TRUST AT NO SIGHT: ESTABLISHING TRUST IN THE PROCESS RATHER THAN IN THE INDIVIDUAL MEMBERS OF A GLOBAL VIRTUAL TEAM

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ABSTRACT

Current research has established the importance of establishing individual trust in global virtual teams to achieve project success. Global virtual teams (GVTs) emerged as a result of the growth of multi-national corporations (MNCs) conducting business operations in more than one country. This research explores eliminating the need to establish individual trust among the members of short-lived global virtual teams and suggests an institutional trust in the project's processes can suffice. Beginning with an exploration of various aspects of trust, it draws from the current literature on individual and institutional trust in the real and virtual worlds. The data were gathered using two versions of an online survey administered to global virtual teams working for Infosys®, Inc., a global leader in technology services and consulting. The analysis was limited to small, short-lived Information Technology (IT) virtual teams of four to six members. Survey responses were received from 273 managers and 195 virtual team members. The results found support for institutional trust in the process, established through the team members' favorable perception of their project's online processes, as having a significant effect on supporting both individual trust among the team members, as well as ensuring project success. The paper concludes with potential costs and benefits to multi-national companies in their management and training of virtual teams. Finally, I provide suggestions for further research into the elimination of trust building exercises for short-lived virtual teams, as well as implications of these results for academicians and practitioners.

Key words: trust, trustworthiness, reliance, process knowledge, multi-national Companies (MNCs), global virtual teams, computer-mediated environments

ACKNOWLEDGMENTS

In order to conduct this research, I sought to identify an appropriate research subject, i.e., a multi-national corporation with many small, short-lived global virtual teams. In this effort I was greatly supported by one of my fellow Fox doctoral cohort members, Ms. Irene M. Graff. Ms. Graff is a Senior Manager of Business Operations, Apple Pay at Apple Inc. It was through her connections that Infosys®, Inc. agreed to participate as the subject of my research.

This research subject has clients in more than 50 countries and assists in the creation and execution of strategies for their digital transformation. With nearly 200,000 innovators, they have Information Technology (IT) global virtual teams of diverse sizes and project durations. I limited this research to small, short-lived IT virtual teams of approximately four to six members. Infosys® was not asked to limit the primary study sample to only those projects deemed successful.

I received permission from Infosys®, to conduct two online surveys (Survey 1: Pilot Study and Survey 2: Primary Data Collection). Infosys® only condition to participating in the study was that I share with the company my eventual findings on the effects of institutional trust in the process versus the need to establish individual trust among the virtual team members.

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CHAPTER 1

INTRODUCTION

This research explores the relationship between perceptions of an organization's processes, institutional trust, and team outcomes. Specifically, this research examines a very particular type of team—small, short-lived global virtual teams.

This research began with the seeds first sown during my service with the US Navy. As a dual-qualified Navy Pilot and Surface Warfare Officer, I had the privilege of participating in missions that required some aspect of trust in both the real and virtual worlds of operations. Those seeds lay dormant until first nurtured during my doctoral academic studies at Temple University's Fox School of Business.

During those engaged scholar weekends, the concept of trust and its many variations were superficially explored as a topic that might be of interest to some of my colleagues. In fact, I became fascinated with the many facets of trust as I had experienced during my naval service days. The seeds began to germinate, and this paper is my attempt to build with the reader a bridge between what we understand as individual trust with the alternative of institutional trust in the real and virtual worlds that we currently live, work, and play.

As a US Navy pilot, I became fascinated with the mission interoperability of various types of aircraft crewed by different nationalities, all conducting missions requiring covert coordination of inflight activities. Having logged over 4,000 flight hours in multiple variations of Lockheed's P-3 Orion, I have significant personal experience in flying long-range, maritime patrol aircraft for the US Navy in the 1970's and 1980's.

Consequently, I can state unequivocally that maritime aircrews effectively operated as Global Virtual Teams (GVTs).

We flew missions with other multi-national armed forces, in effect assigned from various countries throughout the world acting as part of a Multi-National Corporation (MNC). These flights were often conducted in inclement weather; during nighttime conditions; without visual guides; and with electronic communications strictly forbidden between the oncoming and off-going aircraft. The mission commanders "swapped" or exchanged their aircrafts' altitudes and mission parameters "in the blind," i.e., without knowing exactly where the other aircraft was physically operating.

Often, we flew in hostile and unforgiving environments. The pilots and crewmembers had, as likely as not, never had the opportunity to meet with their counterparts. Consequently, the trust we shared as individuals on an organic flight crew was impossible to establish through face-to-face training and social interactions with our counterparts. As a consequence, trust in the other individual crews became an irrelevant factor to the success of the mission, as establishing a sense of individual trust in our fellow airmen of the other aircrafts' crew members simply was not practicable.

In retrospect, I came to believe that some unidentified factor must have existed to supplant the need for establishing individual trust in the other flight crewmembers. My sense is that variable was imbedded in the requirement to gain an in-depth process knowledge of all facets of the mission, e.g., knowledge of the mission profile, flight safety, aircraft systems, and rules of engagement. Combined with a keen sense of personal responsibility for their own crew's role, missions were successfully

accomplished not because of a sense individual trust placed in the other flight crews—rather I believe that it was in an institutional trust in the mission's operational processes.

Through the aircraft preflight inspections, mission briefing, rules of engagement, mission skills, and post flight debriefings to share lessons learned, we learned to place our trust in the process. These lessons learned provided a favorable perception of the process that, when shared with future crews, would build a foundation of corporate knowledge leading to the crews placing their institutional trust in the mission process.

As a result of my experiences, I decided to investigate if institutional trust in the military processes had valid application in civilian virtual team activities. I intend to demonstrate how we choose to place our institutional trust in various real-world and virtual processes, without feeling the need to establish a sense of individual trust in the operators of the services in which we engage. The focus of this research will center solely on global virtual teams, and the effects of institutional trust in their processes.

This paper explores why through gaining an understanding of the processes in which we engage, or through an understanding of the organizational rules of the engagement, we gain a level of process knowledge. Through this in-depth knowledge of the online processes involved, we establish perceptions in our expectations of the services to be provided, performance standards, safety rules, and government oversights involved in the activity.

The following chapters begin with a review of the existing literature (Chapter 2) on the various concepts of trust, i.e., individual trust, collective trust, and institutional trust in the real and virtual worlds. Virtual worlds can be seen as the offspring of a marriage of two distinct fields within the Internet. Yesha suggested that, "The father field

is ‘Virtual Reality,’ the mother field is ‘Gaming Worlds,’ and the related fields range from economy, sociology, and law, to biology, computer science, and mathematics” (Yesha, 2008, page 2). Virtual worlds, as Castronova argues are “neither fantasy (constructions of the mind) nor reality (impositions of nature). They are Artistry: mental constructs expressed by their creators in whatever media the physical world allows” (Castronova, 2001 page 6).

These theories on individual trust, collective trust, and institutional trust in the real and virtual worlds are used as a backdrop for an exploration of process knowledge, and how that antecedent can lead to our sense of institutional trust in the processes we encounter in our daily lives. Using our shared experiences of having institutional trust in process lays the foundation for my studies on institutional trust in the virtual world processes of global virtual teams. Chapter 3 discusses the results of Study 1, an initial study that includes data collection and analysis (N=50), where I interpreted the data to serve as theory building for the paper.

In Chapter 4, the initial findings from Study 1 are restructured into this dissertation, an exploration of the four hypothesis of the Revised Conceptual Model (Figure 4) from data gathered from a larger group of virtual team members and their project managers (N>400). Here the resulting data set is analyzed quantitatively to identify any significant connections between institutional trust in process and the participants’ process perceptions. Once the analysis of the dissertation data is completed, I explain what their correlations suggest in terms of individual trust and project success in small, short-lived global virtual teams.

Finally, Chapter 5 presents a discussion of the study's contribution to theory and managerial practice. It includes the limitations of the study and concludes with recommendations for future research. Most notably, this study offers the potential for a further evaluation of the current belief of the need for teambuilding training for virtual and real world teams.

CHAPTER 2

LITERATURE REVIEW

The first section of this literature review is divided into three concept areas with the focus on Individual Trust, Collective Trust, and Institutional Trust (occurring in both Physical and Virtual Realities). The current research explores trust in relation to individuals, institutions, and processes in the virtual world (Germain, 2011; Daim et al., 2012; Pinjani & Palvia, 2013). Although existing research focuses on the terms of trust and trustworthiness, these terms are often erroneously used interchangeably (Mayer et al., 1995; Colquitt et al., 2007; Holtz, 2015). I attempt to clarify this confusion in the "Individual Trust" sub-section.

Next is an exploration of a person's ability to substitute institutional trust in the process for the need to establish individual trust in people. The virtual world operates in computer-mediated environments (CMEs) such as the World Wide Web. These CMEs depend upon computer interfaces to conduct business and social interactions (Zaheer et al., 1998; Pavlou, Tan, and Gefen, 2002; Resnick and Zeckhauser, 2002; Pikkarainen et al., 2004; Ratnasingam et al., 2005). These online environments require a different type of trust than that of placing one's trust in individuals (Section 2). In these CMEs human interactions are often "faceless" and have no personal identity during the user interface. In this section I establish a bridge from the military virtual team experience into our everyday world of virtual interactions.

The emergence of large, multi-national corporations (MNCs) occurred as the world of commerce shifted its focus from developed nations providing finished goods and services to other less-developed nations. The new world economy now reflects these multi-

national corporations operating from different countries, and drawing on their various physical, intellectual, and human resources to deliver goods and services to customers throughout the world (Section 3). As a result these multinational corporations demanded interoperability from their human resources across country boundaries (Boudreau, Loch, Robey, and Straub, 1998). This demand resulted in the creation of global virtual teams working in computer-mediated environments (McDonough III, 2000; Germain, 2011). These virtual teams communicate in synchronous and nonsynchronous computer-mediated environments; often in different time zones; with different language challenges; and differing corporate cultures (Krebs, Hobman, and Bordia, 2006).

The focus of current research in conducting operations in computer-mediated environments centers on two activities: commerce and gaming. These activities require the user to place their trust in the institutions' rules, reputation, and results (Iacono, and Weisband, 1997; Kramer, 2010). This paper describes this institutional trust in online commerce and gaming, and compares this to a similar institutional trust in global virtual teams and their online processes (Section 4).

The closing section of Chapter 2 provides definitions of the concepts discussed, their dimensions, as well as representative references used in this paper (Table 1).

Section 1: The Various Facets of Trust

To explore this topic, I performed a literature search using the following keywords: *trust*, *trustworthiness*, *reliance*, and *propensity to trust*. I used Temple University's online library's advanced search tools and focused on the databases of *Business Source Complete* and *Academic Search Complete*. In addition, I used *Google Scholar* to identify published articles in print, as well as unpublished working papers.

I then divided this section into three concept areas with headings of *Individual Trust*; *Collective Trust*; and *Institutional Trust* (occurring in both Physical and Virtual Realities). Throughout my research I found support in the literature beginning with the observation that "…the literature [on trust] as a whole is not well integrated and lacks coherence" (McEvily and Tortoreiello, 2010, page 23).

Individual Trust

As Ernest Hemingway once stated: "The best way to find out if you can trust somebody is to trust them" (September 5, 2012). The construct of individual trust centers on a positive and confident expectation in the expected behavior of another party (Germain, 2011; Daim et al., 2012; Pinjani and Palvia, 2013). Trust is considered as faith in others' behavior and goodwill that can grow or vanish due to interactions and experiences (Hakanen and Soudunsaari, 2012). In 2002 Stolle wrote, "Trust is a public good and it is important for individuals, for communities, for regions, and for nations" (Stolle, 2002, p. 397).

Individual trust enables people to take risks in relationships (Tyler, 2001; Hall, 2002). Kramer further defined the trust relationship: "Specifically, trust involves a *truster* (the subject rendering a trust judgement), a *trustee* or set of trustees (the object or targets of that judgment), and a specific domain or context which trust judgments arise or apply" (Kramer, 2010, p. 84).

Trust can be viewed from a rational or a social perspective (Jarvenpaa, Knoll, and Leidner, 1998). Most research on individual trust takes the rational perspective (Kramer and Tyler, 1996). From a rational or strategic perspective, trust to place oneself at risk is a decision to be vulnerable based on an expectation of reciprocity for favorable treatment

by another party (Mayer, Davis, and Schoorman, 1995; Stolle, 2002; McEvily and Tortoreiello, 2010).

The rational perspective centers on the calculus of self-interest (Jarvenpaa et al., 1998). Increases in individual trust decrease transaction costs of relationships because individuals must engage less in self-protective actions in preparation for the possibility of others' opportunistic behavior (Mayer, Davis, and Schoorman, 1995; Lewicki et al., 1995; Jarvenpaa et al., 1998; Stolle, 2002). This rational, calculation-based trust is based on the rational considerations of cost and benefit (McKnight, Cummings, and Chervany, 1998).

The social exchange literature identifies two critical components of trust. First, trust includes the built-in vulnerability that exists in the absence of any formal contracts, wherein one party risks the possibility of the other party not meeting its obligations. (Colquitt, Scott, and LePine, 2007). As a result, social exchange relationships cannot exist without the presence of trust (Blau, 1964).

Second, the assets of trustworthiness can offer a "currency" for a social exchange relationship. People who identify with a social group take on the needs of others as their own personal goals (Lewicki, Bunker, and Benedict, 1995). A social group holds values regarding one's obligations to others (Jarvenpaa et al., 1998). Through the act of demonstrating concern, or acting in accordance with accepted principles of behavior, trustworthiness can be established. This could lead to reciprocal behaviors in the other party (Lewicki et al., 1995; Colquitt et al., 2007). The foundation for this social perspective on trust rests upon the premise that people trust those they share a common identity with much more than those with whom they do not (Kramer, Brewer, and Hanna, 1996; Stolle, 2002).

There still exists some ambiguity about the definition and conceptualization of trust versus trustworthiness. The breadth of literature spans a variety of disciplines and offers a rich topic for discussion (Colquitt et al., 2007). The challenge is to differentiate between impressions of trustworthiness and the psychological state of trust (Mayer et al., 1995; Holtz, 2015).

In an effort to clarify some of this confusion, Mayer, Davis, and Schoorman's (1995) integrated model separated trust from trustworthiness. Trust was defined with three characteristics of the trustee, i.e., ability, benevolence, and integrity; while trustworthiness refers to the competence and character of the trustee (Mayer et al., 1995).

Delving deeper into the three characteristics of trust seems to reiterate the same attributes of trustworthiness. *Ability* refers to knowledge and skills required of a specific task, including the ability to demonstrate interpersonal skills and the general wisdom to succeed in an organization. *Benevolence* is defined as the propensity for a trustee to wish to do good for the trustor. *Integrity* is defined as the as the extent to which a trustee is believed to adhere to sound moral and ethical principles (Mayer et al., 1995; Jarvenpaa et al., 1998; Colquitt et al., 2007).

That said, mainstream conceptualizations view trust as encompassing more than merely the predictability of another person's behavior (Perrone, Zaheer, and McEvily, 2003). Kramer further elaborated by stating that therefore: "… positive expectations about others facilitate positive behaviors when interacting with them; those behaviors, in turn, strengthen positive expectations; hence a virtuous cycle in which expectation and action collude to create and reinforce desired outcomes" (Kramer, 2010, page 83).

When we decide to trust another person, we adopt the "participant stance" towards them (Holton, 1994). The participant stance is essential to separate examples of trust in individual relationships, versus reliance relationships wherein we place our trust in machines, processes, and systems (Wright, 2010). Resentment due to someone hurting us, and gratitude because someone helped us, are examples of the attitudes that we feel towards people. We are disappointed when a machine malfunctions, or a system fails to meet our expectations, but we do not have a sense of resentment toward the machine or the system (Holton, 1994; Wright, 2010).

Collective Trust

I now explore the concepts of trust in groups referred to a collective trust. The challenge of examining collective trust in intra-firm engagements rests in translating the concepts of individual trust to that of organizational trust. In literature, placing trust in individuals and placing trust in collective entities (e.g., groups, organizations, industries, and institutions) are often used interchangeably (Jarvenpaa et al., 1998; McEvily, Weber, Bicchieri, and Ho, 2002). Unlike interpersonal trust placed in a specific individual, collective trust is placed in an organization and its collective membership. To establish this group identity, prerequisites such as geographical proximity, frequency of interactions, and an expectation of a "common fate" must exist (Kramer et al., 1996; Stolle, 2002; Kramer, 2010).

While individual trust and collective trust are related, they are distinctly different. It is the individuals within the organization who are deciding to trust, (or distrust), and not the organization itself (Zaheer, McEvily, and Perrone 1998). Rather than being directed at a

specific individual, collective trust is an aggregate social system comprised of several individuals choosing to place trust in an organization (McEvily et al., 2002).

Collective trust within an organization revolves around the members' positive expectations of the behaviors of others. This positive expectation engenders their own positive behaviors when interacting with fellow employees (Jarvenpaa et al., 1998). Through these behaviors, positive expectations are reinforced and the resulting cooperation leads to a sense of intra-organizational trust. In larger organizations, trust becomes more impersonal and more complicated (Kramer, 2010).

Due to the complexity, diversity, and geographic dispersion of large multi-national corporations (MNCs), a corporate culture that engenders this sense of impersonal trust is required. Unlike the "thick" interpersonal trust based upon a sense of trustworthiness, this "thin" trust differs as there are multiple trustors, multiple trustees, and multiple domains requiring interactions between the parties involved (Kramer, 2010).

Organizational rule systems provide the mechanisms for providing shared assurances that facilitate trusting behavior in collective contexts. By reliance on the process as defined by these rule systems, participants can have positive expectations of organizational interactions. This trust in the process can render sensible and productive judgements regarding the binding structure of rules guiding their colleagues' behaviors (Kramer, 2010). This rule-based system guides my belief that a company's Human Resources Managers can instill institutional trust in the process through training for virtual team members.

Finally, while it might appear that having a sense of an individual's trustworthiness is the precursor to trust, there is another line of thought as to an antecedent of trust that can

be found in the propensity to trust. (Mayer, Davis, and Schoorman, 1995; Mayer et al., 1998). This personality-based factor arises when there has been insufficient time to develop a sense of another's trustworthiness. This propensity to assign interpersonal trust is the expectancy that another's words or promises can be relied on (Kramer, et al, 1996). This propensity to trust may be especially germane in cross-functional teams, reorganizations, and new ventures wherein trustworthiness cannot be initially established. (McKnight et al., 1998; Colquitt et al., 2007). This antecedent to trust without establishing trustworthiness could be significant for trust in virtual teams.

Institutional Trust (Physical Reality)

McEvily et al. (2002) observed that: "To a large extent placing trust in individuals and placing trust in collective entities (e.g., groups, organizations, industries, institutions) are used interchangeably in the literature and without specific consideration for whether differences in the object of trust are meaningful or appropriate" (McEvily et al., 2002, pages 2-3).

In support Schoorman et al. (2007) stated: "Just as perceptions about an individual's ability, benevolence, and integrity will have an impact on how much trust the individual can garner, these perceptions also affect the extent to which an organization will be trusted" (Schoorman, Mayer, and Davis, 2007, p. 345). Through an understanding of the processes involved (process knowledge and perceptions), we establish expectations of the services to be provided, based upon established performance standards, safety rules, and government oversights involved in the activity. Institution-based trust assures the protection that individuals receive from the guarantees and safety nets provided by institutions (McKnight et al., 1998).

Institutional trust in the physical world is based upon firsthand experiences observed in the interactions between organizations. In intimate business communities, the ability to predict the behavior of a particular individual is based upon familiarity with previous behaviors. To understand trust within and between organizations requires an examination at both the macro and micro level of organizations (Zaheer et al., 1998; Schoorman et al., 2007).

Like individual trust, three contributing factors (antecedents) for interorganizational trust have been identified as ability, benevolence, and integrity as leading to institutional trust. Schoorman et al. (2007) explained that: "At higher levels of analysis, such as between organizations, viewing the trustee in terms of ability and integrity seems to be well accepted" (Schoorman et al., 2007, page 345).

