrality, (d) density, as well as (e) tie strength and the acquisition of useful knowledge?

Status Differences and Knowledge Disparity in Global Organizations

Status has been defined as the position in a social hierarchy that results from accumulated acts of deference (Goode, 1978; Sauder, Lynn, & Podolny, 2012), thereby considered *relative* social standing (George, Dahlander, Graffin, & Sim, 2016). Status hierarchy is a pervasive feature of organizing; and particularly in a global organization, it is crucial to take account of the nature and consequences of status hierarchy in order to understand the interaction dynamics among heterogeneous groups of workers. Global organizations are often created unequal from the outset since geographical boundaries tend to imply power disparities between headquarters and subsidiaries. Such power disparities are often observed in conjunction with other types of disparities such as knowledge, resources, and influence. With respect to knowledge sharing, status differences can bring about a profound impact because knowledge—or knowledge disparity—itself can be viewed as a powerful signal of status among the members of a knowledge-intensive organization.

Status hierarchy constitutes an important backdrop that fundamentally shapes the flow of interactions and work processes within an organization. It establishes social order, facilitates coordination, and provides incentives for individuals, which subsequently affects performance outcomes (Magee & Galinsky, 2008). At the same

time, however, such hierarchical differentials can also hamper coordination as well as limit individual contributions since low-status workers are subject to others' pre-existing expectations for what types of tasks they are supposed to engage and accomplish (Sande, Ellard, & Ross, 1986). Status hierarchy can emerge based even on stereotypes and merely a quick observation of work-related behaviors including nonverbal acts (Hall, Coats, & LeBeau, 2005). In turn, it is reinforced through an informal and implicit consensus among organizational members, and maintained for an extended period of time (Anderson, Srivastava, Beer, Spataro, & Chatman, 2006). Therefore, status hierarchy tends to be sustained and difficult to get transformed.

Status imbalance is inextricably linked to numerous types of disparities between low-status and high-status actors, which can beget differential organizational outcomes. Typically, low-status actors are situated in a disadvantageous position to obtain resources and exert interpersonal influence; furthermore, high-status actors are likely to accumulate advantages over time, which in turn exacerbates inequalities (DiPrete & Eirich, 2006). This phenomenon has been referred to as the Matthew effect, which echoes a proverbial saying, "the rich get richer" (Merton, 1968). In small group or team settings, status hierarchy makes an impact on micro-status ordering such as participation, as well as social influence and evaluation processes (Berger, Cohen, & Zelditch, 1966; Skvoretz, 1988; Skvoretz & Fararo, 2016). Even proximity to high-status industry leaders—not a focal actor's status itself—can generate initial benefits for one's career such as promotion since a tie to high-status individuals can color others' perception of the focal actor's qualification (Kilduff, Crossland, Tsai, & Bowers, 2016). Social status can also lead to conformity behavior especially among middle-status actors or peripheral players who are

more constrained in their choice due to a lack of legitimacy (Phillips & Zuckerman, 2002).

In particular, gaining visibility among their peers and competitors is one of the most positive outcomes of high social standing; and, increased visibility subsequently functions as a source of reproducing status asymmetry. Disentangling the emergence of status hierarchy and concomitant inequality, Gould (2002) demonstrated that high-status actors are more likely to be noticed by others in the same domain. Moreover, this visibility consequently enhances high-status actors' access to additional resources and improves their capacity to communicate. Unpacking his findings, Gould proposed the notion of *high-status dominance*: the visibility of high-status actors puts them atop the hierarchy, which enables them to shape the audience's perception and interpretation of their behaviors. In this regard, visibility can aggravate the already-existing asymmetry of attention and influence.

Owing to visibility, high-status actors also enjoy increased social recognition, which is often accompanied by myriad kinds of rewards and privileges. In the field of science, high-status researchers are likely to attract a much greater share of recognition than low-status researchers for simultaneous and nearly identical discoveries. On top of that, visibility in turn brings external resources (e.g., grants) that can make high-status researchers even more prolific in the future (H. Zuckerman, 1977). Thus, once high social standing is established, the accompanied advantages tend to accrue over time. Likewise, high-status actors are more favorably reviewed and rewarded than low-status actors for a comparable contribution (Sauder et al., 2012). Even for the equivalent degree of quality or contribution, the work by high-status individuals are more likely to become visible,

recognized, and celebrated than that of low-status individuals. Indeed, when high-status and low-status individuals share their achievement, the former still receives greater amount of attention (Benjamin & Podolny, 1999). Drawing on prior scholarship, this study seeks to articulate *the visibility effect* and how it may continuously increase the disparities in status, resources, and knowledge between low-status and high-status employees in a global organization.

Not surprisingly, actors are aware of the disproportionate levels of visibility and attention, which can further shape others' perceptions of them. Contrary to low-status firms, high-status firms often do not provide certain offers to their customers (e.g., warranty) because they know that their strong standing in the market and industry already signals their superior performance and trustworthiness (Podolny, 1993). Similarly, occupying a highly regarded position generally makes a positive impact on the self-concept and psychological functioning (N. Adler, Epel, Castellazzo, & Ickovics, 2000). Through a series of experiments, Pettit and Sivanathan (2012) revealed that high-status individuals perceived the identical audience feedback as more favorable, positive, and approving than low-status individuals. Furthermore, these differences were found only when the target of the evaluation was the self. Their findings corroborate the argument that status differences shape one's perceptions and interpretations of the daily interactions with others. High-status individuals have positive expectations of others' responses to them, and in turn, they believe that others' responses meet their anticipation. Overall, people in high social standing are more likely to embrace and enjoy their visibility.

However, such propensity is not likely to be observed among low-status populations. Rather, due to the asymmetric recognition and influence generated by

visibility, low-status individuals may become more vulnerable or constrained. This study seeks to examine whether and how visibility amplifies existing disparities (e.g., access to knowledge, resources, and social connections), which may subsequently perpetuates status hierarchies. Also, this study explores how low-status workers react to such disproportionate impacts. If we can view visibility as yet another status-conferring vehicle, what does “being visible” mean to high-status and low-status workers within a global organization? More specifically, for globally distributed workers who experience multiple status boundaries (e.g., headquarters vs. subsidiaries, Americans vs. the Other, and core functions vs. peripheral functions), how does increased visibility affect existing status differences?

Although enhanced visibility may provide employees with an opportunity to climb up the social ladder or change others’ perceptions of them, it is extremely challenging to achieve a desired outcome through an individual effort. Low-status workers in offshore offices may contrive some self-presentation strategies to reform high-status workers’ perceptions of them (e.g., stereotyping); however, research shows that their endeavor does not necessarily lead to the intended results (Leonardi & Rodriguez-Lluesma, 2013). Since distributed workers do not share physical space and day-to-day routines, changing others’ evaluations of themselves merely through verbal acts can be particularly difficult. Besides, unless needed, high-status workers are less willing to invest their time and energy to learn about low-status workers (Goodwin, Gubin, Fiske, & Yzerbyt, 2000).

The implementation of ESM brings an unprecedented level of communication visibility—previously invisible communications become visible to the whole

organization—and it will make employees’ contributions, interactions, and profiles publicly available across multiple locations. How does the visibility affordance of ESM shape status hierarchies and accompanied disparities? Especially given that workers are encouraged to share their task-related knowledge through ESM, how does visibility affect knowledge processes? This inquiry starts from the premise that increased communication visibility is not likely universally welcomed by individuals in different social standing. Proposing that “being visible” reflects differential meanings and ramifications for high-status and low-status workers, this study will elucidate how visibility is interrelated with status differentials and knowledge disparity. Derived from in-depth qualitative analysis, I argue that visibility brings into high relief extant status differences and knowledge disparities, which in turn reinforces status hierarchies within a global organization. To examine the emerging patterns of ESM use and knowledge sharing practices by different groups, this study pursues the following research question:

RQ4: How does communication visibility, afforded by the use of ESM, affect status hierarchy and knowledge disparity in a global organization?

Whereas a substantial body of research documented the consequences of status differences, Sauder et al. (2012) pointed out that there is very little research that delineates the nature and dynamics of status hierarchy such as how it is enacted and constructed, and how it looks like in a particular context. They suggest that thick descriptions of status hierarchies provide significant insight into the role of hierarchies in organizational life. In a similar vein, George et al. (2016) called for in-depth research on individual-level mechanisms and micro-level interactions surrounding social status. Addressing this pressing need, I seek to offer a nuanced account of how distributed

employees perceive and respond to status hierarchies, visibility, and knowledge disparities, particularly highlighting social interactions that emerge through the use of ESM. By revealing dispersed workers' social practices around knowledge sharing, this study will shed light on our understanding of how status is enacted and reproduced, and how such processes of constituting status are closely intertwined with the adoption and use of communication technology. All in all, this study challenges the prevailing assumptions about the positive role of communication visibility, contributing to the long-standing literatures on organizational technology, knowledge, and status.

Note.

¹ Weisband (2002) originally called this activity awareness.

Chapter 3

Method

Behind every method lies a belief. Researchers must have a theory of reality and of how that reality might surrender itself to their knowledge-seeking efforts.

- Shoshana Zuboff, *Notes on Field-Research Methodology* (1989b)

A Mixed-Methods Approach

A mixed-methods approach acknowledges the interdependence of each methodological component during and before analysis whereas multimethod means simply using more than one method to collect data (Bazeley & Kemp, 2012). A mixed-methods approach aims to achieve a more comprehensive understanding of a phenomenon by using various lenses; thus, mixed-methods research may include multiple research questions as well as hypotheses to address them through interrelating or integrating the data (Myers, 2014). In this study, quantitative, qualitative, and network data analyses jointly enriched the understanding of the study findings, offering different angles to look into the research phenomena. For instance, the interpretations of both quantitative and qualitative findings enabled an in-depth understanding of the ways in which ESM use fostered emerging forms of organizational awareness, which subsequently promoted the acquisition of knowledge in need (see Chapter 4).

A mixed-methods approach also encourages adopting different epistemological paradigms and theoretical frameworks when applicable (Morgan, 2007) because epistemological purity rather constrains the understanding of research problems (Miles & Huberman, 1994; Onwuegbuzie & Leech, 2005). Informed by these tenets, I did not

privilege one particular framework over the other (e.g., a constitutive approach and a network perspective) and I engaged with different types of data to look for complementary explanations to corroborate research findings. In fact, the results of social network analyses and qualitative analyses were closely intertwined with each other and explicated the underlying dynamics of knowledge sharing within a global organization, signaling the challenges associated with cross-boundary communication (see Chapters 5 and 6). In aggregate, multiple types of data were compared and interpreted to inform the findings through a triangulation process (Creswell & Plano-Clark, 2010), which supported creating a deeper understanding of research phenomena.

Research Context

Design Inc. (pseudonym) is a multinational high-tech organization that builds software for data management, product design, and product development. Its headquarters are located in the United States, and its regional offices are dispersed in Uruguay, Bulgaria, Japan, India, and the United Kingdom. The headquarters and offshore offices in Uruguay, Bulgaria, and Japan intimately collaborate for product development and maintenance while the branches in India and the United Kingdom are small sales offices (six employees in India and seven in the United Kingdom). The organization is by and large structured around its major product lines and services. Each division consists of members with different expertise—engineering, user experience, localization, developer support, marketing, and evangelism, to name a few.

The company was established in 1989, and began to open international sales offices in 2002. As its customer base constantly grew, Design Inc. has maintained offshore engineering centers in Bulgaria (since 2007) and Uruguay (since 2008) although

product design and feature development decisions were still made by the American headquarters. All executives were employed at headquarters, yet the director in Uruguay was often included in top management meetings. Also, the managers of international development teams were supposed to report to their supervisors or division heads at headquarters. Most of the product managers were American employees as well, collaborating with developers in multiple locations.

The members of Design Inc. had faced frequent top-down structural changes, which hindered offshore workers from staying up-to-date and maintaining relationships. There was a large-scale structural change in the beginning phase of formal data collection in October 2014, yet no substantial organizational changes have occurred since then. The management of Design Inc. had been interested in reconfiguring the company structure to facilitate efficient communication and coordination. Reflecting this goal, the latest restructuring involved the merger of two large divisions, which aimed to foster streamlined communication. It was part of the company's strategic plan for enhancing cross-functional interactions to make teams "holistically accountable" and support "more fluid movement" between teams in order to ultimately make knowledge transfer "much faster and more efficient within the same group" by deploying related work groups under the same division.¹ However, many employees were often frustrated by the constant changes that they had experienced for the past few years, and some high-level employees even believed that no more changes would be necessary for the time being. As Ben stated:

I think we're at the point to where we finally got people where we think they will do the best. So we're hoping that this doesn't happen a lot anymore. We should be stabilized now. (Ben, Product Manager, United States)

Communication across teams, countries, and job functions must be supported by both strategic efforts (e.g., training) and individual endeavors (e.g., mindful communication, building common ground); however, employees experienced a number of communication obstacles when they collaborated with their coworkers across borders. Throughout the fieldwork, participants openly shared their challenges and suggestions, helping me better understand the context and refine the research goals. The management allowed me to conduct a company-wide online survey, sit in management meetings, interview employees, and observe their internal websites. I will describe the procedures of data collection and analyses in the following section, which is organized according to the different kinds of data sets: quantitative, network, and qualitative data.

Data Collection

My dissertation, which is a yearlong field study, benefitted substantively from the site access that allowed the collection of multiple types of data through various methods. Before formal data collection, I was able to arrange a few meetings with top management in April 2014 to glean background information about Design Inc., and my acquaintance with most executives helped me reach out to more employees and resources. Whenever I visited the research site, I was permitted to “drop by” anyone’s office including executives if they were available for a quick conversation. The division of human resource management provided me with the company roster, which significantly improved the process of network data collection and manipulation. Vice presidents and a regional director shared the organization charts with me although the charts did not accurately display the current structures, revealing that the employees had difficulties staying abreast of organizational changes and updating the system information

accordingly. The interviews later validated this diagnosis. In addition to the roster and organization charts, I also obtained numerous company documents such as workshop materials, employee orientation documents, process improvement proposals, and company plans including the overview of revenue. One of the most beneficial parts was the unlimited online access to their Microsoft Outlook (email and calendar) and Yammer (internal ESM) platforms. With full access, there was no significant difference in system privileges compared with regular employees, and I was allowed to join any Yammer groups except private ones. The unlimited Yammer access offered a unique vantage point from which I was able to observe the employees' activities happening not only at headquarters but also in offshore locations, such as their day-to-day tasks, product updates, and the dialogues between different parties. Yammer observations provided some important sources to paint an elaborate, holistic picture of the research site.

During the fieldwork, I switched some of my propositions as I acquainted myself with everyday practices at Design Inc. in a greater detail through interviews and observations. While my core research concerns remained the same, specific hypotheses and research questions were revisited after a long, steady process of data collection to examine the research site from a more accurate perspective. In this sense, this study was significantly advanced thanks to the methodological merit of fieldwork: the heuristics, supported by field observations, enabled me to grasp a better sense of the research context. Hence, an inductive approach guided the whole process of learning about the field, not simply the process of data analyses. In what follows, I will describe the procedures of data collection as well as analysis.

Quantitative Data

To collect quantitative and network data, a company-wide, 15-minute online survey was conducted in November 2014. The questionnaire was pre-tested by performing a pilot survey with 21 employees in July and August of 2014. The participants of the pilot survey consisted of volunteers in the American office. After confirming the reliabilities of the main scales through the analysis of pilot survey data, I refined the questions and created the main online survey using Qualtrics. I directly distributed the survey to all 275 full-time employees across regions. Around the launch of the survey, I worked closely with the CEO and high-level executives to ensure participation from all employees, especially in remote locations. The CEO sent out an email announcement to everyone to encourage participation; additionally, I emailed weekly reminders while the survey remained open. Three participants who completed the survey were randomly selected to receive one of three \$50 Amazon gift certificates as compensation. Employees were informed that participation was voluntary and the data would be kept confidential. Also, the survey invitation clearly explained that individual responses would not be disclosed and only aggregated results would be reported in future presentations and publications. Over a 1-month period, 224 employees completed the survey, yielding an 81.45% completion rate. Please see Table 3-1 for participant demographics.

Table 3-1

Participant Demographics (n = 224)

Job Function		Hierarchical Level		Location		Gender	
Development	98	Executives	10	U. S.	95	Male	161
Sales/Marketing	36	Managers	34	Uruguay	32	Female	63
Developer Support	32	Full-time Workers	176	Bulgaria	74		
User Experience	13	Full-time Interns	4	U. K.	7		
Product Management	11			Japan	10		
Information Systems	11			India	6		
Evangelism	5						
Localization	5						
Finance/Accounting	9						
Human Resources	4						

Measures

The online survey consisted of questions about the use of Yammer as well as other communication technologies, organizational awareness, task interdependence, and demographics. Most demographic information was obtained directly from the company roster. Since demographic data collected through the online survey included several missing values, the roster information was utilized for all analyses involving demographic variables. I reviewed the roster with the division of human resource management and other executives before distributing the survey, and requested an updated roster after reviews to ensure the accuracy of data. The network data (e.g., tie

strength, the acquisition of useful knowledge from alters) were also collected in tandem with other quantitative data.

Communication technology use. The survey asked about the usage frequency of the official company email, personal video conferencing, group video conferencing, instant messenger, and Yammer. Design Inc. had utilized most of the standard features of Yammer including company-wide newsfeeds, public and private groups, tags, file sharing, directory, and personal profile. Two types of Yammer use—company wide communication and private group communication—were assessed separately to differentiate the levels of communication visibility. The frequencies of different communication tools were measured based on the same Likert-type scale (1 = Never, 7 = More than 10 times a day). Email was excluded from analyses since its universal use significantly decreased its variance. In the analyses, both public ($M = 2.69$, $SD = 1.64$) and private ($M = 2.30$, $SD = 1.49$) uses of Yammer were included.

Organizational awareness. For this project, an organizational awareness scale was developed and tested before circulating the online survey. The scale items were created based on the literatures, specifically informed by Weisband's (2002) typology and definition of organizational awareness. The scale was developed as a three-dimensional scale that encompassed availability awareness, task awareness, and social awareness. Availability awareness refers to one's knowledge about whether others are available to meet or participate in an activity. Task awareness is defined as one's knowledge about others' work-related activities at any given moment. Finally, social awareness deals with one's awareness about others' social life outside the context of work. The draft version of scale items was reviewed by several organizational

communication scholars to confirm whether each item described the intended theoretical construct. I had revised items multiple times following their feedback before finalizing the scale.

Before implementing the final scale, I performed a content adequacy assessment (CAA) test to determine whether each scale item accurately reflected the designated dimension of awareness (Schriesheim, Cogliser, Scandura, Lankau, & Powers, 1999; Schriesheim, Powers, Scandura, Gardiner, & Lankau, 1993). The CAA test aims to investigate whether general populations interpret all scale items as intended and multiple dimensions thus emerge according to the definition of each scale dimension. In this test, participants were provided with a randomly listed scale items and asked to rate to what degree each item describes the suggested definition of a scale dimension. As the CAA test is a kind of linguistic test, it can be conducted using any adult populations that understand the language (i.e., English in this case). The CAA test is essential for developing a new scale that consists of multiple dimensions since some items may belong to more than one dimension if the constructs are closely related.

For the CAA test, I recruited undergraduate students at a large northeastern university, and the test was performed for all three dimensions of organizational awareness. Among 118 students contacted through three course instructors, 72 students completed the survey (61.01% of response rate). The students who completed the survey were granted with extra credit for their class. I performed an exploratory factor analysis (EFA) using the collected data to ascertain whether the students' rating for each scale item hung together under the proposed dimensions. The EFA results confirmed that the

scale items appropriately explained each dimension of awareness and no items loaded on other dimensions (see Table 3-2).

Table 3-2

The EFA Results for CAA Test of Organizational Awareness Scale

	Factor 1	Factor 2	Factor 3
Availability 1	.014	.893	.032
Availability 2	.188	.830	.109
Availability 3	.029	.876	.047
Task 1	.083	.112	.807
Task 2	.367	.047	.785
Task 3	.310	.173	.805
Social 1	.938	.139	.152
Social 2	.959	.073	.129
Social 3	.947	.048	.182

After completing the CAA analysis, I polished the scale items and implemented the final 9-item scale in the main online survey at Design Inc. The sample items for availability awareness included: “I am aware of whether or not my coworkers are available to talk at a given moment,” and “I know when will be a good time to contact my coworkers to initiate discussion.” Task awareness was measured using items such as “I am aware of what tasks my coworkers are currently working on at work” and “I know what actions my coworkers have recently taken to proceed with their tasks.” Finally, the

social awareness dimension was assessed by rating statements such as “I am informed of what’s new in my coworkers’ personal lives” and “I have knowledge about my coworkers’ social lives happening outside of work.” All items were rated on a 5-point Likert-type scale, where 1 indicates “strongly disagree” and 5 refers to “strongly agree” ($M = 2.72$, $SD = .73$, $\alpha = .90$).

To examine the scale validity with the actual sample, I conducted both EFA and confirmatory factor analysis (CFA) using the data collected at Design Inc. The results of both analyses showed a high level of the internal scale validity. For the EFA results, please see Table 3-3. I performed CFA using AMOS version 22. The CFA model fit was assessed based on the following goodness-of-fit indices: (a) the chi-square to the degrees of freedom ratio is less than three; (b) the comparative fit index (CFI) is higher than approximately .95²; and (c) the root mean square error of approximation (RMSEA) is less than .06 (Browne & Cudeck, 1993; Hu & Bentler, 1995; Kline, 2015). The results of CFA demonstrated that the proposed 3-factor model provided a good fit for the data: $\chi^2/df = 1.60$, CFI = .99, RMSEA = .05.

Table 3-3

The EFA Results for Final Organizational Awareness Scale

	Factor 1	Factor 2	Factor 3
Availability 1	.174	.215	.886
Availability 2	.097	.298	.873
Availability 3	.225	.294	.760
Task 1	.137	.869	.288
Task 2	.228	.867	.286
Task 3	.171	.858	.246
Social 1	.932	.212	.172
Social 2	.942	.179	.170
Social 3	.946	.126	.142

Task interdependence. An adapted version of the task interdependence scale (Bishop & Scott, 2000) was implemented to assess the degree of interdependence among team members. Sample items include: “I work closely with my team members in doing my work,” “I frequently must coordinate my efforts with other team members,” and “I work fairly independently of others in my work” (reverse-coded). The average was computed as an aggregated measure ($M = 3.78$, $SD = .68$, $\alpha = .77$).

Network Data

To capture full network data, I obtained the most up-to-date version of the company roster from the vice president of human resource management. The roster was accurate except that some employees’ legal names were different from the names actually

used within the organization. I revised those cases before survey implementation to prevent potential confusion. Through the main survey, respondents were provided with the complete roster of employees to identify their knowledge-sharing networks.

The network questionnaire employed sociometric choice format to have participants choose their knowledge-sharing contacts: they were asked to select (a) people who acted as a critical source of task-related knowledge and (b) people for whom they had been a critical source of task-related knowledge (Reagans & McEvily, 2003). Participants were allowed to nominate their knowledge-sharing ties without limitations. After respondents selected their knowledge-sharing contacts from the roster, they were asked to answer a series of questions about the usefulness of knowledge that they received from each contact. I also extracted node attribute data directly from the company roster and organization charts, which provided the information about employees' location, job function, division, organizational tenure, hierarchical levels, and gender.³ Hence, the demographic data collected from the survey were not used since the information from the roster did not have missing values and offered more accurate data.

Network Variables

Degree centralities. Degree centrality has been defined as the number of direct ties that a focal actor has with alters within the network. Degree centrality serves as a simple, but effective barometer that signals the activity and popularity of the focal actor (Wasserman & Faust, 1994). Analyzing directed network data, both in-degree and out-degree centralities can be examined according to the direction of ties. In-degree centrality indicates the number of ties that are directed to the focal actor from others whereas out-degree centrality shows the number of ties that the focal actor directs to others. Freeman

(1979) argued that in-degree centrality is a more adequate measure that explains the focal actor's access to knowledge. In other words, if the focal actor is more frequently nominated by others (rather than the focal actor nominates more alters), it indicates the focal actor is more likely to obtain knowledge in need.

Betweenness centrality. Betweenness centrality refers to the extent to which a focal actor creates the geodesic paths between all pairs of other actors within the network. Thus, it explains the degree to which people have to rely on the focal actor to reach out to others, representing the actor's social influence (Freeman, 1979). Betweenness centrality has been considered an indicator of the focal actor's control over the flow of knowledge and information (Borgatti, 2005).

