Through the Looking Glass: Reflected Knowledge and Trust in Global Collaboration

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ABSTRACT

Scholars argue that firsthand experience with distant colleagues is crucial for fostering trust in global collaboration. However, their arguments focus mainly on how trust accrues from direct knowledge about distant collaborators’ personal characteristics, relationships, and behavioral norms. We suggest that an equally important trust mechanism is “reflected knowledge,” knowledge workers gain about the personal characteristics, relationships, and behavioral norms of their own site by interacting with their collaborators. Through surveys of 140 employees in a division of a global chemical company, we found that direct knowledge and reflected knowledge enhanced trust. While both enhanced feelings of closeness with others, results indicate that direct knowledge increased focal actors’ understanding of their distant colleagues, while reflected knowledge promoted feelings of being understood. We discuss implications of reflected knowledge to theories of trust and interpersonal dynamics in globally distributed collaboration.
Globalization increasingly requires a distributed workforce to collaborate across far-flung locales. Such distributed collaboration, in which employees work with and depend on distant colleagues on a day-to-day basis, allows firms to leverage their intellectual capital, enhance work unit performance, meet ever-changing customer demands more fluidly, and gain competitive advantage in a dynamic marketplace (e.g., Cummings 2004, Gray and Meister 2004, Jarvenpaa and Leidner 1999, Malhotra et al. 2001, Sole and Edmondson 2002, Townsend, DeMarie and Hendrickson 1998).

Yet research on distributed collaboration shows that performance frequently suffers because interpersonal trust among distant collaborators is difficult to achieve (Jarvenpaa and Leidner 1999). Interpersonal trust refers to “the extent to which a person is confident in, and willing to act on, the basis of the words, actions, and decisions of another” (McAllister 1995: 25). Trust is regarded as the key determinant for the effectiveness of distributed collaborators (Handy 1995, Poole 1999). Researchers have linked trust to heightened cooperation and teamwork (Dirks 1999) and improved organizational citizenship (McAllister 1995), as well as enhanced information sharing (Uzzi 1996) and task-related advice (Chua, Ingram and Morris 2008). Organizational scholars have elaborated extensively on the importance of trust in improving the quality of working relationships (for a review, see Dirks and Ferrin 2001), which tend to be fragile in distributed collaboration (Jarvenpaa and Leidner 1999). In particular, trust-damaging conflicts tend to arise as dispersed collaborators struggle to establish mutual knowledge (Cramton 2001, Hinds and Cramton 2010). Such conflicts spike performance costs associated with increased monitoring, increased work redundancies, and lower satisfaction among workers (Wilson, Straus and McEvily 2006).

For the last two decades, scholars have explored the pivotal relationship between trust and distributed work contexts. Some scholars argue that “firsthand experience,” defined as face-to-face exposure gained through time spent at the site of distant collaborators, is paramount for bridging the interpersonal gap between distant workers (Hinds and Kiesler 2002) and mitigating interpersonal trust challenges among them. In an ethnographic study of site visits, Hinds and Cramton (2010) found that firsthand experience demystified colleagues’ work practices and increased effective relational coordination. Their findings build on an earlier study of global software companies in which employees with direct experience of their distant partner sites were more generous in sharing resources and expertise (Orlikowski 2002). Firsthand experience may be an important means to address the limitations that physical distance places on how quickly or how well trust develops between workers.

In line with this notion, some researchers have argued that trust is more easily generated in collocated settings, since collocated workers are better situated than their distributed counterparts to use behavioral cues to read intentions and foster collective identity (Frank 1993, Wilson et al. 2006). Theorists further argue that trust can be much harder to achieve in distant collaborations because mediated communication can constrain information sharing across sites (e.g., Chidambaram and Jones 1993, Cramton 2001, Hightower and Sayeed 1996). Consequently, information about the social
dynamics of distant collaborators (e.g., people, relationships, and norms) is difficult to discern and is susceptible to relational impediments. For example, people who lack social information about their distant co-workers are more likely to interpret the actions of those co-workers as reflecting dispositional traits rather than situational factors (Cramton 2001). Moreover, absence of social cues in computer-mediated interactions may lead to greater levels of depersonalization, less attention to coworkers, and more uninhibited behaviors (Kiesler et al. 1985). In conjunction with lower levels of social cohesion and conformity, behavioral invisibility may increase risks for work-related cheating, neglect, and abuse (Sheppard and Sherman 1998, Wilson et al. 2006).

A number of scholars have furthered the research agenda by incorporating the multidimensional nature of interactions or virtuality (for virtuality reviews, see Bell and Kozlowski 2002, Griffith, Sawyer and Neale 2003, Kirkman and Mathieu 2005, O'Leary and Cummings 2007, Zigurs 2003) among distant workers in examining trust in the absence of firsthand experience (Walther 1992, Walther and Burgoon 1992, Weisband and Atwater 1999, Wilson et al. 2006). For example, Walther (1992) drew on social information processing theory to argue that computer-mediated interactions can foster the same type of relationships that are afforded in firsthand experiences, albeit over a longer period of time. Walther claimed that messages people exchange using mediated interactions can contribute to positive impressions that people form, test, and retain about one another. In a three-week longitudinal experimental study of distributed collaboration, Wilson, Straus, and McEvily (2006) tested Walther’s proposition, confirming that computer-mediated interactions did eventually yield the same levels of trust as face-to-face interactions. Bos, Olson, Gergle, and Wright (2002) found similar results when comparing video and audio conference groups to those who participated on a social task in person. These studies demonstrate that in cases where distributed collaborators are able to exchange adequate information to achieve mutual understanding they may be able to build trust without firsthand experience.

**Information as a Basis for Trust: Direct and Reflected Knowledge**

We believe that such mutual understanding and trust, gained through either mediated communication (over time) or firsthand experience, benefit from what we call direct knowledge: information about the personal characteristics, relationships, and behavioral norms of the other collaborator. This social information, when used to build trust, also improves the degree of comfort and reliability between distant collaborators. As an example, consider the experience of Ben, a product engineer located in the UK who travels to Taiwan to spend two weeks working side-by-side with his Taiwanese counterpart, Yee, on a design for a customer. During that time, Ben observes Yee in his element. For example, Ben notes how Yee manages work under pressure, whose counsel Yee solicits when brainstorming, and that Yee goes to lunch with the same group of people daily on the second floor cafeteria where people often hold working lunches. Such insights help Ben better understand who Yee is and how he works as they continue to work together. The more Ben knows about Yee, the better he will understand Yee’s attitudes, behaviors, and motivations, and the more
likely he is to be confident in and willing to act on Yee’s words and actions—thereby fostering the development of trust.

