

Project leader's dual socialization and its impact on team learning and performance:
A diagnostic study.

by
Tanvi Gautam
B.A (Hons.) Delhi University, India, 1997
Master of Arts (with Distinction) La Trobe University, Australia, 1998

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Katz Graduate School of Business

This dissertation was presented

by

Tanvi Gautam

It was defended on

Jan 15, 2009

and approved by

Dr. Laurie Kirsch Academic Professor,

Katz Graduate school of Business, University of Pittsburgh

Dr. Richard Moreland, Professor,

Katz Graduate School of Business, University of Pittsburgh

Dr. Linda Argote, Professor

Tepper School of Business, Carnegie Mellon University

Dr. Peter Gray, Assistant Professor

McIntire School of Commerce, University of Virginia

Thesis Director/Dissertation Advisor: Dr. Gary Florkowski, Associate Professor,

Katz Graduate School of Business, University of Pittsburgh

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Tanvi Gautam, PhD

University of Pittsburgh, 2009

One of the important challenges for leadership in project teams is the ability to manage the knowledge, communication and coordination related activities of team. In cross-team collaboration, different boundaries contribute to the situated nature of knowledge and hamper the flow of knowledge and prevent shared understanding with those on the other side of the boundary. While existing research on the issue has focused on 'what' is needed to overcome these boundaries, there is very little research on 'how' leaders can be equipped to deal with the challenges of cross-boundary work.

We propose a new construct: 'dual socialization' of the project leader, as an important means of surmounting challenges of knowledge sharing and collaboration across boundaries. We argue that dual socialization enables a leader to gain a deep contextual understanding of collaborating teams in a manner that is not easily available through other means of learning. This understanding then is invaluable for the knowledge transfer process as well as for achieving project goals. A model of dual socialization, knowledge transfer and project team outcomes (team performance & inter-team coordination) is proposed and tested using data from project teams in a leading global IT consulting firm. We focus on the inter-organizational boundary encountered by the consultants when dealing with the client. The thesis is based on the consulting team's point of view. The data is collected from client-consultant dyads in an engaged in an outsourcing relationship.

The results support the importance of dual socialization as a construct for understanding and enhancing leadership capabilities needed in inter-organizational project teams. An important finding of this dissertation is that socialization to home and socialization to client don't always influence outcomes in a similar manner. They act in competing or complementary ways depending on the dependent variable and moderators under consideration. Also socialization to home/client may enhance or detract team performance based on project contingencies. Additionally, we found that prior knowledge of the team enhances the acquisition of knowledge, but detracts from the

performance capability of the team. This finding has important implications for issues of team composition and design, as well as utilization of expertise.

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1.0 CHAPTER 1: THE ISSUE AT HAND.

“The traditional organizational map describes a world that no longer exists”

(Hirschhorn & Gilmore, 1992)

Organizations today are increasingly relying on work structures that involve varying degree of dependence on external arrangements (Lepak, Bartol, & Erhardt, 2005). This trend is most visible in the stellar growth of the outsourcing industry. For instance, the knowledge intensive business processes outsourcing market is expected to grow from \$1.2 billion (2003) to \$12-\$14 billion by 2010 (Datamonitor, 2008)¹. The growth of this sector can be attributed to the cost advantages available from outsourcing, as well as its ability to fill gaps in skills, knowledge and resources of a firm. Increasing pressure of global competition has ensured that outsourcing will not be seeing a slow down any time soon.

Information Systems (IS) related consulting services represents a large portion of the outsourcing sectors. For instance, the market for application development management services (where the goal is close integration of IT with business, joint optimization of resources, and innovation around IT) alone exceeds \$170 million worldwide (Everest research institute, 2007). The growth of IS outsourcing is related to the increased ability to effectively outsource across companies and geographies in a knowledge based economy.

However, just because boundaries of work execution are breaking physical, technological and cultural barriers, does not mean that they cease to matter in the minds of individuals, or lose their strong hold on how employees understand and cooperate with each other. For instance, in a study of global software development teams Chery & Robillard (2004) found that R&D engineers spent 50% of their time with their counter parts in adhoc communication and collaboration activities. More than half of this time was spent simply trying to develop what they called “cognitive synchronization’ i.e. making sure that they all shared the same information and had shared representations of the task related objects.

¹ India has been at the forefront of the outsourcing wave and is expected to account for 65 – 70% of this market.

The work of inter-organizational IS project teams, functioning in a cross cultural set up, exemplifies the challenges that arise in knowledge sharing across organizational and cultural boundaries. The need to share knowledge between clients and consultants in outsourced IS projects is as difficult as it is critical (George & Chattopadhyay, 2005; Klein & Barrett, 2001; Vlaar, van Fenema, & Tiwari, 2008). The criticality arises due to the fact that while projects based mode of work may differ in its form, goal and duration, it is based on the premise of moving knowledge, skills and resources from where they are abundant to where it is needed most. The difficulty arises due to magnitude of knowledge gap resulting from the nature and novelty of boundaries (functional, technical, temporal, cultural, organizational etc) between the client and consultant teams.