Clustering coefficient. To capture the density (i.e., cohesion) of a focal actor's neighborhood within the whole network, clustering coefficient was computed as a measure of transitivity (Watts, 1999; Watts & Strogatz, 1998). Clustering coefficient shows the extent to which the focal actor's alters are also connected to one another, indicating the network's closeness to being a clique. It can range from 0 to 1, where 1 denotes that all vertices of the focal actor's network are interconnected.

Tie strength. Finally, tie strength was added to the analyses since the role of strong ties in knowledge sharing has been one of the key research concerns among network scholars (Granovetter, 1983; Krackhardt, 1992a). In particular, researchers have argued that strong ties lubricate knowledge sharing processes, especially when the knowledge is complex (M. Hansen, 1999). To assess tie strength, participants were asked to answer a pair of questions about emotional closeness (1 = distant, 5 = very close) and

communication frequency (1 = a few times a year, 5 = a few times a day) regarding each contact that they nominated ($M = 3.22$, $SD = .56$, $\alpha = .79$).

Acquisition of useful knowledge. An adapted version of the scale developed by Levin and Cross (2004) was administered in this study. This scale examined the degree to which respondents were able to obtain high-quality knowledge from each nominated alter during knowledge-sharing incidents. Specifically, the scale asked respondents to rate the actual usefulness of received knowledge to evaluate the quality of knowledge acquisition. The usefulness was defined with respect to the knowledge's impact on the effectiveness of their project. In other words, respondents were directed to rate how much the received knowledge was helpful in terms of the contribution to "client satisfaction," "overall team performance," as well as "quality of project and service." All three items were measured according to a 5-point Likert-type scale, ranging from "strongly disagree" to "strongly agree" ($M = 4.24$, $SD = .51$, $\alpha = .86$). Each respondent i was asked to rate each alter j based on this scale; in turn, I took an average of all answers to create an aggregated measure for i 's knowledge-sharing network.

Control variables. Among the variables described in the foregoing section on quantitative data, task interdependence was included as one of the control variables since it may be related to employees' connectedness and knowledge sharing practices. Also, demographic variables such as location, job function, organizational tenure, and gender were obtained from the company roster.

Analysis Procedures

As the unit of analysis is the relationship between pairs, node-level variables (e.g., node attributes) were converted to matrices to generate dyadic variables. With respect to

network measures such as in-degree, out-degree, and betweenness centralities as well as clustering coefficient, I created matrices for each of them where each cell indicates the differences in the extent of each measure between node i and alter j . After importing the usage frequencies of Yammer (both public and private communication) into UCINET 6 (Borgatti, Everett, & Freeman, 2002) as node attributes, same procedures were performed to create matrices for the two types of Yammer use. Also, dyadic variables for task interdependence and organizational tenure were created by computing the difference between node i and alter j for each cell. Regarding demographic variables such as location, job function, and gender, matrices were created where each cell marks the similarity of the attributes between node i and alter j . As for the strength of tie and the acquisition of useful knowledge, I created edge lists where each row indicates the value of tie between node i and alter j . Then the edge lists were imported into UCINET 6 as matrices directly. Overall, each dyadic variable was represented as a matrix where analogous cells across all matrices constitute an individual case (Krackhardt, 1987).

To test dyadic hypotheses, multiple regression quadratic assignment procedure (MRQAP) using a double semi-partialling (DSP) method was performed in UCINET 6. MRQAP employs a random permutation technique to estimate the significance of regression coefficients since the observations are not independent of each other. Statistical significance of MRQAP indicates to what extent the proportion of results from randomly altered matrices would occur from the given dependent variable matrix (Krackhardt, 1988). DSP is known as one of the most robust procedures for handling the issues of statistical bias under various conditions of collinearity, skewness, or autocorrelation (Dekker, Krackhardt, & Snijders, 2007). As this study tests linear models

of continuous network data, a DSP method with a *t*-statistic is a suitable choice for the analysis.

Qualitative Data

The most significant advantage of qualitative research lies in its heuristic value. Collecting qualitative data for over one-year period was an enlightening journey of constant learning and discoveries. I was able to make sense of the employees' disparate patterns of ESM use by gleaning detailed information of underlying structural and psychological mechanisms. Further, I was informed of the employees' everyday practices and their contrasting perceptions and thoughts about such routines, which ultimately inspired me to delve into status differentials and concomitant disparity issues in a global organization. Since knowledge sharing, by definition, can be affected by existing knowledge disparities, concentrating more on disparities to better understand how disparities shaped and were shaped by ESM use enabled a different look into the workplace diversity in global organizations. Throughout this project, all qualitative methods—individual in-depth interviews, ESM observations, and field observations—served as unique ways to explore the research site. I will further delineate the procedures of qualitative data collection and analysis below.

Individual In-Depth Interviews

Interviews are considered an effective method to understand individuals' experiences and perspectives through their stories, accounts, and explanations (Lindlof & Taylor, 2002). I selected individual in-depth interviews to help participants share about their work experiences in a private setting. Although headquarters employed approximately 42% of all members, I recruited participants both from headquarters and

subsidiaries to examine different perspectives on their work and communication practices. However, two sales offices in India and United Kingdom were excluded from the interviews since they operated fairly independently and did not collaborate with the main development divisions. Under these inclusion/exclusion criteria, I strived to diversify the sample population by contacting people in different job functions, locations, and at different hierarchical levels so as to avoid collecting biased opinions. All participants were informed that the interviews were confidential and their participation was voluntary. Please see Table 3-4 for the list of participants (N = 32). All pseudonyms were randomly chosen among the most common names in each country.

Table 3-4

The List of Interview Participants

	Alias	Location	Job Role
1	Albert	US	Developer Support Manager
2	Joe	US	Director of Product Management
3	Andy	US	Developer Support Engineer
4	Ben	US	Product Manager
5	Cynthia	US	Senior UX Architect
6	Scott	US	Senior Technical Evangelist
7	Ryan	US	Product Manager
8	Eric	US	Principal Software Engineer
9	Jeffrey	US	Online Marketing Director
10	Patricia	US	Principal Product Developer
11	Sam	US	Internal Systems Manager
12	Travis	US	Senior Practice Director
13	Claire	US	Principal Localization Engineer
14	Ignacio	Uruguay	Regional Director
15	Juan	Uruguay	Software Architect
16	Milton	Uruguay	Software Architect
17	Marcos	Uruguay	Principal Software Engineer
18	Louis	Uruguay	Product Manager
19	Santiago	Uruguay	Developer Support Engineer
20	Mauricio	Uruguay	UX Architect
21	Bogdan	Bulgaria	Senior Software Developer
22	Dimitar	Bulgaria	Associate Software Developer
23	Danail	Bulgaria	Software Development Team Lead
24	Kiril	Bulgaria	Platform Lead
25	Kaloyan	Bulgaria	Software Development Team Lead
26	Petar	Bulgaria	Software Development Team Lead
27	Samuil	Bulgaria	UX Architect
28	Toma	Bulgaria	Software Development Team Lead
29	Yordan	Bulgaria	Engineer
30	Takeshi	Japan	Marketing
31	Yosuke	Japan	Developer Support/Technical Account Manager
32	Akira	Japan	Localization Manager

I used a semi-structured interview questionnaire that specified key areas that I sought to examine during the interviews. The interview guide included basic questions about participants' job role and day-to-day routines, followed by main questions on cross-boundary communication, knowledge-sharing practices, benefits and challenges

associated with collaboration and knowledge sharing, and the use and perceptions of communication technologies with a particular focus on Yammer. Depending on the responses, I expanded questions in a particular area or included additional questions in the interview. Whenever possible, I met participants in person to conduct interviews if they worked at headquarters; however, I used Skype to interview people in remote locations. Each interview lasted approximately 60 minutes on average.

All interviews were digitally recorded after obtaining an explicit agreement from each participant. The interviews were transcribed verbatim, excluding small talk in the beginning and at the end of the interviews. In total, 503 single-spaced pages of texts were generated for analysis. The transcripts were imported into Atlas.ti as its functions are conducive to line-by-line coding, comparative analysis of themes and data, and extraction of key quotes. The features of Atlas.ti were compatible with my analysis tactics, which were informed by Corbin and Strauss (2008). For the initial analysis, I used an open coding method to categorize the data drawing on an inductive approach. Throughout the line-by-line coding procedures, I assigned free codes to each meaningful incident in the data without restriction on the number of codes or themes. Hence, the themes were not necessarily limited to the key research concerns such as ESM use or knowledge sharing, which in turn facilitated a broader understanding of the organizational activities and cultures at Design Inc. The initial analysis generated 63 draft codes. After building a deeper understanding of the interviews, I later selectively organized the initial codes to delimit the boundaries of analysis and focus on my research questions. In the second stage, I followed the constant comparative approach to integrate those categories to broader clusters and merge/rename related codes. The total number of all subcategories

was 32, and among them, 16 subcategories were directly related to the use and perception of Yammer. Axial coding helped analyze all codes to reorganize them according to their hierarchical relationships. Based on the hierarchy of the codes, high-level code groups were created to identify recurring themes across data. Yet, subcategories were not mutually exclusive since the same quotes often reflected multiple constructs. Axial coding processes required iteration and constant comparison to disambiguate the meanings and relationships of the codes. Finally, I made thematic connections between the code groups by integrating categories into a set of key findings. In this phase, broader common themes emerged from data, which in turn identified my key findings. The chapters that present qualitative findings were structured following those core themes.

Observation

Field observations. I performed both field observations and online observations (of Outlook and Yammer) for this project. Throughout the fieldwork, I made 24 field visits including the ones for in-person interviews (approximately twice a month on average). In most cases, my main purpose of visits was conducting individual interviews rather than observing the office space. Before or after interviews, I sometimes used their guest office but mostly stayed in common areas to initiate spontaneous chats with the employees around. I took notes during my visits especially when I attended management meetings or all-hands gatherings. The “jottings” (Emerson, Fretz, & Shaw, 1995) or “raw records” (Tracy, 2013) were used simply to keep track of my visits as well as observation data, and the field notes were not formally analyzed through coding processes. The field observations still greatly helped me to grasp a sense of the company climate, work environment, and day-to-day practices. My approach was unobtrusive, non-participant

observation—I stayed mainly at the periphery observing how the scene unfolded rather than intervening in the situation (Tracy, 2013). My dissertation was considerably informed by the contextual knowledge gained from field observations.

Figure 3-1

Common Area in the First Floor



Figure 3-2

Common Area in the Second Floor



Figure 3-3

Office Space



Online observations. I engaged in online observations of Yammer on a regular basis, which yielded tremendous benefits for enhancing the understanding of communicative interactions among distributed employees. By virtue of the persistence affordance of ESM (Treem & Leonardi, 2012), there was no need to log onto Yammer to “witness” what was happening at a given moment—I invested about one hour per week to catch up with the updates during that particular week. All images, videos, and conversations on company-wide newsfeeds remained available, and I was able to review the popular public groups that were of my interest. Also, instead of jotting, I took digital screenshots of critical incidents that exemplified key themes. Those cases were vivid illustrations of status differences and knowledge-sharing challenges although I did not include screenshots in my dissertation due to confidentiality concerns.

The observations of Yammer served as a legitimate resource for triangulation and validation of other types of data. For instance, one of the interview participants expressed the frustration about lack of sharing (i.e., *routinized exclusion*; see Chapter 6) during the

interview. I was able to locate the participant's actual post on Yammer: since her question delivered through the official channel was never answered, she repeated the very same question on Yammer soliciting a timely response. People began to answer the question within a couple of hours because the question was publicly visible to all employees. As another notable example, a participant mentioned a case of building evolving knowledge repositories through reference sharing on Yammer (i.e., *contribution opportunities for common good*; see Chapter 4), and I was able to find such cases on public newsfeeds. More importantly, the constant observation of Yammer helped me pursue the idea of *visible disparity* since the disparate levels of engagement in knowledge conversations were conspicuous—eventually I decided to hand-code all posts in core public groups to demonstrate the difference in posting frequencies between high-status and low-status workers (see Chapter 6). I selected two of the most popular newsfeeds for knowledge conversations and simple status updates respectively, and coded whether the posts were authored by the employees at headquarters or in subsidiaries. All in all, I learned about the analytical potential of online observations, and future work should involve more techniques such as content and linguistic analyses.

Reporting to the Research Site

Although my formal observations for data collection must be conceived as unobtrusive observation, I was not completely detached from the managerial practices. As part of the research team, I reported the summary of findings to the top management at headquarters and all employees in the Uruguay office. The preliminary findings and presentation materials were also shared with the management; later, a couple of vice presidents informed me that they had discussed those findings since some of them were

“surprising” and they wanted to address the issues. One executive also began to overhaul the company’s knowledge management systems after I shared the employee feedback on the ineffectiveness of their systems. From time to time, I had informal conversations with the CEO and vice presidents regarding the research progress and findings, and they also shared their key concerns and challenges. Although I was not deeply involved in management practices, sharing the summary of findings was one way to reciprocate their research support and contribute to the improvement of work procedures, as an engaged organizational communication scholar (Barge & Shockley-Zalabak, 2008).

Notes.

¹ The quotations are excerpts from the CEO's official email announcement targeting the whole company.

² Although the original cut point was .90, recent work advises that the threshold must be close to .95 (Byrne, 2010).

³ Gender was not recorded in the roster; yet I marked all employees' gender based on their name and profile page.

Chapter 4

Leveraging Organizational Awareness through Visibility Management:

Impacts on Knowledge Acquisition among Distributed Workers

All understanding is socially local, or situated.

- Sandra Harding, *Sciences from Below* (2008)

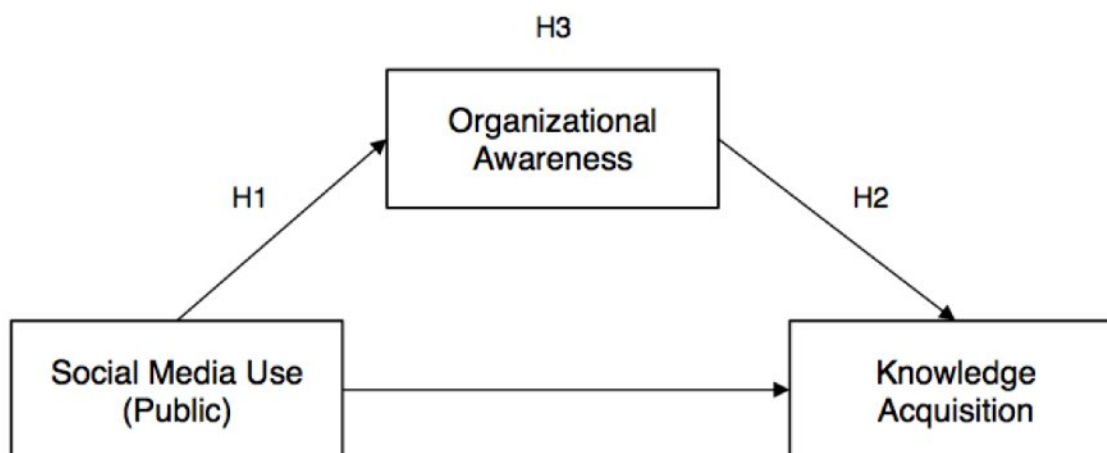
This chapter reports the findings regarding whether and how the visibility affordance of ESM enhances organizational awareness, which in turn promotes knowledge acquisition among distributed workers. As discussed in the foregoing chapters, organizational awareness can lubricate knowledge acquisition through aiding a contextual understanding of others' work, day-to-day activities, and expertise. For remote workers, however, building and maintaining a good level of awareness beyond collocated teams is a critical but daunting task. Focusing on this challenge, this study posits that communication visibility afforded by ESM may countervail their lack of in-person interactions and contextual understanding of others' work. As the use of ESM for company-wide communication (e.g., public newsfeeds) makes previously invisible communication visible beyond the immediate interlocutors, organizational members may be able to achieve increased awareness of their co-workers' activities by following the streams of conversations on various ESM channels; in turn, enhanced organizational awareness can function as a springboard for soliciting and garnering knowledge more effectively.

In this vein, the findings pertaining to organizational awareness and knowledge acquisition will be presented in the following sections. First, this study hypothesizes that

communication visibility, enhanced by company-wide communication on ESM, increases organizational awareness among dispersed workers. Subsequently, although company-wide communication itself does not necessarily promote knowledge-sharing outcomes, I propose that increased organizational awareness can help dispersed workers obtain the knowledge in need from their coworkers beyond the immediate team. The quantitative analysis was, therefore, designed to demonstrate that the impact of the use of ESM on the acquisition of useful knowledge was mediated by organizational awareness (H1-H3). The hypothesis is also presented in Figure 4-1. Next, the qualitative analysis provided in-depth accounts of how communication visibility enabled new forms of organizational awareness that in turn facilitated knowledge sharing among distributed workers through different mechanisms (RQ1). I will discuss five areas of organizational awareness identified through data analysis and how they allowed new modes of knowledge sharing across the organization.

Figure 4-1

Hypothesized Model for the Mediating Effect of Organizational Awareness



Quantitative Results

As preliminary analyses, I computed descriptive statistics and bivariate correlations among all study variables (see Table 4-1). Descriptive statistics and normality tests revealed that one of the key variables, the use of ESM (in this case, Yammer), was positively skewed. This pattern of Yammer use reflects the power law, which is commonly observed in the distribution of online activities: only a small number of users account for the most of online activities (Barabasi & Reka, 1999). Online platforms such as social media, message boards, and wikis are sustained mainly by top contributors' ongoing activities—the same tendency was also observed on Yammer at Design Inc. For example, among 224 participants who completed the online survey, 77 people (34.4%) were “lurkers” who never posted or used Yammer for the past year whereas 47 people (21.0%) were non-users of personal video conferencing; 39 people (17.4%) were non-users of group video conferencing; and also, 39 people (17.4%) were non-users of instant messaging software. In comparison to communication tools geared toward private conversations (either one-on-one or many-to-many), online venues that require public contributions such as Yammer tend to show less evenly distributed user activities. However, some members of Design Inc. also opted out from other traditional communication tools, as indicated above. The choice of communication technologies was largely at individuals' discretion although task-related platforms such as Team Foundation Server was mandatory in many teams. The only communication technology that had been universally used at Design Inc. was their corporate email. With respect to

Yammer, the mean of usage frequency excluding non-users was 3.57 for public communication and 2.90 for private group communication.

Table 4-1

Descriptive Statistics and Bivariate Correlations ¹

	1	2	3	4	5	6	7	8
1: Yammer (Public) ²								
2: Availability Awareness	.10							
3: Task Awareness	.20**	.61**						
4: Social Awareness	.12	.38**	.44**					
5: Interdependence	.12	.06	.18*	.02				
6: Job Function ³	.22**	.20**	.17*	.17*	-.03			
7: Location ⁴	-.12	-.04	.02	.00	.07	-.16*		
8: Gender ⁵	.11	-.02	.02	.05	-.14*	.26**	.01	
9: Organizational Tenure ⁶	.03	-.09	-.01	-.19**	-.04	-.17	-.34**	-.07
10: Knowledge Acquisition	.10	.15*	.19*	.03	.23**	.10	-.13	.15*
Mean	2.69	3.18	2.76	2.30	3.78			
SD	1.64	.87	.89	.96	.69			

Notes. ¹ * $p < .05$, ** $p < .01$. ² Yammer use for company-wide communication (public). ³ 0 = Engineers, 1 = Others (Offshore offices). ⁴ 0 = Headquarters, 1 = Others (Offshore offices). ⁵ 0 = Male, 1 = Female. ⁶ Unit = Year.

Bivariate correlations indicated that the three facets of organizational awareness (i.e., availability, task, and social awareness) were positively intercorrelated; however, only task awareness had a significant relationship with the company-wide use of Yammer ($r = .19, p < .01$). Thus, availability awareness and social awareness were excluded from the main analysis. These correlations were explained by the patterns of Yammer use at Design Inc. First, to check others' availability at a given moment, employees primarily utilized an instant messenger, which offered the presence information such as log-on signals and status messages (e.g., "away," "available"). With respect to general schedules for a longer period of time, they mainly used a shared calendar to see others' schedules. Although Yammer was used for communicating with a broader group of colleagues, Yammer was not necessarily a major tool to get informed of their availability. Next, employees rarely used Yammer to share their social and interpersonal life. Although there was no such policy that restricted personal conversations, and some employees even opened "movie groups" and "tech humor groups" for informal communication, those groups failed to draw much attention from employees. The posts in those groups also did not include any content on one's personal or social life. Given that the majority of content on Yammer consisted of task-related interactions, it was not surprising that Yammer use at Design Inc. was not associated with social awareness.

With respect to the dependent variable, the acquisition of useful knowledge was positively associated with task awareness ($r = .19, p < .05$), availability awareness ($r = .15, p < .05$), and interdependence ($r = .23, p < .01$). Also, the correlations among demographic and other variables revealed that non-engineers (i.e., peripheral roles) were likely to use Yammer for public communication more frequently ($r = .24, p < .01$) and to

have a higher level of organizational awareness in terms of others' availability ($r = .20$, $p < .01$), task ($r = .17$, $p < .05$), and social life ($r = .17$, $p < .05$). These results may indicate that employees in supporting functions are more likely to attend to others' activities to learn about their task progress and day-to-day practices. Finally, the analysis also demonstrated that employees with a longer organizational tenure were more likely to be engineers ($r = -.17$, $p < .05$) and located at headquarters ($r = -.34$, $p < .01$). Also, women were more likely to occupy non-engineer roles ($r = .26$, $p < .01$).

As a primary analysis, I conducted bootstrapping to test the proposed indirect effect of Yammer use on the acquisition of knowledge through organizational awareness (see Figure 4-1), controlled for interdependence and demographic variables, utilizing the PROCESS macro Version 2.15 (A. Hayes, 2013). Among other mediation analysis methods, bootstrapping has been known to have the highest power and best control the Type I error (A. Hayes, 2009; J. Williams & MacKinnon, 2008). Also, unlike Sobel test, bootstrapping does not make any additional assumptions required by parametric methods including the normality of sampling distribution. In fact, the distribution of intervening variables is likely to be non-normal (Bollen & Stine, 1990). Given that the use of Yammer was also a skewed variable, it was optimal to select bootstrapping method as recommended. Bootstrapping repeatedly performs random sampling with replacement to estimate the size of the indirect effect. The results demonstrated that the effect of company-wide Yammer use on task awareness was statistically significant ($\beta = .09$, $p < .01$), and in turn, the effect of task awareness on the acquisition of useful knowledge was also significant ($\beta = .10$, $p < .05$). Thus, H1 and H2 were supported. The indirect effect of Yammer use on the acquisition of useful knowledge through task awareness was

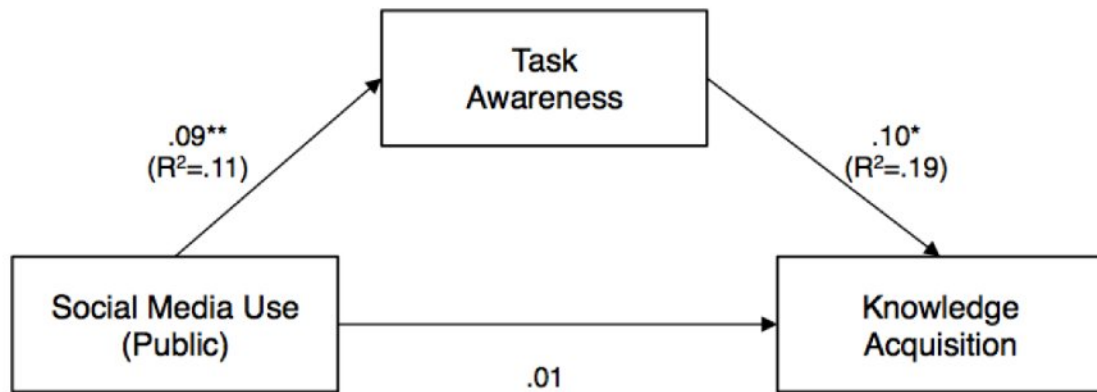
computed for each of 5,000 bootstrapped samples. The 95% bias corrected confidence interval (CI) ranged from .0004 to .0273; hence, the indirect effect was significant.

Additionally, the direct effect of Yammer use on the acquisition of useful knowledge was not statistically significant¹ ($\beta = .01$, $p > .05$), implying the critical role of task awareness.

Although the power and effect size of the mediator were not high, it is important to note that without task awareness, the use of ESM did not generate positive knowledge acquisition outcomes. Overall, H3 on the indirect effect of Yammer use was supported.