In addition to direct knowledge, we have identified another important source of knowledge for building trust, which we call reflected knowledge. Complementary to direct knowledge, reflected knowledge is the information workers gain about the personal characteristics, relationships, and behavioral norms of their own site by interacting with distant collaborators. Reflected knowledge is acquired by “becoming virtual to one’s self”—learning to see one’s site and work relationships through the eyes of the collaborator. In this paper, we explore the theoretical context for understanding reflected knowledge, provide evidence that reflected knowledge can improve trust in distant collaborations, and consider the implications of our findings for future studies of distant collaboration.

We draw in part on the work of Cooley and Mead to formulate the concept of reflected knowledge, but we build on their insights by focusing on the social dimensions that pertain to collaboration. Cooley’s (1983) formulation of “the looking glass self” asserts that our self-view is a social product shaped by the way we think others perceive us: “We always imagine, and in imagining share, the judgments of the other mind” (p. 184-185). Operationally, the looking glass means that our concept of self is developed through interaction with others (Cooley 1983, Mead 1934). Mead (1934) asserts an agentic component to the theory, whereby people actively evaluate how others perceive them before they accept any reflected view of themselves.

Although Cooley and Mead’s conceptualization of the self-view emphasizes individual cognition, for the purposes of our study, we consider reflected knowledge to encompass broader characteristics of a focal actor’s home site as the unit of analysis; namely, personal characteristics, relationships, and behavioral norms. Reflected knowledge promotes understanding of how distant coworkers experience a focal actor’s site and related interpersonal factors. For example, Julie, a French chemical engineer who typically works from Marseilles, spends time at the site of Paul, her American collaborator in Palo Alto, California. While there, she realizes that her practice of responding to Paul’s emails in the afternoons, which allows her uninterrupted stretches of work, adds an overnight delay to her correspondence with Paul. Her visit enabled her to link the time delay with a new perception of her behavior. Such enlightenment, we argue, produces a new understanding that ultimately shapes interpersonal trust outcomes.

Reflected knowledge might also be gained through mediated communication, although our study focuses on reflected knowledge acquired while visiting the sites of distant collaborators. For example, Julie could have acquired reflected knowledge when speaking to Paul on the phone or via email as well. It is plausible for Julie to eventually discern how Paul experiences her correspondences by accumulating insights about the exacerbating effects that the time zone difference has on his work with her. The common element in all reflected knowledge is that the person gains knowledge about their own site by taking the viewpoint of the collaborator. We have begun to formulate and test reflected knowledge by initially examining its acquisition firsthand, during site visits, to avoid some
of the confounds in studying virtuality, given its multidimensional nature (O’Leary and Cummings 2007).

In terms of impact, we take guidance from the literature reviewed earlier, which suggests that firsthand experience is a dimension of virtuality (including mediated and face-to-face contact) that has strong effects on distributed work. The results of the study reported in this paper bear this out. In terms of methodology, studying reflected knowledge within the context of firsthand experience allows us to develop theoretical insights without introducing potential confounds from the various modes of virtuality that shape distributed collaboration (e.g., Kirkman et al. 2004). Such confounds arise because of the variety of media and the many ways in which workers can choose combinations of media during collaborations. Many studies of media choice indicate that people select media that they think will ensure accurate interpretation of their messages (Daft, Lengel and Trevino 1987, Trevino, Daft and Lengel 1990). The choice of media can therefore be a deliberate act that shapes communication and relational outcomes. More recently, scholars have argued that people also combine multiple media that have distinct features, such as instant versus delayed, as a function of precipitating events at the workplace (Leonardi, Neeley and Gerber 2011). These approaches in mediated communication research show that workers select and combine media conjunctively during the course of their communication with others. The task of tracing which bits of reflected knowledge resulted from which communications and in what context is daunting, if not impossible, to achieve at this point. However, we believe that our study of reflected knowledge acquired through firsthand experience will inspire investigation into how reflected knowledge is acquired and used throughout all aspects of virtual work. We expect our focus on firsthand experience to provide a fruitful context in which to unpack how reflected knowledge can boost trust for distant collaborators.

A Model of Reflected Knowledge and Trust

Building on existing theory, we have developed a model of the relationships linking firsthand experience, direct knowledge, reflected knowledge, and trust in global collaboration, and we tested the model using survey data gathered from an entire division of a multinational organization. We found that firsthand experience increases reflected knowledge, that reflected knowledge is distinct from direct knowledge, and that these two types of knowledge promote trust in different and significant ways. Our results show that to understand the effects of firsthand experience on trust, we must account for both reflected and direct knowledge, thereby broadening our understanding of interpersonal dynamics and the development of trust in distributed collaboration.

The establishment and growth of trust in virtual collaboration hinges on the extent to which a distant coworker perceives their colleague(s) as reliable, feels concern for their co-workers’ welfare, and is comfortable with interacting with them (Chua, Morris and Mor 2011). Cognitively, direct knowledge provides insights into coworkers’ social and organizational norms and increases affinitive ties, while reflected knowledge establishes a greater perception of mutual understanding and empathy.
We argue that, in conjunction with greater affective cohesion, such gains in mutual understanding lead to higher levels of trust for global collaborators. In the sections that follow, we present the model and its hypotheses as depicted in Figure 1.

The Role of Firsthand Experience

We accept the link between firsthand experience and direct knowledge—the information about distant collaborators’ personal characteristics, relationships, and behavioral norms gained through unmediated communication (Cramton 2001)—as both intuitive and in line with prior research (see Hinds and Kiesler 2002). When distant coworkers can interact face-to-face, they gain insights and share experiences that enable them to make more informed interpretations of their colleagues’ behavior and intentions. By definition, then, firsthand experiences will increase direct knowledge. Since the relationship between firsthand experience and direct knowledge has been fairly well delineated, we focus primarily on the relationship between firsthand experience and reflected knowledge.

In addition to increasing direct knowledge, firsthand experience can also generate reflected knowledge, which we previously defined as the knowledge a worker gains about the personal characteristics, relationships, and behavioral norms of their own site by interacting with their distant collaborators. We conceptualize reflected knowledge by building on theories of the reflected self (Roberts et al. 2005, Tice and Wallace 2003), which posit that individuals form self-perceptions based in part on how they believe others see them. Scholars find that relationships in which individuals become embedded have a major impact on how they define and feel about themselves (Bradbury and Lichtenstein 2000, Ely 1994, Gabarro 1990, Gersick, Bartunek and Dutton 2000, Granovetter 1985, Kahn 1998). An individual’s self-image is shaped in part by the opinions of those he or she values (Ashford 1986). In the context of distributed collaboration, we argue that firsthand experience will promote reflected knowledge, which will likely enhance collaborators’ understanding of themselves as their distant colleagues see them.