Ability at the macro level is the belief of one company in another organization's potential to perform. An example would be the belief that a particular supplier has the ability to provide a quality service or product. If the supplier is considered benevolent it is due to a perception that the supplier has a strong interest in serving the buyer's needs. If the supplier has a history of inconsistent delivery performance, its integrity might be suspect and trust withheld by the buyer (Mayer, Davis, and Schoorman, 1995; Schoorman et al., 2007).

But at this macro level, companies are primarily motivated by their own fiscal interests. In support Schoorman, et al. (2007) suggested that: "Benevolence between corporate entities is the extent to which a party is believed to want to do good for the trusting party, aside from an egocentric profit motive. Does the other company hold the focal company's best interests as highly important?" (Schoorman et al., 2007, page 345).

Only in sole proprietorships might there be strong bonds of institutional trust due to the proprietors themselves sharing a sense of individual trust between them. However, interorganizational trust at the macro level can be observed in acts of benevolence (e.g., allowing benchmarking) from a potential partner in a joint venture that might help to build interorganizational trust.

Psychological models try to explain why organizations trust, and why trust increases or declines over time. While many models suggest the necessity for "goodwill" to be present to facilitate trust, Holton provides an example wherein goodwill is absent, yet trust is present. He uses the example of two armies, not only lacking goodwill to each other, actively having ill will toward each other. Yet, when one raises a white flag and trusts the other side not to fire upon them, trust is present without goodwill (Holton, 1994, p. 65).

At the micro level, most interorganizational activities involve some level of interdependence between individuals of differing organization. An individual within one organization may claim to trust another organization but may only be referring to the trustworthiness of a specific individuals in the other organization. (McEvily, *et al*, 2002).

Interorganizational trust is predicated on the interactions of those employees who span the corporate boundaries of the two organizations. Trust in boundary spanners cannot be predicted merely based on formal role definition because organizational agents are neither completely constrained nor completely free to be trusted. Due to their unique role in their organization, boundary spanners deal with competing expectations from their own, as well as the partner organization (Perrone et al., 2003). Katz and Kahn proposed that: "…rather than the relationship between organizations being faceless and monolithic,

it is actively handled and managed by individual boundary spanners" (Katz and Kahn, 1978).

In the boundary spanner role between organizations, what really matters is individual trust (Clelland and Zarankin, 2012). Consequently, improvement in collaboration effectiveness can be directly affected by improving individual trust between the boundary spanners. As a result, trust between organizational boundary spanners emerged as an alternative to managerial controls and authority (Bradach and Eccles, 1989).

Thus, the existence of trust between two organizational individuals enables them to take risks (Jarvenpaa et al., 1998). The perception of power between boundary spanners also influences trust between the two parties. *Ceteris paribus*, the party who has more power in the relationship will likely perceive by virtue of that power less risk and, thus, will engage in more risk-taking actions (Schoorman et al., 2007).

In the physical or "real-world" environment, once we gather sufficient process knowledge we gain an institutional trust in that process (Holton, 1994; Zucker, 1986; Zaheer et al., 1998; Hall, 2002; Schoorman, Mayer, and Davis, 2007; Wright, 2010; Kramer, 2010). Examples of our experiencing institutional trust in the real world of our daily lives abound.

For example, we board commercial aircraft, never asking the flight crew members are their flight qualifications current for this aircraft; are their medical records up to date; or how they did on their last proficiency evaluation. (Chen, Chen, and Tsung, 2007). No passenger reviews the aircraft maintenance logs or conducts a preflight check of the aircraft's systems before boarding. We simply have an institutional trust in the process of

commercial aviation due to our knowledge of the process, leading to a sense of individual trust in the operators of the activities.

We embark on cruise ships, having no personal relationship with the crew members, no information on the maintenance history of the vessel, little awareness of the safety records for the ship, or the required qualifications of its crew members. The cruise ship is a space where participants feel at ease socially with strangers, due in part with their institutional trust in the experience (Yarnell, and Kerstetter, 2005). As vacationers we gain sufficient process knowledge leading to a favorable perception of the processes through social media, published news, or word-of-mouth as to another person's experience with the cruise line. Thus, we can achieve some sense of an institutional trust in the cruise process.

Based upon our institutional trust, we choose to travel in mass transit systems, including trains, subways, and buses. We travel in taxis and use ride-sharing services, again without any personal relationship with the operators or drivers. "Since drivers are not hired by matching agencies as professional service drivers, establishing trust is an important requirement for passengers to participate in ridesharing" (Furuhata, Dessouky, Ordóñez, Brunet, Wang, and Koenig, 2013, page 38). While a direct experience is the most reliable foundation of establishing a sense of trust in a ride-sharing service, an implementation of a large-scale, word-of-mouth network, known as reputation systems, can engender institutional trust in the service (Furuhata et al., 2013). Based on our understanding of the process, we choose not to ask to see the individual driver's qualifications, the vehicle's maintenance logs, nor their driving safety records.

We eat the food prepared by chefs and food preparation employees without checking their health certificates, training records, or qualifications. Few of us check the available information on recent sanitary inspections. The risk of food poisoning is overcome by our institutional trust, because of the increasing inability of consumers to make their own assessment of the risks related to food hazards. Consequently, we depend on those in social media and our government institutions to provide appropriate information (Lobb, Mazzocchi, and Traill, 2007). Simply stated, it is the relationship between general consumer confidence in the safety of food and consumer trust in institutions and organizations (de Jong, van Trijp, van der Lans, Renes, and Frewer, 2008). Thus, it is our institutional trust in the food chain that enables us to ignore any potential health risks in food consumption.

As medical patients, we might research our pending operation's primary surgeon, their experience and track record in the procedure. We place our trust in an individual medical provider, based upon our assessment of their competency and our perception of their interest in our healthcare (Newcomer, 1997). Trust in a physician is based primarily on personal experience and individual personality, whereas trust in an institution, healthcare plan, or surgical procedure is based upon reputation through media (Hall, 2002), Few patients preparing for surgery also check the qualifications of the anesthesiologist, the nursing team, or the assisting surgeons. We simply choose to accept institutional trust in the supporting infrastructure of our medical treatment, the caregivers, and the procedures (Hall, 2002). Furthermore, in a medical emergency, we simply place our lives or the lives of a loved one in the hands of strangers. We simply have an

institutional trust in the process, and depend upon the institution to meet standards of healthcare, equipment sanitation, and training necessary to support medical procedures.

For these real-world activities, we simply experience an institutional trust in the process based upon our knowledge of the processes involved, their checks and balances, what we have read or heard in the media, and what we believe we understand about the process.

Institutional Trust (Virtual Reality)

Trust is crucial for both social and business relationships in computer-mediated environments (Wu and Tsang, 2008). Researchers have found that trust has become very important in virtual communities and e-commerce (Hoffman and Novak, 2005).

I found that trust in online environments between individuals remains based upon the three dimensions of trustworthiness—integrity, ability, and benevolence (McKnight, Cummings, and Chervany, 1998; Gefen, Benbasat, and Pavlou, 2008). Due to the lack of information on personal attributes, e.g., physical appearance, members assume similarities (Walther, 1996; Walther, 1997 Jarvenpaa et al., 1998). These perceived levels of similarities reinforced the virtual experience and one's perceptions of individual trustworthiness (Jarvenpaa et al., 1998). Future research could further explore the distinction between trust and trustworthiness when examining the dimensionality, nature, and role of trust in online environments (Gefen, Benbasat, and Pavlou, 2008).

However, institutional trust in the virtual world is less personal, less based upon individual interactions, and more focused on the process experience. Examples exist of institutional trust in the process substituting for individual trust in people interacting with each other in the virtual world. Due to our gaining an understanding of the organizational

rules (process knowledge), we gain an institutional trust in a computer-mediated environment's processes (Zaheer et al., 1998; Pavlou, Tan, and Gefen, 2002; Resnick and Zeckhauser, 2002; Pikkarainen et al., 2004; Ratnasingam et al., 2005). Our interactions with virtual processes feel safe because of our institutional trust in the computer-mediated environment processes, and not on any individual trust with others in the virtual world.

Examples exist of institutional trust in the process substituting for individual trust in people interacting with each other in the virtual world. Due to our gaining an understanding of the organizational rules (process knowledge), we gain an institutional trust in Computer Mediated Environment (CME) processes (Zaheer et al., 1998; Pavlou, Tan, and Gefen, 2002; Resnick and Zeckhauser, 2002; Pikkarainen et al., 2004; Ratnasingam et al., 2005). Our interactions with virtual processes feel safe because of our institutional trust in the CME processes, and not on any individual trust with others in the virtual world.

In the online world of e-commerce, the question of trust in e-marketplaces is one of trusting in the online institutions versus placing one's trust in an individual. In the virtual reality of EDI, institutional trust has been demonstrated to be a predictor of online buying decisions (Pavlou, Tan, and Gefen, 2002; Ratnasingam et al., 2005; Gefen et al., 2008). More and more buyers are being driven toward online purchases, versus face-to-face commerce activities. EDI should be utilized as the preferred method of communications between boundary spanners, i.e., buyers and suppliers (Mukhopadhyay et al., 1995).

In e-marketplaces, the trust falls on the process protocols of the website, and not on any faceless individuals. Especially at the online relationship's initial stages, institutional provisions designed to build institutional trust are encouraged. This effort is necessitated

by the buyer's need to infer product quality and its characteristics (Gefen et al., 2008). This effort to build a sense of trust in the virtual world is based on the desire of the supplier to provide satisfactory process experiences that build long-term relationships with the buyer, versus one-time transactions (Pavlou et al., 2002; Gefen et al., 2008).

In Computer-Mediated Environments (CMEs), trust often cannot be established between individuals. In e-commerce, where most researchers maintain that trust is essential for understanding interpersonal behavior and economic exchanges (Pavlou, 2003; Ratnasingam et al., 2005), the trust now resides in websites and the expectation of protections through reliable processes, industry standards and security protocols. The resulting institutional trust (or lack thereof), determines the participant's perceived level of risk to trust engaging in the process. In the institutional context of trust in Computer-Mediated Environments, the structure of the environment may transfer the buyer's trust to the process (Gefen, Karahanna, and Sträub, 2003; Gefen et al., 2008).

E-commerce has become an accepted form of shopping, moving from "bricks" (physical stores) with the need to interact with other humans, to "clicks" (online retail stores) where there are seldom any actual human interactions. "In an environment where it is not easy to maintain loyalty, web-based vendors, in addition to attracting more individuals to visit and browse their virtual communities, must create mechanisms to encourage individual members to trust each other, and, in turn, encourage them to be loyal to their communities. This is crucial for their survival and continuity" (Wu and Tsang, 2008, pages 115-116). Beginning with Amazon's online book store, e-commerce has rapidly gained shoppers in clothing, groceries, and home services providing "use recommendation algorithms" to personalize the online store experience for each

customer. (Linden, Smith, and York, 2003). Another example would be e-Bay's feedback mechanism that enables the online shopper to build institutional trust in the process with unknown sellers (Resnick and Zeckhauser, 2002).

In the virtual world of "freemium" gaming, people play simple King® developed games such as "Candy Crush©," or Playrix® developed "Gardenscapes©," or "Fishdom©." Many online games are the more challenging action/adventure real-time strategy games developed by Blizzard®, such as "WarCraft©," "StarCraft©," or "Diablo©." Others choose to play the games of chance, including poker, slots, and blackjack, wherein real money is gambled online. We do not have an individual trust in the other virtual participants; rather we have an institutional trust in the CME and its processes. Our institutional trust in these games' online rules and website monitoring has a significant positive effect on building institutional trust (Wu and Tsang, 2008).

Online banking and investing has changed the world of finance. From checking account balances to applying for credit, people have moved from trusting their wealth with real people working in the brick and mortar buildings of the past. Online banking is an example of our institutional trust in the virtual world of bill paying and investing through an internet portal (Pikkarainen, Pikkarainen, Karjaluoto, and Pahnila, 2004). Because of our knowledge of the rules, monitoring systems, and media reports we have an institutional trust and feel safe to move our money without ever actually touching it in the real world.

Thus, in the virtual world, if we choose to rely on the behavior of a person whom we do not know, we are in effect placing our individual trust in them without establishing the prerequisites of trustworthiness (Holton, 1994; Stolle, (2002). We can choose to trust

another's behavior because of the organizational rules that govern the process. Understanding the rules and governance procedures leads to process knowledge, which encourages a collective trust to rely on the group's online processes.

Based upon a favorable perception of the processes gained through process knowledge, we can choose to place an institutional trust in the online environment. In the virtual world, institutional trust can provide us with a confident expectation of project success through the shared belief in the professional execution of the processes.

This expectation then lays the groundwork for my hypotheses of establishing institutional trust in the global virtual team's project processes over the need to establish a sense of trustworthiness in the virtual team members. The positive effects of institutional trust could positively affect the need to establish individual trust in fellow team members.

Section 2: Institutional Trust in Process Versus Individual Trust in People

This section provides the foundation for the exploration of the existing literature to substitute individual trust in virtual team members with institutional trust in the process. Specifically, this section addresses task-specific, small-sized, short-term global virtual teams operating in computer-mediated environments. There is a difference between institutional trust and reliance on the process, versus individual trust based upon our perception in an individual's trustworthiness.

Real-World Teams

When we rely on something to work, e.g., a piece of equipment, a process, or a system, we plan our actions on our expectations of the outcomes (Wright, 2010). This is referred to as institutional trust. We trust that the plane can and will take flight, the

ticketing procedures allows us to board the aircraft, and the commercial aviation systems assures us of safety during the flight.

The literature on one's reliance on process is positioned differently from that of one's trust in people. Typically, reliance is thought of pertaining to machines, systems, or process, and the expectation that one can plan on their proper functioning. For example, in the virtual world Sullivan and Marvel state that the: "…entrepreneurs' reliance on network sources for their knowledge acquisition [serves] as a moderator between an entrepreneur's knowledge and venture outcomes. (Sullivan and Marvel, 2011, page 1171).

My example of the difference between reliance on process and trust in people is a military one. Where we might have no goodwill toward our enemy, under a white flag we could choose to rely on them to not fire on us during a temporary truce. Trust is absent, yet we rely on the process of the truce (Holton, 1994; Wright, 2010).

Within the domain of teams, the motivation to trust fellow team members depends upon numerous, and sometimes conflicting antecedents (Maslow, 1943; McClelland, 1961; Herzberg, 2003). The effects of trust are likely to be more pronounced in ongoing teams rather than short-term teams, because ongoing teams tend to be more focused on interpersonal relationships. Teams that continue to operate over many months, even years, results in an increase in the impact of trust dynamics on team member interactions (Karau and Kelly, 2004).

Virtual-World Teams

Online trust is an occurrence of institutional trust that specifically qualifies the relation of communications ongoing among individuals in digital environments. On this

basis, one could argue that online institutional trust promotes the emergence of social behaviors rewarding honest and transparent communications (Turilli, Vaccaro, and Taddeo, 2010). Although trust is important in any type of team, trust is pivotal in preventing geographical distance from leading to psychological distance in a global team (Snow, Snell, and Davison, 1996; Jarvenpaa et al., 1998).

Because of the lack of shared social context in virtual teams, much of the theoretical and empirical literature on interpersonal and organizational trust suggests that it is difficult to form trust in geographically dispersed contexts (Jarvenpaa and Leidner, 1999). This has brought about the concept of "swift trust" in virtual teams (Crisp and Jarvenpaa, 2013). Situations requiring swift trust do not allow for the incremental, gradual evolution of individual trust based on increasing knowledge and information about others' trustworthiness that might occur in teams of long duration (Iacono, and Weisband, 1997).

Virtual teams encounter synchronous and nonsynchronous communications in their computer-mediated environment. This environment can be more challenging than that of face-to-face teams. Literature on virtual teams has advanced our understanding of swift trust primarily in terms of its cognitive components (Jarvenpaa and Leidner, 1999; Crisp and Jarvenpaa, 2013).

Since speed is of the essence, efforts to establish individual trust based upon developing a sense of trustworthiness among team members will create distractions from the short-lived virtual team's performance. For example, monitoring others' behaviors, personal disclosure, or time invested in teambuilding exercises could divert a small, short-lived virtual team from its project (Iacono, and Weisband, 1997).

The social perspective of institutional trust in the virtual environment centers on one's moral duty to performing his or her tasks as assigned in the virtual team's project. This offers an alternative to transfer the virtual team members' individual trust in their fellow members to an institutional trust in the project processes (Iacono, and Weisband, 1997; Jarvenpaa and Leidner, 1999; Crisp and Jarvenpaa, 2013).

To establish trust in a process, the first thing we need to know is what an individual's trust level is and how a member's individual trust develops (Cheng, Fu, Sun, Han, and Shen, 2016). To date, most research on trust in online environments has combined trust (which is the willingness to depend) and trustworthiness (which describes the three attributes of the trustee, i.e., ability, benevolence, and integrity), (Mayer et al., 1995; Jarvenpaa et al., 1998; Colquitt et al., 2007; Gefen, Benbasat, and Pavlou, 2008).

As uncertainty increases, so does the importance of process-based and institution-based trust (Schilke et al., 2017). In this online context there are two types of uncertainty (Coleman, 1990; DiMaggio and Louch, 1998). The first is uncertainty about the quality of a good or service; the second is uncertainty about the quality of an exchange partner's performance (Schilke et al., 2017).

To date, most research on trust in any computer-mediated environment is focused on establishing individual trust between members through team-building exercises. Jarvenpaa, *et al* stated that in virtual teams, "although the teambuilding exercises had a positive effect on the perceptions of other members' integrity, ability and benevolence, they did not have a direct effect on trust" (Jarvenpaa et al., 1998, p. 57).

It is interesting to note that despite its somewhat narrow focus, trust is one of the most studied variables in the virtual team literature (Mayer et al., 1995; Jarvenpaa et al., 1998;

Colquitt et al., 2007; Gilson, 2015). The literature poses the question: can trust in the process be successfully nurtured to exist in global virtual teams? Noting the lack of shared social context in such teams, much of the theoretical and empirical literature on interpersonal and organizational trust would suggest a negative response to this question (Jarvenpaa and Liedner, 1999).

Organizational rule systems provide the mechanisms for establishing institutional trust that facilitate acceptable behavior in collective contexts. By reliance on the process as defined by these rule systems, participants can have positive expectations of organizational interactions (Kramer, 2010).

This rule-based system guides my belief that placing institutional trust in the process can be instilled through training for the global virtual team members by their multi-national corporation's human resource management functions. With this foundation in the observed behavior of our placing institutional trust in processes that occur in both the real-world and the virtual world, this paper will provide an introductory exploration on the effects of placing institutional trust in virtual team processes.

The existing literature on virtual teams is focused on the premise that individual trust must be established between members of the team. This paper challenges the expectation that there is a necessary requirement to establish a sense of individual trust among for global virtual team members, especially in small, short-lived team projects. There is a potential benefit to organizations, since many multi-national corporations invest significant resources, i.e., time, talent, and treasure, in their efforts to establish a sense of individual trust among the virtual team members.

This research hypothesizes that in the absence of trustworthiness of the individual team members, the virtual team members and their managers can choose to rely on institutional trust in the processes as backed by their corporation. By placing their trust in the online process management of the project, a positive effect on individual trust among the virtual team members could be established, thereby reducing costs and time associated with teambuilding exercises (Iacono and Weisband, 1997).

Section 3: The Emergence of, and Demands Placed Upon, Global Virtual Teams

This section explores the emergence of global virtual teams as a result of the growth of multi-national corporations that conduct business operations in more than one country. Global virtual teams are described by the Virtual Team Intelligence website as: "A Virtual Team working together as one…side-by-side, separated by waters, brought together by technology" (www.virtualteamintelligence.com).

In addition, I explore the virtual world of their virtual team's projects as they operate in computer-mediated environments. Finally, I address the potential value of my research, and the findings that will guide human resource managers in their efforts to provide appropriate resources to future virtual teams.

At the beginning of the twenty-first century, the phenomenon of developed nation corporations investing in developing nation subsidiaries introduced the economic force known as globalization (Jarvenpaa and Leidner, 1999; McDonough III, Kahn, and Barczak, 2001; Germain, 2011; Daim, Ha, Reutiman, Hughes, Pathak, Bynum, and Bhatla, 2012; Pinjani, 2013; Gilson, Maynard, Young, Vartiainen, Hakonen, and Marko, 2015).