In inter-organizational projects the clients and consultant belong to different organizations, cultures and/or functional affiliations, making it difficult for them to develop shared frames of references and understanding. The various boundaries inhibit the formation of a common ground that enables knowledge transfer (Carlile, 2002a; Levina & Vaast, 2005). Consequently, this thesis focuses on the knowledge gap between clients and consultant team members, and the way the consultant team can overcome such gaps. Given the critical role played by the project leader as an important boundary spanner between the two sides, I will examine the influence s/he can have in overcoming the knowledge boundaries. The next section describes the practical problem that motivated this research study and the literature themes that helped define the research age.

1.1 A PRACTICAL PROBLEM

Given my work experience as a human resources professional in the headquarters of an Asian consulting firm going global, as well as in the subsidiary of an international MNC, I had observed how critical it was for consultant team-leaders (and changing team members) to come onboard quickly to understand and effectively interact with clients. Individuals who were able to understand not just the technical aspects of work, but also had a sense of the way projects interacted with and were influenced by the context in which they were unfolding, continued to be in high demand by account managers and clients alike. This was evident in

the volume of requests to have employees with prior client experience reassigned. This preference could stem from the fact that these individuals knew and understood client context better than consultants who were newcomers to the client set up.

It has been noted that the context or frames-of-reference that guide the behavior of the other party can be important in knowledge transfer, since it forms the foliage that frames the issue at hand. This theme comes out strongly in the literature on managing knowledge in IS project-teams (a detailed review is presented in chapter 2). Research shows how in IS projects it is not just the technical aspect of solution design but the transfer of contextual nuances and social processes that help create the learning outcome (Bresnen, Edelman, Newell, Scarbrough, & Swan, 2003). Others have noted the importance of grasping contextual nuances while implementing technology and understanding client requirements (Barley, 1986; Orlikowski, 2002). The question then becomes how to get the requisite context understanding to consultant teams in the quickest manner without compromising content quality--all in a time- and goal-limited setting. My interactions with other HR professionals in various forums and conferences revealed that the firms I worked with were not unique in facing this issue, nor was the need for such employees 'idiosyncratic' to them. To seek answers to these questions, I turned to past research on knowledge transfer in general, and project teams in particular, as well as boundary spanning and socialization (detailed review in chapter 2). The following key constructs emerged as necessary for framing the research question effectively.

1.2 KEY CONSTRUCTS

1. **Knowledge transfer**: Knowledge transfer is the process by which one unit of an organization is affected by the experience of another (Argote & Ingram, 2000)². When a knowledge recipient understands the rationale and consequences associated with knowledge, and learns and applies it during task performance, then the knowledge is considered transferred (Deng, 2005; Ko, Kirsch, & King, 2005a). As

² In inter-organizational set ups this definition would expand to include the impact of experiences of one organization on the other.

- work becomes more global and cooperative in nature, the issues of knowledge transfer between collaborating parties becomes increasingly critical. This is because, knowledge transfer between individuals, teams and organizations working together impacts both the process and performance outcomes of their collaboration.
2. **Boundaries**: Work-related knowledge-sharing often takes place across multiple, and sometimes coinciding, boundaries (such as functional, hierarchical, geographical, temporal, technological, cultural and physical). These boundaries serve to unite those within them through the sharing of similar cultural norms, frames-of-reference, history, *et cetera*(Lawrence & Lorsch, 1967; March & Simon, 1958). However, these same boundaries create barriers to dealing with others who fall outside the boundaries.
 3. **Socialization**: The research on socialization speaks directly to the issue of how newcomers/outsideers are brought into the cultural milieu of the firm. Socialization is an important learning mechanism which embeds the individual in the social and technical aspects of the work to be performed, and the context within which it is performed. In an organizational context, socialization refers to the process by which an individual acquires the attitudes, behavior and knowledge needed to participate in the organization (Van Mannen & Schein, 1979; Bauer, Morrison & Callister, 1998). Due to its role in interpretation and understanding of the context that an individual encounters, socialization can be regarded as the first step in an effective knowledge-transfer process. Having located and accessed knowledge in an organization/team, socialization becomes an important factor in contextualizing and sense-making of the knowledge gained (Lois, 1980).

1.3 A FOCUS ON LEADERSHIP

(a) Advantages of focusing on leaders

A focus on the role of project leaders (PLs) has several advantages when approaching the issue of transferring knowledge from the client to consultant teams. First, project setting

are often characterized by the time-limited nature of work, finite goals and often times unfamiliar member-team composition. Consequently, the luxury of team members getting to know each other and becoming familiar with the expertise and knowledge that each brings to the table is not there (Faraj & Sproull, 2000). There may not be an opportunity for team members to fully appreciate the frames-of-reference and context that structure the knowledge being conveyed from one party to the other. Second, while PLs may not be the only boundary spanner in the group, they have substantial influence on decision making and project execution by virtue of the power and authority vested in them. Hence, understanding how to enhance their capability of transferring knowledge and framing issues to create common ground becomes important. Also, given the cognitive centrality of the project leader to work in the project, we can be relatively confident that his/her levels of awareness and understanding of client should be greater on average, if not at the same level, as that of the project team (Kameda, Ohtsubo, & Takezwa, 1997). Therefore, a project leader's knowledge-structure about clients almost serves as a proxy for how aware the larger team is of the client's context.