_Hypothesis 1:_ Firsthand experience at a distant site will be positively related to a worker’s knowledge of how collaborators at the distant site view the interpersonal aspects of the worker’s site (reflected knowledge).
Differential Impact of Direct and Reflect Knowledge

Ample evidence indicates that perceptions of shared understanding (mutual understanding) and closeness are critical dynamics to successful distributed collaboration (e.g., Cramton and Hinds 2007, Hinds and Mortensen 2005, Petronio et al. 1998, Webster and Wong 2008). With respect to cognition, confidence that one not only holds information about the self and others, but that collaborators do as well, creates expectations that future coordination can move forward based on this mutual understanding (Cramton 2001). In terms of affect, cross-site cohesion and empathy are likely critical for overcoming dysfunctional tendencies that can arise in distributed collaboration (Cramton and Hinds 2005, Hinds and Mortensen 2005). Accordingly, we hypothesize that both reflected and direct knowledge can increase both mutual understanding and closeness, albeit via different means. Direct knowledge increases understanding of distant collaborators’ expectations for effective interactions, while reflected knowledge uniquely enhances workers’ feelings of being understood by their distributed counterparts.

Cognitive Impact of Direct and Reflected Knowledge: Understanding and Feeling Understood

Failures in mutual knowledge are central to difficulties experienced by dispersed collaborators (Cramton 2001). As Olson and Olson (2000) discuss in their review of the distributed teams literature, establishing common ground is essential for communication and productivity across distance. In this literature, however, gaining mutual understanding is linked solely to knowledge of distant others and their contexts. While direct knowledge is important for constructive distributed interaction, the literature has ignored the importance of the looking glass self in discussions of globally distributed interactions: individuals shape their feelings and actions in the context of others’ perceptions. Below we discuss each in turn.

Direct Knowledge Promotes Understanding of Distant Collaborators.

We predict that direct knowledge provides insights into distant others’ expectations around interactions. These insights are beneficial in supporting adaptation, the process by which people change their behavior to better match the expectations and norms of others. This topic has been widely studied in research on cross-cultural behaviors (Gelfand, Erez and Aycan 2007). As illustrated in recent reviews of cross-cultural work (e.g., Gelfand et al. 2007, Leidner and Kayworth 2006), people’s attitudes, beliefs, and behaviors are shaped both by their native environments and the foreign cultures to which they are exposed. In particular, Cramton and Hinds’ (2005) theory on the drivers of cross-national learning provides insight into how direct knowledge can aid adaptation. The authors explore the likely determinants of individuals taking an ethnorelativistic perspective (understanding the world, including their own group, through the lens of others) – a core tenet of adaptation (Bennett and Bennett 2004, Bennett 1986) – as opposed to an ethnocentric, non-adaptive perspective. They
argue that information promotes a sense of mutual positive distinctiveness, which increases the motivation to engage with and adapt to distant colleagues. Given this line of reasoning, we expect that as collaborators gain more information about their distant colleagues, they will be more likely to take an ethnorelativistic perspective. In addition, confidence that they better understand their distant counterparts should strengthen their expectations that they can interact with their counterparts effectively. Thus, we hypothesize that direct knowledge about distant co-workers promotes understanding the expectations of colleagues.

*Hypothesis 2a:* Direct knowledge will be positively related to understanding of distant collaborators’ expectations.

**Reflected Knowledge Helps Distant Collaborators Feel Understood.**

In its own way, reflected knowledge is particularly useful in helping collaborators feel understood. In particular, reflected knowledge combats perceptual biases towards egocentrism and the false sense of objectivity that often goes along with it. The tendency for people to hold egocentrically biased assessments has been well documented (Gilovich and Savitsky 1999). For example, people overestimate the extent to which their own behaviors are noticed by others (Epley, Savitsky and Gilovich 2002, Gilovich, Medvec and Savitsky 2000). In the same way, they overestimate their contributions to a group task (Ross and Sicoly 1979), and assume that their own mental states and motivations are more visible to others than they actually are (Savitsky and Gilovich 2003, Vorauer and Cameron 2002). Moreover, people believe that their self-disclosures are more revealing than those of others (Pronin, Fleming and Steffel 2008).

Consequently, in distributed contexts we would expect egocentric biases to be more acute. On the one hand, compared to collocated individuals, distributed colleagues are more likely to avoid responsibility and attribute blame to others for their own mistakes (Walther and Bazarova 2007). On the other hand, distant collaborators can misunderstand each other by overestimating the importance of their own behavior and assuming that their motivations and mental states are more apparent to, and better understood by, their distant colleagues than they actually are. In fact, Kruger and colleagues (2005) found that these effects, for example, lead people to overestimate the effectiveness and clarity of their communication via mediating technologies like email. These biases are reinforced by the belief that the individual’s own perspective more closely matches the objective reality than that of distant colleagues (Pronin, Gilovich and Ross 2004). Such biases lead to misunderstandings when collaborators have differing expectations (Ross and Ward 1996), which they assume to be objectively correct, and are compounded by the belief that individuals are more likely to be misunderstood by others than vice versa (Pronin et al. 2001).
Reflected knowledge, however, can provide a mechanism to counter such biases. By definition, it implies that individuals have learned about themselves and their work site from their distant collaborators, thus providing evidence that counters their previous biased perspective. This is in line with work by Epley and colleagues (2006) showing how perspective-taking reduces egocentric bias in competitive social interactions. Thus, we should expect reflected knowledge to improve perceptions of being understood by distant collaborators.

Hypothesis 2b: Reflected knowledge will be positively related to perceptions of being understood by distant collaborators.

Affective Impact of Direct and Reflected Knowledge: Enhances Closeness

Direct Knowledge and Closeness. We suggest that direct knowledge of distant collaborators increases collaborators’ sense of closeness to their colleagues. Closeness refers to feelings of personal connection to individuals at the other site. Research on intergroup contact posits that greater exposure to the members of another group increases affinitive ties and closeness to that group and its members (for a meta-analysis, see Pettigrew and Tropp 2006). Wilder (1986) argued that knowledge about the other leads to the perception of others as more individually distinct, thereby de-emphasizing group-level boundaries and distinctions. Furthermore, knowledge about the other may increase the perception that distant collaborators are indeed beneficially distinctive – yielding a sense of positive interdependence and complementarity, which has also been linked to stronger affinity (Brown and Wade 1987, Dovidio, Gaertner and Validzic 1998). In fact, Pettigrew (1998) proposes that learning about others is a critical step through which contact improves intergroup relations. Building on the arguments that increased familiarity with the other increases closeness, we hypothesize that direct knowledge of distant collaborators will promote closeness.