In today's international marketplaces, multi-national corporations are faced with a greater reliance on their human assets to create competitive advantages in their subsidiary organizations. The demands on multi-national corporations brought about by the fast-changing global marketplace has forced these organizations to adopt a more dynamic approach to day-to-day operations to survive and compete successfully in the global virtual economy (Boudreau, Loch, Robey, and Straub, 1998). Ghoshal indicates: "Even in the relatively slow-moving world of academe the issue of globalization of industries and corporations has emerged as the new bandwagon…" (Ghoshal, 1987, p. 425).

Multi-national corporations expanded to enjoy incredible opportunities in new markets, to broaden their customer base, and as a result spread their risk in international investments. Rapid globalization, a reduction in global travel, advances in technology, flatter organizational structures, the need for synergistic cooperation among firms, and a shift to knowledge workers have led to the increasing use of virtual teams in multi-national corporations (McDonough III, 2000; Germain, 2011).

Along with this global initiative was the realization that cross-functional teams would necessitate their collaboration using electronic data interchanges; information technology tools to create mainly nonsynchronous, and rarely synchronous communications among the team members. These work groups have been labeled virtual teams and can include team members from diverse geographic locations with differing experiences and cultural values (Krebs, Hobman, and Bordia, 2006).

As the pace of globalization rapidly increased, research has highlighted the advances in technology to support global virtual teams (Bjørn and Ngwenyama, 2010; Daim et al., 2012; Dennis et al., 2008; Pinjani and Palvia, 2013). Multi-national

corporations face the challenge of operating effectively to generate knowledge across multiple boundaries (Mudambi et al., 2007). Without Internet, email, video conference and audio bridges, virtual teams cannot exist (Daim et al., 2012).

These geographically dispersed virtual teams are now referred to as global virtual teams. These virtual teams according to Jarvenpaa and Leidner are a, ‘‘temporary, culturally diverse, geographically dispersed, electronically communicating work-group of members . . . who think and act in concert within the diversity of the global environment” (Jarvenpaa and Leidner, 1999, p. 792). Multi-national corporations assign critical tasks to their virtual teams, such as developing and launching new global products, negotiating and managing cross-border acquisitions, mergers, and alliances, and coordinating global account management programs (Harvey et al., 2004; Maznevski and Chudoba, 2000).

Managing these global virtual teams with geographically distributed participants presents a complex task (Bjorn and Ngwenyama, 2009). This can be particularly challenging with managing small, short-lived global virtual teams that rapidly form, change, and dissolve due to dynamic changes in the market. In addition, most global virtual teams have their members spread among several projects with competing priorities (Daim et al., 2012).

When groups are to provide a forum for sharing information across functional and cultural boundaries, the diverse views and backgrounds members bring with them to the group must be successfully managed (Krebs et al., 2006). These virtual teams can include team members from diverse geographic locations with differing experiences and cultural values. Cultural differences are one salient source of difference that may have an

important influence on how individuals perceive information, act on it, and relate to other individuals in a virtual team (Kayworth and Leidner, 2000).

Barriers to the successful completion of a virtual team's project are numerous, as these teams connect people across organizational units whose policies, systems, and structures may not easily mesh together. Staffing a virtual team poses significant challenges to the multi-national company and its subsidiaries' human resources (Harvey et al., 2004). They involve people from multiple disciplines, functions, location, and culture, with team members working together on specific opportunities (Pinjani, 2013).

These interactions, either by conveyance (nonsynchronous) or by convergence (synchronous) means require various levels of information technology tools (Dennis et al., 2008). Communication breakdown can wreak havoc on a project as team members struggle to effectively communicate and work with one another (Daim et al., 2012).

In recent years, the trend of increasing use of virtual teams has been intensified by travel-budget cuts imposed by the global financial crisis (Klitmøller, 2013). Leadership has been recognized to have a considerable influence on global virtual team success, but the influence of the organizational context (process knowledge) on team leaders' possibilities to succeed in leading virtual teams in the team's different lifecycle stages have been omitted (Väyrynen, 2013).

Furthermore, competitive advantage for multi-national corporations may hinge on their ability to leverage virtual teams' knowledge sharing (Mudambi, Mudambi, and Navarra, 2007). Despite the advantages of virtual teams, they are often less effective in making group decisions, need more time to reach decisions, and their members are less

satisfied in comparison to face-to-face teams (Baltes, Dickson, Sherman, Bauer, and LaGanke, 2002).

Just as corporations and industries go through life cycles, these teams are "born, grow, mature, and decline" during the project life (Daft, Murphy, and Willmott, 2010). Therefore, in the design of training for a virtual team, human resources should take the view that forming any team is like the establishment of a start-up company. How to best engage the team members will depend upon the training they are provided, as well as the technology tools that support either synchronous or nonsynchronous interactions among the virtual team members. Multi-national corporations managing their employees working in computer-mediated environments must design and administer teamwork skills training for virtual team members.

Timely communications are a prerequisite for successful completion of the projects assigned by multi-national corporations to their global virtual teams. This becomes even more important when dealing with project teams, which are from diverse cultures and different geographic regions (Daim et al., 2012). Human resource managers can provide guidelines for the expectations of virtual team members in terms of communication response times, content, and feedback.

Media synchronicity is the ability of electronic media to support virtual teams coordinated behavior as they work together (Dennis et al., 2008). Specific media tools acquire new capabilities rapidly so that it is appropriate to refer to a set of features that each medium offers. For example, instant messenger (IM) has been a predominately text medium, yet many new instant messenger applications now provide audio, video, image

sharing, and even application sharing, making them more media rich (Dennis et al., 2008).

Sherer et al. (1998) suggested that, "Without the direct controls that employment affords, an organization may be unable to conduct training or control the work process and hence would have a very difficult time establishing and maintaining organizational routines" (Sherer et al., 1998, p. 38). This organizational reality presents real difficulties for traditional team-building activities. Creed and Miles believed that, "In terms of human capital investment, team building probably reaches its zenith in the extended process of creating self-managing work teams . . . in these settings, team builders routinely invest heavily in team skills development . . ." (Creed and Miles, 1996, p. 33).

Harvey et al. (2004) wrote, "An human resources management system addressing the needs of GVTs should not only focus on the aggregate talent of the organization's employees, but also on the globally coordinated virtual deployment of this talent in teams dispersed across the organization's network of relationships" (Harvey, Novicevic, and Garrison, 2004, p. 290). The need for coordination of resources and necessary training challenges the HRM function to explore their decision-making in terms of the believed necessity to establish a level of individual trust in team members (Javenpaa, Knoll, and Leidner, 1998). Although individual trust is considered important in face-to-face interactions, institutional trust is considered essential in preventing geographical distance from leading to psychological distance in a global virtual team operating in a Computer Mediated Environment (Javenpaa et al., 1998).

Global virtual teams, whose members are geographically dispersed and cross-functional in nature, are assigned projects demanding highly interdependent tasks,

presenting unique leadership challenges (Malhotra, 2007). Within the domain of virtual teams, the psychology of motivation to trust depends upon numerous, and sometimes conflicting antecedents (Maslow, 1943; McClelland III, 1961; Herzberg, 2003). Managers responsible for innovation and knowledge production face strategic decisions on autonomy and control, working conditions, and tangible rewards for these virtual teams. (Mudambi et al., 2007).

This suggests that agency theory might be broadened to incorporate the capabilities derived from the dynamic teamwork of an organization's employees as they utilize their principal's resources (Sherer, Rogovsky, and Wright, 1998). Agency theory explores the relationship wherein a principal delegates their work to an agent who actually performs that work (Eisenhardt, 1989).

Existing research has focused on the position that for virtual teams to function at an elevated level of performance, individual trust must first be established in the virtual team members. This belief has resulted in significant multi-national corporate expenditures to invest in team building exercises to establish individual trust among global virtual team members (Jarvenpaa and Leidner, 1999; Zhang, Lowry, Zhou, and Fu, 2007).

If institutional trust could be established in a virtual team's project through an in-depth knowledge of the online processes, project success could become more dependent upon the management of the processes. The value of this research is that it could help guide human resource managers in their efforts to provide appropriate resources to future virtual team members. This practitioner opportunity to reassess the investment in team interpersonal trust-building training led to my interest in researching if institutional trust in the process can positively affect individual trust in the virtual team members.

Section 4: Institutional Trust in a Global Virtual Team's Processes

Thus far in this paper I have explored and summarized the current academic articles on trust by focusing on Individual (interpersonal) Trust; Collective (group) Trust; and Institutional (process) Trust. I further divided Institutional Trust into two realities, one of the physical, or "real-world," and second the world of virtual reality of computer-mediated environments. I then discussed the emergence of global virtual teams; their multi-national corporations; and their operations in computer-mediated environments.

The constant interaction necessary for the development and maintenance of swift trust requires consistent access to technology, the forming of good communications habits (e.g., checking and responding to email as demanded by the task), and the ability to attend to requests from a distance while simultaneously handling local work demands. Studies of ongoing teams have consistently shown evidence of a positive main effect of individual trust on larger, longer-term project performance lasting more than a few months (Crisp and Jarvenpaa, 2010). The research on ongoing teams has reported results that differ systematically from those found in studies of short-term teams. Whereas studies of short-term teams have reported insubstantial relationships between trust and performance (Aubert & Kelsey, 2003; Jarvenpaa, Shaw, and Staples, 2004), studies of ongoing teams have consistently shown evidence of a positive main effect of individual trust on team performance (Costa, 2003; Rispens, Greer, & Jehn, 2007; Spreitzer, Noble, Mishra, & Cooke, 1999).

Central to trust in these teams is the premise that it leads people to engage in risk taking behaviors such as delegating and knowledge sharing, and it causes acceptance of vulnerability (Sankowska, 2013). McEvily suggested that trust works as a experiential

process in knowledge transfer, which minimize the resources spent on assessing credibility of knowledge provider (McEvily et al., 2003) or the intentions of its seeker. Additionally, this belief would save valuable resources that can be employed for a particular task's accomplishment (Sankowska, 2013).

Organizational rule systems, and a favorable perception of the processes involved, can offer the mechanisms for providing shared assurances that facilitate trusting behavior in collective contexts (Schilke et al., 2017). By establishing a sense of institutional trust in the process as defined by these rule systems, participants can have positive expectations of organizational interactions. This trust in the process can render sensible and productive judgements regarding the binding structure of rules guiding their colleagues' behaviors (Iacono, and Weisband, 1997; Kramer, 2010).

The disposition to establishing trust among virtual team members, indicating an expectation of mutual task completion without face-to-face interactions, is influenced by media synchronicity in the computer-mediated environment. If members of a team do not have a sense of trust in each other, they are likely to expend additional time and effort monitoring one another, backing up or duplicating each other's work, and documenting problems (Iacono, and Weisband, 1997; Wilson, Straus, and McEvily, 2006). Institutional trust would be based on an expectation that virtual teammates will behave as expected without the experience of face-to-face interactions.

Establishing trust among virtual team members is perceived as a core responsibility for their human resource managers. Initial trust in newly formed organizations depend on two antecedents, i.e., trusting the other's intentions, and trusting beliefs, e.g., that the other person is competent, honest, and predictable in their behaviors (McKnight,

Cummings, and Chervany, 1998). By trusting in another person, group, or nation, humans gain the ability to predict a positive, supportive outcome in a world where our very nature is designed to ward off threats and dangers. Uncertainty, or the lack of trust in a relationship, diminishes our ability to successfully progress in a project (Azziz, 2014).

The degree of uncertainty in the process, or the lack of individual trust among members of a small, short-lived virtual teams, can adversely impact the success of their project. As uncertainty increases, so does the importance of process-based and institution-based trust. (Schilke, Wiedenfels, Brettel, and Zucker, 2017). In the absence of personal experience with the other virtual team members, the trustor can only place their trust in, or reliance on, the process as established by their institution.

In short-lived projects in a computer-mediated environment, institutional trust appears essential because exchanges are not motivated by contractual obligations stipulated in advance, but by expected and actual returns (Staples and Webster, 2008). Initially, in short-lived global virtual team start-ups, institutional trust seems to be crucial.

Over time, as team members learn about those with whom they interact, they start relying more on the usefulness of the interactions as guided by organizational rules than on individual trust in forming their behavioral intentions (Gefen, Karahanna, and Sträub, 2003). Moreover, institutional trust in the process is even more necessary for cooperation in virtual teams, since traditional management activities, such as monitoring and control mechanisms, are not feasible through face-to-face interactions (Wilson et al., 2006). This seems to be the case in small, short-lived virtual teams.

Based upon my research on institutional trust in the virtual world, I found that the primary focus has been on exploring trust in the virtual world of e-commerce and online

gaming. While there exist research articles on trust in global virtual teams, the focus has been on establishing individual trust among the team members. This existing literature on institutional trust in online activities, primarily on e-commerce and gaming, established the foundation for my own research on institutional trust in the process among global virtual team members.

My focus is on small, short-lived global virtual teams. For this research I have defined these teams as composed of four to six members working on projects scheduled for completion in less than one year. Current literature suggests that there is insufficient time to develop a sense of individual trust, as exists in virtual teams of long duration. By limiting my study to small, short-lived global virtual teams, the literature on trust in virtual teams led to an exploration of the ability to substitute institutional trust in processes for individual trust in team members operating in computer-mediated environments.

Study 1, an initial pilot study (Chapter 3), focused on establishing the groundwork for a primary study on institutional trust in the process among small, short-lived virtual teams. Using the results from Study 1, Study 2, the primary study, (Chapter 4) explored the relationship of institutional trust in process among small, short-lived global virtual teams, and its effects on the need to establish individual trust among the virtual team members and their managers.

Section 5: Explanations of Terms

Table 1 provides definitions of concepts, their dimensions, and representative references as used in this research. The terms are placed in alphabetical order to ease the reader's search for a specific term.

Table 1. Explanations of Terms

Concept	Definition	Dimensions	Representative References
Boundary Spanner	An individual in one company interacting with a person in another company. Trust may operate at interpersonal and interorganizational levels.	-Interorganizational trust -Competitive advantage -Interpersonal trust -GVT Member -Performance	Zaheer, McEvily, and Perrone (1998); Perrone, Zaheer, and McEvily (2003)
Collective Trust	The extent of trust placed by its collective members on the organization.	-Absence of personal trust -Common membership -Organizational rules -Generalized trust -Experience	Zaheer et al. (1998); McEvily, Weber, Bicchieri, and Ho (2002); Stolle (2002); Kramer (2010); McEvily and Tortoriello, (2010)
Computer-Mediated Environments (CMEs)	The online environment, its tools, and various challenges in which the GVT works on its project assignment	-Clear Task Assignments -Challenging Projects -Collaboration Tools -Process Training	Csikszentmihalyi (1988); McKnight, Cummings, and Chervany (1998); Hoffman and Novak (2005); Gefen, Benbasat, and Pavlou (2008)
CME Communications	Nonsynchronous or synchronous interactions employing various levels of information technology tools to achieve the appropriate level of media richness.	-Communication Routine -Media Richness -Frequency -Delivery	Straub and Karahanna (1998); Cornwell and Coote, (2003); Harvey, Novicevic, and Garrison (2004); Mudambi, Mudambi, and Navarra (2007); Dennis, Fuller, and Valacich (2008); Thomas and Bostrom (2010); Daim, Ha, Reutiman, Hughes, Pathak, Bynum, and Bhatla (2012)

Table 1. Explanations of Terms (Continued)

Electronic Data Interchange (EDI)	Information Technology systems, e.g., e-mail, texting, etc., leads to vertical information integration along the value chain.	-Information exchange -Error reduction -Cost savings -Quality	Mukhopadhyay, Kekre, and Kalathur (1995); Linden, Smith, and York (2003); Pikkarainen, Pikkarainen, Karjaluoto, and Pahnila (2004); Ratnasingam, Gefen, and Pavlou (2005)
Globalization	Phenomenon of developed nations' corporations investing in developing nations' subsidiaries	-Broaden customer base -Global virtual markets -Economic force -Risk reduction	Jarvenpaa and Leidner (1999); McDonough III, Kahn, and Barczak (2001); Germain (2011); Daim et al. (2012); Pinjani (2013); Gilson, Maynard, Young, Vartiainen, and Hakonen (2015)
Global Virtual Team (GVT)	People from multiple disciplines, functions, locations, and cultures, working together on specific projects	-Electronic communication -Geographically dispersed -Culturally diverse -Temporary	Jarvenpaa and Leidner (1999); Zhang, Lowry, Zhou, and Fu (2007); Pinjani (2013)
Individual Trust	The intention by the truster to accept vulnerability to a trustee based on the positive expectations of his or her benevolent actions.	-Subject matter expertise -Interactional histories -Positive expectations -Reputation -Experience -Gravitas	Kramer, Brewer, and Hanna (1996); Holten, (1998); McKnight, Cummings, and Chervany (1998); Mayer (1999); Hall (2002); Stolle (2002); Harvey et al. (2004); Slemrod and Katuscak, (2005); Colquitt, Scott, and LePine (2007); Kramer (2010); Germain (2011); Daim et al., (2012); Pinjani and Palvia(2013)

Table 1. Explanations of Terms (Continued)

Institutional Trust (Physical Reality)	The belief that a system, process, individual, or piece of equipment will work as expected.	-Ability-Benevolence-Integrity -Based on relationships -Process Knowledge -Rule systems -Guarantees -Standards	Holton (1994); Zucker (1986); Zaheer et al. (1998); Hall (2002); Schoorman, Mayer, and Davis (2007); Wright (2010); Kramer (2010)
Institutional Trust (Virtual Reality)	The belief that a system, process, individual, or piece of equipment will work as expected in an online relationship.	-Ability-Benevolence-Integrity -Process Knowledge -Process trust -Standards -Experience -Security	Zaheer et al. (1998); Pavlou, Tan, and Gefen (2002); Resnick and Zeckhauser (2002); Jarvenpaa. Shaw, and Staples (2004); Pikkarainen et al. (2004); Ratnasingam et al. (2005); Wu and Tsang (2008)
Interorganizational Trust	The extent of trust placed on a partner organization by the members of another organization	-Ability-Benevolence-Integrity -Macro and Micro levels -Inter-firm relationships -Performance records -Boundary spanners -Collective trust	Zaheer et al. (1998); Kramer (2010)
Multi-National Corporation (MNC)	National corporations investing in other nation's subsidiaries that introduced the economic force known as globalization and are referred to as MNCs	-Reduction in global travel -Advances in technology -Synergistic cooperation -Flatter organizations -Knowledge workers -Rapid globalization	Ghoshal (1987); Jarvenpaa, and Leidner (1999); McDonough III et al. (2001); Germain (2011); Daim et al. (2012); Pinjani (2013); Gilson et al. (2015)
Online Trust	Based on beliefs in the trustworthiness of the online trustee(s), typically a faceless boundary spanner	-Relationship building -Boundary spanners -Benevolence -Integrity -Ability	Gefen (2002); Pavlou (2003); Hoffman and Novak (2005); Gefen, Benbasat, and Pavlou (2008)

Table 1. Explanations of Terms (Continued)

Participant Stance	Trust in individuals must be differentiated from reliance or trust on the process.	-Reliance on process -Trust in people -Consequences -Betrayal	Holton (1994); Wright (2010)
Process Knowledge	A systematic approach of knowledge transfer to make project workflow more effective, more efficient, and more capable of adapting to an ever-changing environment.	-Organizational rule systems -Clear Task Requirements -Data Collection Process -Progress Reviews -Testing Scripts	Deming (1982); Creed and Miles (1996); Harvey, Novicevic, and Garrison (2004); Schilke, Wiedenfels, Brettel, and Zucker (2017)
Process Ownership	The sense that personal success is directly tied to the project's success	-Consistency of intent -Delivery deadlines -Co-Ownership -Consequences	Ammeter and Dukerich (2002); Krebs, Hobman, and Bordia (2006); Rico, Gil, and Gibson (2008); Lin, Wang, Tsai, and Hsu (2010); Boughzala and De Vreede (2015)
Reliance	Distinguished from interpersonal trust, the expectation that something will happen and planning for that event to occur.	-Institutional trust -Dependence -Confidence	Holton (1998); Resnick and Zeckhauser (2002); Wright (2010)
Small, Short-lived GVT Projects	GVTs of 4—6 members working on projects scheduled for completion in less than one year.	-Swift trust -Time constraints -Institutional trust -Trust in the process -Lack of individual trust	Jarvenpaa et al. (1998); Iacono, and Weisband (1997); De Jong and Elfring (2010)
Trust Propensity	Antecedent to awarding trust in contexts of unfamiliar actors before trustworthiness can be gauged.	-Structural reorganizations -Cross-functional teams -Personality-based -Joint ventures	Mayer, Davis, and Schoorman (1995): McKnight, Cummings, and Chervany (1998); Colquitt et al. (2007)

Table 1. Explanations of Terms (Continued)

Trust in Process	The positive and confident expectation of project success through a shared belief in the professional execution of the project.	-Communications -Knowledge -Oversight -Standards	Kramer and Tyler (1996); Resnick and Zeckhauser (2002); Chen, Chen, and Tsung (2007); Staples and Webster (2008); Wilson, Straus, and McEvily (2006); Wright (2010); Sankowska (2013)
Trustworthiness	The belief in the inherent, underlying ability, benevolence, and integrity of a trustee.	-Benevolence -Experience -Integrity -Ability	Mayer et al. (1995); Perrone, Zaheer, and McEvily (2003); Colquitt et al. (2007); Holtz (2015)

CHAPTER 3

STUDY 1 (PILOT STUDY)

Study 1 was a pilot study to test the effects of an in-depth knowledge of the project's online processes on institutional trust in the process, and the resulting influence on individual trust among the members of a virtual team and project success. It assessed the initial suitability of the data collection instrument, an online questionnaire. It was important to lay the foundation for the content of the survey questions developed for Study 2

In addition, it was important to the research outcomes to determine if the company selected for data collection would be responsive to the parameters of the study, i.e., the desired number of respondents and the responses collected. If the response rate was less than desired, further discussions with Infosys® would have been required, as a less than desired number of respondents might reduce the value of the data collected in Study 1 and Study 2.