Figure 4-2

Final Empirical Model for the Mediation Effect of Task Awareness



Qualitative Findings

In addition to testing the model, I also sought to investigate how dispersed workers achieve organizational awareness through harnessing the affordances of Yammer. Focusing on the affordance of visibility, this study unravels how communication visibility enabled new dimensions of organizational awareness by delineating usage practices in detail (RQ1). The findings will be organized in five sections reflecting the key themes that emerged through the analysis of interview data. One may argue that communication visibility—afforded by the use of ESM—is inextricably linked to organizational awareness; however, the mechanisms through which visibility heightens organizational awareness have not been examined much. The analysis reveals that the affordances of visibility transform the once-isolated nature of communication into public, pervasive, and persistent; further, these three modes of communication contribute to the new forms of awareness that leads to positive knowledge sharing outcomes, in line with the quantitative results. In what follows, I present five areas of organizational awareness that subsequently enabled emerging knowledge-sharing practices among distributed workers. I also discuss how each area of awareness can be viewed as concomitant of public, pervasive, or persistent forms of social media communication although these forms are not mutually exclusive. The findings will ultimately elaborate on how an elevated level of awareness beyond the respective team can facilitate knowledge sharing and integration across the organization. The summary of findings and sample quotes are presented in Table 4-2.

Awareness of Knowledge Sources through Encounters

Design Inc. has established Agile processes in most development teams. Agile software development methodology is marked by short feedback and adaptation cycles, frequent deliveries based on iterations, and daily-basis debriefing through the “scrum” (Schwaber & Beedle, 2001). Everyone in a team attends a daily scrum meeting in the beginning of work hours (typically 9 a.m.) to share the progress of their tasks with one another. The number of attendees does not exceed ten to twelve people since the scrum mostly involves only the immediate team members. Agile methodology was originally contrived to improve collocated teamwork, highlighting physical proximity and face-to-face communication as core principles. It arguably provides a strong foundation for efficient and collaborative development practices; however, it does not consider distributed work settings much although recent advancement suggests some viable ways to apply it to distributed teams. For instance, some teams at Design Inc. tailored Agile practices to include team members in other locations in the daily scrum by adjusting meeting times. For some teams in Bulgaria, the scrum time refers to 4 p.m. since it is 9 a.m. in the United States. Also, distributed teams use a high-definition video conferencing system called Lifesize to videostream the entire room. In addition to the scrum, some teams hold weekly “sync” meetings with extended team members or close collaborators. In other teams, however, only team leads keep regular weekly (or bi-weekly) sessions with managers and key stakeholders in other regions. Overall, within-team communication at Design Inc. is well structured and frequently occurs particularly among collocated members.

Like any other software development organization that employs more than a few hundred employees, however, Design Inc. had been facing a number of obstacles associated with lack of contact across teams, departments, and locations. Each collocated team is a tightly-knit community where members share daily rituals such as lunch, social events, and work-related gatherings including the scrum. In contrast, there had been no channel² to raise awareness of activities happening in other teams and offices until they implemented Yammer, which was their only ESM platform; besides, the absence of protocol for inter-team or cross-location communication at Design Inc. hindered or delayed the processes of locating a knowledge source outside of a team. The interview participants shared frustration over their inability to find an expert in a particular domain in times of need. Without Yammer, they relied heavily on their first-line manager who would email several managers in other divisions to ask to locate someone who had experienced or solved similar issues among the members they supervised. This pattern occasioned “a lot of cloaked communications” especially “when you are using email for ad-hoc queries about a product” (Eric, United States).

Yammer use had gradually alleviated this situation by making conversations public and accessible to everyone in the organization. Comparing the communication patterns between pre- and post-implementation of Yammer, Danail said: “You can reach out to, let’s say, twenty-five different people in the email thread while you can go into a group on Yammer—the guys are interested and wanting to see notifications if they decided to help this group.” Yammer became especially beneficial for participants to forge connections beyond their regular collaborators. As Dimitar put it, “There have been names that pop up that I’ve never seen before.” This visibility allowed participants to

discover new knowledge sources in two ways. First, they broadcast their problems or questions on public newsfeeds to draw attention from someone who can potentially offer relevant knowledge. A participant described his experience as follows:

I was pretty sure that there was no way—no one has been working on a similar tool. (...) I managed to come up with to use Yammer, so I asked that question and ultimately found a guy who actually had been doing some similar work. He gave me some pointers where I should look at. I think that's at least my understanding of how it should—what you should use Yammer for. (Kaloyan, Engineering Team Lead, Bulgaria)

The aforementioned episode illustrates how Kaloyan used Yammer eventually to encounter someone who could provide useful knowledge to resolve his problem. Instead of targeting co-workers or supervisors to consult on the problems, he opted to publicly share his questions with everyone else in the organization through Yammer. By making the problem areas visible to other employees, he not only acquired the needed feedback but also discovered new knowledge sources otherwise he would not find easily. Another participant, Yosuke, also explicated that his posts had been answered by someone “unexpectedly” and those initial connections sustained for further knowledge sharing after their first interactions on Yammer. The awareness of knowledge sources beyond their team can significantly decrease the future effort required to solicit help to locate information sources, especially given that employees had to go through multiple chains when contacting other teams. Other informants also echoed these cases reflecting that they were enabled to locate and create connections with new knowledge sources beyond structural and geographical boundaries.

Second, participants monitored Yammer newsfeeds to learn about others' expertise that had become visible through public conversations. Even when they did not have any specific inquiries at the moment, observing Yammer posts and discussions

increased their awareness about others' specialties and skills that could be utilized in the future. Since Design Inc. had not been successful in maintaining an up-to-date organization chart (despite having an online tool for that purpose), finding "the right person" was always a major hurdle for many employees. Patricia's remark, "I think with a little bit of asking here and there they will eventually get to the right person but it's hard to figure out who the right person is straight away," reflects this common problem. As Cynthia explained below, this lack of expertise awareness can greatly complicate their work:

I was working on the website—one of the pages we have is for support environments and product life cycles and stuff like that. I wanted to know who all the product owners were for each product. Well, it's not really... there's a page on SharePoint and every time I try to navigate, I can never find the information.
(Cynthia, Senior UX Architect, United States)

In this work environment, enhanced expertise awareness was a definite advantage for employees. Since the information on others' responsibility and expertise was not immediately available, following others' profiles and posts on Yammer helped workers achieve a better sense of others' knowledge areas. Juan's comments succinctly described this benefit of getting the information on "who knows what" as follows:

Yammer works as a kick-off, or at least you come to have a notion of that the guy [in the other division] is working in that thing. So if you want to know something else about it, you know who to contact. (Juan, Software Architect, Uruguay)

Juan was able to match people to their specialized knowledge simply by continuous monitoring of their posts on Yammer even though he had never collaborated with them. Knowing someone outside of the extended team can be a crucial asset for IT workers since they share interests in recent trends and advancements in tools/frameworks, programming languages, and design principles that can improve their performance.

Hence they can still exchange information with each other to be better equipped for their tasks although they are not necessarily assigned to the same product. As Yammer can contribute to expertise mapping across the organization by making one's knowledge areas visible to everyone, participants could harness the visibility affordances of Yammer to determine expertise of others. Overall, participants' stories show that their awareness of (potential) knowledge sources had been enhanced by their regular use of Yammer.

Awareness of Contribution Opportunities for Common Good

For a globally distributed organization, it is an exacting task to build the public knowledge commons in which members can donate and exchange their knowledge with one another. Although Design Inc. had implemented several digital platforms to serve as knowledge repositories, employees rather felt the increasing demand for inter-team communication and knowledge integration. Team wiki pages were dispersed and not readily available for out-group members; SharePoint, the official platform for document sharing, was outdated and disorganized; Local drives were piled up with non-traceable items (e.g., duplicate files, multiple versions, and disparate file-naming conventions). Betraying the original intention, these digital repositories did not substantially benefit task completion, not to mention knowledge sharing. Since they had long been left unmanaged, there was a pressing need to create a space where people in different locations and divisions could initiate knowledge conversations and discussions with relatively less effort.

The interviewees acknowledged the challenges of triggering spontaneous conversations among distributed workers; yet they also believed that the problems were not insurmountable. Although Yammer was not perceived as a "perfect solution," it

greatly encouraged people to participate in a range of discussions on various topics.

Unlike other digital repositories, participants were able to make the areas that need input widely visible to others by posting them on Yammer. This visibility laid the bedrock for building a public knowledge pool—people started to chime in on conversations to share their knowledge and help problem solving even the subject matters were not directly relevant to their tasks. Noting this change, Kaloyan explicated: “We haven’t provided really great transparency before and now everyone who wants to engage more in all the projects and problems have just to sign up for a certain group [on Yammer] and follow all the development.” Another informant also stressed how Yammer had significantly leveraged contribution opportunities: “What Yammer has done is giving me the ability to join conversations I would never have been part of otherwise.” He further explicated his actual experiences as follows:

One of the engineers providing support a couple months ago asked a question on Yammer. They asked it to one of the engineering teams, but *I* answered it. (...) It was something I knew and I happened to see it on Yammer so I answered. But I wasn’t part of the team that he was contacting for the information. (Albert, Manager, United States)

As others’ questions and discussions had become publicly available, he was able to interpose in their conversations on Yammer. As seen in this case, enhanced communication visibility allows people to identify the areas that may require their contributions, which in turn can increase the chances of participation. Employees began to utilize the visibility affordance of Yammer to attract participation from other parties across geographic locations. This created an accessible knowledge pool that eventually evolved into common good. The quote below illustrates how one team transformed its

own documentation work into the open process of company-wide collaboration through visibility management.

If we make it public, we're hoping to get people to actually contribute to the documentation because it has been criticized once or twice so far. (...) It wasn't even an easy process for us internally to make changes so to speak. This actually needed a change, so making it public was just a bonus for us. It doesn't really hurt the company to put it out there and hope somebody would actually decide, "You know what, I don't like this and I can make it better. Oh, here's the link so I can actually do that now." (Dimitar, Engineer, Bulgaria)

Although documentation was the responsibility of respective teams, his team simply opened the door for participation to encourage submissions of better ideas.

Indeed, engineers in other teams can suggest more accurate, effective ways of documentation based on their previous work. In this aspect, Yammer can help others intervene and improve the product together—their updates, revisions, or the documentation itself can be viewed as common good generated by collective effort.

Confirming this trend, one of the product managers also stated that "For the [development team name], I made this group public and we've had people even from Sales jumping in."

Moreover, contribution opportunities were not necessarily limited to engaging in specific issues. One of the most distinctive advantages of Yammer was that users could make day-to-day team communications and processes visible and others could also be part of them. This can switch knowledge sharing from "a need basis [sic]" to continuous activities that are pre-requisites for effective maintenance of common good. As Kiril described:

I wouldn't say that teams had a whole lot of problems speaking to other teams, but it wasn't happening very often because it was on a need basis [sic]. So now, just because you have Yammer, for example, you have specifications and features and so on shared publicly on Yammer to all the people in the company. We have

more people who are able to actually contribute and give their opinion about what everyone is doing. (Kiril, Platform Lead, Bulgaria)

The routinization of ad-hoc, continuous engagement is especially important because it lowers participation barriers compared with formal interdepartmental contacts, official meeting agenda, or submitting an inquiry to a person in charge. It also supports the constant growth of the knowledge commons that invites contributions from anyone interested. Particularly in distributed organizations, the visibility of individual activities—that are not constrained in a specific locale—can boost motivations for engagement. The comment below captures how one employee’s participation motivated many others’ voluntary sharing of resources.

We often do some sorts of discussions. For example, if somebody shares, let’s say a prototyping tool, a new one, then it’s likely that another person will share another one. Or another person shares some sorts of a pack of icons or some design resources. It’s very often that a discussion starts where everybody shares his references and at the end of the day, we have a list of references to visit and check out. (Samuil, UX Architect, Bulgaria)

As above, workers at Design Inc. followed others’ acts and donated useful resources to develop an ad-hoc knowledge repository on Yammer. The communal nature of sharing can help the knowledge pools evolve into self-sustaining common good. Albert’s remark, “I’m more active because I saw a value in information sharing,” summarizes the nature of their participation very well—the active users of Yammer were aware of collective benefits of sharing and engaged in knowledge exchange as one form of contribution to the public.

Awareness of the Out-group’s Everyday Work

In the foregoing, I focused primarily on the public nature of social media communication and its relationships with organizational awareness, but the pervasive

quality can also make unique contributions to promoting organizational awareness. In distributed settings where workers cannot easily obtain the information on others' day-to-day activities, enterprise social media can provide ambient information about how things are moving along across the organization. Indeed, the paucity of information about the out-group activities was one motivation for Yammer use. Yordan said: "I use Yammer because I want to be aware of what my company is doing. Not only my team but I'm interested in what other teams are working on. (...) I knew only about what my team was doing [before using Yammer]."

To get a sense of how other teams are doing, participants do not necessarily need to engage in active knowledge sharing but simply observe the newsfeeds in a rather passive manner. ("It's a way to see what's going on without getting involved in using too much of my time.") Concurrently, the newsfeeds that they monitor may not include critical information but just snippets of mundane activities. However, when aggregated, those pieces of information can help members develop a granular understanding about everyday occurrences on the other side of boundaries. Referring to this process, Samuil described the company-wide newsfeeds as "broadcasting media to keep us alive around what's going on" that allowed him to "sync with" others' activities. The following quote elaborated on how passive monitoring of others' updates on Yammer had increased an understanding of them by piecemeal.

Because under normal conditions you might have only a very vague sense of what other individuals in the company are doing or what they do on a general day-to-day basis. To have even just an intuitive understanding, when you don't remember particular instances as to someone talking about a particular technology on Yammer, you might just have this inkling that they are connected with something, and that's just because of the information that you've absorbed. Absorbed by reading the flow of information going through Yammer. (Eric, Engineer, United States)

The last sentence encapsulates the influence of pervasive communication on promoting organizational awareness: the daily doses of exposure to others' everyday activities can accumulate to help make sense of others' work. The streams of Yammer newsfeeds are especially advantageous for dispersed workers. Whereas collocated team members can easily know about their co-workers' daily routines merely by observing their surroundings, it is difficult to collect information on task progress, recent accomplishments, and mundane activities in other offices. The pervasiveness of social media communication enables distributed workers to stay abreast of what is going on in different offices, albeit slowly.

The ambient awareness supported by enterprise social media has implications for knowledge sharing as well. Participants, who perceived the affordance of pervasive communication, made it a rule to share their daily updates through Yammer. The following remark by Jeffrey illustrates how participants shared information bit-by-bit on Yammer assuming the potential audience across the organization. In particular, his quote highlights that pervasive awareness is closely intertwined with the unobtrusive nature of knowledge sharing on social media. His comparison of Yammer and email indicates that he preferred using Yammer since he wanted to avoid direct contacts and interruptions.

It's more to make them aware that a new piece of content is available. So it's just a way for me to say "we've done something, here it is." If you want more details than this, click on this link and you can go to the marketing blog and get all the details. (...) I don't feel comfortable sending a company-wide email every time I update the marketing blog because I update it a couple times a day. (Jeffrey, Marketing Director, United States)

Taken together, communication visibility can help participants create a continuous, pervasive stream of updates that can be passively monitored by interested

parties. As one informant described, “It can also let more people be aware of the pulse of the specific project.” The use of Yammer thus helped workers at Design Inc. develop better knowledge of others’ work outside of the team. Under distributed conditions, gleaning bits of information from multiple locations can become an important source of organizational awareness. Given that it is difficult to channel everyday activities to employees across geographical boundaries, social media newsfeeds offer a complementary way to allow dispersed workers to stay in the know in terms of quotidian activities in different offices.

Awareness of Project-in-Context

When cross-boundary communication suffers due to various issues such as physical dispersion, time differences, or lack of inter-team communication protocol, organizational members are less likely to achieve an in-depth understanding about where their project is situated in relation to other teams’ work. Sparse communication between teams, divisions, and locations was a prevalent issue at Design Inc., especially between headquarters and offshore offices. Although it must be challenging to design an official device to effectively “sync” all the projects across five different locations, the absence of regular contacts can create more adverse conditions for remote workers. Unlike higher-level engineers at headquarters, lower-status workers in offshore branches did not occupy a vantage point to look over the project roadmap with regard to organizational milestones. However, awareness of the big picture—how other teams’ work could influence their own work—considerably supported task preparation and completion. The following statement by a worker in Japan shows one example:

Before using Yammer, we never knew the details. Just we knew the fact: this function is coming in 6 months. But now people [in headquarters] post

specifications about the features, how it's been made, how it should be used—all the discussions. I can follow all of them to get the ideas about the product. It's definitely useful. (Takeshi, Marketing, Japan)

Through “following” the discussions on Yammer, he was able to collect information about the detailed processes of product development, the rationale behind product features, and how engineers reached at the current status of product ideas. Without social media newsfeeds, it would require tremendous effort from both parties to share those activities in detail. For Takeshi, Yammer offered a window to look into the conversations among engineers at the headquarters, which helped him prepare for his next step as a developer support engineer who often bridges engineers and clients. Akira also confirmed that keeping track of Yammer posts enabled her to “plan in advance” since she built better knowledge about what would be delivered to her from other engineering teams in the near future.

Participants were able to contextualize their work better than before by constant monitoring of social media newsfeeds that provided ambient information about other teams' work. The pervasive nature of social media communication is a key contributor to promoting awareness of project contexts. Interviewees were able to map the position and status of their project in connection with the progress of related projects. Also, the knowledge about other projects' trajectory informed them of confirmed schedules or upcoming changes (not officially relayed to them on time). Participants, especially those in remote locations, still did not believe that they had a bird's eye view of the project map across the organization; nonetheless, they were able to increase contextual knowledge about their project owing to Yammer newsfeeds.

Furthermore, participants utilized the contextual knowledge to improve their work process from an early stage. Participants shared the information acquired through Yammer within their team to ensure mutual understanding about their project and make changes in their work if necessary. A team lead in Bulgaria regularly monitored a company-wide newsfeed on development, and he switched his team plan based on other teams' moves when needed. He explained his strategy as follows:

When you receive some communications you can easily look through, then you can verify if there is something that you or your team has to work on. (...) So I'm aware of, just by following this group, what impact it's going to have on the product, which means I will understand if our team has to be involved. So I drop the news in early stages so I can prepare better if we have to change something in terms of how the products are created, viewed, and how they should be delivered to customers. (Danail, Engineering Team Lead, Bulgaria)

By observing the newsfeeds on Yammer, he was able to gauge the future impact that updates in other teams would make on his own team. Continuous reading of newsfeed updates helped him become astute at determining what decisions need to be made in earlier stages, which thus could prevent from work overload or "rollback" in a later stage. When he learned about new information or possible shifts, he tried to jumpstart a new plan on his own reflecting the changes in other teams. Another engineer Kiril also used Yammer as a reference to understand the position of his product with respect to other projects: "[We use Yammer] because we need to see whether our progress is what people would expect to see, and the feature is working in a way that people expect it to work." In this respect, access to team discussions across the organization aided employees in understanding broader expectations and goals as well as matching up the product design with them. Interviewees' stories showed that reading a project in the context of others' work could substantially benefit process improvement.

Once participants learned about the affordance of disseminating contextual information through Yammer, they engaged in further knowledge sharing by “tagging” people in other departments. Another engineer described, “[W]e always involve people from the local team in the design [on Yammer]. So they have to be part of the process to understand better why that design decision was made.” In turn, the designers could be aware of what engineers had discussed through reading the conversations and updates, which could help them situate their design work in the context of engineering work. The usage patterns discussed here can yield great advantages for knowledge sharing across functional and geographical borders. The findings suggest that assembling information about the relationships between projects can enable distributed workers to better situate their work in relation to others’ work. Hence, the awareness of projects-in-context may support establishing common ground, which can facilitate cross-boundary collaboration and knowledge sharing.

Awareness of Conversation Histories

In addition to the public and pervasive nature of social media communication enhanced by communication visibility, the persistence of conversations is another key catalyst for effective knowledge sharing. Given that conversations between professionals may reveal advanced knowledge, thought processes for problem solving, and diverse viewpoints and opinions, the archive of those conversations can be useful resources for other individuals such as newcomers and workers in other job functions. In contrast to archiving files or documents, however, making those conversations searchable and accessible by all members of an organization used to be a cumbersome task. For instance, someone would need to record their dialogues or document and publish meeting minutes.

In reality, even making existing files searchable and retrievable is also challenging when there are a few hundred users, let alone conversations. Contrary to other digital platforms, enterprise social media can provide a notable advantage for the retention of conversational materials. Eric elaborated on the benefit of Yammer drawing on the comparison with other tools.

SharePoint is very much a deliberate thing that you're doing to make information more sharable. (...) But it's not an automatic process. It's not an inherent process. Meanwhile, if you're funneling communications through Yammer, then it's automatically documented and searchable, which is a very interesting thing. (...) [Compared to email,] you didn't have to pay more in terms of time. If you've taken something that was an email thread, and turned it into a Yammer discussion, it isn't really more difficult to have that conversation via Yammer, but you've gained ancillary benefits at no additional time cost. (...) If you've produced some information that should be searchable, then why don't you document that in a knowledge base?

He pointed out the unique characteristics of Yammer—the automation of archiving conversations. Since the conversations on Yammer are public and persistent from the outset, employees need not to take extra steps to create a separate archive. Given that conversations on Yammer are continuously updated and accumulated over time, it can be regarded as one form of evolving knowledge repository that is maintained with relatively less effort. Specifically, the persistence of communication is a pre-requisite for future access, and Yammer can function as a case repository where workers can easily look up previous cases and conversations. Eric continues to explicate this aspect as follows:

When you were asked the same question multiple times, you want to make sure the answer wound up in some FAQ (Frequently Asked Questions) database or documentation. All those are requiring explicit steps performed by a team member. (...) If someone has a feeling that a question may already have been asked, they should be able to search Yammer to see whether it comes up there. There's no explicit step required to make that information more searchable.

Awareness of discussions, decisions, and solutions in the past may help workers avoid duplication of work and knowledge (Leonardi, 2014). As Eric described, the awareness of histories can also prevent workers from receiving the same questions multiple times from different individuals. Once people start to move their discussions to Yammer newsfeeds from isolated platforms such as email, those conversations can organically develop and remain in the public archive. Given that the cost of contribution and maintenance is a big impediment to building a sustainable knowledge repository, reduced effort can be a significant motivation for participation. This is one of the major strengths of Yammer—users can naturally build a sustainable knowledge base by simply posting or responding to others’ posts. As employees at Design Inc. were aware of this possibility, some higher-level employees strongly advocated the benefits of Yammer to increase participation. One informant (who was promoted to vice president later) said:

Everyone has their own email, and if someone leaves and there’s a conversation, eventually you lose information that way. That’s another core thing that drives as much of the product discussions onto Yammer as possible so that we would have them available. (Joe, Product Management, United States)

Joe clearly indicated that one purpose of Yammer use was preventing the loss of information, which was inextricably linked to the affordance of persistence. Whereas emails belonged to a particular account, conversations on Yammer appeared on the public newsfeeds that could be accessible beyond temporal restrictions. Akira also used Yammer newsfeeds to preserve the discussions within her team because “not everybody can attend the meeting” and “we can look up Yammer later to see what has been decided or discussed.” That way, she could keep other team members in the loop even though they were absent in the team meetings. In aggregate, Yammer contributed to preserving

organizational memory by archiving a range of conversations and making them public and persistent.

Finally, some participants harnessed the affordance of persistence to leave an official record, which is available to everyone in the organization (unlike email). Ryan's case below illustrates how he harnessed the persistent nature of communication to ensure the awareness of previous discussions, confirmed decisions, and assigned responsibility. He used Yammer posts as a reminder for himself as well as his team members.

If we made some agreement, some implied commitment, unless we follow up with another email, "As we discussed, we are going to do X, Y, and Z," somebody has to take the initiative to become a note-taker and archive it. Otherwise that commitment is in either. With Yammer, I can post it there trying to communicate, but when I see them next time, I can remind them. It is a way to say, "I don't want to walk away from what I'm doing. I've found something and I put it out there so that I don't forget about it." (Ryan, Product Manager, United States)

Overall, Yammer had become a gradually evolving knowledge base for workers at Design Inc. By virtue of its ease of use, participants were able to transfer their conversations to Yammer when desired, and the conversations became persistent across time. As illustrated by the quotes above, interviewees proactively used the persistent nature of social media communication to store their conversations in a searchable format. Yammer use enhanced the awareness of histories of communications, which in turn offered a shortcut to the next stage by preventing workers from reinventing the wheel (e.g., coming up with the same solution, asking the same question). Through maintaining a growing archive of work and knowledge, which was available even after the original contributors left the organization, Yammer operated as a great tool to preserve organizational memory.