Hypothesis 2c: Direct knowledge will be positively related to closeness to distant collaborators.

Reflected Knowledge and Closeness. Interpersonal closeness – the converse of social or interpersonal distance – has been studied extensively in both collocated and distributed contexts. It is frequently linked to cohesion, either conceptually (e.g., Seashore 1954) or by definition (e.g., Huang et al. 2002), and is also tightly linked to identification: close others are spontaneously incorporated into conceptualizations of the self (Aron, Aron and Smollan 1992), resulting in a positive relationship between closeness and identification (De Cremer 2003). In fact, measures of closeness are often used as proxies for, or components of, identification (Hinds and Mortensen 2005, Rockmann, Pratt and Northcraft 2007).

In traditional contexts, closeness has been shown to influence a range of cognitive, interpersonal, and group-level processes and states. It increases individual and group cognitive overlap (Aron et al. 1991, Smith, Coats and Walling 1999), a state in which individuals share similar
cognitive models whereby they see themselves to be similar as others (De Cremer 2003). Closeness among distributed collaborators reduces conflict (Hinds and Mortensen 2005), improves teamwork quality (Hoegl and Gemuenden 2001), and increases both satisfaction (Chidambaram 1996) and performance (Lurey and Raisinghani 2001, Maznevski and Chudoba 2000, Wong 2004). Conversely, lack of cross-cultural empathy may contribute to destructive team dynamics (Earley and Mosakowski 2000). Work by Gudykunst and Kim (1984) stresses the importance of taking on the other’s viewpoint as a means to empathize with a partner in a cross-cultural setting, a point which is also made in subsequent studies by Hammer (1989) and Gibson and Manuel (2003). Gaining reflected knowledge through the belief that one shares the perspectives of distant collaborators is likely to create a sense of shared experience, and a basis for closeness and identification. We therefore expect reflected knowledge to promote closeness.

Hypothesis 2d: Reflected knowledge will be positively related to closeness to distant collaborators.

The Mediated Impact of Knowledge on Trust

Researchers have identified complementary cognitive and affective bases from which people decide whether to trust others (McAllister 1995). Essential to these mechanisms is their ability to mitigate emotional risks and minimize uncertainty around both their own behaviors and those of others, which are essential to the development of trust (Jones and George 1998, Sheppard and Sherman 1998). Key preconditions for trust include the ability to gather evidence of another’s trustworthiness, the knowledge that breaches may irreparably damage valued affective bonds, and the reinforcing effects of prior experiences of trust (Lewis and Weigert 1985). These preconditions for trust are considered to be both the most essential and most difficult to establish in dispersed teams (Joshi, Lazarova and Liao 2009: 241). We argue that increased understanding and closeness engendered by both direct and reflected knowledge may provide these preconditions for mitigating the risks of global collaboration and fostering trust between collaborators

Understanding Others and Trust. When expectations about attitudes and behavior between distant collaborators are not met, misunderstandings arise, leading to cycles of distrust. As Lewis and Weigert (1985) posit, individuals choose to trust based on evidence of trustworthiness that stem from mutual understanding. As a counter, numerous scholars have emphasized the importance of feedback loops, arguing that prior trust-related experience helps to shape future trusting behavior – trust begets trust, while failures of trust undermine it (Mayer, Davis and Schoorman 1995, Philipson 2002, Pratt 2000). As Cramton (2001) argues, poor knowledge sharing, found commonly in distributed collaboration, may be particularly disruptive to the development of trust, especially when perceived to be due to unreliability on the part of the distant collaborators. In fact, understanding the challenges
faced by others has been shown to minimize the tendency for such dispositional attribution (Epley et al. 2002). In accordance, knowing how distant colleagues function in the workplace – and knowing that one can adapt one’s behavior to cohere with their functioning – makes interpersonal interaction more predictable and enhances confidence between participants. For example, Oertig and Buegri (2006) found that face-to-face contact was crucial for distributed teams because it provided the opportunity to make sense of rules for interaction. In fact, strangers are more likely to trust each other to the extent that they are certain of the other’s intention (Ho and Weigelt 2005). In the absence of predictable communication that promotes mutual understanding, Jarvenpaa and Leidner (1999) found that trust in distributed groups suffered. We therefore predict that understanding promotes trust.

**Hypothesis 3a:** Understanding distant others will be positively related to trust.

**Feeling Understood and Trust.** Another promoter of trust is confidence that one’s situation is understood, because it enables collaborators to align their behaviors and diminishes uncertainty about each other’s actions. Armed with greater knowledge of how others view oneself, individuals are able to foresee how their collaborators might respond to their own actions. In turn, when collaborators take on their distant partners’ perspective of themselves, they are increasingly able and willing to align their behaviors to fit their partners’ expectations in the context of this knowledge. The less uncertainty actors experience about their partners’ and their own behaviors, the more accurately they can make the social predictions underlying trust (Lewicki, Tomlinson and Gillespie 2006). Minimizing this uncertainty is paramount, given that doubts about collaborators’ intentions and reliability are central risk factors in building trust (Rousseau et al. 1998: 395).

Moreover, confidence that one’s own motivations are understood is likely to increase the perception of a collaborator’s trustworthiness and, potentially, one’s obligation to reciprocate. For example, recent research on teams suggests that when “one partner perceives another partner’s perception [of trustworthiness],” this perception increases overall trust (Yakovleva, Reilly and Werko 2010: 80), as partners feel obligated and motivated by the trust of another (Pillutla, Malhotra and Murnighan 2003).

**Hypothesis 3b:** Feeling understood by distant others will be positively related to trust.

**Closeness and Trust.** Closeness with distant others provides the emotional connection that influences trust (for a discussion, see Williams 2001) As noted by Jones and George (1998), “People often decide if they can initially trust someone by examining the feelings they have toward that person” (p. 534). Furthermore, affective attachment drives positive behaviors that in turn foster trust (Mayer et al. 1995, McAllister 1995). Closeness provides a basis for such feelings because people associate
positive feelings with those they identify with (Brewer 1979). Two common desires—to maintain social attachments and to be part of a collective—both elicit trusting behavior (Granovetter 1985, Hodson 2001, Leicht and Fennell 2001). Conversely, distrust can arise when people are categorized as distant and belonging to a different group (Gibson and Manuel 2003, Spears and Lea 1992). In addition, closeness tends to further engender trust on the basis of wanting to maintain (not threaten) existing relationships. As noted by Jones and George (1986), betraying emotionally based trust has been shown to trigger a strong emotional response, signaling the need to attend to and potentially reevaluate the relationship (Coser 1974, Hurlbert 1991). Thus, through both an initial positive connection and the fear of damaging the existing relationship, closeness to distant collaborators provides a basis for trust. We therefore predict closeness will be positively related to trust in distant collaborators.