Section 1: Methods

For this research I sought to identify an appropriate research subject, i.e., a multi-national corporation with many small, short-lived global virtual teams. The requirements for selecting this test subject organization were global virtual teams of small size. In addition, their virtual team projects had to be short-lived, i.e., less than 1-year projects, as existing research indicated that long-lived virtual teams build individual trust over the course of their projects. My colleague, Ms. Irene M. Graff, was arranged an introduction to Infosys®, Inc. They agreed to conduct two online surveys (Study 1 and Study 2), with their condition that I share my eventual findings with the company.

One of the most critical organizational capabilities is learning to adapt to the new hypercompetitive global landscape. The capabilities needed in this evolving competitive context are increasingly employee centric, particularly when related to those employees who are performing knowledge-based teamwork in structures like global virtual teams (Harvey, *et al.*, 2004).

Challenges are caused by distance and time zone changes, by language and cultural differences, by adoption and implementation of technology, and by member interaction. These factors can affect the shared knowledge among the team members (Pinjani, 2013). In virtual teams, knowledge sharing is positively related with job effectiveness (Lin, 2011) and perceived job effectiveness (Lin, Wang, Tsai, and Hsu, 2010). It is necessary to examine the relationship between group information elaboration and team learning, since team learning is believed to be a precursor for effectiveness in teams and organizations (Edmondson, 1999).

Study 1 provided the vehicle to explore the effect of process knowledge on establishing a sense of institutional trust in the global virtual team's processes. If successfully established, would this institutional trust in their online project's processes positively (or negatively) affect their individual trust in each other, and would it improve their potential for project success.

Thus, I initially proposed in Study 1:

Proposition 1: *An in-depth knowledge of a global virtual team's processes will positively impact the team members' institutional trust in the online processes of the project.*

Team learning is a collective form of learning that involves a process of social interaction among the members of a team. According to social exchange theory (Blau, 1964), social exchanges differ from economic exchanges in that the former involves

unspecific obligations. The multi-national corporation tasks its human resource function to teach critical teamwork skills that can lead to higher levels of individual initiative and accountability.

Establishing a sense of individual ownership of the project's process might be a critical antecedent to establishing trust in the process management of the project. This need to establish ownership in the process was articulated as a sense of being one with the project from beginning to end (a sense of ownership), and a sense of the goals of the project being the goals of the individual (Ammeter and Dukerich, 2002).

Often referred to as accountability for one's actions, process ownership assignments can be made ineffectual without consequences for one's activities. Either virtual team members do what they say they will, or they do not. Team collaboration is exchanging information, altering activities, sharing resources, and enhancing the capacity of another organization for mutual benefits and common purposes (Rico, Sanchez-Manzanares, Gil, and Gibson, 2008; Boughzala and De Vreede, 2015). A significant number of organizations, especially task-oriented groups, use collaborative work practices to help achieve success (Stahl, Cress, Ludvigsen, and Law, 2014).

The need to establish a sense of personal ownership of the assigned project tasks may be a critical variable in the global virtual team's ability to achieve a sense of institutional trust in the project's online processes.

Thus, in Study 1, I proposed:

Proposition 2: *The greater the sense of process ownership, the stronger the positive effect on the global virtual team's perception of institutional trust in the process.*

Due to the lack of information on personal attributes, e.g., physical appearance, members assume similarities among other members (Walther, 1997). This institutional

trust in a computer-mediated environment reinforces the virtual experience and one's perceptions of individual trustworthiness (Jarvenpaa, et al, 1998). Now in an atmosphere of institutional trust, Study 1 explored trust in the process and its effects on individual trust among the virtual team members.

Thus, in Study 1, I proposed:

Proposition 3: *Institutional trust in the project's processes will positively affect individual trust among their fellow virtual team members.*

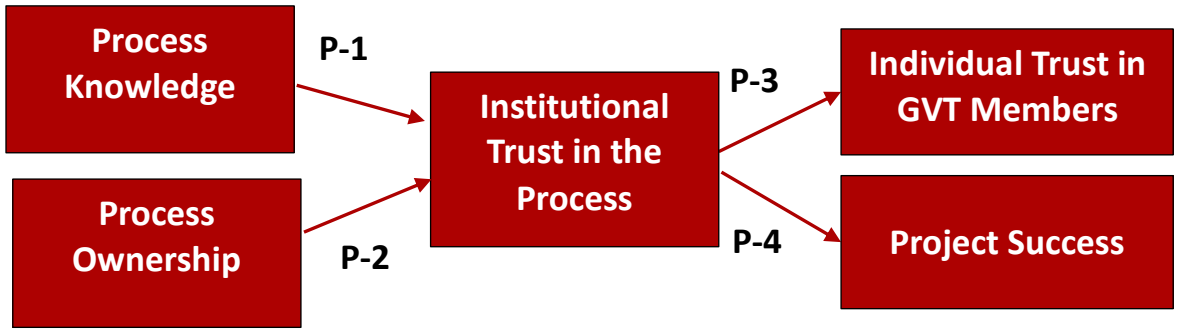
With teamwork norms established through training the virtual team members, an elevated level of optimism and excitement can exist. Study 1 also explored the virtual team members heightened perception of institutional trust in the process effects on their project's success.

Thus, in the Study I proposed:

Proposition 4: *Institutional trust in the project's processes will positively affect the project's success.*

Figure 1 depicts the original conceptual model for Study 1, acknowledging the independent variables that impact the ability of the global virtual team members to establish institutional trust in the online process of their project.

Figure 1. Trust in Virtual Teams and Online Processes: Original Model



For Study 1's sample selection and data collection, I designed an initial online questionnaire seeking a response rate from Infosys® of no less than 25 participants. The desired number of respondents was based on an understanding that less than 25 would provide too small a data set to analyze the questions and their responses. Study 1's actual response was 50 completed surveys.

Study 1's introductory remarks explaining the survey's purpose, confidentiality of their responses, and the intent to share the results with Infosys®, as well as the actual survey questions are contained in Appendix A.

Study 1 conducted an exploratory research focused on organizational beliefs using psychometric techniques to measure trust. McEvily and Tortoreiello stated: "The psychometric approach to measurement typically takes the form of a multi-item survey that includes a variety of questions intended to capture different theoretical dimensions of trust" (McEvily and Tortoreiello, 2010, page 26).

Study 1 reflects this approach with 18 questions using a Likert Scale of 1-5, and 4 demographic questions. The 18 survey statements are provided in Table 2 and were administered only to virtual team members.

Study 1 focused on exploring the constructs of the conceptual model (Figure 1) to be measured using the survey questions listed in Table 2.

Table 2. Study 1: Antecedents Leading to Trust and Project Satisfaction

Antecedent	Survey Statement
Process Knowledge	GVT-2: Your fellow GVT members effectively used the project's online tools GVT-4: The testing scripts your GVT was provided were clear and concise GVT-8: I had a clear understanding of the process in which I worked in the GVT GVT-12: GVT team members had sufficient knowledge about the work that needed to be done
Process Ownership	GVT-7: Your fellow GVT members displayed a solid work ethic GVT- 13: Your IT GVT members were strongly committed to the project GVT-14: The outcomes of this project were very important to the other GVT members GVT-17: The outcomes of this IT project were very important to me

Table 2. Study 1: Antecedents Leading to Trust and Project Satisfaction (Continued)

Antecedent	Survey Statement
Online Trust in the Process	GVT-1: Your GVT's project requirements were clearly stated GVT-15: I had complete trust in the process of our IT project GVT-16: I relied on my fellow GVT members to complete their assigned tasks
Online Trustworthiness in GVT Members	GVT-3: I really wish I had a good way to oversee the work of the other GVT members GVT-5: You would have been comfortable giving your fellow GVT members complete responsibility for the completion of this project GVT-9: Overall, the people in my GVT were very trustworthy GVT-11: I could rely on those with whom I worked with in my GVT
Satisfaction with the IT Project	GVT-6: Your IT Project was completed within allotted time GVT- 10: Your IT Project was completed within resources budgeted GVT-18: Your level of satisfaction with the GVT's project performance

Section 2: Measures

The research was conducted in the environment of the global virtual team's process management of a short-lived (less than one year) IT projects and focused on small teams of four to six members. Study 1 explored the effects of two independent variables.

Study 1 analyzed the participants' responses using a Partial Least Squares (PLS)—Structural Equation Modeling (SEM). Partial least squares structural equation modeling (PLS-SEM) is a method for estimating (complex) path models with latent variables and their relationships. PLS-SEM has experienced increasing dissemination in a variety of fields in recent years with non-normal data, small sample sizes and the use of formative indicators being the most prominent reasons for its application (Sarstedt, Ringle, and Hair, 2017). PLS-SEM operates much like a multiple regression analysis (Hair et al., 2011).

SmartPLS 2.0. SmartPLS 2.0 is a software with graphical user interface for variance-based structural equation modeling (SEM) using the partial least squares (PLS)

path modeling method. Besides estimating path models with latent variables using the PLS-SEM algorithm, the software computes standard results assessment criteria.

SmartPLS 2.0 software performs a regression analysis on the two independent variables' propositions, with *Individual Trust* and *Project Success* as dependent variables. ***Regression Analysis*** is a procedure for determining a relationship between a dependent variable and an independent variable for a surveyed population. The mediating variable in this analysis is *Institutional Trust in the Process*. Reliability was calculated using the SmartPLS 2.0 internal consistency scores.

After running a PLS model, estimates are provided for the path coefficients, which represent the hypothesized relationships linking the constructs. Path coefficient values are standardized on a range from -1 to +1, with coefficients closer to +1 representing strong positive relationships and coefficients closer to -1 indicating strong negative relationships. Although values close to +1 or -1 are almost always statistically significant, a standard error must be obtained using bootstrapping to test for significance (Helm et al., 2009).

Coefficient of determination or "Goodness of Fit" (R^2). The R^2 is a measure of the model's predictive accuracy. Another way to view R^2 is that it represents the exogenous variable's combined effect on the endogenous variable(s). This effect ranges from 0 to 1 with 1 representing complete predictive accuracy. Because R^2 is embraced by a variety of disciplines, scholars must rely on a "rough" rule of thumb regarding an acceptable R^2, with 0.75, 0.50, and 0.25, respectively, describing substantial, moderate, or weak levels of predictive accuracy (Sarstedt, *et al*, 2017).

Bootstrapping. A general approach to statistical inference based on building a sampling distribution for a statistic by resampling from the data at hand. The term bootstrapping is an allusion to the expression "pulling oneself up by one's bootstraps" (Freedman, 1981). In bootstrapping, subsamples are created with randomly drawn observations from the original set of data (with replacement). The subsample is then used to estimate the PLS path model. This process is repeated until a large number of random subsamples has been created, typically about 5,000. PLS-SEM relies on a nonparametric bootstrap procedure (Hulland, 1999) to test the significance of estimated path coefficients in PLS-SEM. Coefficients determined by bootstrapping that have a value greater than 1.96 indicate that the coefficient is statistically significant at the 5% level.

T-Statistics. In statistics, a method of testing hypotheses about the mean of a small sample drawn from a normally distributed population when the population standard deviation is unknown. As the sample size (and thus the degrees of freedom) increases, the *t-distribution* approaches the bell shape of the standard normal distribution. In practice, for tests involving the mean of a sample of size greater than 30, the normal distribution is usually applied. The response rate for Study 1 was an N=50.

Independent Variable 1: Process Knowledge. The first independent variable of interest was the virtual team members' level of knowledge in their project's processes in a computer-mediated environment using a Likert continuous scale of 0—5. As an example, the response to the statement: "I had a clear understanding of the process in which I worked in the GVT" could be responded to as follows: 1=Strongly Disagree; 2=Mildly Disagree; 3=Neither Agree nor Disagree; 4=Mildly Agree; 5=Strongly Agree.

Independent Variable 2: Process Ownership. The second independent variable was the individual member's sense of personal ownership in their part of the process measured on the same continuous scale (0—5) as used for Process Knowledge.

Mediating Variable: Institutional Trust in the Process. A mediator variable is one that explains the relationship between two other variables. A mediator variable describes the process or path that an independent variable may work through to affect a dependent variable. De Jong and Elfring (2010) make the point in their study of ongoing teams that multiple mediators are likely at work to describe the relationship between trust and team performance. The mediating variable in this model was the individual team member's institutional trust in their computer-mediated processes. Measured on the same continuous scale (0—5). Baron and Kenny in their classis work stated that: "In general, a given variable may be said to function as a mediator to the extent that it accounts for the relation between the predictor and the criterion. Mediators explain how external physical events take on internal psychological significance. Whereas moderator variables specify when certain effects will hold, mediators speak to how or why such effects occur" (Baron and Kenny, 1986, p. 1176).

Outcome Variable 1: Individual Trust in Global Virtual Team Members. This variable was measured on the same continuous scale (0—5) and focused on the surveyed individual's perception of their level of individual trust among the members of the virtual team.

Outcome Variable 2: Project Success. This variable was measured on the same continuous scale (0—5) and focused on the surveyed individual's sense of their project's success, i.e., on-time and within budget of the tasks assigned.

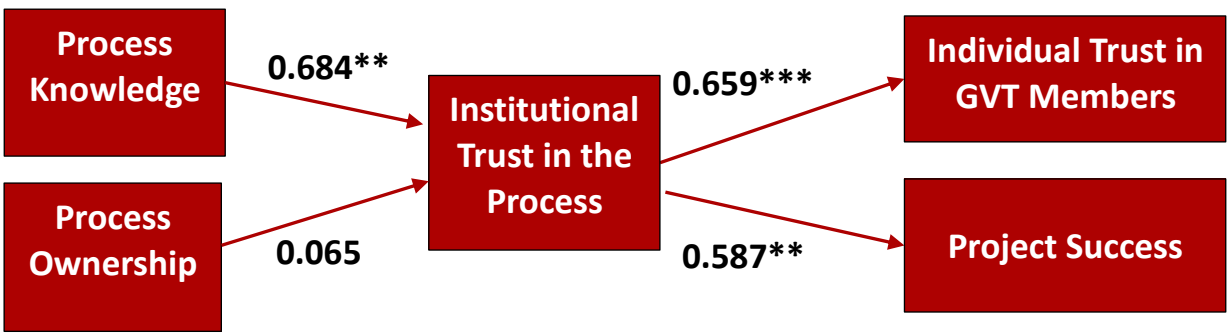
Section 3: Results

Using the SmartPLS 2.0 software, the internal consistencies of the effect of the two independent variables on *Institutional Trust in the Process* varied, with *Process Knowledge* considered a strong positive relationship with a coefficient of determination (Goodness of Fit R^2) of 0.64. The effect of the second independent variable, *Process Ownership*, on *Institutional Trust in the Process* was less robust with a coefficient of 0.065.

The Goodness-of-Fit measure (R^2) for "Institutional Trust" regression has a value of 0.538, indicating that the model explains 53.8% which is considered a moderate level of predictive accuracy of the variability of the *Institutional Trust in the Process* variable around its mean.

As shown in the upper half of Figure 2 (Study 1), for the "Individual Trust Among the GVT Members" regression, the coefficient on *Institutional Trust in the Process* variable is 0.659, representing a positive relation. The Goodness-of-Fit measure (R^2) for this regression is 0.434 which is considered a moderate level of predictive accuracy. In the "Project Success" regression, the coefficient on *Institutional Trust in the Process* variable is also positive, with a value of 0.354 and a Goodness-of-Fit measure (R^2) of 0.434 which is considered a moderate level of predictive accuracy.

Figure 2. Trust in Virtual Teams and Online Processes: Original Model Results



Note: (* p< .001, ** p<.05, *p<.10).**

Table 3 summarizes the demographic data collected in Study 1 and gives a profile of the survey respondents.

Table 3. Study 1: Participant Demographic Data

Subject	Response 1	Response 2	Response 3
Gender	27: identified as male	23: identified as female	
Age Ranges	50: 20—30 years	24: 31—40 years	6: over 41
Education Level	21: High School	19: BS/BA Degree	10: MS/MA Degree
Experience	24: 1—2 GVTs	20: 3—4 GVTs	6: 5 or more GVTs

Section 4: Discussion

Although Study 1's sample size was small (50 surveys), the results suggested that the independent variable of "Process Ownership" was not a significant contributor to "Institutional Trust in the Process." While a future study might delve deeper into the subject of the effects of team member feelings of ownership, for this research I have chosen to focus on a positive perception of the online processes gained through an in-depth "Process Knowledge" as the primary independent variable for the revised model.

As a result, the revised model (Figure 4) reflects the focus of my dissertation research. In addition, the pilot study results required a refocus on the hypotheses developed from the data, and accordingly some of the survey questions for virtual team members and their managers has been slightly modified in order to align their responses to the same topic of study.

To address concerns in regard to recreating an existing data base, I took six survey statements for incorporation into Study 2 extracted from from Jarvenpaa, Knoll, and Leidner, (1998) article "Is Anybody Out There? Antecedents of Trust in Global Virtual Teams?"

Additionally, I took two survey statements were extracted from a study by Mcadam and Reid (2001) titled "SME and large organisation perceptions of knowledge management: Comparisons and contrasts." My intent was to build on existing secondary data to ensure that my survey responses could be compared with previous survey results.

I now theorize that the effects of institutional trust, as influenced by the level of virtual team member's positive perceptions of their online processes through an in-depth knowledge of the project's processes can mitigate, even eliminate, the need to establish a sense of individual trust among the virtual team members.

With the sole independent variable of the level of knowledge in global virtual team processes, Study 2 will explore the impact of institutional trust vis-à-vis individual trust, as well as its impact on the project's outcome.

Section 5: Limitations of Study 1 (Pilot Study)

There are several limitations to Study 1 (Pilot study) that should be noted. The first limitation is that only one company, Infosys®, and IT company was studied, making it difficult to suggest the results might be applied to other industries.

A second limitation to Study 1 was that the sample was limited to surveying only virtual team members. The interpretation of the results provides a one-sided view of a virtual team's projects. To address this concern in Study 2 (Dissertation study), a greater sample size that will include the virtual project managers, a two-version questionnaire

will be administered to gain the managers' insights into the relationships between constructs.