Table 4-2

Areas of Organizational Awareness Supported by Communication Visibility

Nature of Communication	Areas of Organizational Awareness	Sample Quotes
Public	New knowledge sources: Locating and forging connections with new knowledge sources	“Yammer is also helpful to get to know people better. Sometimes I got responses from someone unexpectedly. The person knew very well about the question, then we became closer after several conversations. I was able to talk to more people because of Yammer than before.” (Yosuke)
	Contribution opportunities for common good: Identifying new areas that need input	“A kind of encouraging and openness point of view—encouraging and openness mean to me that you get people who you wouldn’t thought you needed to include can still see things and jump in if they have something to add, which I’ve seen that happen many times actually since I started using Yammer.” (Joe)
Pervasive	Out-group’s everyday work: Ambient understanding of others’ day-to-day work	“One thing that it’s really good for is a more ambient understanding as to what other teams are working on. People to an extent are broadcasting what they are working on and you can come to a high-level understanding as to what other teams there are working on. You can reach and go, ‘Oh, we are interested in that sort of thing,’ then start interacting with them.” (Eric)
	Awareness of project-in-context: Enhanced understanding of projects in relation to others’ work	“I joined some development groups on Yammer to follow them, for example, new features—what’s coming in the next release. That directly impacts my work. (...) We can plan in advance because we know the changes, what’s coming next.” (Akira)
Persistent	Conversation histories: Awareness of previous cases and conversations	“I suppose that it is the greatest feature that stands out in using Yammer when compared to emails and Skype in terms of Q&A and the history that anyone could refer to that Q&A later.” (Kaloyan)

Notes

¹ For the discussions of the direct, indirect, and mediating effects, please see Mathieu and Taylor (2006).

² Design Inc. did not have an intranet or message board in which everyone could post and share their activities publicly within the company. Also, the system privilege to send a company-wide email was restricted to higher-level employees such as top management. If other members desired to email everyone, the message should be authorized beforehand.

Chapter 5

More Visible, More Connected:

Network Impacts on Knowledge Acquisition

No one would deny that social order is often created hierarchically. But it is useful to see that order can emerge from a spectrum of sources that extends from hierarchical and centralized types of authority to the decentralized and spontaneous interactions of individuals.

- Francis Fukuyama, *The great disruption* (1999)

This chapter examines the effects of ESM use on individuals' social network connectivity, which in turn can make a substantial impact on the acquisition of useful knowledge. Drawing on a social network approach, I first delve into the relationships between the different patterns of Yammer use and various network characteristics that indicate the extent of range and cohesion of one's network. In particular, depending on the degree of communication visibility, I differentiate between public (i.e., company-wide communication) and private (i.e., closed-group communication) uses of Yammer. I posit that public and private communications on Yammer may exert disparate influences on the configuration of one's network within the organization: (a) as employees' conversations on the public newsfeeds are widely visible, dispersed workers may utilize the platform to tap into broader circles across different locations and departments; (b) on the contrary, invisible exchanges within membership-restricted groups may not necessarily promote social connectivity but contribute to cohesiveness of one's existing network. Hence, the first part of analysis will explore how the public and private uses of Yammer are associated with the properties of one's network. Subsequently, I also investigate how such network characteristics are associated with the acquisition of useful

knowledge within the organization. Broadly, I concentrate on the two types of network qualities: range and cohesion. I examine key network measures that reflect each quality analyzing the whole network data. Next, I will demonstrate how various network properties generate differential impacts on knowledge acquisition. In the following sections, the analysis procedure and result will be presented. The findings show that how the nature of one's network represents the advantages and constraints that employees experience, and how network analysis can generate valuable insight into knowledge-sharing practices among diverse groups within a global organization.

Results

Visibility and Connections

As a preliminary procedure, I computed descriptive statistics for core study variables (see Table 5-1). In-degree and out-degree centralities indicated that employees had both approximately 9.41 incoming and outgoing ties on average respectively. Betweenness centrality showed that the average number of geodesic paths that individuals created between all other pairs of actors in the network was approximately 365.33. The value of clustering coefficient demonstrated that approximately 32% of ties were present in each node's neighborhood within the whole network. Finally, the average degree of tie strength was slightly above neutral ($M = 3.04$) and the mean of knowledge acquisition was relatively high ($M = 4.24$).

I conducted QAP correlations among study variables drawing on 10,000 random permutations using UCINET 6 (see Table 5-2) to test the relationship between Yammer use and network characteristics (RQ 2 and RQ 3). The public use of Yammer was positively correlated with out-degree centrality ($r = .17, p < .05$) and betweenness

centrality ($r = .15, p < .05$); however, it was negatively correlated with clustering coefficient ($r = -.17, p < .01$). However, the public use of Yammer did not contribute to in-degree centrality ($r = -.10, p > .05$). The results hence revealed that company-wide newsfeeds on Yammer could serve as an important venue to reach out to more people but did not increase incoming contacts. Next, although the public and private use of Yammer was highly correlated ($r = .63, p < .001$), the private use of Yammer did not generate any effects on network variables. Therefore, invisible exchanges within the team or private groups did not yield significant impacts on changes in the configuration of the whole network. Finally, both types of Yammer use did not have significant relationships with the acquisition of useful knowledge. This result implies that the use of Yammer did not necessarily promote knowledge acquisition in its own right. In sum, only the public communication on Yammer affected the characteristics of one's network at Design Inc., particularly with regard to out-degree centrality, betweenness centrality, and clustering coefficient.

Table 5-1

Descriptive Statistics for Study Variables

	Mean	SD
1: Yammer (Public)	2.69	1.64
2: Yammer (Group)	2.30	1.49
3: In-degree	9.41	7.30
4: Out-degree	9.41	7.52
5: Betweenness	365.33	583.27
6: Clustering Coefficient	.32	.19
7: Tie Strength	3.04	.98
8: Knowledge Acquisition	4.24	.52

Table 5-2¹

QAP Correlations between Yammer Use and Study Variables

	1	2	3	4	5	6	7
1: Yammer (Public)							
2: Yammer (Group)	.63***						
3: In-degree	-.10	.05					
4: Out-degree	.17*	.08	.38***				
5: Betweenness	.15*	.05	.75***	.69***			
6: Clustering Coefficient	-.17**	-.12	-.53***	-.50***	-.49***		
7: Tie Strength	-.05	.05	.04***	-.06***	.03*	-.01	
8: Knowledge Acquisition	-.01	-.01	.10***	-.10***	.01	-.01	.56***

Note. ¹* $p < .05$, ** $p < .01$, *** $p < .001$.

Correlations also revealed that a number of network variables were intercorrelated. In-degree centrality, out-degree centrality, and betweenness centrality showed significantly positive relationships. Clustering coefficient was negatively associated with all of centrality measures. Notably, tie strength was positively correlated with in-degree centrality ($r = .05$, $p < .001$) whereas it was negatively correlated with out-degree centrality ($r = -.06$, $p < .001$). Finally, the acquisition of useful knowledge was positively related to in-degree centrality ($r = .10$, $p < .001$) as well as tie strength ($r = .56$, $p < .001$) but was negatively related to out-degree centrality ($r = -.10$, $p < .001$).

Network Impacts on Knowledge Acquisition

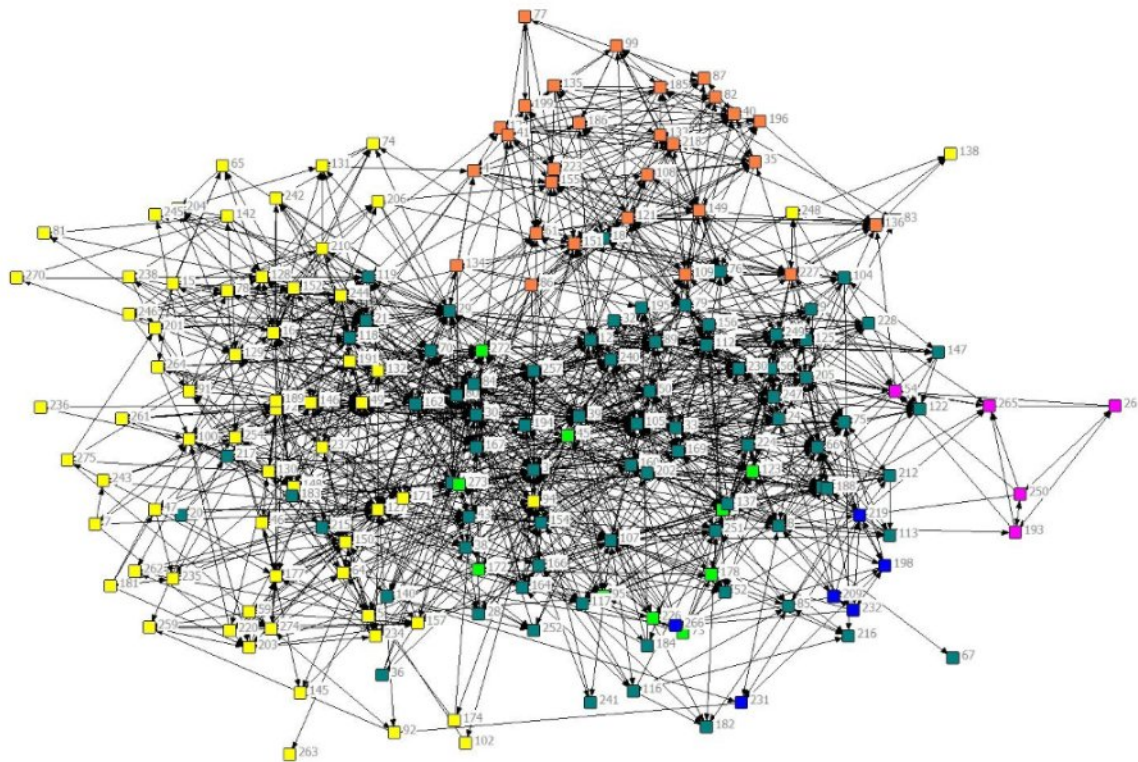
The impacts of social networks on knowledge-sharing practices and outcomes have been widely studied among social network scholars (Borgatti & Cross, 2003; Reagans & McEvily, 2003). Focusing on the role of network range (i.e., in-degree, out-degree, and betweenness centralities) and cohesion (i.e., clustering coefficient and tie strength), the current study looked into whether and how one's network structures affect their acquisition of knowledge from peers. As the social network approach is conducive to capturing actual peer-to-peer relationships beyond official team boundaries, it was

particularly beneficial for understanding how one's connectedness or embeddedness might shape the patterns of knowledge acquisition.

To explore the relationships between variables, I first conducted QAP correlations among all study variables before executing the substantial analysis (see Table 5-3). The acquisition of useful knowledge revealed statistically significant relationships with the most of key measures. It was positively correlated with in-degree centrality ($r = .10, p < .001$) and the strength of tie ($r = .56, p < .001$). Notably, it was also positively correlated with same location ($r = .21, p < .001$), same job function ($r = .14, p < .001$), and same gender ($r = .04, p < .01$), implying that workers perceived knowledge sharing across geographical and functional boundaries as challenging. Also, given that the majority of engineers were male, gender disparities might subsume the differences in job role. By contrast, the acquisition of useful knowledge was negatively correlated with out-degree centrality ($r = -.10, p < .001$). Therefore, the more one maintained a large number of connections by reaching out to different individuals, the more they face difficulties in garnering knowledge that actually contributed to their tasks. Finally, employees with a longer organizational tenure rated the knowledge that they had received as less beneficial ($r = -.04, p < .001$).

Figure 5-1

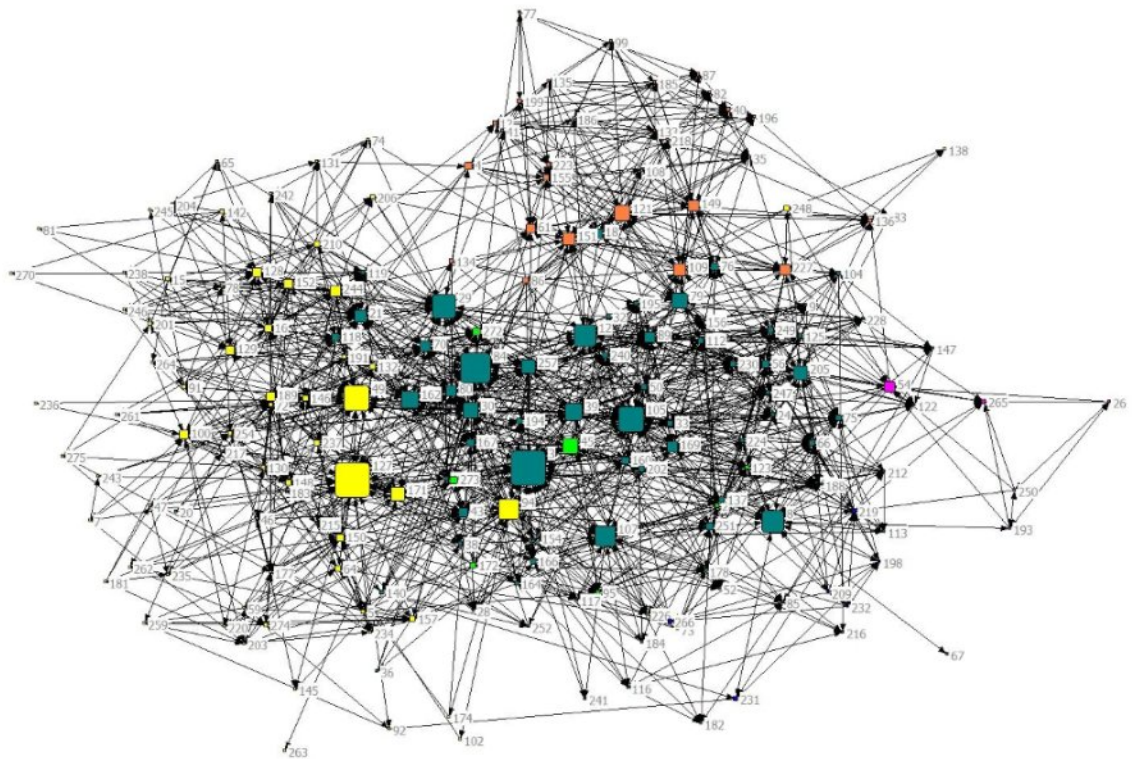
Knowledge Sharing Networks at Design Inc.



Note. Teal = United States (headquarters), Yellow = Bulgaria, Orange = Uruguay, Light Green = Japan, Pink = United Kingdom, Blue = India.

Figure 5-2¹

Visualization of Betweenness Centralities at Design Inc.²



Notes. ¹ Teal = United States (headquarters), Yellow = Bulgaria, Orange = Uruguay, Light Green = Japan, Pink = United Kingdom, Blue = India. ² Node Size = Betweenness.

Table 5-3¹

QAP Correlations among Study Variables

	1	2	3	4	5	6	7	8
1: Knowledge Acquisition								
2: In-degree	.10***							
3: Out-degree	-.10***	.38***						
4: Betweenness	.01	.75***	.69***					
5: Clustering Coefficient	-.01	-.53***	-.50***	-.49***				
6: Tie Strength	.56***	.04***	-.06***	.03*	.02			
7: Interdependence	-.01	.06	.18**	.08	.12*	-.01		
8: Location ²	.21***	.00	.00	.00*	.00*	.18***	.00***	
9: Job Function ³	.14***	.00	.00	.00	.00**	-.15***	.00**	.06***
10: Gender ⁴	.04**	.00	.00**	.00**	.00*	.03***	.00	.01*
11: Organizational Tenure	-.04***	.14*	.43***	.24***	-.26***	-.01*	-.05	.00

Note. ¹* p < .05, ** p < .01, *** p < .001. ² Same location = 1. ³ Same job function = 1. ⁴ Same gender = 1.

The main analysis regarding the effects of network measures on the acquisition of useful knowledge (RQ 4) was performed by constructing MRQAP models (see Table 5-4). In the first model, only the control variables were examined as predictors of knowledge acquisition. According to the standardized regression coefficients, same location ($p < .001$), same job function ($p < .001$), same gender ($p < .01$), and organizational tenure ($p < .001$) had significant impacts on knowledge acquisition. The level of interdependence was not significant ($p > .05$).

In the second model, all network measures were entered subsequently. Controlled for location, job function, gender, and organizational tenure, in-degree centrality, out-degree centrality, and tie strength still showed statistically significant relationships with the dependent variable. First, out-degree centrality was negatively associated with knowledge acquisition ($p < .001$) whereas in-degree centrality made a positive effect on knowledge acquisition ($p < .001$). This may indicate that people who were sought by others—hence, who were likely more influential—tended to obtain useful knowledge more than those who were not. Further, out-degree centrality imposed more difficulties on collecting useful knowledge; thus, employees with more outgoing ties were less likely to succeed in obtaining the knowledge in need. It is important to note that the use of public newsfeeds on Yammer was positively associated with out-degree centrality: the active use of Yammer helped dispersed employees to make connections with a larger group of people. Yet such outgoing connections rather indicated a lower probability of acquiring useful knowledge. Lastly, the strength of tie was the strongest predictor of knowledge acquisition ($p < .001$). Along with the fact that employees were more likely to glean useful knowledge within the same location and job function, the positive role of tie

strength demonstrated that cohesion—rather than range—supported knowledge acquisition at Design Inc.

Table 5-4¹

Multiple Regression Quadratic Assignment Procedure Predicting Knowledge Acquisition

		Model 1	Model 2
		Standardized Coefficients	
1	Interdependence	-.02	.00
	Location ²	.20***	.10***
	Job Function ³	.13***	.05***
	Gender ⁴	.03**	.02*
	Organizational Tenure	-.04***	-.01
2	In-degree Centrality		.10***
	Out-degree Centrality		-.09***
	Betweenness Centrality		-.01
	Clustering Coefficient		.01
	Tie Strength		.49***
	Intercept		.00***
R ²		.06	.35
Adj. R ²		.06	.35
ΔR^2			.29

Notes. ¹ * p < .05, ** p < .01, *** p < .001. ² Same location = 1. ³ Same job function = 1.

⁴ Same gender = 1.

In aggregate, the findings presented in this chapter revealed the contradictory influences of Yammer use on network configuration and knowledge sharing. Although visible communication on Yammer was positively associated with out-degree centrality and betweenness centrality, both attributes failed to enhance the quality of knowledge

acquisition. At Design Inc., demographic similarities and tie strength were more beneficial for effective sharing of knowledge. Also, in-degree centrality, which implied existing social status rather than newly achieved connections by Yammer use, was positively associated with the acquisition of useful knowledge. The results implied that far-reaching networks supported by ESM use brought obstacles for knowledge sharing. In general, cohesion generated an advantage whereas network range functioned as a challenge. The network analysis results disclosed communication challenges that stemmed from structural and relational constraints, which precluded efficient cross-boundary knowledge sharing. The detailed accounts on why having stretched networks was disadvantageous in this organization—instead of serving as efficient webs to collect new knowledge from diverse individuals—will be discussed in the next section, drawing on qualitative findings.

Chapter 6

Disparity, Visualized:

The Unintended Consequences of Communication Visibility

Categories support durable inequality when combined with hierarchies—ties between social sites in which the connections are asymmetrical and the sites systematically unequal. Each reinforces the other, for a relatively impermeable barrier reduces the likelihood that equalizing relations will form across it, while asymmetrical relations based on unequal resources justify the boundary and render it more visible.

- Charles Tilly, *Durable Inequality* (1998)

In this chapter, I delve deeper into the matters of cross-boundary knowledge sharing to further explicate the underlying mechanisms that shape the perception, interpretation, and construction of knowledge-sharing practices occurring across multiple boundaries. Especially in global organizations, the act of spanning boundaries (e.g., spatial, temporal, or functional boundaries) often subsumes the act of spanning status hierarchies. For example, geographical boundaries indicate the distinction between the headquarters and offshore branches, and these two groups of sites have differential access to various assets and opportunities. Functional boundaries also include role-based status hierarchies between core functions (e.g., developers) and complementary functions (e.g., developer supporting engineers). Although status hierarchies may differ from formal structures such as the organization chart or reporting lines, status can legitimize or circumscribe one's behaviors (not to mention when status hierarchies overlap official hierarchies). Further, I argue that status differences are particularly crucial in the context of knowledge sharing because knowledge—or knowledge disparity—itself can be viewed as a powerful signal of status among the members of a high-tech organization (i.e., a

knowledge-intensive firm) in which they must draw on expert knowledge to accomplish their tasks.

When a new communication technology, specifically geared toward knowledge sharing, is introduced in such an unequal setting, organizational members may respond to the same technology in a disparate way. Specifically, the examination of the visibility affordance provokes a question about its ramifications for the individuals of different status: What does *becoming visible* mean to low-status and high-status workers (RQ4)? To unravel this question, I challenge two prevalent assumptions about organizational technology use. First, the implementation of ESM in organizations enables employees to promote their social capital, “climb up the ladder” (DiMicco et al., 2008), and hence it can contribute to reconfiguring or flattening organizational structures (Ellison et al., 2015; Steinfield et al., 2009). Second, gaining visibility, by making communicative acts visible through the use of ESM, brings advantages to organizational members such as establishing expertise, authority, and a reputation. In contrast, I posit that the visibility of individuals and their communicative behaviors on ESM can also bring into relief the knowledge gaps and status differentials among disparate groups, which were not immediately noticeable to dispersed organizational members before. When one’s discursive behaviors become widely visible across the organization, others can make inferences about his or her capabilities and knowledge levels based on the available content without a history of interactions. This issue is particularly salient when organizational members are not trained to make sense of the communication practices by people from different functions, countries, and cultures.

At Design Inc., the members were not provided with concrete opportunities to practice how to negotiate common ground with people in other groups. Although the management might be aware of the needs for intercultural training or team building workshops, the lack of effort at the organizational level was a growing concern across different locations. In fact, the very first global sales division meeting, which was highly welcomed by remote employees, was held in May 2014 even though the company became globally distributed in 2002. This tendency is not uncommon in multinational organizations since the programming of global events requires tremendous investment while they are pressured to allocate the majority of resources mostly for a number of imminent issues. However, as the collaboration across multiple offshore offices had increased at Design Inc., the lack of systematic training for cross-boundary communication gave rise to numerous coordination and communication challenges that exacerbated the disparity in status, knowledge, and participation.

In what follows, I will connect the subjects of status differences, knowledge disparity, and communication visibility (afforded by the use of Yammer) to shed light on how the patterns of Yammer use at Design Inc. were instilled with the existing status differences, and in turn, how the use of Yammer recursively shaped the perceptions of status hierarchy and knowledge disparity. Although knowledge has been examined with respect to its relations to *power* in organizations (Townley, 1993), the paucity of research on its relations to status indicates a pressing need to examine this issue, particularly in global, knowledge-intensive firms (Neeley, 2013). Moreover, since the mutual influences of knowledge disparity and status differentials became more observable due to the communication visibility, I can detail the ways in which Yammer use reflected and

reproduced status hierarchies. To do so, I will unfold this chapter by introducing the company setting as an uneven field to provide the background information on the existing structures of Design Inc., with a specific focus on status hierarchies. Next, I will elaborate on how status differences shaped work practices, which in turn created frictions against sharing and collaboration across boundaries. Finally, I will show how the use of Yammer, which was expected to facilitate cross-boundary communication and attenuate divisions, could also bring about paradoxical dynamics that sustained the barriers. By articulating the intended and unintended consequences of communication visibility, I theorize the paradox of visibility and call for further research on disparity and status in global organization studies.

The Superimposition of Status Cues in Global Offshoring

Before discussing status-induced work practices at Design Inc., I will first briefly explicate its status hierarchy as a backdrop. Like many high-tech organizations, Design Inc. was perceived to pursue open and participatory culture among its employees. However, even when an organization strives to maintain flat and open communication structures, informal social hierarchies inevitably emerge through interpersonal interactions (Leavitt, 2004). Organizational members draw on numerous status signals such as task-engagement behaviors, stereotypes, and even nonverbal cues and physical appearance, all of which contribute to the formation of informal status hierarchies (Magee & Galinsky, 2008). The status hierarchy may be malleable, but cannot transform easily since it has been developed organically for an extended period of time.