Hypothesis 3c: Closeness to distant others will be positively related to trust

METHODS

Data Collection and Analyses

To test our hypotheses, we conducted a survey study within the “MD” division of “ChemiCo,” a large multinational chemical company. We followed up with interviews to verify the findings from the survey data, enrich our understanding of the collaborators and their experiences, and provide illustrative examples.

Research Setting

The MD division of ChemiCo is responsible for the research, development, and manufacturing of specialty chemicals used in the production of consumer electronics. Produced primarily for a small number of large manufacturers with whom MD has longstanding relationships, the division’s products are highly customized. As a result, members of the MD division work closely with customers to identify their ongoing requirements and tailor MD’s basic offerings to each client’s needs. Primary research and development occurs at ChemiCo headquarters in Germany, with advanced research and development conducted at a research facility in the UK. ChemiCo headquarters also houses the production facility that creates MD’s baseline chemical mixtures. Since MD’s major customers are based almost exclusively in Asia, the division maintains country offices in Korea, Taiwan, Japan, and China (Hong Kong), which handle primary customer relations as well as final customization.

The German headquarters, UK research and development facility, and Asian country offices are highly interdependent, with a complex flow of information and materials circulating among them. The following typical scenario for a product order provides a sense of this complexity. Research and development in the UK designs a new mixture, which it sends to headquarters. Headquarters uses the
design to construct a basic product and sends the recipe and product specifications to the country offices. The latter work closely with local clients to determine customization requirements, which are then transmitted to the laboratories at headquarters, where final design specifications are determined, samples created, and tests run. The samples, along with final design specifications for the required customizations, are then transmitted to the country offices along with generic base mixtures. The country offices are responsible for the final manufacturing process, which involves recombining the generic base chemicals. Thus, while their roles are distinct (research and development vs. sales and production), MD’s sites are highly interdependent, requiring significant interactions among collaborators.

Given the dispersed structure of research and development, with basic production in Europe and sales and final production in Asia, management of the MD division recognizes the importance of coordinating work across sites, the impact of cultural differences, and the importance of facilitating interactions and connections between sites. It sees firsthand experience and knowledge as a means of promoting awareness and understanding. To this end, assignments at other sites are common, and successful completion of at least one expatriate assignment is required for advancement to division-level management.

Procedure and Sample

All ChemiCo MD division employees were informed by an executive via email that they would be contacted by researchers to complete a web-survey on the topic of global collaboration. Employees were assured that their participation would be confidential and voluntary. Shortly afterwards, we contacted employees who had been identified by management as collaborating across sites. Initially, we approached 213 of the approximately 250 members of the division, and received 159 responses, yielding a response rate of 75 percent. Dropping incomplete responses resulted in a final survey sample of 140. Respondents were distributed across six country offices as follows: Taiwan (39), Germany (26), Japan (21), Korea (21), United Kingdom (17), and China (Hong Kong) (16). They worked in a wide range of positions and were highly educated, with the majority holding some form of graduate degree: bachelor (37%), masters (31%), or doctorate (26%).

As noted, we supplemented our survey data with both face-to-face and telephone interviews with a total of 47 ChemiCo employees across the six country offices. Interviewees included individuals who had firsthand experience at another office location as well as those who had no such experience. Our intention was to familiarize ourselves with the work context and employees’ experiences, as well as to gain a greater understanding of how respondents thought about direct and reflected knowledge. Interviews were audiotaped and transcribed.

1 Though additional information on non-respondents was not available, member and manager interviews suggest these non-respondents were not systematically different from the rest of the population.
Measures

**Distant collaborators.** Respondents were asked, early in the survey, to identify the distant collaborators with whom they most often interacted. All subsequent questions were tailored to those collaborators. For example, a respondent who interacted most with members of the Japan office would receive questions of the type: “What is the total amount of time you have spent visiting the Japan office?” [emphasis added]. This ensured that respondents’ answers related to a specific and consistent target, referred to in the remainder of this section as the “distant” office. Precisely who those collaborators were differed for each respondent, reflecting his or her own implicit understanding of distance, as perceptions of distance are likely more critical than objective measures in capturing individual experience and team dynamics (Wilson et al. 2008).

**Firsthand experience of distant collaborators.** To assess firsthand experience, we asked respondents to report the total length of time they had spent at the site of the distant collaborators. Responses were standardized into a per-month measure that ranged from 0 to 138 months. Moreover, to characterize the firsthand experience among ChemiCo collaborators, we coded a subset of our interview data. Firsthand experience manifested as joint problem-solving efforts that appeared in four forms: 1) Expatriate assignments that required an extended stay at a distant collaborator’s site. For example, a lab manager was assigned to serve as a peer coach to develop custom material on quality control and safety issues for a multimillion dollar project that a Taiwanese lab manager oversaw. 2) Assignments that required collaborators to travel to a site several times per year. For example, a focal actor would work at a collaborator’s site two weeks at a time up to seven times per year to focus on a joint project. 3) Customer problem-solving assignments that involved mini-technical development processes. For example, a collaborator may travel to a particular site to engage in technical development on a six to eight week cycle which is not uncommon in chemical development. For example, a customer reports a chemical problem. Collaborators would jointly investigate and solve the problem, and produce new samples that are sent out to customers. Once customers test the new sample, the collaborators visit them jointly to discuss the results. 4) Ongoing engagement as part of a customer account team, such as an intellectual property lawyer who draws up the contract and re-engages with account managers and scientists at specific junctures. These four categories of firsthand experience were common at ChemiCo given the nature of their business.

**Reflected knowledge of distant collaborators.** To measure the extent to which respondents learned about themselves and their home site from visiting their distant collaborators, we asked them: “To what extent has visiting helped you to better understand [the following items] of/at your office?” We focused on three interpersonal dimensions about their site: **personal characteristics,** made up of one item: “people (ex. identities, personalities, values, and roles);” **interpersonal relationships,** comprising two items: “relationships (ex. friendships or sources of advice)” and “reporting
relationships (i.e. who reports to whom);” and work norms, using the following item: “work culture (ex. norms and expectations).” Respondents rated how much understanding they had gained about each dimension on a seven-point Likert scale, anchored by 1 = “not much” and 7 = “a lot.” We found the resulting measure to be reliable, with a Cronbach’s alpha of .86. Thus, we used the mean of the three dimensions as a measure of reflected knowledge.