The third limitation was Study 1's focus on selecting a sample of virtual team respondents only from successful IT projects. To broaden the scope of Study 2, Infosys® will be asked for respondents from both successful and successful IT projects.

A strength in the results of Study 1 was the lack of support for "Process Ownership" as an independent variable affecting "Institutional Trust in the Process." This antecedent will be dropped from Study 2's questionnaires and a revised conceptual model will be presented during the dissertation phase of my research.

Table 4. Limitations of Study 1 (Pilot Study) and Proposed Revisions for Dissertation Research

Limitations of the Study 1	Revisions for Dissertation Study 2
Small sample size (n=50)	Increase sample size (n >400)
Sample did not include virtual team project managers	Survey managers who are managing or have managed virtual team projects
Sample did not compare project success as viewed by team members versus their project managers	Ask Infosys® to identify respondents from the same virtual team projects and correlate success versus unsuccessful outcomes
Sample asked for respondents from successful projects	Ask Infosys® for respondents from both successful and successful projects

CHAPTER 4

INSTITUTIONAL TRUST IN GLOBAL VIRTUAL TEAM PROCESSES

This section describes the methods deployed in Study 2 and includes the measures and an analysis of the results obtained from the data. The revised conceptual model is included with developed hypothesis.

Infosys® approved Study 2 as an online questionnaire. As previously stated, their only condition was that I share my findings on the effects of institutional trust in the process versus the need to establish a sense of individual trust in the global virtual team members with the company.

Section 1: Methods

Study 2 was administered with the intent of providing a sufficient data base to analyze the study's hypothesis in depth. Like Study 1, the slightly revised Study 2 questionnaire employed a 22-question online survey with eighteen Likert Scale questions and four demographic questions. In addition, it seemed prudent to broaden the scope of the research to include the virtual teams' managers. Their assessment of their team's project performance and process knowledge might be beneficial to the analysis.

Except where noted, all variables were measured on a 5-point Likert scale: 1=Strongly Disagree, 2=Mildly Disagree, 3=Neither Agree nor Disagree, 4=Mildly Agree, and 5=Strongly Agree.

The eighteen survey statements are provided in Table 5 (page 64) for virtual team members, and Table 6 (page 65) for their project managers. Note that the questions are annotated with abbreviations used in the various analysis charts, i.e., "Process

Perception" (PP); "Institutional Trust in the Process" (ITP); "Individual Trust among Group Members" (ITGM); and "Project Success" (PS).

Infosys® was asked to seek a survey response goal with a minimum of an N>400 respondents. In an effort to correlate team member's perceptions against those of their manager, Infosys® was also asked to correlate responses from the same virtual team members and their managers so as to combine the responses from distinct small, short-lived virtual teams.

Unfortunately, my study does not reflect a correlation between team member's perceptions against those of their manager, as Infosys® expressed a concern in regard to confidentiality and survey response openness if the virtual team members believed their managers would be able to review their responses. As the virtual teams were, by design, limited to small teams of four to six members, it seemed a reasonable concern, and one that I will address in the study's limitations in Chapter 5.

These virtual team members would be full-time employees of the firm. The requested minimum size of 400 respondents resulted in a robust data set for analysis. The actual number of respondents for Study 2 was 469 respondents, with 274 managers and 195 team members responding. The research was inductive in nature, i.e., theory-building, in that it employed a "bottom-up" approach by collecting data about institutional trust in the process and its impact on individual trust in team members and project outcomes.

Success was determined by the subject corporation's managers, although virtual team members might have different views on the relative success of their individual work. Measures of the virtual team's project success included an acceptable software

product that met the minimum requirements of the test scripts; reviewed and approved within the allotted time frame for delivery; and at or below budgeted financial resources for the project.

As previously stated, based on the findings in Study 1, process ownership will not be considered as a significant factor in regard to its influence on institutional trust in the virtual team's processes. The t-statistic finding in Study 1 for "Process Ownership," was 0.390, and is therefore considered not to have had a significant effect on institutional trust. The conceptual model has been adjusted from the original conceptual model and is depicted below.

Figure 3. Trust in Virtual Teams and Online Processes: Revised Model

In developing these hypotheses, I predicted the effects of the virtual team members having a favorable perception of their processes on the institutional trust they placed in their computer-mediated environment. This study did not ask the participants if they had an "unfavorable" perception of the process, i.e., the rules, online tools, or management directions they experienced during their projects. Thus I modified the variable name to process perception instead of process knowledge to better operationalize the underlying concept.

Based upon the results of Study 1, I offer three hypotheses to address the relationships between a favorable process perception, institutional trust in the virtual team's processes, and the resulting effects on individual trust among the virtual team members, as well as the positive outcomes of the project.

Based on the results of Study 1, I now theorize that a virtual team member's perceptions of the project's processes can positively influence the effects of institutional trust in their computer-mediated environment's online processes.

Therefore, I hypothesize:

Hypothesis 1: The greater the favorable perception in their project's processes, the greater the institutional trust in the online processes of their project.

Based on the results of Study 1, I now theorize that the effects of institutional trust by the virtual team member in their project's processes can mitigate, even eliminate, the need to establish a sense of individual trust among the virtual team members. Once an atmosphere of institutional trust in the process is established, it will have a positive effect on individual trust among the virtual team members.

Therefore, I hypothesize:

Hypothesis 2: Institutional trust in the process will positively impact individual trust in fellow virtual team members.

If institutional trust can be established in a virtual team's project, project success could become more achievable.

Therefore, I hypothesize:

Hypothesis 3: Institutional trust in the process will positively impact project success as determined by the virtual team members and their project managers.

Table 5. Antecedents Leading to Trust and Project Success—GVT Members

Antecedent	Definition	Survey Statement
Process Perceptions (PP)	A favorable view of the project's online processes will support knowledge transfer to make project workflow more effective, more efficient, and more capable of adapting to an ever-changing environment.	• GVT-1/PP1: The organization facilitates knowledge transfer among GVT members[1] • GVT-4/PP2: The testing scripts your GVT were provided were clear and concise[3] • GVT-7/PP3: The technology we were provided effectively facilitated Process Knowledge transfer[1] • GVT-12/PP4: The other team members possessed the necessary Process Knowledge to accomplish the assigned work • GVT-17/PP5: How important was it to you to have a clear understanding of the GVT project's processes?
Institutional Trust in the Process (ITP)	The positive and confident expectation of project success through a shared belief in the professional execution of the project.	• GVT-6/ITP1: I felt a sense of complete confidence in the process of our IT project • GVT-8/ITP2: I felt empowered to complete my assigned tasks without concern for the work of others • GVT-14/ITP3: How important was it to you that your GVT's project requirements were clearly stated?
Individual Trust in GVT Members (ITGM)	The intention by the truster to accept vulnerability to a trustee based on the positive expectations of his or her benevolent actions.	• GVT-3/ITGM1: The other team members displayed a solid work ethic[2] • GVT-5/ITGM2: I would have been comfortable giving the other members complete responsibility for the completion of this project[2] • GVT-11/ITGM3: I could rely on those with whom I worked with in my GVT[2] • GVT-13/ITGM4: Overall, the people in my group were very trustworthy[2] • GVT-15/ITGM5: I really wish I had a way to oversee the work of the GVT Members[2]
Project Success (PS)	Measures: on-time delivery of the deliverables; a quality software product that meets requirements of test scripts; within the allotted time frame for delivery; and at or below budgeted financial resources.	• GVT-2/PS1: The successful outcomes for this IT project were very important to me • GVT-9/PS2: My fellow GVT members were strongly committed to the project's success[2] • GVT-10/PS3: It is your opinion that your GVT's IT Project was completed within the budgeted resources[3] • GVT-16/PS4: How important was it to you that your GVT's IT Project was completed within the allotted resources?[3] • GVT- 18/PS5: How important was it to you that your fellow GVT members were strongly committed to the IT project's success?

Notes: 1: Mcadam and Reid (2001)
2: Jarvenpaa, Knoll, and Leidner (1998)
3. Infosys® request

Table 6. Antecedents Leading to Trust and Project Success—GVT Managers

Antecedent		Survey Statement
Process Perceptions (PP)	A favorable view by their team members in the project's online processes will support knowledge transfer to make project workflow more effective, more efficient, and more capable of adapting to an ever-changing environment.	• MNC-1/PP1: The organization facilitates knowledge transfer among GVT members[1] • MNC-4/PP2: The testing scripts you provided to the GVT were clear and concise[3] • MNC-7/PP3: The technology we provided to the GVT members effectively facilitated Process Knowledge transfer[1] • MNC-12/PP4: The GVT members possessed the necessary Process Knowledge to accomplish the assigned work • MNC-17/PP5: How important was it to you to have your assigned GVT members have a clear understanding of the project's processes?
Institutional Trust in the Process (ITP)	The positive and confident expectation of project success through a shared belief in the professional execution of the project.	• MNC-6/ITP1: I felt a sense of complete confidence in the process of my IT project • MNC-8/ITP2: The GVT members were empowered to complete their assigned tasks without concern for each other's work • MNC-14/ITP3: How important was it to you that your GVT's project requirements were clearly stated?
Individual Trust in GVT Members (ITGM)	The intention by the truster to accept vulnerability to a trustee based on the positive expectations of his or her benevolent actions.	• MNC-3/ITGM1: The other team members displayed a solid work ethic[2] • MNC-5/ITGM2: I would have been comfortable giving the GVT members complete responsibility for the completion of this project[2] • MNC-11/ITGM3: I could rely on those with whom I worked with in my GVT[2] • MNC-13/ITGM4: Overall, the people in my group were very trustworthy[2] • MNC-15/ITGM5: I really wish I had a better way to oversee the work of the GVT Members[2]
Project Success (PS)	Measures: on-time delivery of the deliverables; a quality software product that meets requirements of test scripts; within the allotted time frame for delivery; and at or below budgeted financial resources.	• MNC-2/PS1: The successful outcomes for this IT project were very important to me • MNC-9/PS2: My GVT members were strongly committed to the project's success[2] • MNC-10/PS3: It is your opinion that your GVT's IT Project was completed within the budgeted resources[3] • MNC-16/PS4: How important was it to you that your GVT's IT Project was completed within the allotted resources?[3] • MNC-18/PS5: How important was it to you that your assigned GVT members were strongly committed to the IT project's success?

Notes: 1: Mcadam and Reid (2001)
2: Jarvenpaa, Knoll, and Leidner (1998)
3. Infosys® request

Section 2: Measures

Study 2 was conducted in the environment of the global virtual team's process management of a short-lived (less than one year) IT projects and focused on small teams of four to six members. Study 2 explored the effects of one independent variable.

Study 2 analyzed the participants' responses using a Partial Least Squares (PLS)—Structural Equation Modeling (SEM). It used SmartPLS 2.0 software with graphical user interface for variance-based structural equation modeling (SEM) using the partial least squares (PLS) path modeling method.

SmartPLS 2.0 software performed a regression analysis on the stated hypothesis. Study 2 had one independent variable, *Process Perception*, with *Individual Trust* and *Project Success* as dependent variables. The mediating variable in Study 2's analysis is *Institutional Trust in the Process*. Reliability was calculated using the SmartPLS 2.0 internal consistency scores.

After running a PLS model, estimates are provided for the path coefficients, which represent the hypothesized relationships linking the constructs. Path coefficient values are standardized on a range from -1 to +1, with coefficients closer to +1 representing strong positive relationships and coefficients closer to -1 indicating strong negative relationships. Study 2 determined standard errors for the data by using bootstrapping to test for significance.

Coefficient of determination or "Goodness of Fit" (R^2) was measured to predict the model's predictive accuracy. This effect ranges from 0 to 1 with 1 representing complete predictive accuracy. An acceptable R^2 with coefficients of 0.75, 0.50, and 0.25, respectively, described substantial, moderate, or weak levels of predictive accuracy.

Bootstrapping the respondents' data created subsamples with randomly drawn observations from the original set of data (with replacement). The subsample is then used to estimate the PLS path model. PLS-SEM uses a nonparametric bootstrap procedure to test the significance of estimated path coefficients in PLS-SEM. Coefficients determined by bootstrapping that have a value greater than 1.96 indicate that the coefficient is statistically significant at the 5% level.

Finally, t-statistics were calculated for each hypothesis. As the sample size (and thus the degrees of freedom) increases, the *t-distribution* approaches the bell shape of the standard normal distribution. In practice, for tests involving the mean of a sample of size greater than 30, the normal distribution is usually applied. The response rate for Study 2 was an N=469.

Independent variable: Process Perception. The independent variable of interest was the virtual team members' perceptions of their project's processes in a computer-mediated environment using a Likert continuous scale of 0—5. As an example, a project manager's response to the statement: "The GVT members possessed the necessary process knowledge to accomplish the assigned work" could be as follows: 1=Strongly Disagree; 2=Mildly Disagree; 3=Neither Agree nor Disagree; 4=Mildly Agree; 5=Strongly Agree.

***Mediating variable: Institutional Trust in the Process*.** The mediating variable was the individual team member's trust in their computer-mediated processes. Measured on the same continuous scale (0—5).

Outcome variable 1: Individual Trust in Global Virtual Team Members. This variable was measured on the same continuous scale (0—5) and focused on the surveyed

individual's perception of their level of individual trust among the members of the virtual team.

***Outcome variable 2: Project Success*.** This variable was measured on the same continuous scale (0—5) and focused on the surveyed individual's sense of their project's success, i.e., on-time and within budget of the tasks assigned.

Study 2 collected primary data using an online questionnaire administered with Infosys® and targeted both virtual team members and their project managers. For Study 2 Infosys® was asked to include projects that were deemed successful and unsuccessful. No attempt was made to identify any of the participating employees or their managers, rather an alphanumerical identity was assigned by Infosys® to ensure that survey responses were confidential for the participating employees.

Study 2 targeted small virtual teams composed of four to six members. The teams were working on short-lived projects lasting less than one year. They were asked to limit these surveys only to Infosys employees, or if necessary identify any responses received by subcontractors. Study 2 respondents are considered to represent only Infosys® employees.

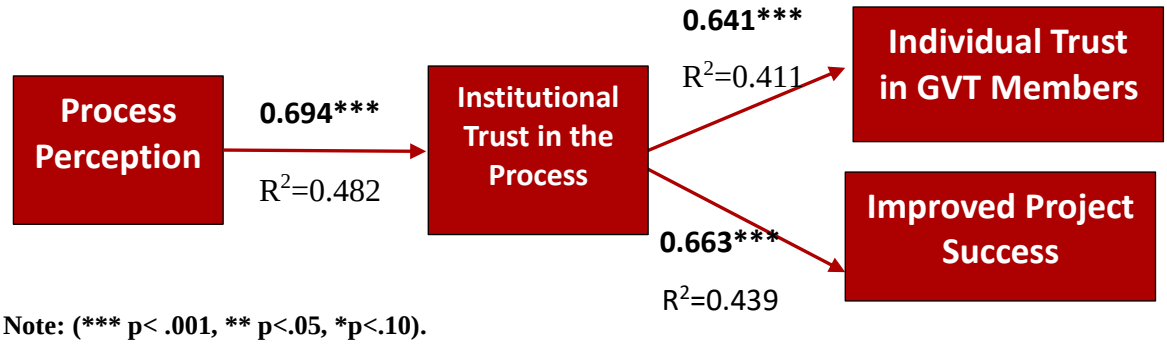
Section 3: Results

Three models were run, first using STATA, and a PLS-SEM on the Study 2 data. The first analyzed the virtual team member responses, with a survey response of N=195. The second analysis centered on the virtual team project managers whose response rate was N=274. The combined response rate for Study 2 was N=469, which exceeded the desired goal of N>400. A third analysis was run on the data using the combined responses from virtual team members and their managers.

Table 7. Summary Statistics—GVT Members

Variable	N	Mean	SD	Min	Max	Cronbach Alpha
pp	195	4.58E-09	0.755201	-2.49912	1.204539	0.7297
itp	195	-1.99E-09	0.575355	-1.85993	0.914318	0.7584
itgm	195	-1.81E-10	0.860903	-2.8459	1.362464	0.7658
ps	195	-8.04E-10	0.663972	-2.55468	0.862218	0.8336
Correlation Matrix						
	pp	itp	itgm	ps		
pp	1					
itp	0.665	1				
itgm	0.6234	0.5881	1			
ps	0.4888	0.4108	0.4219	1		

Figure 4. Trust in Virtual Teams and Online Processes: Revised Model Results



Note: (* p< .001, ** p<.05, *p<.10).**

PLS-SEM Algorithm—GVT Members

As shown in Figure 4 above, the Goodness-of-Fit measure (R2) for "Institutional Trust in the Process" (ITP) regression has a value of 0.482. This value indicates that the model explains 48.2% of the variability of the "Institutional Trust in the Process" (ITP) variable around its mean, which is considered a moderate level of predictive accuracy.

As shown in the upper half of Figure 4, for the "Individual Trust" (ITGM) regression, the coefficient on "Institutional Trust in the Process" (ITP) variable is 0.641, representing a positive relationship and is considered substantially accurate in predicating

the hypothesis. The Goodness-of-Fit measure (R2) for this regression is 0.411, which is considered a moderate level of predictive accuracy.

In the "Project Success" (PS) regression, the coefficient on "Institutional Trust in the Process" (ITP) variable is also positive, with a value of 0.663 is considered substantially accurate in predicating the hypothesis. The Goodness-of-Fit measure (R2) of 0.439, which is considered a moderate level of predictive accuracy.

Table 8. Summary Statistics—GVT Project Managers

Variable	N	Mean	SD	Min	Max	Cronbach Alpha
pp	273	-3.71E-09	0.803736	2.89416	1.36617	0.7510
itp	273	-3.00E-10	0.452924	-1.92731	0.743027	0.7694
itgm	273	5.32E-09	0.839043	-3.06447	1.342017	0.8068
ps	273	-3.27E-09	0.713596	-3.05425	0.808912	0.8015
Correlation Matrix						
	pp	Itp	itgm	ps		
pp	1					
itp	0.6086	1				
itgm	0.5782	\0.5346	1			
ps	0.5848	0.5527	0.4165	1		

PLS-SEM Algorithm—GVT Project Managers

As shown in the upper half of Figure 8, for the "Individual Trust among Group Members" (ITGM) regression, the coefficient on "Institutional Trust in the Process" (ITP) variable is 0.584, representing a positive relation. The Goodness-of-Fit measure (R^2) for this regression is 0.341, which is considered a weak level of predictive accuracy.

In the "Project Success" (PS) regression, the coefficient on "Institutional Trust in the Process" (ITP) variable is indicative of a positive relation, with a value of 0.664 and a Goodness-of-Fit measure (R^2) of 0.428, which is considered a moderate level of

predictive accuracy. In the Figure 8 algorithm, the Goodness-of-Fit measure (R^2) for "Institutional Trust in the Process" (ITP) regression has a value of 0.444, indicating that the model explains 44.4% of the variability of the "Institutional Trust in the Process" (ITP) variable around its mean.

Table 9: Summary Statistics on Study 2 Data—GVT Combined Responses

Variable	N	Mean	SD	Min	Max	Cronbach Alpha
pp	468	-7.74E-10	0.785011	-2.77385	1.312302	0.7395
itp	468	3.47E-09	0.490243	-1.91181	0.822159	0.7731
itgm	468	-1.09E-09	0.846785	-2.98822	1.359133	0.7897
ps	468	4.38E-11	0.68427	-2.87534	0.834727	0.8137
Correlation Matrix						
	pp	itp	itgm	ps		
pp	1					
itp	0.6250	1				
itgm	0.6045	0.5491	1			
ps	0.5621	0.4806	0.4287	1		

PLS-SEM Algorithm—GVT Combined

As shown in the upper half of Figure 9, for the "Individual Trust among Group Members" (ITGM) regression, the coefficient on "Institutional Trust in the Process" (ITP) variable is 0.607, representing a positive relation. Note that for "itgm5" the factor loading is small at -0.055. If the factor loading is smaller than 0.4 this observed factor can be dropped from the analysis. That said with "itgm5" included or not, it does not adversely impact the resulting analysis coefficient on "Institutional Trust in the Process."