(b) Gaps in our understanding

Despite these advantages, there is a paucity of research on what enables leaders to be effective in their knowledge-transfer role. Some clues may be available in the social networks & boundary spanning literature that has tried to examine issues of knowledge transfer from across boundaries (Kameda, Ohtsubo, & Takezwa, 1997). From that literature, we know that the structural positions of individuals (as spanning holes, or network closure) can allow them to be in a unique position to transfer knowledge—a role that project leaders often end up occupying.

We are also aware that strong ties help in the transfer of more tacit knowledge, and weak ones in the transfer of more non-redundant information (Hansen, 1999). Relational aspects such as trust make for greater knowledge transfer (Levin & Cross, 2004). However, all these ideas point to 'what' is needed for better knowledge transfer, not *how* it is to be achieved. This gap in our understanding can prove to be an impediment limiting the way we can capitalize on leaders an effective source of knowledge transfer between the client and their consultant team. Additionally, while research on socialization can provide us with

insights into what can help a leader get onboard rapidly and transfer knowledge effectively to the team, most of this research has been conducted in a single-firm context and mostly on novices rather than for experienced professionals.

1.4 DUAL SOCIALIZATION AS A POSSIBLE ANSWER

Socialization makes available learning that is not possible through other channels and provides deep contextual understanding of how a given organization functions and how knowledge available from that set up can be used and applied to solve the issues at hand.

Based on the practical problem I observed and the understanding generated by decades of research on similar issues, I arrived at the need to explore what can be termed the ‘dual socialization’ process of PLs (i.e. socialization in both the home as well as the client context). Solely focusing on the home socialization of employees who operate in a two firm context would not adequately explain or capture factors that impact knowledge transfer and the performance of such individuals. Socialization to the client, which involves understanding the historical, political, cultural landscape of the client’s operations, is very critical to knowledge transfers by project leaders, and ultimately team performance. Socialization to the client also involves understanding the way technology has been used and can be used given the opportunities and limitations that arise from the client’s unique, firm-specific environment. An accounting of both home- and client-socialization in the form of dual socialization holds tremendous potential for understanding issues of knowledge transfer and performance in inter-organizational project teams.

While, dual socialization seems like an obvious answer, an extensive review of literature did not reveal the content and parameters of dual socialization. While dual commitment (Ashforth, Harrison, & Corley, 2008; Liden, Wayne, Kraimer, & Sparrowe, 2003) and dual identification (George & Chattopadhyay, 2005; Johnson & Ashforth, 2008; Vora & Kostova, 2007) of workers who respond to or work with two context existed, there was no similar exploration of dual socialization. Consequently, it was decided that

investigating the content and outcome of this idea in a sector-specific context would make a meaningful contribution to the broad concerns of interest.

1.5 RESEARCH QUESTIONS

To establish the importance and validity of ‘dual socialization’ as a characteristic that matters for success in project settings, it is important to show that the value of being socialized in both client and home firm yields superior outcomes to being socialized in one or the other. By establishing this relationship, we would not only expand the content domain of socialization research, but also provide empirical validation for a heretofore acknowledged, but underexplored, area—the importance of contextual understanding for project success. Hence the two questions that will be explored are:

- 1a. Does the dual socialization of PLs substantially impact the quality of knowledge they transfer to the team?
- 1b. To what the extent does the dual socialization of PLs impact team performance?

The importance of knowledge’s situated nature, along with the need to grasp its tacit components, makes it imperative on the consultant to understand the milieu in which the client operates. This would be useful for effective knowledge transfer and project team success. Yet, the focus of knowledge management in project environments has mostly been on managing explicit knowledge (Fernie, Green, Weller, & Newcombe, 2003); Brensen et al., 2003, Schindler et al, 2003). In this thesis, I wish to consider both aspects together. It is my hypothesis that understanding context (i.e. institutional and cultural) knowledge is critical not only for framing the issue between teams, but also for utilizing the content (i.e. domain and process) knowledge in a more effective manner. Context knowledge in a way can be conceptualized as a shell around the content knowledge. Therefore, it is not that projects can’t get by on content knowledge alone, but that process variables such as inter-team coordination (through which performance is ultimately measured) will be impacted positively by proficiency at the institutional and cultural dimensions of the client environment.

2. How does context knowledge interact with content knowledge to impact project team outcomes ?

Given that clients also directly transfer knowledge to the consultant team, I shall investigate whether knowledge transferred through the client and project leader ends up playing a competing or complimentary role in team performance. An assumption is made that the process of dual socialization bequeaths upon the knowledge transferred by project leader certain advantages versus knowledge transferred by the client. Hence:

3. What is the relative role of knowledge about the client transferred by the project leader vs. that available directly through client in impacting project performance?