**Direct knowledge from distant collaborators.** We assessed direct knowledge using a measure similar to the one we used to assess reflected knowledge: “How much do you know about [the following items] of/at the distant office.” (As noted, the word “distant” was replaced with the country office they visited.) Respondents were asked to rate how much they knew about their distant collaborators with respect to the same three dimensions as for reflected knowledge, using the same items, again anchored by 1 = “not much” and 7 = “a lot.” We used the mean of the three dimensions as a reliable ($\alpha = .89$) measure of direct knowledge.

**Understanding distant collaborators.** To measure individuals’ knowledge of appropriate interactions with and expectations from distant collaboration partners, we asked them to rate the accuracy of four statements (e.g., “I know how to give effective feedback to colleagues from the [distant] office” and “I adjust my behavior to let colleagues know that I respect them”). The scale was anchored by 1 = “not at all true” and 7 = “very true.” We found the mean of the four items to be a reliable index ($\alpha = .85$) and used it as the measure of understanding the distant other.

**Feeling understood by distant collaborators.** To measure the extent to which they felt understood by distant coworkers, we asked respondents to rate the accuracy of four statements: “Colleagues from the [distant] office misunderstand my intentions” (reverse scored); “I have been misunderstood by colleagues in the [distant] office” (reverse scored); “I feel confident that my colleagues in the [distant] office clearly understood me after our meetings;” and “I get confused after speaking to my colleagues in the [distant collaborator’s] office” (reverse scored). The scale was again anchored by 1 = “not at all true” and 7 = “very true.” The mean of the four items was deemed a reliable index ($\alpha = .74$) and used as the measure of feeling understood by distant collaborators.

**Feeling close to distant collaborators.** We assessed closeness with a pictorial measure of interpersonal closeness correlated with feelings and behaviors of interconnectedness as used in several other studies (Aron et al. 1992, Hinds and Mortensen 2005, O’Leary and Mortensen 2010, Tropp and Wright 2001). We provided collaborators with a set of six graphical representations of relationships between “self” and “other”, and asked them to select the number that corresponded to the picture that most closely matched their relationship with the other site and its members (1 = “very distant”, 6 = “very close”).

**Trust in distant collaborators.** To measure trust, we adapted Cook and Wall’s (1980) interpersonal trust scale, asking respondents to rate the accuracy of eight statements (e.g., “I can trust the people I work with in the [distant] office to help me if I need it” and “I feel quite confident that my colleagues at the [distant] office will always try to treat me fairly”). The scale was again anchored
by 1 = “not at all true” and 7 = “very true.” The mean of the eight items was deemed a reliable index ($\alpha = .92$) and used as the measure of trust.

To ensure that our measures captured distinct constructs, we ran a factor analysis with varimax rotation on the scale items for reflected and direct knowledge, understanding, feeling understood, and trust. The analysis generated a five-factor solution in which the scale items loaded onto factors that corresponded to our constructs. In addition, we used our pre- and post- survey interviews to verify that subjects viewed the constructs distinctly.

RESULTS

To test our proposed model, we used structural equation modeling (SEM) with maximum likelihood estimation. We used SPSS AMOS (Byrne 2001) version 18 to analyze the saturated measurement model, the structural model corresponding to the full set of hypotheses, and to analyze individual hypotheses (see Table 1 for correlations between key variables).

We assessed model fit using several statistics. First, we used the Chi-square test that assesses the goodness of fit between the reproduced and observed correlation matrices. The non-significant Chi-square [$\chi^2(10) = 15.240, p = .128$] here indicated that the departure between the model in this study and the data is not significant (see Figure 2). Because the Chi-square test is highly sensitive to sample size – with models fitting the data reasonably well rejected due to the moderate-to-large size of the test sample – we also used four other widely used goodness of fit criteria that are not sensitive to sample size (Bentler and Bonett 1980): Normed Fit Index (NFI, Bentler and Bonett 1980), Incremental Fit Index and Tucker-Lewis Index (IFI & TLI, Bollen 1989), and Comparative Fit Index (CFI, Bentler 1990). These indices have expected values of 1.00 when the hypothesized model is true, and a value of .90 or higher suggests an adequate fit (Bentler and Bonett 1980). The values for all four within the saturated model indicated an excellent fit (NFI = .93, IFI = .98, TLI = .95, and CFI = .97). Finally, we used the Root Mean Squared Error of Approximation (RMSEA, Steiger and Lind 1980).

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2 The measure for identification was not included in our factor analyses as it was based on a pictorial representation.

3 We assessed variable normality and found non-normal distributions for firsthand experience, reflected and direct knowledge, understanding, feeling understood, and trust. Transforming these variables successfully reduced skewness and kurtosis, and models with transformed and untransformed variables were identical with respect to significance of both model and individual weights. We report results for transformed variables as they yielded models with slightly better overall fit.
which is an estimate of the discrepancy between the original and reproduced covariance matrices in the population. A RMSEA of under .05 represents a close fit and RMSEA of .08 represents a reasonable fit (Browne and Cudeck 1993). Our saturated model yielded a RMSEA value of .06.

In hypothesis 1 we predicted that firsthand experience would be positively related to individuals’ reflected knowledge. As expected, the path was significant in the model, with a weight of $\beta = .43 \ p < .001$. Thus, we find support for hypothesis 1.\(^4\)

In hypotheses 2a, b, c, and d we predicted that direct knowledge would be positively related to understanding distant colleagues (2a), while reflected knowledge would impact perceptions of being understood (2b), and that both direct (2c) and reflected (2d) knowledge would be positively related to closeness to distant collaborators. Both the path linking direct knowledge and understanding collaborators and the path from reflected knowledge to feeling understood by distant others were significant and positive ($\beta = .53 \ p < .001$, and $\beta = .28 \ p < .05$, respectively). The paths leading to closeness from both direct ($\beta = .28 \ p < .01$) and reflected ($\beta = .23 \ p < .01$) knowledge were both positive and significant. Thus, we find support for hypotheses 2a-d. Finally, in hypotheses 3a, b, and c, we predicted that understanding coworkers (3a), as well as feeling understood by (3b) and close to (3c) distant colleagues would be positively related to trust. All three hypotheses were supported, as all paths were significant and in the expected direction (understanding distant others: $\beta = .17, \ p < .001$; feeling understood by distant others: $\beta = .30, \ p < .001$; closeness: $\beta = .25, \ p < .01$). Thus, the model as a whole was supported, as were all individual paths.\(^5\)

**DISCUSSION**

In this study, we demonstrate how distributed collaborators can gain trust through a novel source of information—reflected knowledge—that draws from the insights gained about one’s work

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\(^4\) Similarly, as assumed, firsthand experience also increased direct knowledge ($\beta = .39 \ p < .001$).