The Goodness-of-Fit measure (R^2) for this regression is 0.368, which is considered a weak level of predictive accuracy. In the "Project Success" (PS) regression, the coefficient on Institutional Trust in the Process variable is also positive, with a value

of 0.663 and a Goodness-of-Fit measure (R^2) of 0.426, which is considered a moderate level of predictive accuracy.

Table 10 looks at the demographic data collected in Study 2 and provides a profile of the survey respondents.

Table 10. Participant Demographic Data

Subject	Response 1	Response 2	Response 3	Response 4
Gender:				
Members	**125: identified male**	**70: identified female**	**2: Other/preferred**	**N/A**
Managers	**188: identified male**	**84: identified female**	**not to answer**	
Age Ranges:	**20—30 years**	**31—40 years**	**41—50 years**	**Over 60 years**
Members	**95**	**76**	**7**	**3**
Managers	**111**	**125**	**12**	**2**
Education:	**High School**	**BS/BA**	**MS/MA**	**PhD**
Members	**11**	**103**	**67**	**11**
Managers	**73**	**83**	**107**	**10**
Experience:	**1—2 GVTs**	**3—4 GVTs**	**More than 5 GVTs**	
Members	**68**	**76**	**51**	**N/A**
Managers	**97**	**102**	**74**	

Section 4: Discussion

Study 2 employed partial least square (SmartPLS 2.0 software) for measurement validation, and for testing the structural model hypotheses. Pavlou et al. explains, "PLS employs a component-based approach for estimation, and it places minimal restrictions on sample size and residual distributions. PLS is best suited for testing complex relationships by avoiding inadmissible solutions and factor indeterminacy" (Pavlou et al., 2007, p. 122).

First, as hypothesized, the greater the positive perception of the process, the stronger the positive affect on the virtual team members' intuitional trust in their online processes for the project. The effect of the independent variable "Process Perception" (PP) on the mediating variable "Institutional Trust in the Process" (ITP) is considered

moderately predictive with resulting coefficients for virtual team members = 0.694; project managers = 0.0653; and their combined responses = 0.666.

The bootstrap analysis on Study 2 data for the independent variable "Process Perception" (PP) effects on the mediating variable "Institutional Trust in Process" (ITP) determined that the initial regression results are significant. The coefficients' "t-statistics" with a value greater than 1.96 indicate that the coefficient is statistically significant at greater than the 5% level, i.e., virtual team members = 12.886; project managers = 11.736; and their combined responses = 11.193.

These results support H-1: "The greater the favorable perception in their project's processes, the greater the institutional trust in the online processes of their project."

In regard to H-2, as hypothesized, the greater the institutional trust the virtual team members have in their project's processes, the stronger the positive affect on their individual trust among their fellow team members. The internal consistencies of the effect of the mediating variable "Institutional Trust in the Process" (ITP) on the outcome variable "Individual Trust among Group Members" (ITGM) is considered moderately predictive with resulting coefficients of virtual team members = 0.641; project managers = 7.749; and their combined responses = 0.444.

The bootstrap analysis on the data on the mediating variable "Institutional Trust in Process" (ITP) effect on the outcome variable "Individual Trust among Group Members" (ITGM) determined that the initial regression results are significant. The coefficients' "t-statistics" with a value greater than 1.96 indicate that the coefficient is statistically significant at greater than the 5% level, i.e., Members = 11.088; Managers = 7.749; and Combined Responses = 9.348.

These results support H-2: “Institutional trust in the process will positively impact individual trust in fellow virtual team members.”

In regard to H-3, as hypothesized, the greater the institutional trust the virtual team members and their managers have in their project’s processes, the stronger the positive affect on the perception of project success. The internal consistencies of the effect of the mediating variable “Institutional Trust in the Process” (ITP) on the outcome variable “Project Success” (PS) is considered moderately predictive with resulting coefficients for virtual team members = 0.663; project managers = 0.664; and their combined responses = 0.663.

The bootstrap analysis on the data for the mediating variable “Institutional Trust in Process” (ITP) effect on the outcome variable “Project Success” (PS) determined that the initial regression results are significant. The coefficients’ “t-statistics” with a value greater than 1.96 indicate that the coefficient is statistically significant at greater than 5% level, i.e., virtual team members = 11.213; project managers = 10.271; and their combined responses = 10.074.

These results support H-3: “Institutional trust in the process will positively impact project success as determined by the global virtual team members and their multi-national project managers.”

CHAPTER 5

INSTITUTIONAL TRUST IN PROCESS AND ITS EFFECTS ON PROCESS PERCEPTION, INDIVIDUAL TRUST, AND PROJECT SUCCESS

My primary contribution in this research is in examining the significant relationships that exist between institutional trust in online processes; the role of a positive perception of the online processes; and the resulting effects on individual trust among small, short-lived virtual team members and their project managers. In addition, a relationship was established between institutional trust in virtual team project processes and the perceived success of their project.

Embedded in the general discussion (Section 1) are suggested contributions to theory and managerial practice. My research findings may have limitations as to their applicability outside of small, short lived IT virtual teams, and future directions for follow-on research are suggested (Section 2). Finally, the paper concludes with a brief summary of the core results of the two studies (Section 3).

Section 1: Discussion

The current research provided evidence that institutional trust in online processes already is established in the literature. Specifically, institutional trust in the virtual world has been studied in online banking, commerce, and gaming. This research suggests significant opportunities in replacing the requirement for establishing individual trust among global virtual team members and their managers, with an investment in institutional trust in their project's processes.

Having identified, researched, and summarized the various trust constructs in both the real and virtual worlds (Chapter 2), a model of constructs and its hypothesis were

offered to explore the relationships between a positive perception of the project's online processes, institutional trust in the process, individual trust among the virtual team members, and the perception of project success.

Once an atmosphere of institutional trust in the process is established, the data obtained from the multi-national corporation studied suggests a positive effect on individual trust among the virtual team members, as well as the perception of its positive effects on their project's success. By studying small, short-lived global virtual teams, the firm's ability to identify and prioritize the project's key process perception that, either in combination or uniquely stand-alone, might serve as predictors of project success. It is not beyond the realm of possibilities to relate the results of this study to small, real-world teams of short-lived projects.

My model attempts to resolve the issue by pointing out that institutional trust in process can mitigate, even eliminate the need to establish a sense of individual trust among global virtual team members. My model integrates different aspects of trust that have not been linked previously, and it does so within specific parameters of size (small virtual teams of four to six members), and time (short-lived projects of less than 1 year).

Contributions to Theory

This research will add to the literature of institutional trust in the process, versus the need for establishing individual trust among the virtual team members. This exploratory research demonstrated that institutional trust on the process can mitigate, even substitute for, the need to establish individual trust among the members and their managers of a multi-national IT corporation's virtual projects.

The bulk of the existing literature is focused on the virtual worlds of commerce, banking, and gaming. This research, and the identified gaps in these findings will pave the way for future research in this critical area of global virtual teams' project performance. Future work might consider other variables that could impact virtual team project success without the presence of individual trust among its globally-dispersed members.

I suggest that the theory of having a positive perception of the online processes leading to institutional trust in the virtual team's project process has not been fully explored by academia. This study could establish a new field of study, i.e., the role of process perception and its effects on institutional trust in computer-mediated environments outside of online commerce and gaming. As a result, existing theories in the current body of knowledge about the emphasis on establishing individual trust in a virtual team's computer-mediated environment could be challenged.

Contributions to Managerial Practice

My research described the challenges of establishing individual trust in small, short-lived virtual teams. This difficulty is well-documented in current literature, which has focused on the position that for virtual teams to function at an elevated level of performance, individual trust must first be established in the virtual team members. This belief has resulted in significant expenditures to invest in team building exercises to establish individual trust among the virtual team members (Jarvenpaa and Leidner, (1999); Zhang, Lowry, Zhou, and Fu (2007).

By replacing these training exercises to build individual trust among virtual team members, a sense of institutional trust can be established. Institutional trust in the

process can render sensible and productive judgements regarding the binding structure of rules guiding their colleagues' behaviors (Kramer, 2010). This rule-based system guides my belief that placing institutional trust in the process can be instilled through training the tools of the online processes for virtual team members by their company's human resource managers.

If uniqueness in the antecedents to sharing process knowledge are identified, it may enable human resource managers to better staff and train future global virtual team members. The desired outcome of this research is to provide a rational for institutional trust in their project's processes by the virtual team members. While the literature suggests the three pillars of benevolence, ability, and integrity are key to establishing individual trust, there simply may not be sufficient time to establish trust among short-lived, virtual teams.

This refocusing of training dollars could be significant for the corporation's investments, especially in the virtual team's project start-up phase. If the human resources department establishes formal organizational rules to ensure compliance, the virtual team members could place their trust in the institution's project processes. By doing so, a short-lived virtual team could operate in its computer-mediated environment without the need to establish a sense of individual trust among their members.

Establishing and nurturing a corporate culture of knowledge sharing will provide virtual teams with a greater willingness to place their institutional trust in the process (Zakaria, Amelinckx, and Wilemon, 2004). As human resource managers staff and train their virtual teams, an understanding of the independent variable of process perception can provide the foundations for the development of a high-performance virtual team. By

providing the necessary knowledge to form positive process perceptions, an institutional trust in the project's processes can be achieved. This in turn can positively affect the virtual team members' individual trust in each other, as well as the odds for completing a successful project.

Finally, with this deeper understanding of process perception and its impact on institutional trust in the online processes, the need for a continuing corporate investment in team building exercises might be reduced, even eliminated. By focusing the corporation's training efforts on process knowledge and perceptions instead of teambuilding exercises, an increase in team productivity and future project success could be realized.

These findings and recommendations should be shared with multi-national corporations, their subsidiaries, and human resource managers.

Section 2: Limitations and Future Directions

There are several limitations to this study that future research on small, short-lived virtual teams may wish to address.The first limitation is that only one company, Infosys®, a global IT solutions company, was included in the research study. This research was limited to global virtual teams working in the computer-mediated environments of an Information Technology (IT) multi-national corporation. Therefore, it might raise a question about a bias toward IT virtual teams, and a question as to its application among other global virtual teams outside of the IT industry.

As Infosys® is a corporation focused on delivering IT solutions to its clients worldwide, it is possible that this group might have a stronger dependence on institutional trust in their processes than other industries. Therefore, the learning gained from studying

IT virtual teams may not easily transfer to other industries and their own virtual team challenges. Future research will need to be conducted to include other industries in order to show that the relationships established in my research can be generalizable.

Second, I focused on small virtual teams of 4 to 6 members whose IT projects were short-lived. The existing literature suggests individual trust plays a greater role in larger virtual teams whose projects may span multiple months, or even years (O'Hara-Devereaux & Johansen, 1994; De Jong and Elfring, 2010). Short-lived teams have reported either a negligible or conditional effect of trust on performance (Aubert and Kelsey, 2003; Jarvenpaa, Shaw, and Staples, 2004).

That said newer studies of virtual teams have shown evidence of a positive main effect on team performance (Spreitzer, Noble, Mishra, and Cooke, 1999; Costa, 2003; Rispens, Greer, and Jehn, 2007; Sankowska, 2013). The issues identified in my study of small, short-lived IT virtual teams may not relate to larger virtual teams, and even smaller virtual teams in other global industries.

The study's third limitation was due to Infosys® concerns for confidentiality of the responses between the small virtual teams and their project managers, resulting in a reluctance to tie the responses of virtual team members to those of their project managers. As a result, the data could not be correlated to specific virtual teams and their assigned project managers.

This disconnection between the virtual team members' data and their project manager's responses might adversely affect my ability to interpret the results and calls into question the ability to interpret the results of their perceptions of project success. In a future study, tying member and manager responses to distinct virtual teams would make

the resulting data more conducive to interpretation. For example, "project success" survey question responses by virtual team members would be compared to the same questions asked of their manager for the project.

A fourth limitation has to do with the cross-sectional data obtained from Study 2's questionnaire. The data obtained from the questionnaire limits conclusions to correlation only, no conclusions can be drawn on causality. Although the model indicates causality, it must be emphasized that these results are limited by the methodology employed. By using survey data collected all at one time, this represents a single moment in time and thus cannot support any conclusions regarding cause and effect relationships, only statements about co-occurrences or correlations. Future studies could explore casualty through longitudinal methodology or experimental designs.

The fifth limitation resides on the questionnaires for GVT members and their project managers may not have captured the intended concepts (validity). Future studies may seek to develop and validate survey items related to institutional trust, process perception, and team performance through rigorous confirmatory factor analysis

In addition, a future study might delve deeper into the subject of the effects of team member feelings of project ownership. For this research I chose to focus on the positive perception of the online process as the primary independent variable for the revised conceptual model. While it was my belief that a sense of accountability among the virtual team members would have a significant effect on institutional trust in the process, Study 1 did not support that proposition.

Finally, it was beyond the scope of this investigation to measure feelings of distrust, which has been argued to be conceptually distinct from trust (Kramer, *et* al,

1996; Kramer and Tyler, 1996; McEvily and Tortoreiello, 2010). An examination of a sense of distrust among the members and their institution; between the members and their project's processes; or the members and each other could be an interesting path of research.

This model is predictive based upon the level of a positive perception of process knowledge leading to institutional trust in the process. It is interesting to note that the model is applicable to both global virtual teams and their project managers. This model, along with my discussion of the lack of research currently on institutional trust in the virtual world, (beyond online commerce and gaming), might generate significant amounts of research.

This study will add to the body of knowledge of the role of institutional trust in global virtual team projects vis-à-vis the positive effects of institutional trust in the processes. That said there are significant remaining areas that were not explored in this research. Fortunately, they lend themselves to future research in this emerging topic of institutional trust in the virtual world of global virtual teams. While global virtual teams provide great benefits to multi-national corporations, this field of study will continue to be rich with research opportunities for the coming decade(s) (Gilson, 2015).

Table 11. Methodology Limitations and Future Directions for Research

Limitations	Suggestions for Future Research
Study limited to an IT multi-national corporation (Infosys®)	Broaden research to study other multi-national corporations outside the IT industry
Study limited to small (4—6) member virtual teams whose projects were of short duration (less than one year)	The issues identified in my study may not relate to larger virtual teams, and even smaller virtual teams in other global industries

Table 11. Methodology Limitations and Future Directions for Research (Continued)

Sample did not compare project success as viewed by team members versus their project managers	In future studies, tie member and manager responses to distinct virtual teams to ensure the resulting data is more conducive to a correlated interpretation
The cross-sectional data obtained from the questionnaire limits conclusions to correlation only, no conclusions can be drawn on causality	Future studies could explore casualty through longitudinal methodology or experimental designs.
The questionnaires for GVT members and their project managers may not have captured the intended concepts (validity)	Future studies may seek to develop and validate survey items related to institutional trust, process perception, and team performance through rigorous confirmatory factor analysis
Does a sense of accountability among the virtual team members have an effect on institutional trust in the process	Aa future study might explore the effects of the virtual team member feelings of process or project ownership
This investigation did not attempt to measure feelings of distrust among the virtual team members	A future examination of the effects of distrust among the members and their institution; between the members and their project's processes; or the members and each other should be explored

Section 3: Conclusions

The social perspective of institutional trust in the virtual environment centers on one's moral duty to performing his or her tasks as assigned in the virtual team's project. This offers an alternative to transfer the team members' individual trust among their team members to an institutional trust in the project processes (Iacono, and Weisband, 1997; Jarvenpaa and Leidner, 1999; De Jong & Elfring, 2010; Crisp and Jarvenpaa, 2013).

The practical implications for corporations with virtual teams could equate to significant savings in training resources, including the time and talent needed to bring the virtual team members into a training environment. For example, on the economic

significance suggested in my findings, a 10% increase in process perception (PP) could lead to a 6.9% increase in the virtual team's institutional trust in process (see Figure 5).

Note that the data mirrors similar findings, though not as robust, in the case of virtual team project managers (as shown in Figure 7). The ramifications of this repurposing of training for virtual teams from individual trust to institutional trust could be significant to millions of dollars.

By conducting future research on small, short-lived teams from different industries, in both the real and virtual worlds, the effects of the independent variable of process perception on the establishment of institutional trust in the virtual team's processes can be further explored.

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APPENDICES

APPENDIX A

STUDY 1: INTRODUCTORY REMARKS AND QUESTIONNAIRE

"You are being asked to participate in a research study on your most recent experience in participating as a member of a Global Virtual Team (GVT) IT project.

The purpose of this study is to understand how trust influences a Global Virtual Team's (GVT's) project performance. Can trust in the Process Perception of the project's process mitigate, even eliminate, the need to establish trust among individual GVT members? Your participation in this study will contribute to a better understanding of the role of trust in a GVT Information Technology (IT) project. The total estimated duration of the study is less than 15 minutes. The procedure is to complete the following online survey.

There are no reasonably foreseeable risks or discomforts. There will be no cost to subjects for participating. The benefit you will obtain from the research is in knowing that you have contributed to the understanding of this topic. A limited number of research team members will have access to the data during data collection. This information, along with any other personally identifiable information about you, will be stripped from the final dataset.

Your participation in this survey is voluntary. You may decline to answer any question and you have the right to withdraw from participation at any time without penalty. The alternative to participating is not to participate. You may decline to participate at any time.

Please contact the research team with questions, concerns, or complaints about the study and any research-related injuries by calling 215-317-6201, or e-mailing michael.hagy@temple.edu. This research has been reviewed and approved by the Temple University Institutional Review Board. Please contact them at (215) 707-3390, or e-mail them at irb@temple.edu for any questions, concerns, or complaints about the research; questions about your rights; to obtain additional information; or to offer input.

Confidentiality: Efforts will be made to limit the disclosure of your personal information, including research study records, to people who have a need to review this information. However, the study team cannot promise complete secrecy. For example, although the study team has put in safeguards to protect your information, there is always a potential risk of loss of confidentiality. There are several organizations that may inspect and copy your information to make sure that the study team is following the rules and regulations regarding research and the protection of human subjects. These organizations include the IRB, Temple University, its affiliates and agents, Temple University Health System, Inc., its affiliates and agents, and the Office for Human Research Protections.

Initials: _____ Date: _____

Survey 1 Questionnaire

Using the following scale, please evaluate the following statements in your role as a member of an IT GVT.