The answer to this question would provide us with important insights into the advantages that different sources of knowledge may have for various project outcomes.

1.6 THEORETICAL CONTRIBUTIONS

This project makes theoretical contributions to literature on several fronts. By bringing together disparate but related research on knowledge transfer, project teams and socialization, it proposes a more integrated approach towards managing knowledge in project teams. It also is distinct from previous research in the following ways:

- (a) By expanding the socialization research domain from a single to a dual context perspective we establish an important new line of research. Dual socialization as a variable is critical to understanding issues of performance and knowledge transfer of individuals and teams which have ‘one foot in both camps/work contexts’. A focus on single socialization alone misses out on the variance that arises from the interaction between home and client socialization. From a review of the literature it is obvious that the context of socialization research has been narrow with a focus on home socialization alone. An open systems view of socialization, where an individual is actively socialized to both home and external context holds a promise for important insights previously unavailable.

(b) While research on socialization has mostly examined individual-level socialization and outcomes, this thesis will demonstrate the team level impact of socialization. It draws attention to the fact that socialization of certain key individuals such as project leaders has ramifications beyond that of attitudes and behavior of the person him/herself. By virtue of his/her status, the project leader is cognitively central (Tinsdale & Kameda, 2000) to the knowledge available to a team, and dual socialization of the leader should ensure that the contextual understanding of the leader translates into higher-quality knowledge-transfer.

While most work on socialization has been at the organizational level, there is a strong recognition of importance of being socialized to the team/work group (Ahuja & Galvin, 2003; Chen, 2005; Chen & Klimoski, 2003; Moreland & Levine, 1982). This is because the work group forms the immediate context in which behavior takes place and unfolds. Most investigations have studied the issue of knowledge acquisition of newcomer from the organizational level, and subsumed within it the issues of task- and workgroup-socialization. However, work-group level knowledge and the task-knowledge aspects of employees socialization are worthy of separate treatment because in a knowledge economy heavily populated with project-based organizations, people often change work groups and tasks, and the rate of change in team- and job-socialization proceeds at a much higher speed than organizational socialization per se.

(3) This dissertation compares and contrasts the relative role of knowledge from the consultant-team project leader versus that available from the client on project outcomes. By doing so, a more integrated view of knowledge transfer into the team emerges which allows us to consider how various sources of knowledge co-exist and interact to impact team performance. This, in turn, can help figure out the optimal configuration of knowledge flows in a time constrained setting.

(4) Past research frames knowledge transfers by boundary spanners as an issue of translation/interpretation, as well as the creation of a common ground between parties separated by functional, affiliation and/or cultural differences. While this perspective is a useful one, my thesis notes the criticality of deep contextual understanding that goes beyond the existing perspectives. Context accessibility fostered by dual socialization enables

consultants to better understand the client and its priorities. By staying focused on interpretation/translation and issues of common ground, we remain focused on ‘what’ is to be done for knowledge transfer rather than ‘how’ it is to be done.

1.7 NEED FOR EMPIRICAL VALIDATION

(a) Falsification

Popper (1959) notes that to be considered worthy of investigation, research propositions should be open to falsifiability. In other words, the propositions should not be tautological or true by definition. Popper (1959, p.41) notes “ It must be possible for an empirical scientific system to be refuted by experience”. Bacharach (1989) makes similar observations. In this section then, we lay out the underlying assumptions and scope of the relationships under investigation to show that their linkages can not be taken for granted. This is best done by showing that in each pair of theoretically linked constructs, the predictor is not by itself both a necessary and sufficient factor in producing the outcome. Or in other words a change in predictor does not unavoidably lead to a change in the outcome, and that there are boundary conditions which open the propositions to falsification attempts.

The relationship between dual socialization of the project leader and its impact on knowledge transfer and team performance, is based on the assumption that if an individual is able to understand the context in which work and collaboration unfolds, then he or she should be able to acquire and transfer knowledge more effectively than some one who doesn’t share that appreciation. Also an individual who is highly socialized into his/her work context is able to establish a shared understanding with others, and due to their deep contextual knowledge lead to smoother collaboration and performance. However, one can not be absolutely certain that these relationships which are based on existing theory and research on socialization conducted in traditional work environment will play out in project settings.

Project settings do not have the longevity of employment and interaction assumed by socialization researchers on whose work the hypotheses are based. Nor is there an expectation that the consultant will adopt or buy into the client culture completely, an assumption that is important to the way socialization in a ‘within’ firm setting has been

conceptualized. It is in relaxing these assumptions that the linkages between socialization, knowledge transfer and performance in project settings remain open to falsification. In other words, upon removing long term relationship and assimilation as core ideas, it is possible that socialization may not lead to the expected outcomes, or that the assumption of longevity and assimilation act as boundary conditions to the way socialization impacts knowledge transfer and performance.

In the real world, the relationship between dual socialization and knowledge transfer may for instance play out in the following manner. Due to the temporary nature of the projects, and the role of consultants, the employees of the consultant team will always associated with the 'tag' of an outsider. This reduces their chance of become 'one of us/client' as would socialized new recruits or job changers in the firm (that form the subject of traditional socialization research). The client employees are aware of the transient status of the consultants and may even feel threatened by the changes the project might bring forth resulting in resistance from the clients. Under such circumstances despite dual socialization there would be barriers to acquisitions and transfer of knowledge from the client.