Although status hierarchies might form on multiple social dimensions, the status differentials between the headquarters and subsidiaries were the most salient factors that

constitute both formal and informal hierarchies at Design Inc. The formal status hierarchies were based on the explicit distinction between American headquarters and offshore branches, which implies disparate opportunities for decision-making, policy design, and resource management. In addition, their positional relationship also included nuanced differentiation with respect to job ranks and functions. First, the rank hierarchy overlapped with geographic dispersion on many different levels. Except one Director in Uruguay, all high-rank employees such as C-Level Executives, Vice Presidents, and Directors belonged to the American headquarters. Since every member of the top management, which consists of C-Level Executives and Vice Presidents, was located in the United States, Design Inc. could respond to urgent matters effectively and expedite decision-making processes when necessary. Yet, this structure was not conducive to incorporating multiple voices from offshore offices in two ways: (a) offshore branches had no representatives to express their views in management meetings that could generate crucial decisions impacting their work procedures; (b) participation from offshore employees was further compromised since they had significantly less interaction chances with the executives due to physical distance. Although each region had a managing director, they were not invited to attend management meetings but were rather supposed to report operation status to their supervisors at headquarters. Moreover, similar patterns were also found within divisions and departments. In some cases, team members in offshore offices reported to their supervisors at headquarters.

Second, the functional hierarchy also overlapped with geographic distribution. Ostensibly, each function such as development, developer support, sales, design, and localization was treated as unique expertise built upon its own domain knowledge. In

practice, the status differences between “core” and “periphery” functions were widely acknowledged. The work of periphery functions (e.g., developer support engineers, localization engineers, and interaction designers) were structured by the plan and progress of the development work; besides, the confirmations from the developers were often prerequisites for task completion in periphery functions. For instance, when a developer support engineer received an inquiry about the plans for a new feature from clients, he or she had to contact the development team to obtain the company’s official response. Also, the developers were in charge of making product-related decisions, and then the updates were supposed to be relayed to other collaborative functions directly or through task management systems. However, people in peripheral functional roles were not always in the loop in part because the majority of them were dispersed across offshore offices. Lack of proximity further sidelined peripheral functions, and thereby reinforced the existing hierarchy. Especially the Japanese office consisted only of peripheral functions, which means that Japanese employees did not have developers in residence for spontaneous chats or informal consultations. This condition hence made the Japanese office more subordinate to the headquarters.

Further, the comparison of betweenness centralities can illustrate the disparities in connectivity and interpersonal influence that are in line with geographical and functional differences described above. The betweenness centrality of people in the core function ($M = 427.64$, $SD = 600.61$) was higher than that of people in peripheral functions ($M = 308.63$, $SD = 561.05$). Likewise, employees at headquarters showed a higher betweenness centrality ($M = 376.67$, $SD = 610.24$) than those in subsidiaries ($M = 348.16$, $SD = 539.46$). Thus, the configuration of the employees’ knowledge-sharing networks also

reflects status differences that overlap structural. As higher betweenness provide better access to knowledge and information, the different levels of betweenness may reinforce existing knowledge disparity.

In conjunction with the aforementioned structural factors, work experience (e.g., industry tenure, organizational tenure), education levels, and English proficiency jointly constituted informal status hierarchies. These factors often aligned with the dividing line between the American and international offices. Although one's work experience and academic degrees were not immediately visible, the members of Design Inc. had gleaned relevant information through interpersonal interactions. For example, some American workers at headquarters were known to hold a Ph.D. degree in user experience or interface design whereas some designers in Uruguay had just started their career in the field. The following remark by a UX architect in Uruguay implied the perceived knowledge disparity: "American people go to the university to study interaction design. We don't have a university for that in Uruguay. I didn't go to school for that." As in this case, when the informal status signals were superimposed with geographic dispersion or national difference, the status differentials were likely aggravated.

Lastly, the fluency in English—the lingua franca at Design Inc.—was another component that extended status hierarchies. As people make inferences about others' competence and expertise drawing on their speaking and writing style, the use of a second language can undermine one's status. Offshore workers at Design Inc. showed disparate levels of English proficiency, and some employees voiced their concerns about articulating or simply expressing their opinions in English. A manager in Bulgaria described:

Most of the guys here don't feel very comfortable with interrupting and asking him to repeat what he said, because there's [sic] twenty or more people [on the call]. We sometimes feel that probably our English isn't that good, so we might have something [to say] and we are kind of anxious to stop him and ask questions and this leads to some—well, basically decreasing the efficiency of such training. (Kaloyan, Team Lead, Bulgaria)

As illustrated above, their knowledge acquisition was doubly challenged since they did not fully understand the training materials and could not intervene in the discussions in a timely manner. This lack of participation or “silence” caused mainly by language barriers can lead to “status loss” (Neeley, 2013) of offshore workers and increase the knowledge gap.

As a case in point, the quotations below sum up the disparity between the headquarters and an offshore office that stem from the combination of formal and informal status differences. In the first quote, an American developer describes his relationship with the Bulgarian office. The second quote explains work routines through the eye of Bulgarians, which echoes the relational dynamics described in the first quote.

Our Sofia team is really young, really inexperienced and we don't have any senior developers over there whatsoever. (...) They always ask what they should do next, what they are gonna work on, so that's a good thing and a bad thing. It's a good thing because they don't want to mess up, they want to make sure they do the right thing and they're gonna confirm everything with me. But it's a bad thing too because you want to let the team go off and accomplish something and not have to micromanage every single thing they do. You want to be able to trust that you say one thing and trust that they can go do it effectively in the right way. (Ben, Product Manager, United States)

Basically all the core team members are here in Sofia, but we're working closely with a few guys from the States. For example, we're working with [the names of American developers] who are our technical leads and they provide technical leadership for the team whenever we face perhaps a bug that we have to fix and we are not really sure the best way to do this. We reach out to them and discuss the issues and they give us some guidance. So basically they are providing the technical leadership for the team. For the last release cycle, (...) we arranged for him to give guidance on the architecture, a part of our issues that we faced. In that situation, we were

not completely sure what the best choice was. (Kaloyan, Team Lead, Bulgaria)

Ben claimed that offshore teams could not steer their own course without his guidance, implying the knowledge disparity between American and international employees. Kaloyan meant to explicate his team's intimate working relationship with the American counterpart, but rather revealed their heavy reliance on the headquarters. As seen in their descriptions, knowledge disparity between the headquarters and offshore offices was taken for granted in many cases in part because of the entrenchment of status hierarchies. All elements of status hierarchies—job rank, function, work or educational experiences, and language ability—also signaled one's knowledge level and thus (re)produced knowledge disparity. The most problematic case would be when all components overlapped with the geographic divisions; namely, even among offshore employees, those with peripheral functional roles experienced more challenges than developers. In the following section, I will provide a detailed account of how these status differences were reinforced through day-to-day work practices, which in turn shaped the patterns of Yammer use.

Enacting Status through Communicative Practices

This section investigates how status is embedded and embodied in communicative practices at work. The existing status hierarchies were linked with communication dynamics at Design Inc., and in turn, status differences were reproduced through communicative construction. Specifically, the analysis highlighted three key facets of communication patterns that contributed to the entrenchment of status differentials. First, the interaction styles that participants had illustrated reflected *relational asymmetry*, particularly with respect to knowledge disparity. Second, grounded on the asymmetrical

relationships, ongoing work practices continued to reinforce exclusion systematically or unwittingly; this *routinized exclusion*, which often went unnoticed, was the central dynamic of maintaining status hierarchies. Lastly, the accumulated experiences of asymmetry and exclusion led to *feelings of disempowerment* among low-status workers. Unpacking these stories, I will expound on how status differences were represented and reproduced through communicative practices and thereby sustained the inequitable distribution of knowledge and power within the organization.

Relational Asymmetry

Status differences were clearly manifested in participants' description of their work and relational experiences. The analysis revealed that the relationships between high-status and low-status workers were asymmetrical in the sense that their communications were marked by a lack of reciprocity, namely, one-way dissemination of knowledge. High-status workers were perceived as more knowledgeable than others since the combination of high-status cues conferred the position of knowledge "authority" on the members of headquarters; and in turn, the disparity was upheld by continuation of similar communication patterns. There were only a few product managers at Design Inc., and one of them who oversaw a number of dispersed teams from the American office explained his role as follows:

I am *the source of knowledge* so they have to come to me to get clarification on specifications, how should this feature work, what should the API look like, what are the customers expecting from this. (Ben, Product Manager, United States)

His status as a "knowledge source" could be related to his official job title but was also based on social agreement among the members of the subsidiaries. The engineers in offshore locations relied heavily on his opinions although he was not their direct

supervisor. The team leads and developers followed his guidelines since he was the *de facto* arbiter of product specification by virtue of his knowledge level. The prevalent, taken-for-granted perception of knowledge gap can legitimate the attitude of “educating” others as described in another American developer’s approach:

There are some areas that get a lot of attention. In those areas, most people are aware of what’s going on. There are some players in the organization who are very influential. And their field and areas are pretty clear to everybody. But then, there are areas that people are not that—I don’t know what the word is—powerful or influential. So those people are kind of stuck with running around and doing things. (...) We’re just going to go and *educate them*. We’re just going to say “here’s the deal.” And if there’s a problem, they’ll come to us. “*We’ll take care of it for you. You don’t have to go around things.*” *That’s how we do constant improvement.* (Sam, Developer, United States)

His explanation also reflects status imbalances between headquarters and offshore branches. According to him, the employees in international locations got “stuck with running around” since they were less informed (or knowledgeable) and thereby less efficient in performing their tasks. Furthermore, the ways he defined “improvement” represented the headquarters’ view on knowledge disparities and desirable solutions: “we should educate and take care of them.” This stance, however, might not necessarily alleviate disparities since it would perpetuate unidirectional delivery of knowledge generated at headquarters rather than reciprocal and collaborative sharing of knowledge among equal parties. His tone clearly showed the skewed relationships between high-status and low-status employees, which could be aggravated by offshore locations’ constant knowledge dependency.

The relational asymmetry further shaped the ways in which they communicated with others. Since Ben had collaborated with many teams and individuals in offshore

offices responsible for different projects, I asked how he modulated when he talked to people in different knowledge domains and locations. Ben responded:

No. Normally I'm just myself no matter who I'm talking to. I don't adjust the way I carry myself and the way I communicate. I really rely on the people I'm talking to—to pick up what I'm saying.

By contrast, Mauricio in the Uruguay office presented a different point of view as follows:

People need to make some kind of concession, try to contain myself [sic] to do something. In Uruguay, we all talk, we are always talking together. In the U.S., it's not the way people talk. You need to think about both sides of thinking to accommodate a little bit. (Mauricio, UX Architect, Uruguay)

Ben was in a more advantageous position to glean and circulate resources and information. Despite his awareness of the knowledge disparity between him and international team members, however, he failed to acknowledge the need for accommodation or negotiation (let alone the consideration of language differences or possibility of misinterpretation). Rather he expected others to make adjustments and “pick up” his intention correctly. His remark could reflect the tendency that high-status individuals were less attentive to low-status individuals (Goodwin et al., 2000). Also in other interviews, offshore workers were able to verbalize subtle differences that they had experienced in terms of language and culture whereas American workers typically did not recall specific examples. In line with this, Mauricio's answer showed a stark contrast to Ben's approach. Mauricio had attempted to change his attitudes and communication styles based on what he learned about American norms. Such asymmetrical communication patterns could preclude relationship development and open dialogue since mutual recognition is critical for facilitating common ground. In fact, Mauricio later elaborated on his frustration about the absence of reciprocal return and how his

supervisor at headquarters “doesn’t know me.” The continued experiences of relational inequality sometimes stifled his further engagement. Overall, the status differences at Design Inc. were closely intertwined with disparities in knowledge, power, and influence.

Routinized Exclusion

Exclusion was the key dynamic that sustained status differences at Design Inc. It was not driven by official policies or strategic decisions; however, there had been a nexus of routinized practices that continuously excluded low-status individuals from information sharing, decision-making, and product-related discussions. As exclusionary practices had become part of day-to-day routines, low-status employees were consistently sidelined by high-status employees, albeit unwittingly. On top of the geographical distribution that already impeded seamless communication across offices, the lack of organizational- and individual-level efforts to create an inclusive communication environment could exacerbate the discontinuities between headquarters and subsidiaries. Below is an exemplar case that displays the severity of routinized exclusion supported by the absence of systematic endeavor for inclusion.

We have a lot of content translated into Japanese and the website was supposed to be translated into Japanese, and *we didn’t realize it until we were going to release the new website because, yes, everyone just focused on the U.S. and Europe.*
(Louis, Product Manager, Uruguay)

Even though it is an official, company-wide milestone to revamp the product website, decision-makers and content creators “forgot” including Japanese language when translating the materials into other foreign languages. This example represents the overall patterns of exclusion: offshore locations—Japan, in particular—were repeatedly overlooked to the point where core members did not recognize the problem throughout the process, and there was no institutionalized step to ensure equal treatment and

participation. This incident also hurt the overall progress especially given that the company's largest clients were Japanese corporations. In fact, the analysis of knowledge-sharing networks at Design Inc. indicated such exclusionary communication patterns. Table 6-1 below displays the proportion of reciprocated ties by location. Namely, the values indicate the extent to which a focal actor's counterpart also nominated him or her as a knowledge-sharing contact. To determine the group-level reciprocity, I computed arc-based reciprocity drawing on the location attribute using UCINET 6 (Borgatti et al., 2002). As highlighted below, the core engineering offices (i.e., United States, Uruguay, and Bulgaria) tended to communicate with one another more frequently in comparison to other regions. However, the outgoing ties from Uruguay and Bulgaria were less reciprocated by headquarters. Most notably, Japanese employees were less likely to be nominated as knowledge-sharing contacts from other engineering offices although they closely collaborated. Despite small differences, the reciprocity index showed a tendency that offshore workers were less likely to be regarded as knowledge-sharing counterparts. In addition, Krackhardt (1994) suggested that reciprocity is related to the existence of hierarchy within an organization. Thus, the disparate levels of reciprocity across locations may indicate the structure of informal status hierarchies.

Table 6-1

Reciprocity by Location

	1	2	3	4	5	6
1: U.S.	.46	.36	.54	.40	.71	.53
2: Uruguay	.28	.52	.78	.50	.00	.30
3: Bulgaria	.32	.44	.43	.00	1.00	.35
4: U.K.	.25	.50	.00	.46	.00	.00
5: India	.20	.00	.33	.00	.50	.00
6: Japan	.20	.25	.22	.00	.00	.33

Further reflecting the routinized exclusion practices at Design Inc., localization engineers enumerated a number of cases where the Japanese translation work had been assigned to them at the last minute before an impending deadline. The following is the voice of the localization department manager, revealing another case that followed similar patterns.

We have packages of the products, called “Premium [pseudonym],” which is a suite of most of our products. They [American developers] contact us at the very last minute, “okay, we decided to remove this product from the Premium,” or “we will include another product to this volume of the release.” I’m not sure if they actually decide this at the last minute, or they decided earlier but we get this information late. I don’t know about the process. They should give us an early notice so that we have an understanding about what we need to focus or work on. It’s confusing. We should know about what the urgent focus is to manage our work. (Akira, Localization Manager, Japan)

Her descriptions indicated the iteration of the same exclusionary routines including the lack of on-time information sharing. Her team had not been in the loop although the information on procedures and schedules could significantly help the team members allocate their time and resources more efficiently. It had been taken for granted not to include the localization team during the product discussions, and high-status workers did not even realize that the existing procedures generated onerous burdens on low-status workers. The ongoing practice was detrimental to the overall quality of the

product, but incurred much larger cost to low-status employees since they had to handle challenging, and often unplanned, situations caused by one-sided decisions. At the expense of low-status workers' additional effort, the company was able to meet the requirements and deadlines. The following complaints show the impact of routinized exclusion on low-status employees' work experiences.

If they need me, they can ask me. It doesn't happen. They already make things with developers, and then, they contact us, "okay, fix this, let the magic happen." This is a problem. You lose your time a lot. (...) For me, it's strange that, people in the U.S., they don't take it into consideration. In my timeline, it had to happen in April, but I worked on that in November. If we work independently, it doesn't matter. But if we want to work together, this is a problem. (Marcos, Engineer, Uruguay)

We don't get notified. Usually when some people leave, nobody tells us. When I contact someone, only then I found that she or he had left. One of my suggestions is keeping us updated about the organization chart so that I can find the right person. (Takeshi, Marketing, Japan)

Since the decisions and changes were not shared with them in a timely manner, Marcos had to re-arrange his work while Takeshi had to ask around to locate the new person in charge. The headquarter members might learn about those changes through informal conversations or observations without the formal procedure of notification; however, for remote employees who did not have opportunities for vicarious learning, the changes could be perceived as abrupt and thereby require bumpy adjustment processes. Besides, low-status workers were considered recipients of top-down orders without many chances to provide input into the decision-making processes. The normalization of exclusion can conceal the fact that low-status workers receive a disproportionate level of attention; and in turn, high-status workers can lose the chance to be self-reflexive and switch their routines to improve coordination. Indeed, network data also corroborated that engineers are more likely to communicate with each other whereas all other job roles

communicate more with people in other job function. The E-I index is calculated by subtracting incoming ties from outgoing ties, and then divided by the total number of ties. The E-I indices for each job function demonstrated that only the developer group showed a negative E-I index (-.41), denoting that their tendency of internal communication was significantly higher than random chance ($p < .05$). In addition, the E-I indices for each location also confirmed that all three engineering offices communicated more internally (U.S. = -.51, Uruguay = .37, Bulgaria = .41) whereas Japanese office communicated more externally (.14). All values were significant ($p < .05$). These differences imply that their communication routines were more internally oriented although their tasks often required cross-functional and cross-regional collaborations.

Nonetheless, some members at headquarters acknowledged that remote employees had been constantly alienated from numerous product-development stages. As Sam lamented below:

There are a lot of managers here [in the U.S.] managing teams there [in Sofia]. (...) My team [in Sofia] will never know about the leaders and the senior members here. We wouldn't know about what happened to be able to judge, provide feedback, impact and all that. So generally *the location tends to communicate within themselves*. And most of the execution happens here, decisions happen here. We have some significant things going on here. We can walk up and discuss some things. *But we don't always write it up in an email and send it over to the team over there to help them understand that. And they're just suddenly surprised on why I am doing this feature? Where did this come from?*

Since continuous exclusion significantly delayed coordination and task completion, two members of top management led an initiative to implement a new work procedure that defined which members (specifically, people in peripheral roles) must be included in each phase of the product development to streamline the process. However, as other American workers pointed out that “there’s no one enforcing it,” the idea was perceived

as a recommendation and not a binding agreement. The interview with the localization department (after the suggestion of the new procedure) confirmed that it was tough to let others adopt it once the members were habituated to existing routines.

It's supposed to be happening from 16.1 development, which started two months ago. (...) None of the development team members contacted us to let us know about new features or updates for us to work on. We've been working in the same way as before. We need to find about what's new by ourselves. (...) For instance, we saw the updates, so we started working on localizing them and found issues to report to them. And they are like, "no, it's not ready, we are still working on it, so wait." Then, we check in with them later again, and they also say, "not yet, wait." So we wait and wait... And when it's finally ready, they don't notify us. And time just passes, and at the end of the cycle, we only find out there is much more to work on. So it's much better if they let us know about what should be localized, rather than we find out what to work on. It would be great if the new process were working. But it's not. (Akira, Localization Manager, Japan)

In status quo, workers in complementary roles were constantly excluded from ongoing discussions on products and provided with a delayed notice. Occasionally they did not even receive any updates from developers. Reduced knowledge on the overall progress and tack made them more subjugated to the people in core functions. In tandem with the lack of informal conversations, insufficient structural/official support for information sharing added another layer to knowledge disparity. Without regular interactions, low-status workers were less recognized and thereby status change became more difficult. In what follows, I will reveal how the ways they depicted their experiences alluded to their feelings of disempowerment, reflecting the robust status imbalance embedded and embodied in everyday practices.

Feelings of Disempowerment

The recurrent experiences of exclusionary incidents generated feelings of disempowerment among low-status workers. Although their workplace encounters might not be viewed as blatant discrimination, repeatedly "missing out" from the updates and

“being disregarded” by high-status workers led to widespread perception of disrespectful treatment. While describing their work experiences, low-status individuals selected many vocabularies that manifest their disempowered state. A localization engineer recounted her experiences of exclusion, trying to make sense of them:

They [developers] are supposed to, before you go from one phase to the next, basically sync with everybody who’s involved, or everybody who should be involved, and make sure “Here is our initial design for this new feature, is everybody okay with this, do you have any questions, do you have any concerns...” But we haven’t really been included in that at all. (...) *Maybe you’ve never heard of the localization department, you’ve never worked with them, so you don’t know exactly what you have to do? I don’t know if that’s part of it, or it’s more like, “Oh, they don’t need to know.”* (Claire, Localization Engineer, United States)

In this quote, she ascribed the exclusionary practices to the lack of recognition of her team among developers. Even though the localization team was launched about seven years ago, she still felt that other teams “have never heard of” the department, struggling for recognition from developers. In a somewhat sarcastic tone, she further suspected that other teams already delimited her team’s involvement without even considering her team’s potential contribution to the project (“they don’t need to know”). The perception that their presence had been overlooked by high-status employees could constitute negative images about their work and themselves. Indeed, the awareness about status differentials was explicitly manifested in the following statement.

Once we had experiences that feature having dropped in the upcoming version (...) but we [the company] didn’t clearly announce that. After we got an inquiry from an existing customer in Japan, and then we realized that the feature had been dropped. *We are not treated as important as other regions or divisions.* We were not informed of the updates in the right time. (Yosuke, Developer Support Engineer, Japan)

Recurring events of “missing out,” namely, not being informed of major changes from headquarters disempowered low-status workers to the extent that they spoke up

about their feeling of disrespect. Developer support engineers faced many obstacles to being in the know since developers did not share necessary information not just due to an oversight but because they did not question how their existing routines had barred others' participation. The lack of official announcement protocol also justified non-sharing and denoted that nobody held accountability about the problem. These ongoing cycles continued to reinscribe status differences between high-status and low-status employees. Another interviewee's experiences resemble the case above. She explained that her work had been less well-regarded among developers.

Many people think that it's just translation. But it's not. We have to consider cultural differences, regional conventions, and local differences. People who don't know about localization or who don't speak any other languages than their native language—*they don't understand how much the language differences are important*. The features and how the application works are important, but they think the quality of translation doesn't matter much. *Even some people think machine translation would be good enough*. (Akira, Localization Manager, Japan)

Localization was, in fact, not a simple task. Localization engineers made a range of suggestions with respect to re-designing features according to language and regional differences—American developers relied on their corrections since those errors were not detectable from Western-oriented perspectives. Nevertheless, the localization team members felt their contributions were not recognized but rather belittled by others. Even some developers believed that their work could be replaced by machines, clearly dismissing and disempowering localization work. In this climate, it would be hard to obtain a feeling of fulfillment, let alone empowerment. Low-status individuals often expressed their lack of influence, insufficient to remedy the inequitable situations.

Often we say like, "Guys, we have this critical bug. Could you look at it?" *Then nobody cares because what are we going to do? We can't get them in trouble*. (Claire, Localization Engineer, United States)

The perceived inefficacy was not uncommon among low-status workers, particularly in peripheral functions. The accrued experiences of exclusion and denial for several years disempowered them gradually, and could bring about a stifling effect that prevented them from speaking up (“we can’t get them in trouble”). Her remark resonated with other participants’ stories that reflected their feelings of disempowerment. On the whole, the interviews revealed how status differentials were constantly enacted and reinforced through work practices and subtle exclusionary acts. In this condition, the communication patterns on Yammer were also shaped by existing disparity undergirded by informal status hierarchies. I will expound further details in the following section.

Paradoxical Outcomes of Social Media Visibility

The adoption of Yammer, which opened a new venue for company-wide communication across different levels and regions, surfaced the tensions associated with public communication among disparate groups. The analyses revealed that the perception and use of Yammer by low-status groups were not congruent with those by high-status groups at Design Inc. Moreover, the emerging patterns of Yammer use and existing status differences recursively shaped each other to reproduce the informal status hierarchies. In this sense, the implementation of Yammer contributed to structural inertia despite the managerial hopes for open communication and cross-boundary sharing. In the following, I will unfold how the patterns of Yammer use were affected by knowledge disparity among high-status and low-status workers, and in turn, how those patterns subsequently made knowledge disparity even more salient. The discussions will focus on three key aspects of Yammer use. First, I will show the ways in which low-status workers harnessed the affordance of ESM visibility to cope with the lack of knowledge sharing

caused by routinized exclusion. As offshore workers in peripheral roles strategically used visibility for on-time acquisition of needed knowledge, the implementation of Yammer provided some advantages for knowledge sharing. Second, although Yammer use greatly helped low-status employees solicit and obtain knowledge in need, it did not necessarily increase their participation in generating and donating knowledge through public communication. Reading others' posts and enhancing awareness on organizational activities can certainly promote knowledge acquisition and task accomplishment; however, writing one's own posts is a distinct activity that signals his or her competence and expertise. The analyses shed light on the underlying status differences that stymie low-status employees' engagement in public communication. Lastly, synthesizing these two phenomena, I argue that knowledge disparity, which had not been immediately noticeable, became visible owing to the differential uses of Yammer. In doing so, I reconceive the notion of visibility, which has been traditionally linked to recognition (in a positive sense), as a quality that can also bring into high relief the inequitable distribution of knowledge, status, and power—gaining visibility means vulnerability for individuals in lower social status. In aggregate, the findings will elucidate the paradoxical influences of ESM visibility that made previously unobservable phenomena visible across the organization.