\(^5\) We tested alternative explanations and models including: a) direct paths from firsthand experience to trust, b) paths from reflected knowledge to understanding, c) paths from understanding to feeling understood, d) all paths listed in a-c, e) closeness as an antecedent, rather than effect, of reflected and direct knowledge, f) generalized cultural intelligence as driving both reflected and direct knowledge either alongside or instead of firsthand experience, g) measures of communication via different modalities (face-to-face, video, phone, instant message, and email), as well as combinations thereof (mediated vs. direct, synchronous vs. asynchronous, rich vs. lean media), and h) measures of interdependence with colleagues at the distant site. All alternative models were either a poor fit for our data – based on indices of fit – or the added paths did not change or reduce the significance of the paths in the presented model. In the interest of parsimony we have not included these here, but these analyses are available from the authors on request.
site and relationships through the eyes of collaborators. We develop and test a model of the relationships linking firsthand experience, reflected knowledge, and trust among distant global collaborators – as opposed to just direct knowledge that has been the primary focus in the literature. We find that direct knowledge and reflected knowledge – capturing information about how others perceive our own personal characteristics, relationships, and behavioral norms – differentially affect interpersonal dynamics across distance. Our study makes contributions to theory and research on trust, global collaboration, and reflected appraisals in several ways.

First, our model locates the antecedents to trust in the self-knowledge gained through vicarious experience of another’s perceptions. Extant literature on the development of trust has mostly emphasized direct knowledge about the trustworthiness of the person that a focal actor interacts with (trustee). Although our findings support prior research in this vein, we also expand on and re-focus the foundational model of organizational trust formulated by Mayer, Davis, and Schoorman (1995). In a meta-analytic review of the organizational literature on trust, Colquitt, Scott, and LePine (2007) found unique and enduring effects of trustee characteristics, such as benevolence and integrity, on the development of trust, through both cognitive and affective means. Our research expands this important finding. We find that perceptions of trustworthiness emerge not only from direct knowledge that, for example, targets will be reliable or adhere to similar principles. Increased interpersonal connections known to foster trust do not occur merely through increased knowledge of another’s worthiness to be trusted, however, but also in the knowledge garnered by taking on the perspective of another. Reflected, not just direct, knowledge shapes our perception of another’s trustworthiness.

Along these lines, we have shown the impact of these forms of knowledge to be conceptually and empirically distinct: self- vs. other-directed knowledge generation. For example, in their study of the impact of communication frequency on perceived trustworthiness between managers of a multinational corporation, Becerra and Gupta (2003) argue that frequency of communication mediates the level of perceived trustworthiness. They argue that greater communication allows managers to gain greater information about the other manager’s individual characteristics, and thus their capacity to be trusted. We have shown that the increase in trustworthiness found in this study, and the development of trust in general, is likely due to this direct knowledge, but also to knowledge gained about the self from those interactions. Managers’ greater frequency of communication is likely to elicit greater reflected knowledge, with its concomitant impact on thoughts and feelings about each other.

Second, and perhaps more interestingly, our research shows that the development of trust does not lie solely in perceptions of the person that the focal actor trusts, but also in how focal actors feel about themselves through vicarious self-knowledge. While research in domains like perspective-taking have highlighted the multiple benefits of stepping into the shoes of the other (Galinsky and Moskowitz 2000, Galinsky and Mussweiler 2001), they have focused on a broad set of effects that arise primarily from being exposed to another’s experience. In short, by experiencing the environment
of the other, actors can better understand other’s behaviors – in effect counteracting the fundamental attribution error (Ross 1977). As such, the benefit occurs because the actors have more information about the other. We, in contrast, suggest that benefits from reflected knowledge also occur because the actor gains information – filtered through the view of the other – about their own work context. In fact, our results suggest that feeling understood has a greater impact on trust formation than mere understanding of the other alone. Along these lines, by missing the importance of reflected self-perception, organizational research that emphasizes the relational nature of the development of trust, either conceptually (e.g., Jones and George 1998) or empirically (e.g., Yakovleva et al. 2010), overlooks the extent to which trust building occurs through reflected knowledge, and not just the joint impact of direct knowledge. It is not just that we know others better and are thus more likely to trust them. Trusting relationships, we argue, are also developed through how we come think about ourselves and our work sites.

Third, research on global teams has emphasized the importance of the development of mutual knowledge, shared context and shared identity for successful distributed work (Cramton 2001, Hinds and Mortensen 2005). Our results contribute to this literature by shedding light on one mechanism that is likely as important for these processes in general as it is for the development of trust in distributed teams in particular. Common to work on distributed teams is the notion that understanding, adapting to, and empathizing with distant others is crucial to avoiding conflict and enabling productive work process, as these capacities undermine the tendency for in-group biases, ethnocentrism, and the emergence of faultlines common in distributed teams (Cramton and Hinds 2005, Polzer et al. 2006, Salk and Brannen 2000, Von Glinow, Shapiro and Brett 2004). While the capacity to understand a distributed colleague’s context and the ability to connect under a common identity are critical to cross-cultural collaboration, knowledge of another’s situation is only part of the equation. Our research has uncovered the extent to which reflected knowledge deepens distributed colleagues’ feeling of closeness to their distant colleagues and perceptions of shared understanding.

Moreover, by distinguishing between direct and reflected knowledge, our approach provides insight into how misunderstandings can occur in distributed collaboration. For example, Cramton (2002) argues that misunderstandings are borne out of the reduced social knowledge about collaborators. Our findings suggest however that, in at least some cases, it might be the lack of reflected knowledge that leads to misunderstanding. In so doing, we provide an alternative and complementary explanation for how the type of knowledge (direct versus reflected) might shape mutual (mis)understandings among collaborators.

Fourth, a main contribution of this work is to evaluate empirically the role of perspective taking, a mechanism largely theorized to be of importance for distributed teams, for cross-cultural collaboration. For example, Cramton and Hinds (2005) write of the potential of ethnorelativistic thinking—“taking the perspective of the other group and understanding the world, including one's own group, through the other group's eyes”—to foster greater cross-cultural learning (p. 238). Yet
they emphasize behavioral adaptation and empathy as the critical outcomes of that perspective taking. While adjusting to and identifying with distant co-workers is indeed important, our research also details the ways in which gaining greater understanding of one’s own work group through another’s perspective creates the conditions for the positive potential in cross-cultural teams.