1	**2**	**3**	**4**	**5**
Strongly Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Strongly Agree

1. Your GVT's project requirements were clearly stated
2. Your fellow GVT members effectively used the project's online tools
3. I really wish I had a good way to oversee the work of the other GVT members
4. The testing scripts your GVT was provided were clear and concise
5. You would have been comfortable giving your fellow GVT members complete responsibility for the completion of this project
6. Your IT Project was completed within allotted time
7. Your fellow GVT members displayed a solid work ethic
8. I had a clear understanding of the process in which I worked in the GVT
9. Overall, the people in my GVT were very trustworthy
10. Your IT Project was completed within resources budgeted
11. I could rely on those with whom I worked with in my GVT
12. GVT team members had sufficient knowledge about the work that needed to be done
13. Your IT GVT members were strongly committed to the project
14. The outcomes of this project were very important to the other GVT members
15. I had complete trust in the process of our IT project
16. I relied on my fellow GVT members to complete their assigned tasks
17. The outcomes of this IT project were very important to me
18. Your level of satisfaction with the GVT's project performance

Please provide some general information about you and your role at Infosys, Inc.:

19. Your level of experience with participating in an IT GVT at Infosys, Inc.
    1-2 GVT IT Project 3—4 GVT IT Projects 5 or more GVT Projects

20. Your education level:
    High School BS or BA Degree MS or MA Degree Doctorate

21. Your age range
    20—30 31—40 41—50 50—60 Over 61

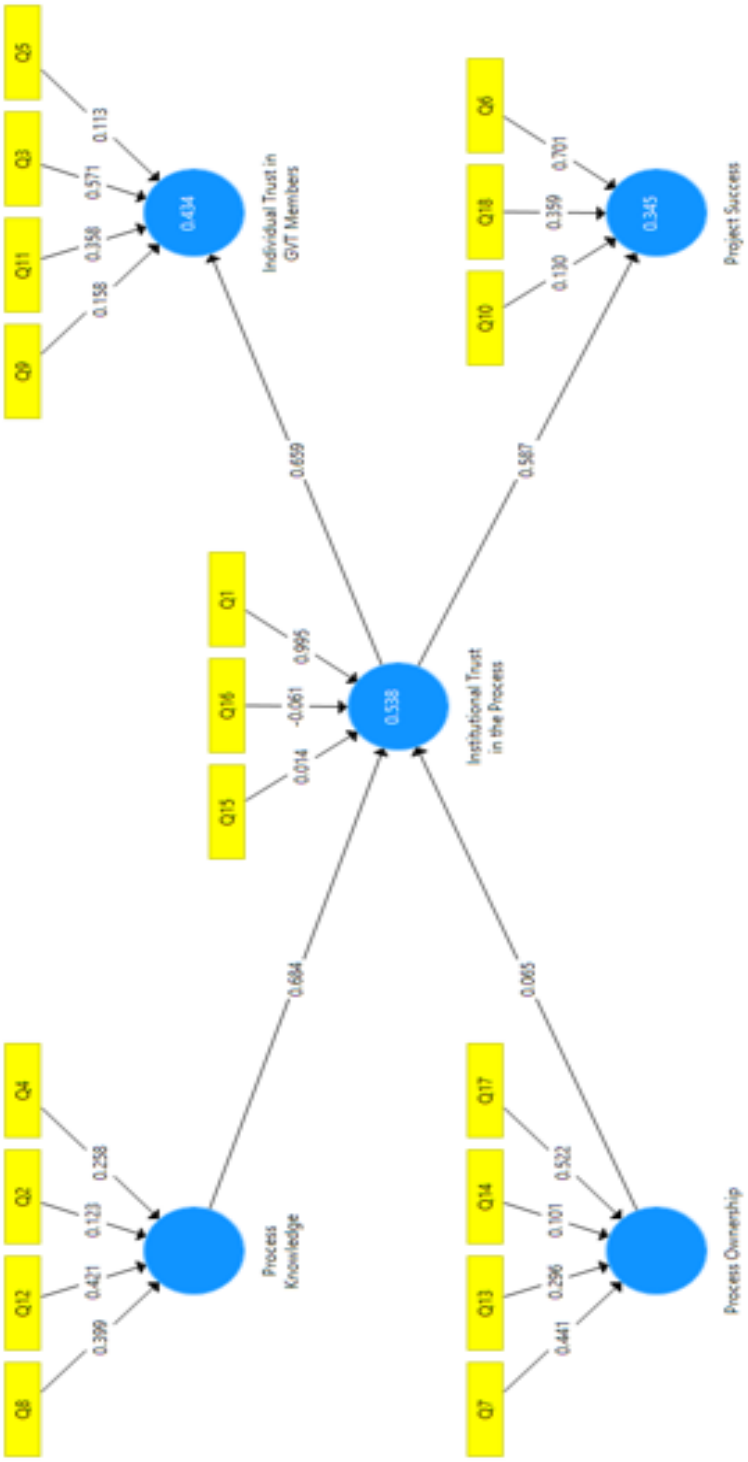
22. Your gender identification
    Male Female Other Prefer Not to Answer

Thank you for investing you time in this survey. The results will be shared with Infosys®, Inc. with the intent of improving its management of Global Virtual Teams

APPENDIX B:

STUDY 1: PLS-SEM AND BOOTSTRAP RESULTS ON STUDY 1 DATA

Figure 5: PLS-SEM Algorithm on Study 1 Data

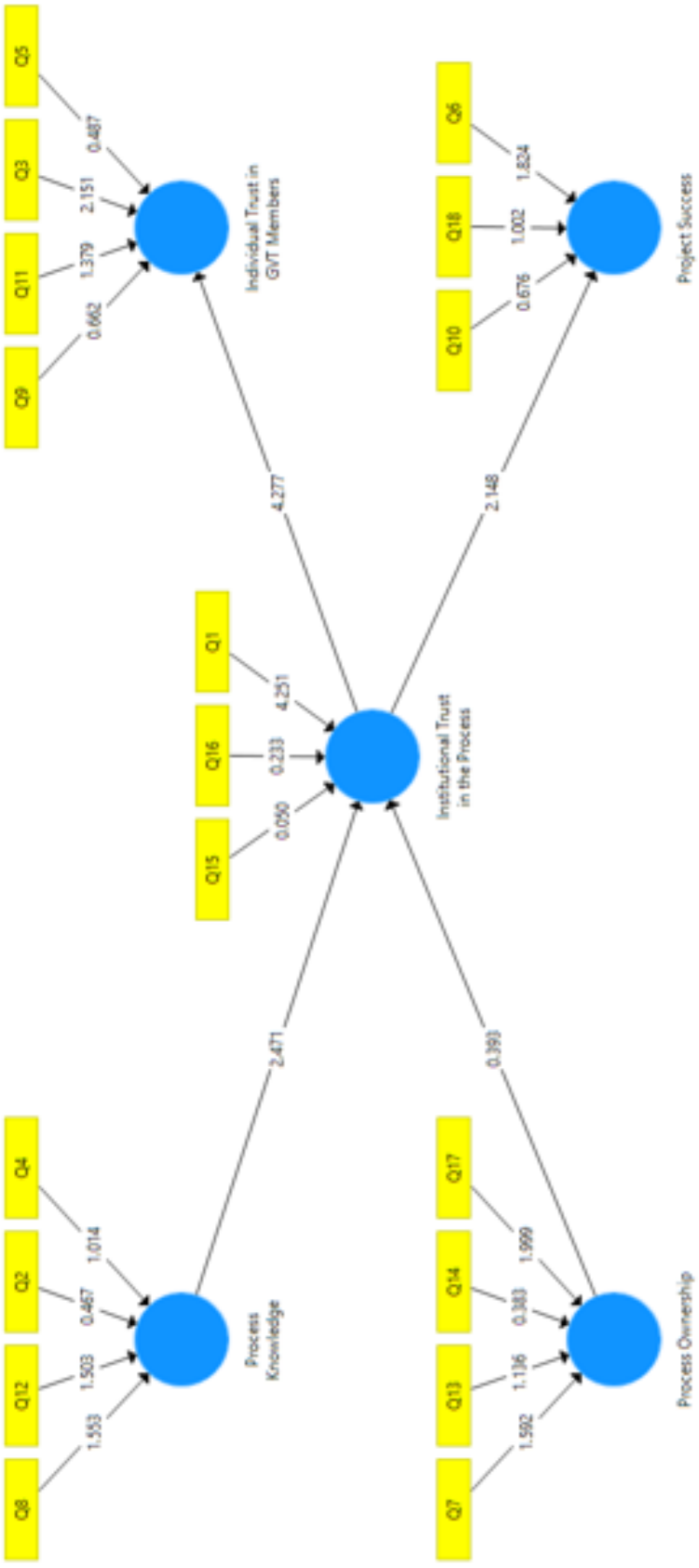


STUDY 1: PLS-SEM Bootstrap Results on Study 1 Data

Study 1 Data

The bootstrap analysis determined that the initial regression results are significant. The coefficients' "t-statistics" with a value greater than 1.96 indicate that the coefficient is statistically significant at 5% level (Figure 3). This t-statistics finding held true for all factors except for "Process Ownership," which was 0.390, and is therefore considered to not have a significant effect on institutional trust in the process.

Figure 6: PLS-SEM “Bootstrap” on Study 1 Data



APPENDIX C:

STUDY 2: INTRODUCTORY REMARKS AND QUESTIONNAIRES

Research Study for Global Virtual Team (GVT) Members of IT Projects.

Exploring trust in process knowledge versus individual trust in GVT members.

Name and Department of Investigators:

- Stuart M. Schmidt, Professor, Human Resource Management, Temple University Fox School of Business
- Michael R. Hagy, DBA Student, Adjunct Professor, Strategic Management Department, Temple University Fox School of Business

Dear Participant: Please read and initial the attached consent form, and if acceptable to you, complete the survey regarding your experience as a Member of a Global Virtual Team IT project. This survey will require no more than 10 minutes of your time. We appreciate your participation in this research study.

Using the following scale please respond to your experience with the latest GVT IT Project in which you participated:

1	**2**	**3**	**4**	**5**
Strongly Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Strongly Agree

GVT-1: The organization facilitates knowledge transfer among GVT members

1 2 3 4 5

GVT-2: The successful outcomes for this IT project were very important to me

1 2 3 4 5

GVT-3: The other team members displayed a solid work ethic

1 2 3 4 5

GVT-4: The testing scripts your GVT was provided were clear and concise

1 2 3 4 5

GVT-5: I would have been comfortable giving the GVT members complete responsibility for the completion of this project

1 2 3 4 5

GVT-6: I felt a sense of complete confidence in the process of our GVT's IT project

1 2 3 4 5

GVT-7: The technology we were provided effectively facilitated process knowledge transfer

1 2 3 4 5

GVT-8: I felt empowered to complete my assigned tasks without concern for the work of others

1 2 3 4 5

GVT-9: My fellow GVT members were strongly committed to the project's success

1 2 3 4 5

GVT-10: It is your opinion that your GVT's IT Project was completed within the budgeted resources

1 2 3 4 5

GVT-11: I could rely on those with whom I worked with in my group

1 2 3 4 5

GVT-12: The other team members possessed the necessary process knowledge to accomplish the assigned work

1 2 3 4 5

GVT-13: Overall, the people in my group were very trustworthy

1 2 3 4 5

Using the following scale please respond to your personal opinions regarding the importance of trust:

1-Unimportant 2-Somewhat Unimportant 3-Neither or Irrelevant 4-Somewhat Important 5-Very Important

GVT-14: How important was it to you that your GVT's project requirements were clearly stated?

1 2 3 4 5

GVT-15: I really wish I had a way to oversee the work of the GVT Members

1 2 3 4 5

GVT-16: How important was it to you that your GVT's IT Project was completed within the allotted resources?

1 2 3 4 5

GVT-17: How important was it to you to have a clear understanding of the GVT project's processes?

1 2 3 4 5

GVT- 18: How important was it to you that your fellow GVT members were committed to the IT project's success?

1 2 3 4 5

General Information for GVT IT Project Members:

1. Your level of experience with participating in an IT GVT at Infosys, Inc.
   a. 1-2 GVT IT Project 3—4 GVT IT Projects 5 or more GVT Projects

2. Your education level:
   a. High School BS or BA Degree MS or MA Degree Doctorate

3. Your age range:
   a. 20—30 31—40 41—50 50—60 Over 61

4. Your gender identification:
   a. Male Female Other Prefer Not to Answer

Thank you for investing you time in this survey. The results will be shared with Infosys®, Inc. with the intent of improving its management of Global Virtual Teams

Research Study for Managers of Global Virtual Team (GVT) IT Projects.

Exploring trust in process knowledge versus trustworthiness in GVT members.

Name and Department of Investigators:

- Stuart M. Schmidt, Professor, Human Resource Management, Temple University Fox School of Business
- Michael R. Hagy, DBA Student, Adjunct Professor, Strategic Management Department, Temple University Fox School of Business

Dear Participant: Please read and initial the attached consent form, and if acceptable to you, complete the survey regarding your experience in managing a Global Virtual Team IT project. This survey will require no more than 10 minutes of your time. We appreciate your participation in this research study.

Using the following scale please respond to your experience with the latest GVT IT Project in which you served as the Manager:

1	**2**	**3**	**4**	**5**
Strongly Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Strongly Agree

MNC-1: The organization facilitates knowledge transfer among GVT members

1 2 3 4 5

MNC-2: The successful outcomes for this IT project were very important to me

1 2 3 4 5

MNC-3: The other team members displayed a solid work ethic

1 2 3 4 5

MNC-4: The testing scripts you provided to the GVT were clear and concise

1 2 3 4 5

MNC-5: I would have been comfortable giving the GVT members complete responsibility for the completion of this project

1 2 3 4 5

MNC-6: I felt a sense of complete confidence in the process of my IT project

1 2 3 4 5

MNC-7: The technology we provided to the GVT members effectively facilitated process knowledge transfer

1 2 3 4 5

MNC-8: The GVT members were empowered to complete their assigned tasks without concern for each other's work

1 2 3 4 5

MNC-9: My GVT members were strongly committed to the project's success

1 2 3 4 5

MNC-10: It is your opinion that your GVT's IT Project was completed within the budgeted resources

1 2 3 4 5

MNC-11: I could rely on those with whom I worked with in my GVT

1 2 3 4 5

MNC-12: The GVT members possessed the necessary process knowledge to accomplish the assigned work

1 2 3 4 5

MNC-13: Overall, the people in my group were very trustworthy

1 2 3 4 5

Using the following scale please respond to your personal opinions regarding the importance of trust:

1-Unimportant 2-Somewhat Unimportant 3-Neither or Irrelevant 4-Somewhat Important 5-Very Important

MNC-14: How important was it to you that your GVT's project requirements were clearly stated?

1 2 3 4 5

MNC-15: I really wish I had a better way to oversee the work of the GVT Members

1 2 3 4 5

MNC-16: How important was it to you that your GVT's IT Project was completed within the allotted resources?

1 2 3 4 5

MNC-17: How important was it to you to have your assigned GVT members have a clear understanding of the project's processes?

1 2 3 4 5

MNC-18: How important was it to you that your assigned GVT members were strongly committed to the IT project's success?

1 2 3 4 5

General Information for GVT Managers:

1. Total number of IT GVT projects that you have managed at Infosys, Inc.
    a. 1-2 GVT IT Project 3—5 GVT IT Projects 5 or more GVT Projects

2. Your education level:
    a. High School BS or BA Degree MS or MA Degree Doctorate

3. Your age range:
    a. 20—30 31—40 41—50 50—60 Over 61

4. Your gender identification
    a. Male Female Other Prefer Not to Answer

Thank you for investing you time in this survey. The results will be shared with Infosys®, Inc. with the intent of improving its management of Global Virtual Teams.

APPENDIX D:

STUDY 2: PLS-SEM AND BOOTSTRAP RESULTS ON STUDY 2 DATA

Study 2 Data—Algorithm Analysis

Three models were run on the Study 2 data. The first analyzed the virtual team member responses, with a survey response of N=195. The second analysis centered on the virtual team project managers whose response rate was N=274. The combined response rate for Study 2 was N=469, which exceeded the desired goal of N>400. A third analysis was run on the data using the combined responses from virtual team members and their managers.

An analysis of Study 2 data shows the internal consistencies of the effect of the independent variable of a positive Process Perception (PP) on Institutional Trust in the Process (ITP) was considered substantially accurate in predicating the hypothesis, with resulting coefficients of 0.694 (GVT Member Data); 0.0653 (GVT Manager Data); and 0.666 (Combined Responses).

Figure 7: PLS-SEM Algorithm on Study 2 Data—GVT Members

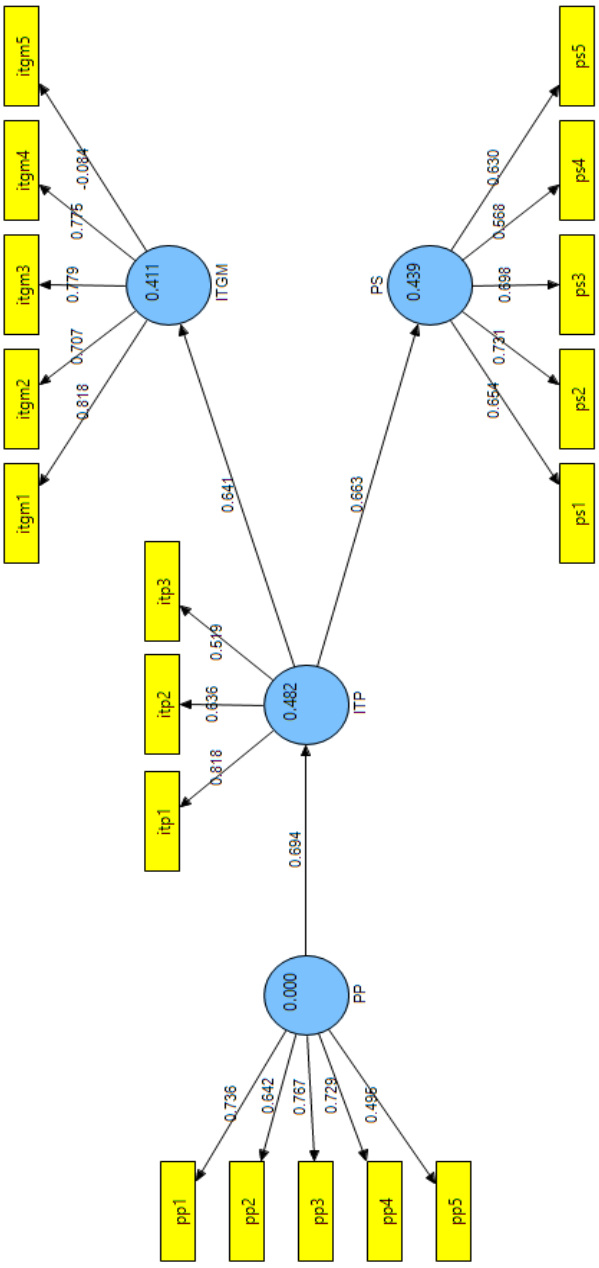


Figure 8: PLS-SEM Algorithm on Study 2 Data—GVT Managers

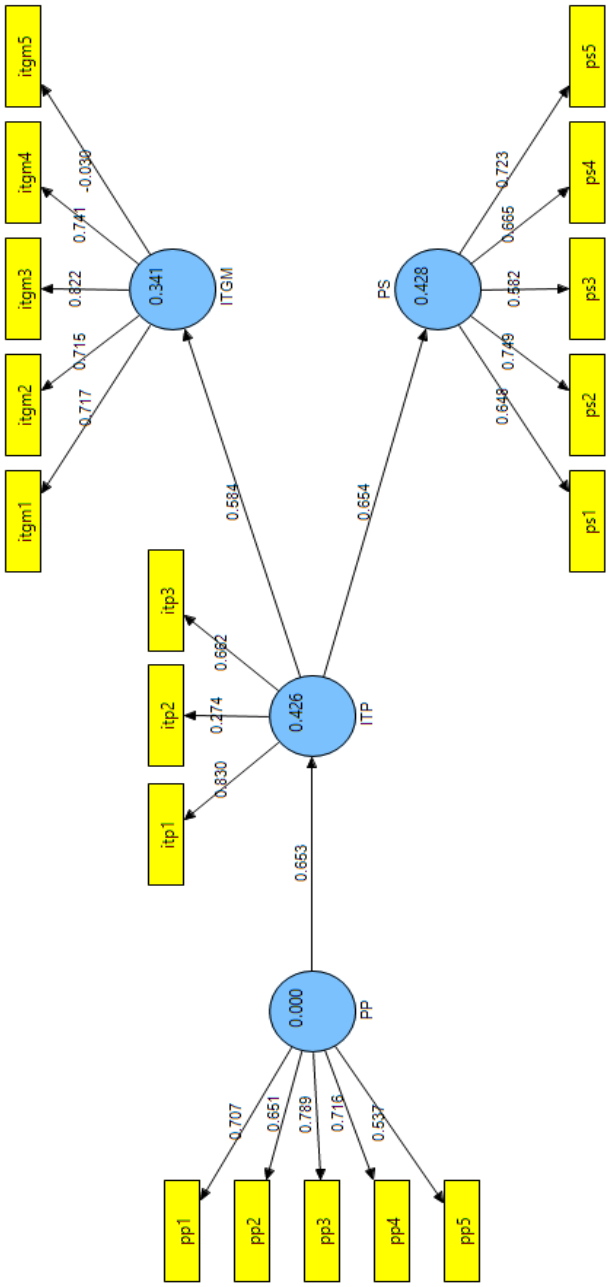
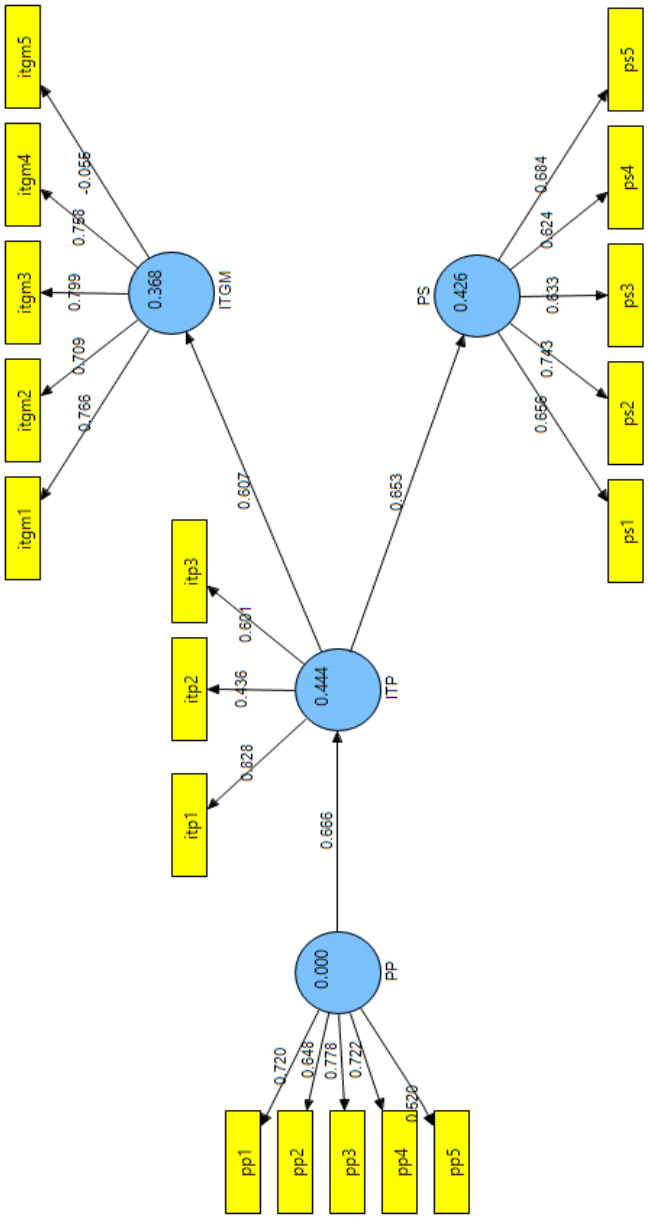


Figure 9: PLS-SEM Algorithm on Study 2 Data—Combined Responses



Study 2 Data—Bootstrap Analysis

A bootstrap analysis was conducted on the Study 2 combined data to determine whether the initial regression results are significant. The coefficients' "t-statistics" with a value greater than 1.96 indicate that the coefficient is statistically significant at 5% level.