The consultants considered to be at the periphery of the organization by virtue of their status as outsiders need not get the cooperation from the client for a shared level of understanding that acts as a pre-requisite for knowledge sharing. The existing research on socialization of contingent employees points to the fact that even individuals who are contracted from outside, and are on firm payroll for years, don't always manage to overcome the 'stigma' associated with being a temporary outsider, despite the high value addition that they are capable of. Consequently, whereas socialization is key to understanding the context in which knowledge originates and behavior unfolds can not automatically lead to better quality of knowledge transfer. However, *ceteris Paribus* a person who is dually socialized may be better able to transfer knowledge and manage team performance than one who is not.

This section then establishes that the model being proposed for testing is open to falsification on several fronts and hence is worthy of empirical investigation. Since socialization is a time consuming and effortful activity, findings confirming or disconfirming the proposed relationship between project leader socialization and knowledge transfer could be still prove to be useful. If confirmed we would have established importance of a hereto ignored aspect of socialization in a two firm setting. If disconfirmed, it would point to the

need for designing and supporting alternate efforts and means of ‘rapid socialization’ of team members.

1.8 THESIS OVERVIEW

The next chapter (chapter 2) provides the literature review of research in the areas of managing knowledge and performance of IS project teams (to show gaps in understanding of knowledge transfer between clients and consultants), socialization research on traditional and contingent work (to show its link to contextual understanding, as well as point gaps in literature when it comes to studying inter-firm context) and boundary spanning (to note our current understanding or role of such individuals that operate between two firms).

Chapter 3 lays out the theory and hypotheses to be tested, while chapter 4 focuses on operationalization of the constructs and research methodology. Chapter 5 provides results of the pilot analysis and the changes made to the final survey. Chapter 6 notes the results of the final data collection and finally chapter 7 will summarize the findings and discuss implications for managers and academics, as well as limitations and potential for future work.

2.0 CHAPTER 2- LITERATURE REVIEW

The research question at hand requires a multi-disciplinary approach towards its understanding. There is a need to understand the existing literature on projects and their management, organizational learning, project leadership and boundary spanning and socialization. In the next few sections we review each of these streams and focus on the insights that have bearing on our research question and identify the gaps that this thesis will be able to fill.

2.1 PROJECT MANAGEMENT

A project can be defined as a 'one shot, time limited, goal directed, major undertaking requiring the commitment of varied skills and resources (Meredith & Mantel, 2000). Project management has been defined as the application of knowledge, skills, tools and technique for the accomplishment of project objectives (PMBOK, 2000). Soderland (2004) notes that research into projects and project management is a matter of capturing their unique, complex and time limited processes of interactions, organization and management. He notes that projects represent just another way of organizing an industrial and organizational activity.

In the recent years the literature on project management has grown due to an increasing interest by practitioners and academics alike. A major impetus to the study of project management was the Harvard Business Review article by Gaddis (1959). This article was among the first in a leading journal to discuss the art and science of project management. Miles (1964) who wrote on temporary systems, influenced the work of others such as Bennis & Slater (1968). While research on projects and projects management has proliferated, much work still remains to be done. Theoretically the area is still considered in its infancy (Shenhar & Dvir, 1996; Soderland, 2004).

2.1.1 Intellectual traditions of project management research

Project management research has been rooted in two major intellectual traditions. The first embraces paradigms and methodologies utilized in engineering, applied mathematics and economics to explain the mechanics of project planning and execution. The second draws upon the social sciences of sociology, psychology and organizational theory to better understand the structural and behavioral aspects of project organizations (Soderlund, 2004). As such, they differ considerably in their conceptualization of, and preferred solutions to, the issues of project management.

2.1.2 Hard sciences tradition

This perspective has dominated project management research historically, focusing primarily on planning techniques such as CPM, PERT and others as the key to projects. Maylor (2001) noted that “the traditional approach to project management is based on the computational planning and control models originating in large projects from the 1950s onwards, and used extensively by many traditional project industries, predominantly contractors to the aerospace, defense and large construction (Kerzner, 2001). The models are highly deterministic and based on techniques — notably PERT”. Given that most investigations were being carried out in the context of defense, space and construction projects, it comes as little surprise that the field did not move far beyond “a collection of organizational schedule and cost control tools”. More importantly, these techniques and models often have limited application to more knowledge-intensive and service-oriented projects (e.g., those found in biotechnology, information technology, new product developments etc.). In these industries the projects tend to be taken on a more emergent character due to the need for coordinating divergent expertise, knowledge, skills and interpretations rather than just tools and materials. This coupled with the different demands placed on projects by multiple stakeholders makes for the stochastic nature of projects in the knowledge based economy (Boland, 1991; Luna-Reyes, Zhang, Ram, & Cresswell, 2005; Markus, Majchrzak, & Gasser, 2002).