Strategic Use of Visibility for Knowledge Acquisition

Yammer functioned as a unique venue in which employees could exchange their ideas across regions and stay abreast of activities in other groups. Especially low-status workers in remote locations utilized company-wide newsfeeds to glean information that had not been available to them before. As developers and executives used public

newsfeeds on Yammer for some discussions, distributed workers in subsidiaries were able to observe them to build a better understanding about rationales about product decisions, work processes, and upcoming changes. Although not all conversations were moved to Yammer, this unprecedented access was viewed as a meaningful shift especially for people in peripheral roles. Their tasks were often stalled owing to information sharing delay from developers (“we can’t get rid of things on our end”); yet, low-status workers adopted Yammer as a provisional measure to cope with routinized exclusion from high-status individuals. The analyses revealed two methods that showed how low-status employees made use of ESM visibility to expedite knowledge acquisition.

Newsfeed observation as a makeshift remedy. As delineated in the foregoing section, exclusionary practices were routinized to the extent that they often went unnoticed by high-status individuals. Since the situations were not easily rectifiable by individual effort, low-status employees used ESM visibility as a makeshift remedy—they took advantage of their access to developers’ Yammer groups to collect needed knowledge faster. Remote workers in peripheral positions were able to regularly follow the conversations among developers and executives by subscribing to several public groups on Yammer. Although the levels of online activities varied, all development teams opened their own Yammer groups where members could report progress and bugs, suggest ideas, and discuss product renovation. Since anyone was allowed to join those groups, they functioned as public outlets that disseminated within-team communication across the company. The lead of the localization department shared her strategy below:

I joined some groups on Yammer and read some information there. (...) For instance, there is a thread about recent news. Microsoft will be dropping support for .NET 4.0. It will affect our 16.1 volume release because we need to update our

script and testing environment. (...) We can plan in advance because we know what's coming next. This kind of information was not available before Yammer.

As previously invisible communications became visible through Yammer, she was able to monitor developers' discussions on how they would handle the upcoming change and redesign the product. Given that such conversations had been kept private within the development teams before the implementation of Yammer, making them visible created a spillover effect that enabled vicarious learning. The new access helped low-status workers learn about development work in greater detail and come up with more adaptive strategies responding to changes made by other teams. Following those conversations was particularly beneficial for employees in peripheral roles because decisions (let alone procedures) were often not relayed to them in a timely manner. In this regard, increased visibility of discussions reduced uncertainty caused by last-minute notices and the lack of sharing. Further, both developer support engineers and localization engineers observed each other's questions on the public newsfeed since they were useful routes to find out developers' answers.

Although it was not a radical solution, newsfeed observation played a role as a temporary measure to mitigate exclusion with relatively less effort. When cross-functional sharing was not supported by an established routine, the queries from low-status workers were not treated as priorities by developers. Similarly, as high-status individuals were not very mindful about the consequences of last-minute notifications, low-status individuals often relied on reading other teams' current discussions instead of actively seeking out knowledge. However, they also devised a more active tactic to grasp the information that they had missed by utilizing the visible affordance of ESM communication. This strategy will be explained in the next paragraphs.

Harnessing visibility to leverage social pressure. Low-status workers harnessed the affordance of visibility in a more active way to garner needed knowledge. One factor that impeded timely knowledge acquisition was the private nature of communication between low-status and high-status employees: the inquiries sent via standard channels (email, instant messenger, and Team Foundations Server) were more easily dismissed in part because they were invisible to the third parties. After their questions had been ignored continuously, low-status employees began to publish their questions through Yammer newsfeeds, which were public to the whole organization. That way, low-status workers could exert social pressure to make high-status workers take such questions as a higher priority. Claire from the localization team clearly explained their tactics:

That's why I think developer support engineers use it a lot because they really do need those quick response times so they can get back to the customer. With email, I've heard a lot that, "Okay, well, we sent an email a week ago and nobody responded, let's follow up. Okay, nobody responded again." We've had the same issue in the localization team. (...) If you're still like, "No, this is not an acceptable behavior," then you can tag someone else. You can be like "Hey [an executive's name], make this happen." (...) I get to complain and I like that because then I know that I can direct it at certain people and other people who might be involved can also see it. Maybe an entire team will see it and they are held accountable.

They moved their questions to public newsfeeds, and even tagged particular names when needed in order to clarify accountability. Once private communications became visible to everyone, people who were in charge of related product features could not delay their responses due to social pressure. Especially when immediate answers were desired, making the questions publicly available worked as an effective tactic by virtue of people's perception that the newsfeeds were constantly reviewed by others including top management and supervisors. The potential chance of surveillance helped low-status workers pull out answers that they were not able to obtain through private

communication tools. Indeed, Japanese employees in peripheral functions confirmed the effectiveness of posting questions on company-wide newsfeeds as follows:

It's easier to get responses through Yammer. The speed and number of responses improved. Yammer is open to anyone, so I think the person in charge or the person who should answer the question feels the pressure to answer. Otherwise it looks bad, "I don't do my job." (Yosuke, Developer Support, Japan)

In Japan, Developer Support adopted Yammer very fast because that was only way to ask questions. When you email US engineering team, then they don't get answers. They know the person [in charge], but they don't get answers. But on Yammer, all the people can see the questions on Yammer, so we get better responses. It opens conversations to everyone, so people can jump in. (Takeshi, Marketing, Japan)

As Takeshi described, it was common not to receive answers from American engineers even when contacting the right person. On top of the lack of sharing (or exclusion), unanswered emails after direct contacts were disheartening routines for low-status employees. Participants tried to cope with the asymmetric situations by capitalizing on the visibility of Yammer newsfeeds: they could either draw on social pressure to force others to respond or solicit attention from a wider audience to locate a potential knowledge source. Making use of public communication channels was a productive tactic that delivered them quality answers more rapidly. All in all, the affordance of visibility offered a provisional solution for people in lower status to offset the adverse outcomes of exclusion to some extent.

Visibility-as-Surveillance and Disengagement

Knowledge sharing on Yammer consisted of two distinct activities: solicitation and contribution. Low-status employees took advantage of the visibility affordance of Yammer to request knowledge in a pressing need through public venues. By contrast, owing to the very same affordance of visibility, they engaged less in contributing

knowledge than seeking. Even though they could observe the newsfeeds and receive answers from high-status workers, they were still reluctant to share their knowledge via company-wide newsfeeds. Since the generation of core knowledge at Design Inc. revolved around the product development, individuals in peripheral functions had to constantly seek knowledge from developers but not vice versa. As a developer support engineer said “if it’s a very basic question, I feel a bit hesitant,” people in lower status were also aware that their inquiries could touch upon merely rudimentary content. In a similar vein, while a developer described his exchanges with support engineers, he mentioned a case where he would even “specify if it is a feature or a bug.” Due to such disparities in knowledge and status, employees in complementary functions shunned public discussions on Yammer in fear of others’ judgment against them. A number of low-status employees particularly in remote locations expressed the surveillance concerns pervasive in regional offices:

Some people, especially here in Bulgaria, can be scared a bit because when you put a post on Yammer, it can be seen by so many people. So probably people are scared that if they write something wrong, the whole company will be able to see it. (Kaloyan, Team Lead, Bulgaria)

I’m on Yammer, but when I need to ask a question or share an idea, I usually send it via email. It’s a shame. I don’t want to share it with everyone. They say you can share an idea there, bad one or good one... I don’t feel comfortable about this. I feel more comfortable with talking to in person, “hey, I’ve got a problem.” (...) It’s not the first thing that I think, “okay, I’ll write it on Yammer.” I don’t want to look stupid. (Mauricio, Interaction Designer, Uruguay)

Participants shared their anxiety about posting their ideas on Yammer, which was visible to the whole organization. They were afraid that their posts might be perceived as inadequate or “wrong,” specifically being conscious of people at headquarters. Since the surveillance concerns were rooted in knowledge disparity, the anxiety was more

prevalent among low-status workers in offshore branches. Participants believed that the visibility of Yammer newsfeeds could make the disparity more conspicuous, which in turn would undermine their reputation. The anxiety of potential surveillance was not limited only to employees in peripheral roles but was pervasive among remote workers in general. Participants in offshore locations preferred contacting their colleagues within the regional office rather than reaching out to the employees at headquarters. Implying different levels of psychological comfort, a few developers in Uruguay used a metaphor of “kitchen,” which referred to the local office, to illustrate their preference for in-person conversations with Uruguayan colleagues: “We are more like outsiders. (...) We can discuss in the kitchen instead of Yammer. We can just talk here face-to-face, not on Yammer.”

The surveillance concerns were more intense among remote workers also because of language differences. Since complex knowledge discussions were susceptible to disparate interpretations, exchanges of knowledge often entailed nuanced or in-depth articulation. Remote workers therefore faced more challenges since they were not able to use their native language for discussions on public newsfeeds. Even if they had advanced ideas or knowledge for a particular issue, conveying the ideas in a clear, sophisticated manner might be viewed as another task that would require additional effort. Even employees at headquarters acknowledged the increased investment needed for public writing on Yammer. Yet employees’ reactions to the increased visibility were dissimilar: high-status workers attempted to polish their Yammer posts before publication to handle higher visibility whereas low-status workers ended up not engaging in discussions to avoid the high cost of time and effort.

You're putting more effort into the way a statement is going to work if you think the entire company is going to read it than if you were just sending an email.
(Eric, Developer, United States)

Language barrier is another thing that contributes to that fear since not all of us are really confident with our English, so I'm pretty sure that's also a part of that fear and resistance that people in Bulgaria are doing with Yammer basically.
(Kiril, Development Team Lead, Bulgaria)

The disparities in knowledge and English proficiency jointly hindered low-status employees from participation and knowledge sharing on Yammer. Since the stakes of company-wide publication could be higher for non-native speakers owing to the possible incongruence between their intention and others' interpretations, remote workers sometimes gave up posting their ideas on Yammer. A manager in the U.S., who closely collaborated with the developer support division, also recognized that such uneven participation from support engineers stemmed from surveillance concerns: "Even though it's potentially work-related, there's also fear of being dumb or not wanting to say something like that." Nonetheless, he did not realize that the fear of surveillance was associated with relational asymmetry and knowledge disparity. He continued to elaborate on his thoughts: "It has more to do with insecurities of the individuals. (...) A lot of that is insecurity, in that they don't know that what they're posting is right. So there's some comfort level that has to be gotten past for people to start sharing information."

As seen in his remark, the lack of engagement in knowledge sharing by low-status employees had been noticed by high-status employees, yet it was ascribed to psychological insecurities rather than structural disparities. Ironically, since the most of remote workers' online activities consisted of inquiries that targeted developers, their participation also reflected knowledge dependency. The paucity of knowledge

contribution by low-status workers was in a stark contrast with a plethora of questions posted by them, which created a visible tendency on Yammer with regard to the uneven patterns of knowledge conversations.

The Visible Disparity: Perpetuation of Status Differences?

Disparate participation activities between high-status and low-status groups, which were visible to everyone within the organization, brought status differentials into high relief in two ways. First, among a variety of Yammer groups, knowledge-oriented discussion groups were dominated by high-status employees at headquarters, which in turn gave them even greater social prominence. As remote employees did not engage much in knowledge conversations, their “absence” in particular Yammer groups was in sharp contrast with the predominance of high-status workers. In other groups in which high-level discussions were not required (e.g., groups for team communication, product status updates, and feature updates), remote employees however engaged in a variety of exchanges. Since the newsfeed streams on Yammer were publicly accessible and remained persistent over time, people could easily spot the difference between the two types of groups: A quick scroll would reveal that the groups for ideation and knowledge sharing were filled with the writings by the employees at headquarters whereas other groups did not show the same tendency.

To provide a holistic picture of online activities, I selected two most active groups for knowledge sharing and project updates respectively and hand-coded all posts to record the location of authors (i.e., headquarters vs. subsidiaries). The two groups for the former included “Process Improvement Ideas” and “Development and Learning” and the other two groups included “Product Report” and “Spec Report.” (Group titles were

renamed to mask the company identity.) The first two groups were opened by a few high-level employees to facilitate deeper discussions on overall process improvement, advanced development methods, and up-to-date information on industry trends. The last two report groups were created to share team progress and product updates with the whole organization to expand review processes. The charts below indicate the number of posts for each Yammer group in the year of 2015. The first two charts clearly display contrasting statistics between headquarters and subsidiaries in knowledge-centered Yammer groups; however, the last two show that remote workers were as active as or more active than headquarter workers in report-sharing groups.

Figure 6-1

Number of Posts by Location: Groups for Knowledge Discussions

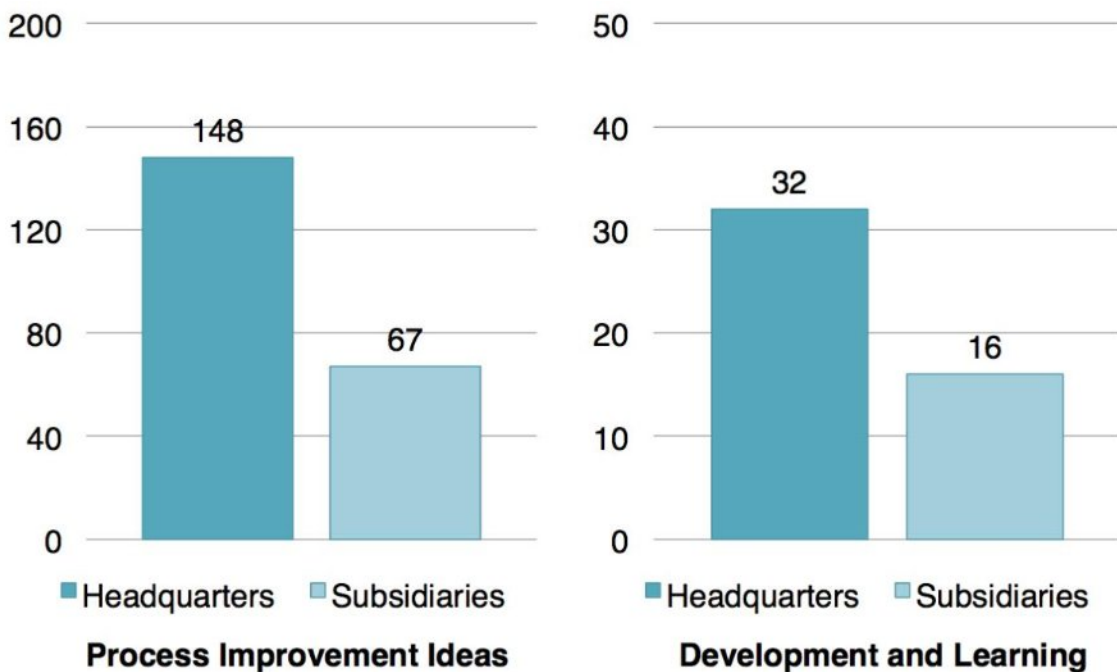
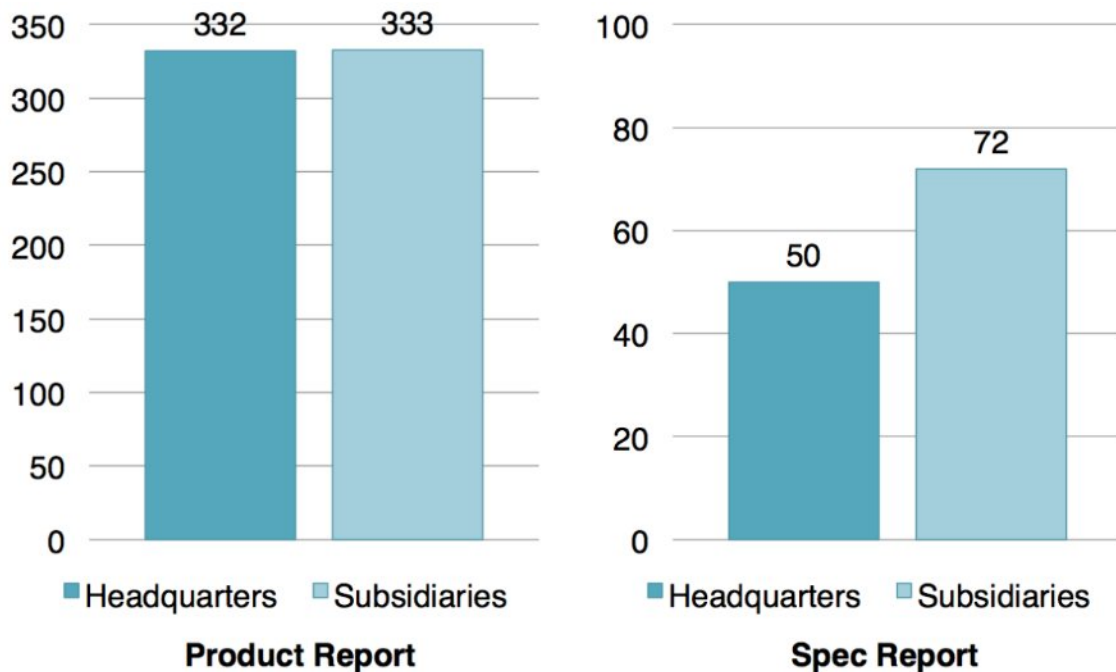


Figure 6-2

Number of Posts by Location: Groups for Project Reviews



As displayed above, the statistics indicated that remote workers participated much less in knowledge-oriented conversations, in line with the interview findings. In the former two groups, many discussions and debates required high-level knowledge or state-of-the-art information regarding product development and team processes. High-level executives often suggested new design principles drawing on recent industry trends, implying their competence to evaluate various approaches. Further, those up-to-date trends were likely to emerge in American high-tech industries, which inevitably doubled the entry barriers that international employees had been facing. As employees at headquarters led high-level discussions that generated greater influence on the overall work procedures, the fact that those conversations were visible to everyone became another source for confirming status hierarchies. Additionally, given that remote workers

engaged actively in report groups, their avoidance of knowledge conversations was even more notable. Product and spec report groups were geared toward sharing the outcomes of collaborative effort (i.e., team output) rather than individual contributions, and this weakened the fear of being judged or surveiled. The existing hierarchies were visibly manifested in Yammer activities, which were supported by disparities in knowledge, English fluency, and access to current resources.

Next, the observation of online activities reinforced people's perception of asymmetrical relationships between high-status and low-status individuals, which in turn rigidified existing status hierarchies. Drawing on disparate online behaviors, participants believed that high-status employees had been more active contributors, who were depicted as more competent, confident, and engaged. In tandem with the greater number of their Yammer posts, the broader range of topics that high-status workers had addressed in multiple groups further made their engagement salient to others. Also, their conversations involved in-depth discussions on the product development and team process, which could switch task protocols or product design. The predominance of high-status employees (especially at headquarters) over such conversations was attributed to their knowledge, confidence, and position at Design Inc. The following quotes reveal that participants associated people's online activities with different kinds of status signals.

I notice that the team members who are a lot more confident, who are more confident to speak to everybody within the company actually post more on Yammer. (...) Whereas there are very quiet and shy people, they wouldn't be going to upper management levels to say, "Hey, look what I did today." (Patricia, Developer, United States)

Because most of the times I've noticed that people who post on Yammer are upper levels, such as product managers, people who are addressing the entire company. Because they are usually talking about possibly a new policy that might

be going into effect, and then there's a whole discussion on it and what people think about it. (Andy, Developer Support Engineer, United States)

According to their explanations, Yammer activities mirrored others' ability and status that had been already confirmed by prior interactions or formal hierarchies. Patricia believed that people who had not been afraid of expressing their opinions to the upper management were also active contributors on Yammer. Likewise, Andy argued that people who engaged more in Yammer conversations belonged to the high-status groups who had advanced knowledge enough to extend proposals to the whole company. Another interviewee also expressed a similar opinion that people in a privileged position tended to publicly share their thoughts on Yammer more actively:

Mostly, active people on Yammer... [An executive's name] has been here eight years. I've been here eight years. [A team lead's name] has been here for five years. [Another team lead's name] has been here for a while. (...) So a lot of the more active people have a tendency to be the ones that have been here longer. (Albert, Manager, United States)

Organizational tenure is a commonly used source to make inference about others' social standing and expertise. Albert's remark showed that employees with a longer tenure were more likely active on Yammer, which also confirmed that people in a higher status were more visible than others. Everyone that he mentioned was also at the upper level. Those high-status workers who had stayed in the company for a longer period of time were likely to feel more comfortable to distribute their opinions in a public venue since their established status at Design Inc. could provide them with the sense of security. By contrast, low-status employees or newcomers, as discussed in the foregoing sections, were more likely to be concerned about others' perceptions about them. The persistent patterns of disparate online activities on Yammer consolidated the existing positions within the hierarchies. Albeit unintentionally, the disparity between different status

groups became more salient owing to Yammer, which in turn kept low-status workers in their current position. The influences of visibility on low-status workers were vividly illustrated in the following statement:

The most awful thing was that they [Japanese] started to use it [Yammer] as a help system. When you see “we have a customer, here is the case number” and what’s that doing on Yammer? (...) Because specifically for the Japanese guys over there—they try to use it like a help system which is not its idea. So they started to post every specific question. (...) It’s kind of not a place to spend your whole day, you know, because at the end of the day, I used to have days where I spent half of my working day just reading and responding on Yammer which is kind of awful. (Toma, Development Team Lead, Bulgaria)

In his remark, “a help system” referred to the series of questions posted by developer support engineers in Japan. Since many of the Japanese support engineers uploaded questions on a regular basis, developers in different offices were very familiar with such inquiries on Yammer; however, they failed to make sense of those posts due to the lack of situational knowledge and interpersonal interactions. Although Yammer was the most effective (and sometimes the last available) solution for support engineers to alleviate exclusion, the rationale behind this use was not immediately noticeable to developers in other locations. Once private inquiries became suddenly visible to everyone without contextual information, developers were more likely to discount low-status workers’ online activities rather than engage in sensemaking (especially without a prior history of interactions). Since most questions on Yammer were indeed posted by people in peripheral functions, the visible tendency perpetuated the status hierarchies.

All in all, Yammer participation was viewed as a reflection of the established hierarchies rather than a potentiality for status change or impression management. Differential participation levels strengthened the perceived hierarchical order and played an instrumental role in keeping low-status employees in their current place. Ironically,

even when low-status workers actively participated in Yammer conversations, most of their posts consisted of inquiries and knowledge solicitation, not high-level discussions on products or teamwork. Thus, both their absence and presence—visibility and invisibility—denoted knowledge disparity, which in turn reproduced status hierarchies at Design Inc.

Chapter 7

Discussion: The Visibility Paradox

In formal logic, a contradiction is the signal of a defeat: but in the evolution of real knowledge it marks the first step in progress towards a victory.

- Alfred N. Whitehead, *Science and the modern world* (1928)

Summary of Findings

This study investigated the ways in which distributed workers in a global high-tech organization engaged (or disengaged) with the affordances of ESM for their everyday practices of knowing. In particular, I zeroed in on the affordance of *visibility* and how it was intertwined with the situational, relational, and material nature of the processes of knowing. I scrutinized the emerging knowledge-sharing activities shaped by ESM visibility to articulate the visible aspects of knowing and their contradictory ramifications. The findings illuminated the intended and unintended consequences of communication visibility, yielding crucial insight into the management of technology, knowledge, and diversity in a global organization.

In the first part of my findings (see Chapter 4), I examined the ways in which communication visibility was linked to public, pervasive, and persistent nature of communication, which subsequently enhanced organizational awareness. The findings demonstrated that the company-wide use of ESM—which enabled publicly visible communication across the whole organization—significantly promoted organizational awareness and helped employees garner useful knowledge for their work in times of need.