PLS-SEM Bootstrap Analysis on Study 2 Data—GVT Members

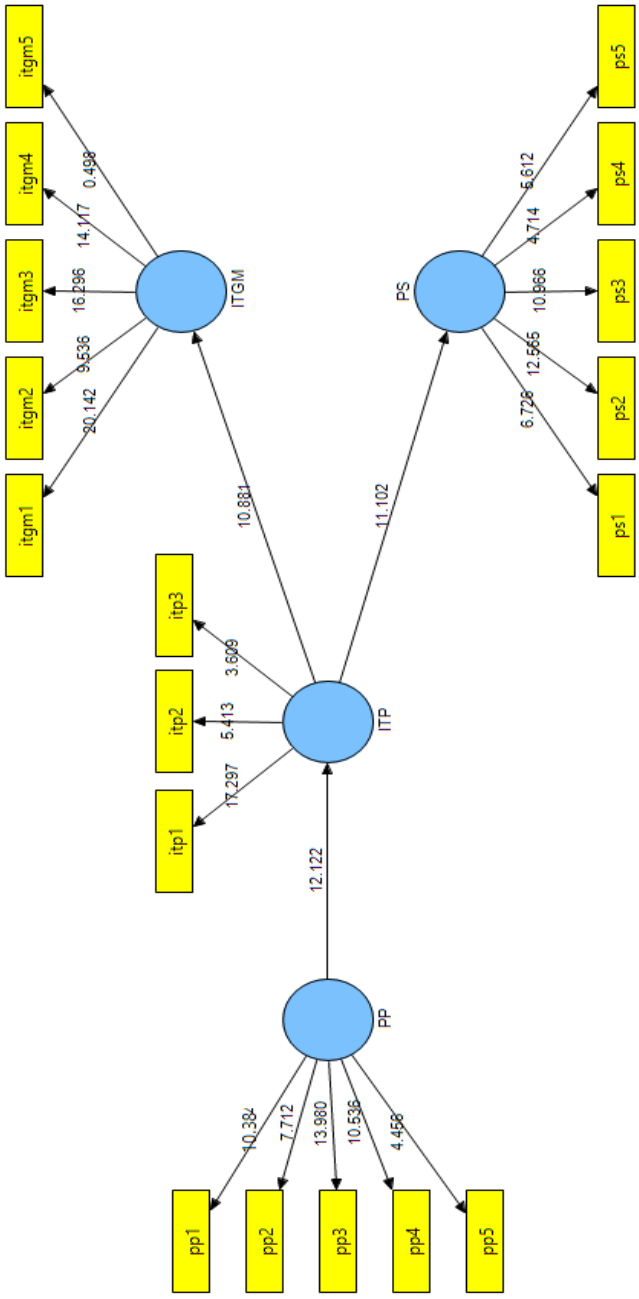
In Figure 10: "PLS-SEM Bootstrap on Study 2 Data—GVT Members," the t-statistics finding held true for all factors, i.e., 12.886 for Process Perception (PP) effects on Institutional Trust in Process (ITP); and 11.088 and 11.213 for Institutional Trust in the Process (ITP) effects on Individual Trust Among the Group Members (IGTM) and Project Success (PS) respectively. This analysis of Study 2 virtual team member data suggests Hypothesis 1, 2 and 3 are supported in the case of virtual team members.

A bootstrap analysis was conducted on the virtual team members' data to determine whether the initial regression results are significant. The coefficients' "t-statistics" with a value greater than 1.96 indicate that the coefficient is statistically significant at 5% level. In the Figure 10 PLS-SEM algorithm, the Goodness-of-Fit measure (R^2) for "Institutional Trust in the Process" (ITP) regression has a value of 0.426, indicating that the model explains 42.6% of the variability of the "Institutional Trust in the Process" (ITP) variable around its mean.

Figure 12: "PLS-SEM Bootstrap on Study 2 Data—Combined Responses." This t-statistics finding held true for all factors, i.e., 11.193 for "Process Perception" (PP) effect on "Institutional Trust in Process" (ITP); and 9.348 and 10.074 for "Institutional Trust in the Process" (ITP) effects on "Individual Trust among Group Members" (ITGM) among the members and "Project Success" (PS) respectively.

This analysis of Study 2 data confirms Hypothesis 1, 2 and 3 are supported in the case of the combined responses from virtual team members and their project managers.

Figure 10: PLS Bootstrap on Primary Study Data—GVT Members



Virtual Team Project Managers Data

A bootstrap analysis was conducted on the virtual team project managers' data to determine whether the initial regression results are significant. The coefficients' "t-statistics" with a value greater than 1.96 would indicate that the coefficient is statistically significant at 5% level.

See Figure 8: "PLS-SEM Bootstrap on Study 2 Data—GVT Managers." This t-statistics finding held true for all factors, i.e., 11.736 for Process Perception (PP) effect on Institutional Trust in Process (ITP); and 7.749 and 10.271 for Institutional Trust in the Process (ITP) effects on Individual Trust among Group Members (ITGM) and Project Success (PS) respectively.

This analysis of Study 2 data confirms Hypothesis 1, 2 and 3 are supported in the case of virtual team project managers.

Figure 11: PLS-SEM Bootstrap on Study 2 Data—GVT Managers

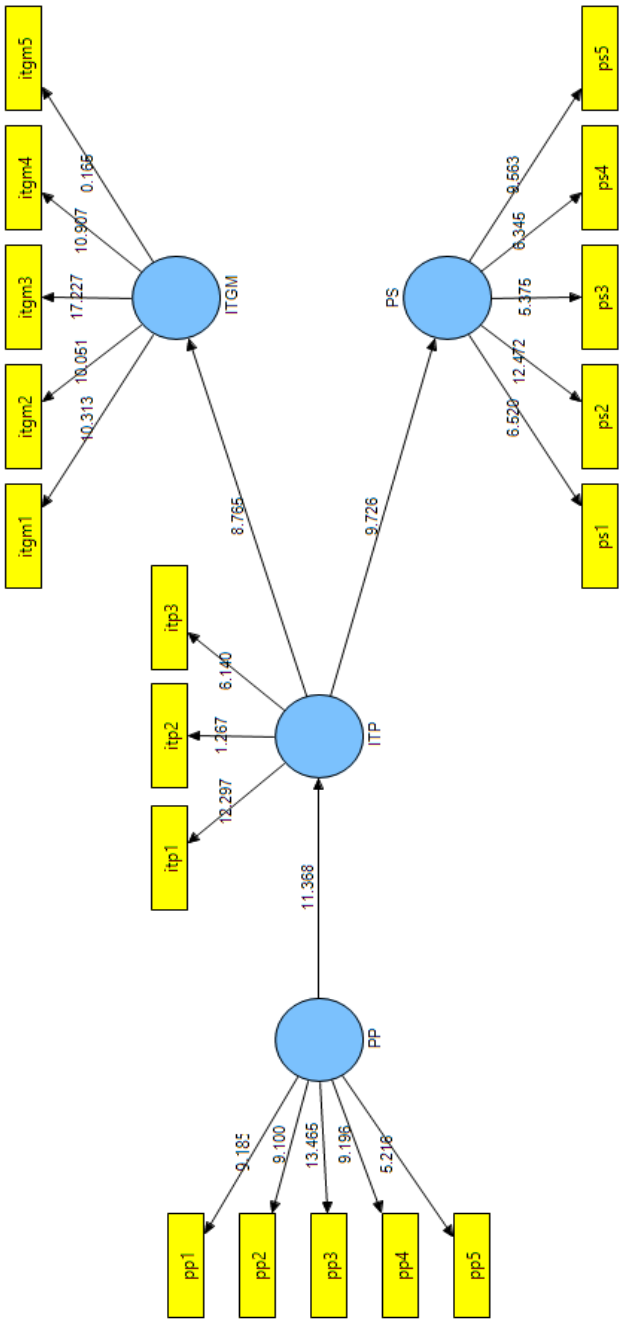
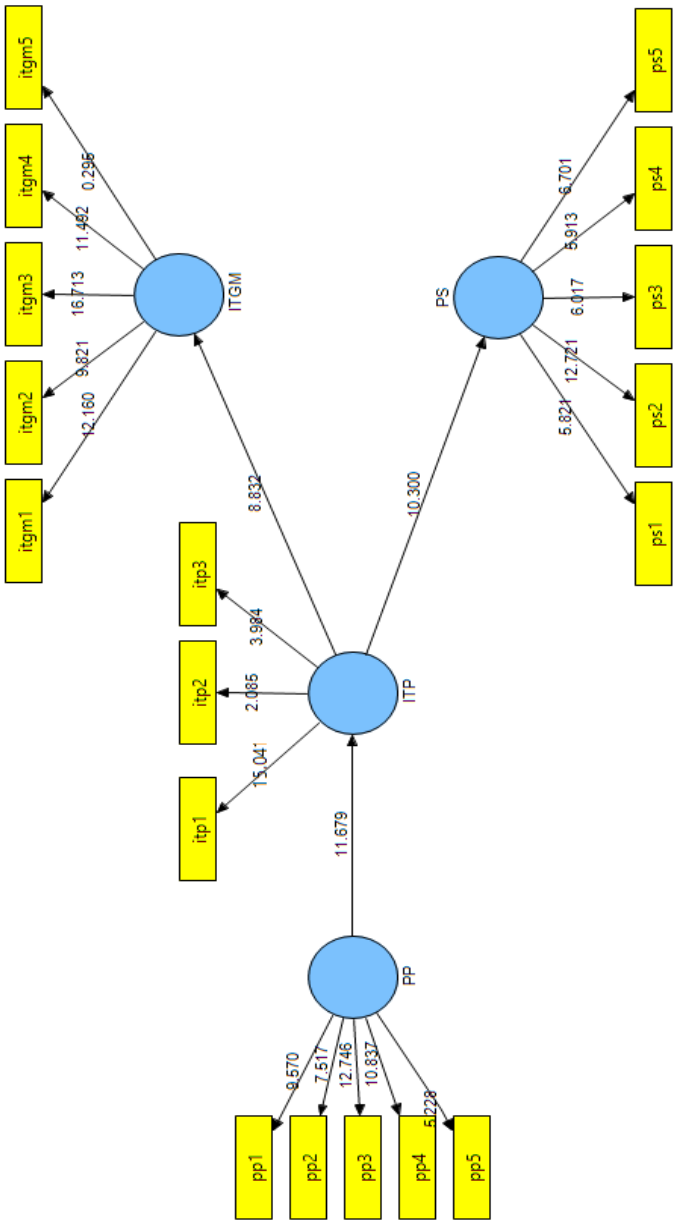


Figure 12: PLS-SEM Bootstrap on Study 2 Data—Combined



APPENDIX E:

STUDY 2: SECONDARY DATA SURVEY QUESTIONS ON ONLINE TRUST

Secondary data was extracted from the Journal of Management Information Systems 1998 article "Is Anybody Out There? Antecedents of Trust in Global Virtual Teams?" written by Sirkka L. Jarvenpaa, Kathleen Knoll, and Dorothy E. Leidner.

The following survey statements were selected for incorporation into this proposed research survey:

T1: I really wish I had a good way to oversee the work of the other Members (GVT/MNC question #15)

T2: I would have been comfortable giving the other members complete responsibility for the completion of this project (GVT/MNC question #5)

TW1: Overall, the people in my group were very trustworthy (GVT/MNC question #13)

TW2: I could rely on those with whom I worked with in my group (GVT/MNC question #11)

I1: The other team members displayed a solid work ethic (GVT/MNC question #3)

I2: The other team members were strongly committed to the project (GVT/MNC question #9)

Additional secondary data was extracted from the Journal of Knowledge Management of Management Information Systems 2001 article "SME and large organisation perceptions of knowledge management: Comparisons and contrasts" written by R. Mcadam, and R. Reid.

The following survey statements were selected for incorporation into this proposed research survey:

Figure 8: The organization facilitates knowledge sharing. (GVT/MNC question #1).

Figure 11: Does technology facilitate learning transfer and dialogue? (GVT/MNC question #7).

APPENDIX F

INSTITUTIONAL REVIEW BOARD (IRB) DOCUMENTATION

Use for newly proposed research	
Study title:	*Love at No Sight:* Establishing trust in process management versus trusting individual Global Virtual Team members.
Investigator:	Primary: Stuart M. Schmidt, Professor
Department:	Human Resource Management, Temple University Fox School of Business
Physical address, phone #, and e-mail address	Human Resource Management, Temple University Fox School of Business Alter Hall 351, 1801 Liacouras Walk Philadelphia, PA 19122-6012 P: 1-215-204-1621 E: stuart.schmidt@temple.edu

Complete the following sections as applicable:
Estimated number of local subjects: _____ Age range: _____
The study will enroll Children
The study will enroll Prisoners
The study will enroll Fetuses
The study will enroll Cognitively Impaired
The study will enroll Employees
The study will enroll Students
The study will enroll Pregnant Women
External sites under the responsibility of the investigator *If so, complete and submit Appendix A: External Site Approvals*
Use of drugs other than the use of approved drugs in the course of medical practice *If so, complete and submit Appendix B: Drugs*
Evaluation of the safety or effectiveness of a device *If so, complete and submit Appendix C: Devices*
Concurrent submission to the Temple Institutional Biosafety Committee (IBC)
Concurrent submission to the Temple Medical Radiation Committee (MRC)
Humanitarian Use Device (HUD) (If you are evaluating the safety or effectiveness of a HUD, complete this application. If not, complete "FORM: Application for Humanitarian Use Device")
Faculty research
Fellow's research
Resident's research
Dissertation research
Master's research
Undergraduate research
Undergraduate course assignment
Undergraduate independent study

Funding Sources
Industry Sponsor (if there is not an industry sponsor, enter "not applicable")
Sponsor – Company Name: Infosys, Inc. **Billing Contact Information: Not Applicable**

Names of all research personnel (including the PI). "Research personnel" is defined as those involved in the design, conduct, or reporting of the research						
	TUID if applicable	Role in the research (e.g, PI, student)	Interpersonal contact or communication with subjects, or access to private identifiable data?	Involved in the consent process?	Financial * Yes	Financial * No
Stuart M. Schmidt Signature stuart.schmidt@temple.edu		PI	NO	NO	☐	X
Michael R. Hagy  Michael.hagy@temple.edu	66141	DBA Student	YES	YES	☐	X
Printed name Signature e-mail address			☐	☐	☐	☐
Printed name Signature e-mail address			☐	☐	☐	☐

- "Financial Interest Related to the Research" means any of the following interests in the sponsor, product or service being tested, or competitor of the sponsor held by the individual or the individual's immediate family ("Immediate Family" means spouse, domestic partner, children, and dependents):
  - Ownership interest of any value including, but not limited to stocks and options exclusive of interests in publicly-traded, diversified mutual funds.
  - Compensation of any amount including, but not limited to honoraria, consultant fees, royalties, or other income.
  - Proprietary interest of any value including, but not limited to, a patents, trademarks, copyrights, and licensing agreements.
  - Board or executive relationship, regardless of compensation.

***If yes, provide a copy of the Conflict of Interest Committee's determination regarding the financial interest.**

Research Integrity & Compliance Student Faculty Center 3340 N. Broad Street, Suite 304 Philadelphia PA 19140
Institutional Review Board Phone: (215) 707-3390 Fax: (215) 707-9100 e-mail: irb@temple.edu
Certification of Approval for a Project Involving Human Subjects

Date: 06-Jun-2017
Protocol Number: 24495
PI: SCHMIDT, STUART
Review Type: EXEMPT
Approved On: 06-Jun-2017
Approved From:
Approved To:
Committee: A2
School/College: BUSINESS SCHOOL (1500)
Department: FSBM:HUMAN RESOURCE MANAGEMENT (15130)
Sponsor: NO EXTERNAL SPONSOR
Project Title: Establishing trust in process management versus trusting individual Global Virtual Team members.

The IRB approved the protocol 24495.

If the study was approved under expedited or full board review, the approval period can be found above. Otherwise, the study was deemed exempt and does not have an IRB approval period.

If applicable to your study, you can access your IRB-approved, stamped consent document or consent script through ERA. Open the Attachments tab and open the stamped documents by clicking the Latest link next to each document. The stamped documents are labeled as such. Copies of the IRB approved stamped consent document or consent script must be used in obtaining consent.

Before an approval period ends, you must submit the Continuing Review form via the ERA module. Please note that though an item is submitted in ERA, it is not received in the IRB office until the principal investigator approves it. Consequently, please submit the Continuing Review form via the ERA module at least 60 days, and preferably 90 days, before the study's expiration date.

Note that all applicable Institutional approvals must also be secured before study implementation. These approvals include, but are not limited to, Medical Radiation Committee (“MRC”); Radiation Safety Committee (“RSC”); Institutional Biosafety Committee ("IBC"); and Temple University Survey Coordinating Committee ("TUSCC"). Please visit these Committees’ websites for further information.

Finally, in conducting this research, you are obligated to submit the following:

Amendment requests - all changes to the study must be approved by the IRB prior to the implementation of the changes unless necessary to eliminate apparent immediate hazards to subjects

Reportable new information - using the Reportable New Information form, report new information items such as those described in the Investigator Guidance: Prompt Reporting
Requirements HRP-801 to the IRB within 5 days Closure report - using a closure form, submit when the study is permanently closed to enrollment; all subjects have completed all protocol related interventions and interactions; collection of private identifiable information is complete; and Analysis of private identifiable information is complete.

For the complete list of investigator responsibilities, please see the Policies and Procedures, the Investigator Manual, and other requirements found on the Temple University IRB website: http://research.temple.edu/irb-forms-standardoperating-procedures#POLICY

Please contact the IRB at (215) 707-3390 if you have any questions