This tradition of research has also been criticized for sidelining subtle, but complex, social and political processes (i.e., identity, control, power-agency relationships) that impact

project performance (Cicmil, 2006). Reliance on deterministic and reductionism models to explain the otherwise complex and stochastic nature of projects fails to address these key contextual aspects of the underlying work activity.

2.1.3 Organizational theory/Social sciences tradition

Others began infusing organizational theory/social sciences perspectives into project management research beginning in the 1990s. The organizational theory/social sciences tradition of project management has become more active in the recent past. This tradition focuses more on the behavioral and organizational aspects of project work. In the 1990s the focus of project management started shifting to the study of human resources, teams and leadership (Cicmil, Williams, Thomas, & Hodgson, 2006; Maylor, 2001). In the recent decade the research focus has broadened to include work on globalizations of projects (Baba, Gluesing, Ratner, & Wagner, 2004; Balck, 1994; Barrett, Jarvenpaa, & Silva, 2003; Herbsleb & Mockus, 2003; Kirsch, 2004; Prikladnicki, Audy, & Evaristo, 2003), outsourcing relationships (Bandyopadhyay & Pathak, 2007; Choudhury & Sabherwal, 2003; Cullen, Seddon, & Willcocks, 2005; Fisher, Wasserman, Wolf, & Wears, 2008; Kern, Willcocks, & van Heck, 2002; King, 2005; Levina & Ross, 2003) and virtual teams (Ahuja et al., 2003; Cramton, 2001; Cramton & Orvis, 2003; Griffith, Sawyer, & Neale, 2003; Handy, 1995; Kirkman, Rosen, Gibson, Tesluk, & McPherson, 2002; Martins, Gilson, & Maynard, 2004; Maznevski & Chudoba, 2000) among other issues of project management.

The strong rise of the organizational theory/social science tradition of research can be associated with a number of influences including but not limited to the ones delineated next. The first was probably driven by the need to create research with a stronger theoretical base. The influence of theories that take a more systemic and holistic approach to the study of organizations have impacted the conceptualization of project management research. For instance the socio-technical school of thought (Trust & Bamforth, 1951), social information processing (Pfeffer & Salancik, 1978), and structuration theory (Giddens, 1984) among others, highlighted the inherent interaction and joint influence of technology, its developers and users on issues of project management. It also may have to do with the affiliation of researchers working on project management. For instance the shift in IS research from a pure

focus on technology to a more process/business/behavioral focused lens may be due to the increasing number of business vs. engineering school researchers doing work on project management. Also as collaboration across technological, geographical and organizational boundaries goes up, there is a greater need to look beyond the technical aspects of project work, and account for the behavioral and organizational aspects of project management.

2.1.4 Current trends of project management research

In a recent review of the project management institute publications from 1996-2002 (Leybourne, 2007) there emerged three main categories of research. The first was (a) tools and techniques (which included work on project life cycle, risk management, scheduling, scope/time/cost, benchmarking etc); the second group of studies were those related to (b) behavior and learning in projects (including issues of customer relationships, ethics, decision making, knowledge management, leadership, project HRM, education and training etc) and the third and was that of (c) analysis based research (forecasting trends, history, research/theory). This categorization then is consistent with the influence of the intellectual traditions discussed in the previous section. The study also notes that there is a shift away from tool box approach of project management to a one that is more focused on the behavioral aspects of projects.

The current research on project management is clearly seeing a shift from a positivist, linear approach towards issues of project management, to a more constructivist approach. This is evident in the way there is a shift in contextualizing issues of project management to the locale in which project are executed. Robey (2003) notes the shift in research priorities thus: ‘the narrow preoccupation on computer programming and application development methodologies is giving way to an identity that encompasses the social context of IS development and use ‘.

The work scholars such as Shenhar and Dvir (1996), has helped establish the contingency model of project management where one size does not fit all. The context and constituents of project teams can vary vastly along the dimensions of technology & uncertainty and organizational, cultural and technological boundaries. The project management research has to account a lot more for the human element of project

management. This is because issues of identity, commitment and conflict, all become heightened when collaboration is sought in a time limited setting from members holding different functional, cultural and/or organizational affiliation (Cramton & Hinds, 2005; Cronin & Weingart, 2007; Hinds & Mortensen, 2005; Hinds & Bailey, 2003; Levesque, Wilson, & Wholey, 2001; Preston, Karahanna, & Rowe, 2006; Vlaar, van Fenema, & Tiwari, 2008) . Consequently, a lot more research is being done on managing the ‘team/behavioral’ aspects of project work (Cronin et al., 2007; Eskerod & Blichfeldt, 2005; Hoegl, Ernst, & Proserpio, 2007; Huiling & Xin, 2008; Jun, Butler, & King, 2007; Oshri, Kotlarsky, & Willcocks, 2008). The recognition of projects as context specific and open systems in active interaction with its environment has gained prominence in project management research.