The quantitative model offered clear evidence showing that organizational awareness mediated the use of ESM and the acquisition of useful knowledge. The findings indicated that achieving awareness beyond the immediate team significantly facilitated the acquisition of knowledge from distributed expertise.

Moreover, qualitative findings generated a granular understanding of the mechanisms through which organizational awareness was promoted by the use of ESM. First, ESM visibility facilitated public communication, which supported organizational awareness in two ways: (a) Employees were able to locate knowledge sources through spontaneous communications with visualized new connections; and, (b) they were more likely to aware of contribution opportunities for the common knowledge pool, thereby get motivated to donate their knowledge and resources. Next, the pervasive nature of visible communication helped dispersed workers make sense of their own task in relation to others' work: (a) ESM visibility allowed employees to stay abreast of others' day-to-day practices beyond their respective team and modulate their work practices accordingly; and, (b) employees could enhance their awareness of the process and progress of other teams' projects, which subsequently helped them plan in advance and coordinate their work more efficiently. Lastly, the persistence of communication, afforded by ESM visibility, established stable access to online conversation histories, which served as a sustainable knowledge base where employees could glean knowledge about previous discussions and decisions about their products.

In the second section of my findings (see Chapter 5), I delved into how the visible aspects of ESM communication could affect the configurations of social networks within the organization. First, I investigated the relationships between ESM use and a variety of

network properties that denote the extent of network range and cohesion. To take into account the differential levels of visibility, I analyzed the public (i.e., company-wide communication) and private (i.e., closed-group communication) uses of ESM separately, and examined how both usage patterns were associated with one's social connectivity. The analysis results demonstrated that communication visibility afforded by the use of company-wide newsfeeds was positively associated with out-degree centrality and betweenness centrality, yet not with in-degree centrality. Thus, ESM served as a public platform that one could reach out to more people to tap into various groups; however, the ESM use did not necessarily make them sought by others as knowledge sources. This suggests that in-degree centrality, which indicates social standing within the organization, can be determined by other contextual influences such as in-person communication networks, job roles and hierarchical ranks, or perceived expertise.

In turn, I further analyzed the relationships between different network attributes and knowledge acquisition. The findings highlighted knowledge-sharing challenges among diverse populations in a global organization. First, employees were more likely to obtain useful knowledge when contacting colleagues in the same location and job function, or of the same gender. This implies that employees might face a number of hurdles when engaging in knowledge sharing across geographical, functional, and even demographical boundaries. It also echoes the qualitative findings about cross-boundary communication challenges: the members of this organization had not been exposed to many opportunities for intercultural and cross-boundary communication trainings, which subsequently precluded efficient sharing and coordination. Further, geographical and functional boundaries often indicate status differentials that significantly hindered

knowledge sharing. Second, the analysis results further corroborated such cross-boundary knowledge sharing challenges by showing that out-degree centrality made a negative impact on the acquisition of useful knowledge. Hence, if employees maintained a far-reaching network, their increased connectivity ironically elevated the difficulties associated with knowledge sharing processes. Although the active use of ESM could help dispersed workers forge new connections across borders, simply having more outgoing ties did not promote knowledge acquisition. By contrast, in-degree centrality was positively related to the collection of useful knowledge. The results indicated that people who had been recognized as critical knowledge sources by other employees continued to garner useful knowledge. Echoing Freeman's (1979) argument, this study also underscored that incoming ties, rather than outgoing ties, could bring more beneficial knowledge-sharing outcomes. Finally, among all other factors, tie strength was the strongest predictor of the acquisition of useful knowledge. Thus, instead of relying on new connections or cross-boundary ties, turning to close coworkers could facilitate obtaining practically beneficial knowledge. The fact that cohesion generally played a significantly positive role in knowledge sharing at Design Inc. led to an in-depth examination of why network range, despite its potential for access to non-redundant information, had been a source of knowledge-sharing challenges. These findings were in turn further examined and validated by the qualitative analysis of in-depth interview and observation data.

In the last part of the three findings chapters (see Chapter 6), I disentangled how communication visibility afforded by ESM use ironically made existing status differences and knowledge disparities more salient and visible across the whole organization. Simply

put, communication visibility carried differential meanings to low-status and high-status workers. For high-status individuals, publicly visible newsfeeds on ESM could function as a springboard to achieve recognition from others by exhibiting their knowledge levels. In contrast to this, the very same visibility made low-status workers more vulnerable when their knowledge-seeking activities were perceived as incompetent or inappropriate. Especially when employees failed to make sense of others' knowledge solicitation behaviors, which were made suddenly visible without any contextual information, low-status workers' status and reputation were further undermined.

To offer more textured accounts of the paradoxical influences of communication visibility, this chapter unfolded how everyday practices at Design Inc. were inextricably intertwined with employees' ESM use. First, the ESM usage patterns at Design Inc. reflected status-induced work practices (*routinized exclusion*), which revealed informal status hierarchies (*relational asymmetry*). The ongoing exclusionary acts, albeit unwittingly, gradually disempowered low-status workers (*feelings of disempowerment*) since they felt that they were less regarded by high-status workers. Second, such routines were reproduced and reinforced through the interactions on ESM. Although low-status workers were able to harness the affordance of visibility to strategically solicit and acquire needed knowledge, high-level knowledge conversations on ESM were dominated by the upper echelon of executives and supervisors. These contrasting usage patterns upheld people's perceptions on disparities: (a) low-status workers' invisibility (i.e., lack of participation) in high-stakes discussions on product design, process improvement, and product-related decisions signaled knowledge disparities between low-status and high-status workers; and, (b) the fact that low-status workers' posts mostly comprised of

inquiries and knowledge solicitation, rather than knowledge contributions, amplified people's perceptions on knowledge disparities. Hence, communication visibility of ESM brought into high relief existing knowledge disparities.

As low-status workers, such as interaction designers, localization engineers, and developer support engineers, were also aware that the company's core values revolved around developers' knowledge and expertise, they often hesitated to publicly share their perspectives on the newsfeeds owing to their surveillance concerns (e.g., fear of judgment). Thus, the use of ESM made visible not only knowledge but also disparities, and thereby perpetuated status hierarchies in the organization. All in all, although the implementation of ESM was expected to lubricate sharing across borders and encourage open participation, the outcomes of ESM use were more multifaceted. Focusing on the affordance of visibility, this study generated an in-depth understanding of the paradoxical influences of ESM use on knowledge sharing. In particular, the differential patterns of use exacerbated knowledge divisions among low-status and high-status employees, which subsequently contributed to rigidifying hierarchical structures. Drawing on these findings, this study calls for future research to further examine how the interaction dynamics that stem from status differences and inequalities can shape a range of work practices and outcomes in a global organization.

The Paradoxical Consequences of Communication Visibility

Synthesizing the findings discussed above, I propose the notion of *the visibility paradox* that is widely applicable to different organizational phenomena. Since visibility can make a profound impact on our lives, a number of thinkers had pondered upon the intended and unintended consequences of "being visible" in a variety of contexts. Most

notably, Foucault (1978) famously averred that “visibility is a trap” (p. 200): he put the construct of visibility in the limelight by documenting its influences on power and surveillance, elucidating how modern architecture—a form of technology—enables visibility for constant and automatic functioning of power. Since his pioneering work, many studies have explored visibility (and its flip side) to elaborate on its social implications (Brighenti, 2007; Flyverbom et al., 2016; Gordon, 2002).

This study also looked into the paradoxical consequences of visibility—to be precise, communication visibility—to create a deeper understanding of its ramifications in the context of global organizing. This inquiry started from my deep interest in examining *process of knowing* among diverse groups and individuals, and investigating how process of knowing is fundamentally intertwined with two key elements—materiality (i.e., the adoption of new technology) and structure (i.e., status hierarchy). Pursuing this goal, I was able to disentangle the complex interrelationships among visibility (afforded by the organization’s new technology, ESM), status, and knowing. The analysis revealed that the interplay between visibility and status refracted knowledge sharing processes, generating paradoxical outcomes. Although the technology was implemented to facilitate knowledge sharing across borders, emerging usage patterns ironically contributed to exacerbating knowledge disparities, which subsequently reinforced status asymmetry in the organization. In what follows, I will provide an in-depth account of the paradoxical influences of visibility on knowledge sharing drawing on three central themes: knowledge (*awareness of knowledge conversations* vs. *awareness of knowledge disparities*), connectivity (*connections as resources* vs. *connections as challenges*), and power (*leveraging panoptic effect* vs. *controlled by*

panoptic effect). These three constructs of knowledge, connectivity, and power are important status signals that are shaped by visibility effects.

Knowledge

Awareness of knowledge conversations. The employees at Design Inc. harnessed the distinctive characteristics of ESM to invite others to spontaneous and informal knowledge conversations, which could support the interactional and processual nature of knowing. As Flanagin and Bator (2011) described, emerging web-based technologies such as ESM do not rely on a central repository or single point of contact; rather, they connect users in multiple locations to capitalize on distributed expertise. Especially, scholars and practitioners alike have begun to use the term *conversational technologies* (or conversational knowledge management) to refer to a particular class of web-based technologies, whose design revolves around conversations that facilitate shared understanding and reflection (Kuhn, 2014). These technologies are characterized by open access, collective authoring, and low participation overhead as well as maintenance cost (Wagner, 2006).

The members of Design Inc. was able to build and maintain a granular understanding of others' everyday practices, work progress, and knowledge-sharing interactions through observing the public newsfeeds on ESM. The visibility affordance of ESM transformed previously isolated nature of within-team or one-on-one communications into public, pervasive, and persistent conversations disseminated across different locations and teams. Majchrzak et al. (2013) termed these knowledge-sharing activities as *online communal knowledge conversations*: (a) knowledge-sharing acts on ESM are *conversational* because they are dynamic, decentralized, and emergent; (b) they

are *communal* by virtue of their nature of public visibility; and (c) they are *continuous* since the persistence enables asynchronous access and future use. The employees at Design Inc. engaged in ongoing conversations to gradually create an evolving knowledge base, and their practices reflected the nature of communal knowledge conversations.

In addition, the access to the streams of public newsfeeds significantly promoted dispersed workers' situated understanding of others' work (Sole & Edmondson, 2002). As fleeting conversations became publicly and persistently visible through ESM, the active ESM users at Design Inc. could glean different pieces of knowledge that informed them of project contexts, company plans as well as milestones, and prior decision histories, which helped them situate their own task within a broad map of project relationships. The visualized practices thus provided significant contextual knowledge that could invigorate collaboration particularly across boundaries (Cramton, 2001; Gilbert & Malone, 1995). Indeed, technology-enabled contextualization can be beneficial for developing collaboration know-how when distributed workers execute non-routine tasks (Majchrzak et al., 2005). The affordances of ESM can make a range of situational information visible to distributed workers to create common ground and facilitate a shared understanding of their work and products.

Finally, the engagement with ongoing knowledge conversations allowed distributed workers to identify new areas to which they could contribute. Leveraging this potential, employees solicited urgent input through public newsfeeds when they were not able to locate appropriate answers via other routes. In doing so, they obtained needed information not merely from their regular collaborators but also from new knowledge sources who discovered the post by chance. Fulk, Monge, and Hollingshead (2005)

postulated that “if the website can be jumpstarted with valuable information that is relevant to the different local contexts of the members, there may be valuable incentives toward participation in such knowledge sharing that are self-sustaining” (p. 159).

Echoing this proposition, the current study demonstrated that visible conversations motivated dispersed workers to participate in the creation and maintenance of sustainable knowledge pool (see also, Bimber, Flanagan, & Stohl, 2005), which Fulk et al. (2004) called *information commons*. In this respect, communication visibility may activate the communal nature of knowledge sharing by making previously private communications visible, which can foster public knowledge commons.

Awareness of knowledge disparities. The access to knowledge conversations, however, was inevitably linked to the acknowledgement of knowledge disparities especially at Design Inc. in which employees diverged on a number of status dimensions. As detailed in Chapter 6, there were clear knowledge divisions between high-status and low-status employees, who had been often excluded from critical product-related ideation and decision-making processes. The iteration of exclusionary routines gradually expanded the disparities in knowledge and resources, and the advantages of high-status individuals accrued over time.

The implementation of ESM played a pivotal role in increasing such disparities. The analysis revealed that (a) the existing knowledge gap was manifested in the ESM usage patterns, and (b) such patterns recursively constituted the employees’ perceptions of expert status. For example, since low-status workers heavily relied on high-status workers for acquiring knowledge on product plans and design, they frequently posted questions on ESM soliciting the most up-to-date or in-depth information. On the contrary,

such knowledge was taken for granted among developers who could obtain the information simply through their day-to-day routines without explicit requests. One developer at headquarters stated that he would need to answer whether “it is a feature or a bug” since he believed that low-status workers did not have even the rudiments of engineering knowledge. As these kinds of conversations became publicly visible, their knowledge disparities were disclosed to the whole organization, solidifying status differentials. The awareness of knowledge asymmetry in part contributed to low-status workers’ disengagement with high-level discussions; by contrast, high-status workers hardly expressed their concerns or fear of public sharing.

A cumulative body of research has discussed how the perceptions of status differences affect individuals’ knowledge sharing behaviors. Wittenbaum (2000) demonstrated that perceived expert status increased high-status members’ confidence to embrace unique and unshared knowledge from others whereas low-status members favored already known, common knowledge. Moreover, it is important to note that these perceived status hierarchies affect not only knowledge acquisition behaviors but also participation behaviors. Evidence suggested that individuals were more likely to share their unique knowledge when their expert status was publicly known within the group (Kim, 1997; Larson, Christensen, Abbott, & Franz, 1996). In another study, status differences were also associated with the relative participation levels between high-status and low-status groups (Dovidio et al., 1988). In general, perceived high-status leads to greater levels of overall participation and contribution (Thomas-Hunt, Ogden, & Neale, 2003).

However, the majority of prior research has examined the knowledge sharing patterns of high-status individuals, rather than low-status individuals. The findings were, for the most part, explicated drawing on the psychological dynamics of high-status members (e.g., confidence) whereas low-status workers' disengagement or non-participation existed as a comparison point. Thus, further reasoning behind the contrasting outcomes between two groups was not provided in detail. Filling this gap, this study sought to highlight the structural and relational aspects of the phenomena to provide a holistic picture of the complex ramifications of status imbalances. The findings elucidated the ways in which informal status hierarchies exerted differential influences on high-status and low-status employees, which subsequently led to disparate knowledge sharing patterns. Specifically, the findings vividly illustrated the underlying dynamics that constrained low-status employees' knowledge contributions to the public knowledge pool. The communication visibility brought into high relief the knowledge gap between high-status and low status individuals, which further demarcated the boundaries: recognizing others' expertise and knowledge levels, ironically, could contribute to realizing knowledge disparities. Although such barriers were not insurmountable, the physical distance, routinized exclusion, and functional division jointly hindered even distribution of knowledge.

In aggregate, this study argues that the communication visibility enabled by the use of ESM can amplify the status effects that confer power and recognition (Alkire, Collum, & Kaswan, 1968; Stasser, Stewart, & Wittenbaum, 1995; Stasser, Vaughan, & Stewart, 2000; H. Zuckerman, 1977). For high-status individuals, communication visibility made their perceived expert status more widely recognized across the

organization. By contrast, the (in)visibility of low-status employees made them face increased disparities, which occasioned further status loss. In this respect, the combination of visibility and status hierarchies (i.e., technology affordances and structural forces) reproduced the inequitable distribution of knowledge in a global organization.

Connectivity

Connections as resources. The analysis of the whole network at Design Inc. revealed that different network attributes generated contrasting effects on the acquisition of useful knowledge. Specifically, in-degree centrality, tie strength, and in-group ties significantly helped employees obtain useful knowledge that contributed to their work accomplishment. These results indicate that the positive benefits of connectivity were derived from their existing ties rather than newly forged connections. Namely, none of aforementioned network attributes showed significant relationships with ESM use; instead, they were closely related to extant social status and cohesiveness of in-group, strong tie networks.

First, degree centralities are generally associated with social status and hierarchical positions in organizations (Berkman & Syme, 1994; Lee, Kim, & Piercy, in press). In particular, in-degree centrality has been considered one of the most adequate measures of one's access to knowledge (Freeman, 1979). Since a high number of incoming ties reflect that the focal actor is well regarded among other organizational members, it can be viewed as a proxy for social status. In the current study, in-degree centrality represents others' reliance on the focal actor as a critical knowledge source, indicating his or her influence on knowledge processes. Indeed, in-degree centrality was

positively associated with the acquisition of useful knowledge, indicating that high-status individuals continued to maintain their access to valuable resources.

Second, employees were more likely to obtain knowledge from strong ties. Tie strength is a function of the amount of time spent, emotional intensity, and reciprocal services (Granovetter, 1973). At Design Inc., employees perceived that they acquired useful knowledge more from strong ties, characterized by frequent communication and emotional closeness. The fact that employees who had maintained more strong ties tended to garner needed knowledge corroborated that they depended on extant, long-term connections instead of new or weak ties. In this case, strong ties can lubricate knowledge sharing because they have already established common ground and a shared language (R. Weber & Camerer, 2003).

Lastly, employees showed a propensity to rely on their coworkers in the same group (i.e., location, job function, and gender) to acquire knowledge, and they perceived that such knowledge directly enhanced their task performance. Thus, their knowledge sharing networks were in part shaped by existing structures and in-group preferences; moreover, cross-boundary connections were rather detrimental for knowledge acquisition. Such preferences can be seen as a mechanism to maintain inequalities for other groups within organizations (Borgatti & Foster, 2003). On the whole, the employees who established high social standing (i.e., in-degree centrality) and cemented strong, in-group ties were far more likely to collect needed knowledge. Hence, those individuals occupied an advantageous position that could draw valuable social resources to promote their work outcomes.

Social network theorists have significantly advanced our understanding of how social relationships can be viewed as resources that make a substantial impact on numerous aspects of our life. Most notably, social capital scholarship has articulated how various resources derived from one's social connections can generate interpersonal and structural dynamics that affect organizational outcomes (P. Adler & Kwon, 2002). Social capital has been conceived as "resources embedded in a social structure that are accessed and/or mobilized in purposive actions" (Lin, 2001, p. 29). As many scholars have noted, social capital plays a significant role in creating and sharing organizational knowledge. Social capital facilitated the exchange of knowledge, expertise, and other assets among units in a large multinational organization (Tsai & Ghoshal, 1998). Also, in online environments, individuals with increased social capital were more likely to contribute to knowledge creation (Chow & Chan, 2008; Wasko & Faraj, 2005). Similarly, social capital was positively associated with knowledge integration in virtual teams, which in turn enhanced decision quality (Robert, Dennis, & Ahuja, 2008). Given that building social capital across geographical and cultural borders is considerably challenging, scholars has emphasized that it is critical to provide institutional support for social capital creation in dispersed work settings (Maznevski & Athanassiou, 2003).

The findings of this study demonstrated that distributed employees at Design Inc. relied on their contacts in the same regional office and functional role as well as their strong ties when soliciting knowledge. Namely, they built and maintained social capital within the boundaries, reflecting the challenges associated with cross-boundary knowledge sharing. Even though the organization implemented ESM in hopes for enhanced knowledge sharing and open communication, ESM use did not boost the

quality of knowledge acquisition across different groups. Additionally, existing social status was still influential in knowledge processes and was not necessarily affected by the adoption of a new technology. In line with the broad picture of status hierarchies discussed throughout my dissertation, the configuration of social networks at Design Inc. also revealed that in-group, hierarchical, and cohesive relationships had strongly undergirded the operation of the organization.

Connections as challenges. Advocating a social capital perspective, a number of communication scholars have posited that the adoption and dissemination of ESM can be a potential solution to enhance employees' social capital. Participation in ESM conversations can be positively associated with relational bonding and access to new people as well as expertise (Steinfeld et al., 2009). In a similar vein, the use of ESM has been expected to facilitate the formation of electronic communication networks that can ultimately foster social capital (Sherif, Hoffman, & Thomas, 2006). Although research on the impact of ESM use on social network configurations in organizations is still nascent, scholars have found that social media use in interpersonal contexts can generally assist building and maintaining social capital (Ellison et al., 2011; Steinfeld et al., 2008; Valenzuela, Park, & Kee, 2009).

The current study also started from a similar concern about the social connectivity effects of ESM to ascertain whether the use of ESM can increase peer engagement and knowledge sharing. I postulated that, contrary to the static nature of traditional databases, the visibility affordances of ESM might support the organic development of knowledge networks, thereby being more compatible with the relational nature of knowing. Scholars have also suggested that the community aspects of ESM could promote the formation of

knowledge networks through real-time, ongoing conversations (Hong, Suh, & Koo, 2011b). In particular, Haythornthwaite (2002) presciently posited that the addition of a new communication platform could transform latent ties to weak ties; namely, individuals might begin to activate connections through harnessing the affordances of new technologies.

Indeed, the current study revealed that the use of ESM was positively associated with employees' out-degree centrality and betweenness centrality, indicating that ESM-enabled communication may allow distributed workers to contact more people across the organization. The paradox is, however, the elevated levels of centralities did not promote the acquisition of useful knowledge. Moreover, out-degree centrality was negatively associated with knowledge acquisition. These findings highlighted that merely increasing connections did not always generate advantages; rather, depending on contextual and environmental factors, the impact of network attributes could differ. At Design Inc., increased external orientation precluded knowledge acquisition and brought more difficulties associated with knowledge sharing. This echoes the findings of other chapters that expound on cross-boundary knowledge sharing challenges. Forging and maintaining far-reaching networks may function as a constraint rather than an advantage in an environment where employees were not trained for cross-functional and cross-cultural exchanges. Indeed, outcomes of having diverse connections are contingent upon various contextual influences (N. Adler, 1986; Argote, McEvily, & Reagans, 2003a), including structural effects, communication climate, psychological safety, and the ways in which organizational members perceive and deal with out-group members. Communicating specialized knowledge with new collaboration partners, transferring accumulated

information from one unit to another (that shares no prior history), and modulating the process to accommodate new routines may surface a number of challenges that must be jointly resolved (Carlile & Rebentisch, 2003; H. Kim, 2015; Tucker, Nembhard, & Edmondson, 2007). Further, Aral and van Alstyne (2011) demonstrated that increased communication flow could actually impede individuals from locating useful knowledge.

In this study, the impacts of in-degree centrality and out-degree centrality made a stark contrast. In-degree centrality was not affected by the use of ESM, but was positively associated with knowledge acquisition. Conversely, out-degree centrality was enhanced by ESM use, yet made a negative impact on knowledge acquisition. The findings suggested that the introduction of ESM failed to change high-status employees internal standing, and they continued to garner needed knowledge using their positional advantages. On the contrary, although employees were able to contact more people through the use of ESM, those far-reaching networks increased knowledge-sharing difficulties. In addition to the cross-boundary knowledge sharing challenges discussed above, it might be also related to the fact that some connections might be in the early phase of relationship building, requiring more time to negotiate a shared understanding. In this context, it would be beneficial encouraging members to deeply engage in making sense of others' work because successful knowledge sharing transpires when members are willing to invest their energy and resources to learn from each other (Edmondson & Nembhard, 2009).

Power

Leveraging panoptic effect. The visibility affordance of ESM can substantially augment organizational members' monitoring capabilities. As dispersed workers at

Design Inc. sought to move private communications to a publicly visible and searchable platform for efficient knowledge sharing, an unprecedented amount of information became available through the ongoing streams of newsfeeds. While the use of ESM could ease sharing a wide range of activities and knowledge, it also allowed employees to unobtrusively monitor the newsfeeds to oversee others' behaviors and collect information about their work and performance. Harnessing this power of visibility, employees began to devise a knowledge solicitation strategy; namely, they reframed one-on-one queries as public questions targeting a wider audience or even tagged specific individuals and teams to publicly indicate accountability.

In particular, these tactics were adopted more frequently by low-status workers in remote offices. As their task progress was significantly affected by the input from high-status workers, they were often frustrated by delayed responses especially from headquarters. Before the implementation of ESM, they used one-on-one or team-specific communication technologies such as email and TFS (Team Foundation Server); however, high-status workers tended not to treat their inquiries as a priority. Further, product-related changes and progress updates were not shared with low-status workers on time. As this propensity for exclusion (see Chapter 6) was ingrained in high-status workers' daily routines, it was challenging for low-status workers to expedite the process on their end. However, by posting their questions on public newsfeeds and sometimes clarifying that the questions had been left unanswered after multiple contacts, low-status employees were able to obtain prompt responses from high-status employees. In other words, high-status workers could not dismiss questions when their actions were visible to the whole organization—from top management to their direct supervisors and coworkers. Thus,

low-status workers resorted to “panoptic eyes” and peer pressure to overcome their challenges that originated from routinized exclusion and status differentials.