Finally, an additional contribution of this research is to further the conception of reflected knowledge, which has tended to emphasize the looking-glass self in the context, for example, of intimate relationships or perceived attractiveness (Felson 1985, Tice and Wallace 2003). In contrast, by operationalizing reflected knowledge about one’s home office, we further theory on looking-glass selves; individuals interpret reflected knowledge not only about themselves as individuals, but also themselves as identified with their work context. The tendency for sub-grouping in distributed teams may mean that reflected knowledge about one’s sub-group, rather than oneself, is even more critical for breaking down the barriers cultural and national distinctions tend to raise. Further research is needed to fully develop the relative impact of reflected knowledge internalized about the self versus a group to which one belongs.

Limitations and Conclusion

As with all studies, our choice of data collection and analytic procedures limit the type of claims that we can make. Additional conceptual and empirical development can further sharpen the reflected knowledge construct as a basis for future research. Empirically, though our data supported the presence of reflected knowledge that is gained through firsthand experience, we relied on our qualitative data to capture the specificity that arises from firsthand experience at ChemiCo. We therefore view our results as suggestive rather than conclusive. Additional research on firsthand experience and reflected knowledge would help establish construct validity.

Conceptually, while we offer an important first look at the differential effects of direct and reflected knowledge, we do not delve deeply into the relationship between the two constructs and their subsequent effects on attitudes, behavior, and interpersonal dynamics. Moreover, reflected knowledge may be expected to drive behavior more strongly than direct knowledge. Such a pattern remains an empirical question to be further studied. Also, the two types of knowledge are likely to reinforce and strengthen each other. Furthermore, as noted, these findings are not inherently tied to geographically dispersed contexts; one might expect to see similar effects in collocated cross-cultural groups. Thus further research examining direct and reflected knowledge in both distributed and collocated contexts may yield fruitful insights.

In addition, we do not address questions about the extent to which actors can and do generalize their firsthand experience across multiple and varied distant sites, nor the effects of potential misapplications of that information. In this particular context it is not clear, for example, whether firsthand experience gained by an individual from Germany who spends time in the Japan office would result in better (or worse) understanding of the context and issues in the Taiwan office. This may hinge on the extent to which that individual can and does generalize (or differentiate)
knowledge across sites. Such experience may, in fact, have a negative effect if it leads collaborators to over-generalize and assume they have a better understanding of a related, yet distinct, context than is actually the case (e.g., assuming that knowledge gained about Japan will translate to the Taiwanese context). Related research on perspective-taking has suggested that, while it increases sensitivity to the target group, sensitivity does not necessarily translate to other similar groups, and may actually decrease such sensitivity (Galinsky 1999) or lead to preferential treatment (Batson et al. 1995). We would expect such bias to be driven by the extent to which an individual differentiates between the “other” contexts, but there is a need for further examination of the way individuals define and distinguish between their distant collaborators.

Finally, we do not examine the effects of negative firsthand experiences on collaborations. Although firsthand experience has the potential to be both positive and negative, the sentiment throughout the MD division of ChemiCo was that it was beneficial to working relationships; site visits were conceived as a means of improving relations. In contrast, where experience arises from emergency “fire-fighting” visits, it could be expected to have negative effects on closeness, and might or might not affect cross-cultural relationships. Our research data, however, did not allow us to examine such potential effects.

Increasingly, organizations rely upon firsthand experience as a means to cope with the problems that arise in global collaborations. This study takes a first look at the mechanisms through which such experience cultivates trust and improves collaboration. It also highlights the critical role that reflected knowledge can play in providing collaborators with information not simply about their distant counterparts, but about the way those counterparts perceive them.
REFERENCES


De Cremer, D. 2003. The closer we are, the more we are alike: The effect of self-other merging on depersonalized self-perception. *Current Psychology* **22**(4) 316-325.


Leonardi, P. M., T. B. Neeley, E. M. Gerber. 2011. How managers use multiple media: Discrepant events, power, and timing in redundant communication. *Organization Science* **Published online before print.**


O'Leary, M. B., J. N. Cummings. 2007. The spatial, temporal, and configurational characteristics of geographic dispersion in work teams. *MIS Quarterly* 31(3) 433-452.


Seashore, S. E. 1954. *Group cohesiveness in the industrial work group*. Univ. of Michigan, Survey Research.


Steiger, J., J. Lind. 1980. Statistically based tests for the number of common factors. *annual meeting of the Psychometric Society, Iowa City, IA 758*.


### Table 1: Correlations between variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Firsthand Experience</td>
<td>1.19</td>
<td>0.90</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Reflected Knowledge</td>
<td>27.94</td>
<td>15.97</td>
<td>0.43***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Direct Knowledge</td>
<td>21.66</td>
<td>10.96</td>
<td>0.39***</td>
<td>0.48***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Feeling Understood</td>
<td>9.08</td>
<td>6.53</td>
<td>0.07</td>
<td>-0.21*</td>
<td>-0.12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Closeness</td>
<td>3.71</td>
<td>1.12</td>
<td>0.14</td>
<td>0.37***</td>
<td>0.39***</td>
<td>-0.14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Understanding</td>
<td>4.83</td>
<td>1.14</td>
<td>0.23**</td>
<td>0.32***</td>
<td>0.54***</td>
<td>-0.26**</td>
<td>0.27**</td>
<td></td>
</tr>
<tr>
<td>7 Trust</td>
<td>30.31</td>
<td>9.52</td>
<td>-0.03</td>
<td>0.11</td>
<td>0.30***</td>
<td>-0.38***</td>
<td>0.34***</td>
<td>0.31***</td>
</tr>
</tbody>
</table>

Note: Table represents transformed values; *p < 0.05, **p < 0.01, ***p < 0.001
Figure 1: Model of relationships

Cognitive Impact
- Understanding Distant Collaborators
  - (H2a)
- Feeling Understood by Distant Collaborators
  - (H2b)

Affective Impact
- Feeling Close to Distant Collaborators
  - (H2c)
- Trust Distant Collaborators
  - (H2d)

Figure 2: Structural equation model for reflected and direct knowledge using minimum least squares estimates

Cognitive Impact
- Understanding Distant Collaborators
  - (H3a)
- Feeling Understood by Distant Collaborators
  - (H3b)
- Trust Distant Collaborators
  - (H3c)

Affective Impact
- Feeling Close to Distant Collaborators
  - (H3d)

Note: Chi-square = 15.194 (10 df)

p = .128