Our research question, which focuses on the issues of knowledge transfer in project management, is clearly in line with the current and evolving trends of project management research. A far greater emphasis is now being put on examining the how project success meshes with the PL style and skills of management (Liu & Fang, 2006; Lovell, 1993; Shenhar, 2004; Summer, Bock, & Giamartino, 2006; Thomas, Palmer, & Govekar, 1999) . We examine the role of leadership and team member knowledge exchange, as well as the contextual impact of organizational distance in managing knowledge. Following the organizational theory/social sciences tradition we hope to account for the organizational and behavioral aspects of the knowledge transfer phenomena.

In the next few sections we cover the literature on this topic in greater detail. Given the context of our study, we will examine the literature on project management in general and IS project teams more specifically. We begin first with a consideration of the ways knowledge has been defined and treated in the literature. This is followed by a discussion on knowledge transfer at a generic level and then a focus on issues of leadership in IS project teams.

2.2 MANAGING KNOWLEDGE AND ITS TRANSFER

2.2.1 Knowledge –images and conceptualization

Knowledge has been viewed from several different perspectives as a construct. Alavi and Leider's (2001) review of the knowledge management literature documented its framing as a (a) *state of mind*, where the focus is on the state of knowledge and understanding (b) *an object*, to be stored and manipulated (Carlsson, El Sawy, Eriksson, & Raven, 1996; McQueen, Hoadley, & Benbasat, 1998; Zack, 1998) (c) *a process*- i.e. a focus on application of expertise. In this the emphasis is on the flow of knowledge and the emphasis on the process of creation, sharing, and distribution of knowledge. (d) *a capability*, is focused on understanding the strategic advantage of know how and creating intellectual capital, and (e) *a condition of having access*- where the focus is on access to and retrieval of content. These categorizations echo Blackler's (1995) observations about the diverse images of knowledge in organizational studies:

- *encultured* (focused on shared understanding and cultural meaning. The work of scholars like Ouchi (1980) on organizational culture, and the work on socialization is related to this image);
- *embrained* (related to conceptual skills and cognitive abilities),
- *embodied* (action oriented and contextually oriented. Dependent on how individuals interact and interpret their environment),
- *embedded* (knowledge as it is pertains to roles, relationships, procedures and material resources. Eg: Routines as discussed by Cyert and March, (1963), and
- *encoded* (concerned with the symbols and de-contextualized forms of conveying information).

Blackler goes on to say that while these images facilitate discussion of the ways knowledge has been treated, it is difficult, in reality, to separate them due to their close inter-relationships.

Knowledge also has been conceptualized as residing in individuals and collectives (Nonaka, 1994). While individual knowledge is created by distinct persons, collective

knowledge arises from group action and ultimately resides within the set of affiliated members. Blacker (1995) noted that organizations tend to emphasize one image of knowledge over others depending on their need to (1) focus on routine versus unfamiliar, issues, and (2) rely on individual, as opposed to collective expertise. The growing prominence of collective effort and collaboration in the organization of work argues for a big shift towards the 'encultured' image of knowledge where the focus is on sense making, dialogue and collective understanding (p.1030).

An analogous conceptualization would be the situated view of knowledge, which is philosophically based in the pragmatist position that knowledge is defined in relation to specific social contexts rather than absolutes (Dewey, 1938). A practice-based perspective (Boudieu, 1977; Brown and Duguid, 1991, Lave and Wenger, 1990, Wenger, 1998) depicts knowledge as collective, situated and provisional nature of knowledge in contrast to a rational, cognitive view which tends to treat knowledge as a more abstract construct, free from interpretations, and a non debatable truth. . Practice involves doing and being aware of both explicit (i.e., language, tools, concepts, roles, procedures) and tacit (rules of thumb, embodied capabilities, shared worldviews) elements (Sole & Edmondson 2002). Contextual elements therefore shape how individuals learn and acquire knowledge and competence, and hence learning cannot be viewed as abstract de-contextualized knowledge transmitted from one person to another. Suggestions also have been made to discard a balkanized view of knowledge and adopt communities-of-practice as a unit of analysis (Brown & Duguid, 2001). When adopting this suggestion it should be remembered that there are epistemic differences in the communities of practices, and a firm's competitive advantage lies in coordinating the knowledge produced by these communities despite its differences. It is the richness of local variations and the consequent idiosyncratic nature of knowledge that provides firm with inimitable advantages.

As this section has shown, there are multiple view points on what constitutes knowledge and how it should be approached conceptually. This, in turn, explains why there is little consensus about the best means of managing and transferring knowledge—it has

depended largely on how knowledge was being conceptualized. For instance, viewing knowledge as an object that can be easily stored and leveraged calls for a very different transfer protocol than would be the case if one asserts that immersion in the context must occur *before* any learning can take place. We now turn our attention to knowledge transfer and its treatment in literature, particularly in the context of IS project teams.