The findings of this study expand the scholarship of surveillance studies by providing the empirical details in organizational settings. Despite a sophisticated line of theoretical work, surveillance practices in the workplace have been underexamined in management and organizational communication. Surveillance studies, which stems from Foucault’s (1978) seminal work, *Discipline and Punish*, is a promising area of research as contemporary technical means for sharing or extracting data have become more involved in our mundane everyday life. The term *panopticon*, coined by Jeremy Bentham, was discussed by Foucault as a modern form of disciplining designed “to induce in the inmate a state of conscious and permanent visibility that assures the automatic functioning of power” (Foucault, 1978, p. 201). The panoptic effect is powerful precisely because individuals cannot tell whether they are actually watched by others at a given moment (but permanently visible as Foucault averred), which makes them constantly subject to potential surveillance. Communication technologies that transform the invisible nature of communications to public, pervasive, and persistent can extend the range of surveillance since their communicative acts can be always monitored, even asynchronously, by not only a “watchman” but also everyone else (Clarke, 1988; Lyon, 1994; Poster, 1990; Whitaker, 1999).

Besides, Long, Goodman, and Clow (2010) pointed out that the ability to monitor employees’ activities is exponentially larger in distributed teams than in collocated teams because most communication in distributed teams occurs through various technologies and thereby can be stored, tracked, and analyzed if needed. The authors call this

management by technological gaze, which refers to “an indirect and unobtrusive organizational mechanism used to closely monitor the online communication, actions, and behaviors of employees” (p. 90). At Design Inc., ESM served as a new venue in which dispersed employees can share, store, and trace their interactions and conversations; further, employees used such ESM affordances to exert peer pressure to garner knowledge in need from others. The findings did not necessarily suggest that executives or supervisors were actively involved in expediting knowledge sharing processes; instead, the key point here is that workers were aware of the possibility that they *could* be watched by management. This new mode of surveillance can generate a profound impact on employees’ knowledge sharing behaviors. In this case, the feedback cycles were remarkably shortened due to (potential) surveillance by peers and supervisors.

Further, the findings underlined the organizational ramifications of the emergence of digitally enabled peer-to-peer, or lateral surveillance (Sewell, 1998), in comparison to traditional management-based surveillance. Although digital forms of communication may reinforce surveillance by both supervisors and peers, peer-to-peer surveillance can be particularly supported by the use of ESM due to its connective capacity and pervasiveness (Andrejevic, 2005; Bossewitch & Sinnreich, 2013; Fuchs, Boersma, Albrechtslund, & Sandoval, 2012; Trottier & Lyon, 2012). Specifically, the findings illustrated how low-status workers, who suffered from the lack of social standing and interpersonal influence, could actually deploy ESM’s connective capacity (e.g., tagging individuals and teams in charge) and panoptic effect to leverage the power of surveillance. These emerging practices implied that low-status individuals were able to enforce workplace norms of cooperation and compliance through enabling panoptic eyes through

the public communication on ESM. Hence, the visibility of ESM communication empowered low-status workers to some extent in the sense that they could attract high-status workers' immediate attention.

Controlled by panoptic effect. Despite the fact that low-status workers were able to rapidly acquire high-status workers' responses by temporarily drawing on peer pressure, such practices did not occasion ongoing knowledge sharing and even distribution of knowledge. Indeed, their knowledge solicitation tactics were rather provisional measures for ad-hoc situations. The analysis further demonstrated that low-status workers still faced significant difficulties in staying in the know and experienced knowledge disparities that precluded from their further engagement in knowledge conversations. Low-status workers were less likely to contribute to high-level knowledge discussions whereas they frequently uploaded questions or team-based reports. Such a stark contrast made the knowledge disparities between high-status and low-status workers even more salient. For low-status employees, requesting information in a pressing need or posting team progress updates was less likely to reveal their lack of knowledge. On the contrary, advanced discussions on process improvement, product design strategies, and emerging development trends were dominated by high-status workers. Low-status workers were reluctant to take risks of disclosing knowledge disparity and subsequently being judged by others, which hampered their further engagement in participation.

Surveillance is inevitably related to the idea of performance monitoring (Ball, 2010; Mason, Button, Lankshear, Coates, & Sharrock, 2002). In this respect, low-status employees (or individuals who do not have sufficient knowledge to intervene in central discussions) were more vulnerable to panoptic effect since their discursive practices

could signal disparities in knowledge and resources, or even lower performance outcomes. In knowledge-intensive work, communicative acts can be a major source from which people make inference of one's abilities, competence, and performance. Thus, low-status workers were more likely to avoid high-level discussions due to the fear of potential surveillance and performance assessment. Indeed, the perception of surveillance through ESM can lead to intensified impression management, constraining open sharing and participation (Trottier & Lyon, 2012).

In light of this, numerous scholars have investigated the controlling effect of digital surveillance. D'Urso (2006) posits that the panoptic effect can be aggravated when workers are aware of how they are being surveilled. As such, when workers are aware of the presence and activities of peers and managers on ESM, they can be more susceptible to surveillance, which can lead to compliance behaviors. Similarly, Willcocks (2006) argues that the use of technologies at work makes employees' activities visible, thus facilitating performance monitoring. This pertains to panoptic control because individuals are aware that their activities can be monitored and measured, making them "both calculable and calculating with respect to their own actions" (p. 284). Increased visibility can thus make employees control themselves according to the perceived expectations of others (Yar, 2003). Such controlling effect may in turn create negative impacts on employee morale (Ariss, 2002).

This study argues that low-status workers are more subject to panoptic control due to knowledge and power disparities. As discussed in Chapter 6, low-status workers felt more constrained due to status asymmetry constructed by continuous exclusion from core discussions. The lack of inclusiveness reinforced knowledge disparities, which led to

low-status workers' disengagement in knowledge contribution through public newsfeeds. Perceived disparity and differential discursive practices could in turn reinforce self-controlling behaviors (e.g., staying silent). In sum, the visibility of day-to-day interactions can make a substantial impact on surveillance and control precisely because they are so quotidian, embedded in practice— when distributed workers are aware that their activities can be seen by everyone within the organization, the panoptic effect can be both subtle and strong. Based on these findings, this study calls for further research that examines the relationships between surveillance and power relations (Ball, 2005; Ball & Wilson, 2000), which will shed light on the interplay between existing status hierarchies and the new modes of surveillance enabled by communication technologies.

Theoretical Implications

Expanding the Paradox Framework to Technology Studies

Numerous scholars have studied *paradox* as a key area of research across disciplines, extending valuable insight into our understanding of complex organizational lives (Fairhurst et al., 2016; Putnam, Fairhurst, & Banghart, 2016). The framework of paradox was developed as a theoretical device to acknowledge and analyze contradictions, tensions, or oppositions that social actors experience through interactions with structures, systems, and technosocial environments (e.g., action vs. structure paradox) (Poole & van de Ven, 1989). The notion of paradox denotes contradictory yet interrelated elements that seem logical in isolation but inconsistent when appear simultaneously (Lewis, 2000). To define the nature of paradox, Stohl and Cheney (2001) described that paradox emerges when “one calls for or carries out actions that are in opposition to the very goal(s) one is trying to accomplish” (p. 354).

The paradox framework allows for theorizing both sides of the phenomenon instead of choosing one pole over the other. By identifying opposing forces around a specific action or phenomenon, researchers can recognize the complexity, diversity, and ambiguity of organizational life (Cameron & Quinn, 1988) and elicit creative insight (Eisenhardt & Westcott, 1988). Furthermore, this perspective notes that paradox is not abnormal but ubiquitous in social actors' lives (Gibbs, 2009; Lewis & Smith, 2014). In fact, paradox can be seen as inherent in the nature of organizing. For instance, individuals' autonomy must be valued to promote creativity, yet control is indispensable for teams' effective coordination and alignment. Likewise, diversifying forms of employment can enhance flexibility of work but may also attenuate cohesiveness and identification. In other words, paradox portrays contradictions that help us capture conflicting demands to better address underlying issues and respond to the tensions around them.

Informed by the paradox approach, this study sought to theorize the contradictory influences of visibility on the process of knowing in a distributed organization. The lens of paradox offers a theoretical vantage point to examine the changes (or stability) enacted by the implementation of new technologies in organizations; however, the paradox perspective has not been employed much in the studies of technologies. The outcomes of technology adoption can be multifaceted, unexpected, or ironic although certain usage patterns are intended by design. A growing body of research has documented the conflicting perceptions and uses of technology across diverse streams of literatures, yet the findings were often not situated under a broad theme of paradox. When examining the emerging patterns of technology use particularly among disparate groups and individuals,

such usage practices are likely to be incongruent, contradictory, and divergent (H. Kim & Lingel, 2016). In this sense, the paradox approach enables researchers to craft a nuanced theory of technology use that captures its multipronged impacts on organizational phenomena.

In a similar vein, Robey and Boudreau (1999) proposed a logic of opposition, instead of a logic of enabler or determination, to study organizational consequences of technology adoption that can both promote and impede change. In many cases, the affordances of technologies can generate countervailing forces depending on its interactions with social actors. For example, the multitasking capabilities of digital technology may be a source of effectiveness and distraction at the same time, creating tensions that originate from conflicting outcomes. More importantly, Robey and Boudreau further argued that the acknowledgement of contradictory outcomes could be particularly beneficial since it enables the detection of forces that both facilitate and hinder organizational change; namely, the implementation of new technologies does not necessarily trigger innovation but may preserve the status quo. Then, the theoretical mission here is disentangling what types of usage patterns emerge, and when and how such patterns contribute to change (rather than inertia).

Focusing on this goal, this study delved into the paradoxical influences of ESM use on process of knowing by identifying antithetical forces that pulled individuals in different directions. The use of ESM enabled new modes of knowledge-sharing practices yet concurrently sustained existing routines by reproducing knowledge disparities. Communication visibility, afforded by the use of ESM, helped dispersed workers glean contextual knowledge from multiple locations. In this sense, communication visibility

could make boundaries permeable by facilitating sharing knowledge beyond geographical, functional, and hierarchical borders. However, the findings also revealed that communication visibility could bring knowledge disparities into high relief by exhibiting disparate levels of knowledge between high-status and low-status workers, which ultimately constrained participation activities and exacerbated status differentials. In this regard, communication visibility rather foregrounded boundaries: they became more rigid and difficult to transcend. On the whole, when cross-boundary communication became widely visible within a global organization, it became a source and an outcome of both diversity and disparity.

With respect to the paradoxical impacts of new technology implementation, Burkhardt and Brass (1990) provided an illuminating perspective by classifying technological changes as competence-enhancing adjustments vs. competence-destroying discontinuities. This distinction was initially developed to explicate the organizational changes that technicians experienced after the adoption of advanced technical equipment or machinery. However, their classification also offers a valuable angle to look into knowledge workers' practices after the implementation of communication technologies, and concomitant changes in social status. Specifically, the current study showed that the visibility affordance of ESM could function as both competence-enhancing adjustments and competence-destroying discontinuities, depending on employees' social status and knowledge levels. In this study, the adoption of ESM substantially elevated the degree of communication visibility, which enhanced high-status workers' knowledge sharing abilities but constrained low-status workers participation. In knowledge-intensive organizations, linguistic abilities and discursive practices are regarded as status signals

that represent one's specialties. As Kuhn and Jackson (2008) argued, "actors' discursive moves indispensably include the processes of classification" (p. 474); and such processes can be shaped by visualized communicative acts on ESM. High-status workers continued to enjoy status gain whereas low-status workers faced further status loss. Hence, technology-enabled communication visibility served as a status-conferring vehicle by revealing workers' knowledge conversations that indicate disparate levels of knowledge and expertise.

Unraveling the paradoxical outcomes of ESM use, this study offered textured accounts of the processes of knowing in a distributed organization, shaped by existing status hierarchies and emerging work practices. Even though communication visibility, afforded by the use of ESM, facilitated knowledge acquisition, it also reproduced status imbalance by disclosing disparate knowledge levels and participation activities. By delineating such paradoxical effects of technology use, this study aimed to build an in-depth knowledge of divergent technological outcomes and disruptive experiences across different populations. By embracing paradoxes, scholars can grasp a nuanced understanding of contradictory, equivocal, and sometimes counter-intuitive effects of technology use in organizations.

Practical Implications

Knowledge Management

Global organizations invest a wide array of resources in knowledge management with a keen interest in fostering collaboration, productivity, and innovation. However, both scholars and practitioners have observed significant variations in knowledge management outcomes, and many organizations failed to exhibit productivity gains from

learning and sharing (Argote, 2013). Knowledge management can be affected by a number of contextual factors as well as psychological and relational mechanisms (Argote, McEvily, & Reagans, 2003b); hence, it is important to examine organizational goals and individual needs before developing specific knowledge management strategies. In particular, knowledge sharing and integration tend to take an extended period of time when workers are spatially dispersed and technology-in-use is complex (Galbraith, 1990). Global organizations thus need to carefully look into the nature of knowledge sharing challenges across different groups and locations.

The findings of this study suggest that creating common ground and a shared understanding among diverse groups (e.g., regions, functions, or cultures) should be considered an important prerequisite for successful knowledge management. For knowledge workers, their challenges are often rooted in disparate routines, practices, and conceptualizations. When workers engage actively in invoking differences and negotiate common ground, local knowledge can be transformed and shared in another context (Bechky, 2003). As such, managerial endeavors to encourage workers to share their knowledge and practices with other groups will substantially benefit process improvement. Simply increasing “open sharing” or implementing standardized training programs is not sufficient (P. Adler & Clark, 1991; R. Hayes & Clark, 1986); rather, executives and managers should facilitate sharing contextual meanings and enforce cooperative norms to better motivate high-status workers to share their knowledge with low-status workers, newcomers, and novices. In addition, organizational members’ reflexivity and mindfulness are critical abilities that can make meaningful differences in process of knowing. Given that status asymmetry can generate major hurdles for

knowledge sharing, employees should take account of others' different standing (e.g., industry tenure, organizational tenure, expertise) and make adjustments to their modes of knowledge sharing accommodating to each other.

The current study also underlines the significance of understanding and harnessing the power of social networks for effective knowledge sharing. In this study, organizational members relied on strong ties to solicit and acquire needed knowledge. When handling complex situations, strong ties are more likely to willingly assist (Krackhardt, 1992b) and generate productive knowledge sharing outcomes (M. Hansen, 2002). As in this case, it can be more beneficial to tap into strong tie networks when employees often face complex communication challenges. Nonetheless, it is equally important to realize the benefits of external or weak ties particularly in a global organization in which members can draw on diverse perspectives and distributed expertise. The findings indicate that workplace routines must be designed to facilitate cross-boundary and inclusive communication since one of major challenges of distributed work is exclusion of out-group members. In doing so, organizational members can better utilize distributed expertise and maintain their relationships with new connections across boundaries.

Technology Management

The recent proliferation of conversational technologies (e.g., ESM, wikis) in organizations has been often discussed in tandem with the ethos of participatory organizing, extolling the virtue of organic, spontaneous, and voluntary use of communication technologies. Indeed, communication via ESM can be dynamic and open rather than static and isolated. However, this nature of ESM also implies that its usage

patterns can be extremely divergent, unstructured, and fragmented. Communication scholars have theorized the unintended (or ironic, unfaithful) use of organizational technologies a few decades ago, calling for in-depth research on emerging patterns of use (DeSanctis & Poole, 1994; C. Scott, Quinn, Timmerman, & Garrett, 1998). More recently, scholars have examined how the affordances of the same class of technologies can be perceived and used differently by various groups and individuals (Earl & Kimport, 2011; Treem & Leonardi, 2012).

As such, the implementation of new communication technologies—especially when the technologies offer a range of utilities rather than a limited feature set—should be cautiously managed to adapt its use to particular organizational contexts (R. Hayes & Clark, 1986). The findings of this study unraveled that organizational members' responses to ESM implementation were not necessarily in line with managerial intentions; furthermore, their ESM use was somewhat unpredictable since it contributed to reproducing status differentials and knowledge disparities. To leverage the sharing capabilities of ESM and reduce the adverse outcomes of visibility effects, organizations need to strategically engage in the process of implementation and distribution of ESM (and other communication technologies). By virtue of the prevalent of misconceptions regarding “social” media, communication practices on ESM are often left unmanaged like the case of this study. Instead, organizational members should observe and analyze different members' reactions and usage patterns to see how the new technology is interrelated with changes in routines, perceptions of other people as well as their tasks, and improvement of work processes. In this way, organizational members can enhance

their adaptability to altered communication patterns and address potentially detrimental outcomes.

In addition, the findings also suggest that providing managerial guidelines may help organizational members make sense of others' usage practices and improve team alignment, contrary to the common understanding of the benefits of bottom-up and voluntary technology use. Although emerging usage patterns can allow for the development of innovative knowledge sharing practices, organizations may also notice particular areas that can benefit from explicit guidelines and expectations. This study proposes that it is important to strike a balance between emergent, voluntary use and structured, formalized use in order to amplify the benefits of technology use. Given that *shared* affordances are the sources of changes (Leonardi, 2013), organizations can promote benefits resulting from specific common practices that organizational members jointly develop and sustain.

Diversity Management

Workforce diversity can contribute to achieving competitive advantages only when it is strategically managed. In the current study, Design Inc. experienced a range of difficulties in facilitating collaboration among diverse groups whereas they employed and retained many international talents. Although diversity can make a positive effect on various organizational outcomes, practitioners should fully acknowledge that diverse teams may go through a challenging time developing relationships and negotiating common ground (Ancona & Caldwell, 1992). Scholars have pointed out that positive benefits accrue when organizational members strive to jointly overcome the challenges associated with diversity (Mannix & Neale, 2005). Thus, it is critical to cultivate an

organizational climate that embraces diversity and fosters respect for others' knowledge, expertise, and different viewpoints. Executives and managers may need to consider offering workshops to promote the understanding of workplace diversity and its implications. Also, managers can overhaul their day-to-day communication practices to identify a way to improve cross-boundary exchanges. In fact, the benefits from diversity in information and expertise can be achieved only under certain conditions, depending on individual and organizational efforts (Edmondson & Nembhard, 2009; Jehn, Northcraft, & Neale, 1999).

Although the current study did not delve into whether the members of Design Inc. perceived cultural differences as a significant obstacle for knowledge sharing, it is inevitable to consider potential effects of cultural diversity since cultural/regional differences were closely related to status hierarchies in this study. Besides, high-status workers were less attentive to cultural differences in comparison to low-status workers, implying that individuals in a more powerful position tended to dismiss or overlook such differences. When cultural differences are not acknowledged or reconciled, cultural diversity can lead to process loss through task conflicts and decreased social integration (Stahl, Maznevski, Voigt, & Jonsen, 2009). In global organizations, it is therefore important to help members recognize cultural differences and learn about different perspectives as well as practices. Specifically, this study highlights that national boundaries (or a distinction between headquarters and subsidiaries) often overlap status hierarchies, thereby precluding equal distribution and sharing of knowledge. To cope with such asymmetric conditions, cultural diversity should be understood as the potential

for unique perspectives and contributions instead of superiority (or inferiority) of particular job roles, knowledge domains, and cultures.

Finally, given that the initial negative influences of diversity can be mitigated over time and diversity can engender long-term benefits (S. Jackson, Joshi, & Erhardt, 2003), ongoing managerial effort to facilitate interactions among different groups can significantly alleviate knowledge-sharing difficulties. At Design Inc., both executives and employees began to realize how disparities hampered their coordination and collaboration although the positive benefits of diversity had not been realized at the time of data collection. Further observations and analyses may yield insightful findings that explicate the ways in which diverse individuals develop a mutual understanding through accommodating to each other and revamping existing work practices.

Appendix A

Online Survey Questionnaire

❖ The following questions ask about your usage of tools for communication within Design Inc. (NOT with external clients or customers). Please rate the approximate frequency of use based on the provided scale. (0 = Never, 1 = Monthly, 2 = Weekly, 3 = Once a day, 4 = 2-5 times a day, 5 = 6-10 times a day, 6 = More than 10 times a day)

1. Company email
2. Personal video conferencing
3. Group video conferencing
4. Instant messenger
5. Yammer (Company-wide)
6. Yammer (Private group)

❖ Please think about your coworkers with whom you need to communicate to accomplish your work. Then, please rate the following statements based on the provided scale. (1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly agree)

1. I am aware of whether or not my coworkers are available to talk at a given moment.
2. I know when will be a good time to contact my coworkers to initiate discussion.
3. I have good knowledge about my coworkers' availability without directly asking them about their schedules.
4. I am aware of what tasks my coworkers are currently working on at work.
5. I know what actions my coworkers have recently taken to proceed with their tasks.
6. I am informed about which activities my coworkers are currently involved in.
7. I have good knowledge about my coworkers' personal lives.
8. I am informed of what's new in my coworkers' personal lives.
9. I have knowledge about my coworkers' social lives happening outside of work.

❖ Please rate the extent to which you agree with the following statements about the company. (1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly agree)

1. When someone criticizes Design Inc., it feels like a personal insult.
2. I am very interested in what others think about Design Inc.
3. When I talk about Design Inc., I usually say "we" rather than "they"
4. This company's successes are my successes.
5. When someone praises Design Inc., it feels like a personal compliment.
6. If a story in the media criticized Design Inc., I would feel embarrassed.

❖ The following questions ask about how closely you need to work with your team members. (1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly agree)

1. I work closely with my team members in doing my work.
2. I frequently must coordinate my efforts with other team members.
3. My own performance is dependent on receiving accurate information from my teammates.
4. The way I perform my job has a significant impact on the rest of my team.
5. I work fairly independently of other teammates in my work. (reverse-coded)

❖ Below is the list of members at Design Inc. (sorted by first name.) Select people based on the instructions below. In the next few pages, you will be asked to answer some questions about those people.

- (a) Who have you contacted when you needed assistance with your project? Select the people who acted as a critical source of knowledge for your projects during the past year.
- (b) Who has turned to you to solicit knowledge? Select people for whom you have been a critical source of knowledge for their projects during the past year.
- (c) If you don't see the names of those people, please enter their full name in the text entry box.

1. How close are you with this person? (1 = Distant, 2 = Somewhat distant, 3 = Somewhat close, 4 = Close, 5 = Very close)
2. How often do you communicate with this person? (1 = A few times a year, 2 = Monthly, 3 = Weekly, 4 = Daily)
3. The information I received from this person made (or is likely to make) the following contribution to:
 - (a) Client satisfaction (1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly agree)
 - (b) Overall team performance (1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly agree)
 - (c) Quality of project/service (1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly agree)

Appendix B

Interview Protocol

1. What is your job role in the team? Could you explain your day-to-day work routines?
2. Does your work involve cross-functional communication? If so, could you explain more about it?
 - 2.1. Have you experienced any challenges regarding cross-departmental communication?
 - 2.2. How do you know that you and your collaborators are on the same page?
3. Does your work involve cross-location communication? If so, could you explain more about it?
 - 3.1. Have you experienced any challenges regarding cross-location knowledge sharing?
 - 3.2. How do you know that what's going on in other offices?
4. Have there been any improvements in cross-functional or cross-location communication since the restructuring?
5. In general, how do you keep track of others' activities in different teams and locations?
6. How do you learn new skills or knowledge from your team members?
 - 6.1. In such processes, do you find technological support useful?
 - 6.2. Do you also ask to outside experts (instead of peers or managers)?
 - 6.3. Do you also reach out to people at headquarters or in other locations to solicit information?
7. How do you use technologies to exchange information or knowledge with others?
 - 7.1. Do you use Yammer? If so, what makes you continue to use Yammer? What motivates you to share something on it?
 - 7.2. How do you find it useful to contact new/diverse people?
 - Across locations, departments, and hierarchical levels
 - 7.3. How do you find it useful to get to know people better and maintain relationships?
 - 7.4. You can do the same thing using other communication tools. But what made you select Yammer over the others?
 - 7.5. You just mentioned some advantages of Yammer in terms of [...]. Are there any trade-offs? Any potential disadvantages?
 - 7.6. Do you also use Yammer groups? Which groups do you belong to? In what occasions do you use groups?
 - 7.7. How would you describe Yammer to new employees?

7.8. Do you use video conferencing tools? If so, when/how do you use personal video conferencing vs. group video conferencing tools?

7.9. There are a number of knowledge repositories at Design Inc. How many have you used so far? For which purposes do you use them? Have you find them beneficial for knowledge sharing?

8. Does recent restructuring make any impact on your work and relationships? How so? Any challenges?

9. Anything that you want to add? Did I miss any important topics?

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