2.2.2 Knowledge transfer

(a) Levels of analysis

Knowledge transfer is the process by which learning of a unit (individual, group, department, division) is impacted by the experience of another (Argote, Ingram & Levine & Moreland, 2000). Organizations can learn from their own experience or that of others (Argote & Epple, 1990; Huber, 1991). Knowledge-transfer studies have investigated this phenomenon using various levels of analysis, including dyadic knowledge transfers (Singley & Anderson, 1989; Thompson, Gentner, & Loewenstein, 2000), the transfer of knowledge within and between teams (Gruenfeld, Martorana, & Fan, 2000; Kane, Argote, & Levine, 2005; Thomas-Hunt, Ogden, & Neale, 2003), knowledge transfers between units of same organizations (Szulanski, 1996), and inter-organizational knowledge transfers (Baum & Ingram, 1998; Darr, Argote, & Epple, 1995; Thompson et al., 2000). More recently the communities of practice as a level of analysis has gained prominence, and this allows us to hierarchical conceptualization of knowledge transfer issues (Garrety, Robertson, & Badham, 2004; Pan & Leidner, 2003; Wenger, 2000). This is because unlike the hierarchical conceptualization that sees knowledge as residing in individuals, teams, departments and the firm level, communities of practice see knowledge as residing in individuals united by a practice or community irrespective of which team or department they belong to.

(b) Factors impacting knowledge transfer

Gupta & Govindrajan (2000) talk of knowledge flows/transfer in terms of the following five aspects: perceived value of the source-unit's knowledge; motivational disposition of the source to share knowledge; availability and richness of a transmission

channel; motivational disposition of the acquiring party; and absorptive capacity (i.e., the ability to assimilate new knowledge that is made available). Argote et al.'s (2003) classification scheme for knowledge-transfer research incorporates similar themes. Their framework demarcates the context impacting knowledge management and transfer along three dimensions: *properties of the unit* (individual, group or organization); *properties of the knowledge* (eg: tacit vs. explicit; causal ambiguity; complexity; observability; sharedness etc.) and the *relationship between units or the properties of knowledge itself*. Other dimensions of the transfer process such as timing (Baum & Ingram), learning mechanism such as purposive learning (Rulke, Zaheer, & Anderson, 2000), and relational learning (Uzzi & Lancaster, 2003) and richness of medium of knowledge transfer (Nadler, Thompson, & Boven, 2003). In this thesis we focus on the *property of the unit* i.e. the leadership and its role in knowledge transfer. The property we wish to isolate is the dual socialization of the project leader.

2.2.3 Managing knowledge in project teams

(a) Team learning research

Before delving into the work on temporary project teams, it would be useful to briefly touch upon some of the themes along which team learning has been researched in the larger literature. This is because the research done on intact teams has had substantial influence on the work that is carried out in temporary project teams. Edmondson et al.'s (2007) recent review of the work on team learning identified three major themes

- i. Improvement in outcomes- In this stream learning is conceptualized as performance improvement (usually mapped as efficiency improvement). The dominant dependent variable is rate-of-reduction in cost or time. This area has its roots in manufacturing and service operations (Darr, Argote & Epple, 1995; (Edmondson, 2003; Pisano, Bohmer, & Edmondson, 2001).
- ii. Task mastery – Here, the emphasis is on understanding how team members accomplish interdependent tasks. Team learning is seen as a result of communication and coordination which leads to shared knowledge. The dominant dependent variable has been how well a team learned its task. The work on shared

mental models(Cannon-Bowers, Salas, & Converse, 1993); transactive memory systems (Wegner, 1987) and social cognition (Larson, Foster-Fishman, & Franz, 1998) are examples of the work done in this field. This area has its roots in the social psychology of small groups.

- iii. Group process- In this stream, researchers try to understand the processes of learning rather than relying on performance improvement as evidence that learning took place. In this stream researchers try to understand the processes of learning rather than noting performance/output improvement as evidence that learning has taken place. The dominant dependent variable here is how effective a team is in the task of learning or learning behavior. Work on team climate and learning behavior such as psychological safety (Edmondson, 1999); role of team leadership in new product development teams (Sarin & McDermott, 2003) and interdisciplinary action teams (Edmondson, 2003); virtual team learning through the situated learning lens (Sole and Edmondson, 2002) are examples of the way this literature has tried to unbundled the team learning process.

The research in this area recognizes that team type and context matter for team learning (Zellmer-Bruhn & Gibson, 2006; Edmondson, 1999). There also has been a recognition that the learning-performance relationship is not always positive (Bunderson & Sutcliffe, 2003; Wong, 2004), and that different types of learning are relevant for different types of performance outcomes (Edmondson, 2002; Wong, 2004). Issues of identity and identification (Kane et al., 2005; Wenger, 1998); status cues (Hollingshead, 1996; Menon & Pfeffer, 2003; Thomas-Hunt et al., 2003) have been central concerns as well. This area has its roots in micro-organizational behavior with much influence apparent from inter-personal climate and group process.

Accordingly, there is no single conceptualization of team learning. While some researchers focus on team learning as a behavior, others concentrate on the outcome. Given the multitude of forms that teams can take and the different contexts and goals that they pursue, it may be very difficult to come up with a universal theory on team learning.

Edmondson (2007) notes, “By proposing models of team learning that are universal we lose conceptual and predictive accuracy. In contrast, models that pertain to specific types of teams, identified along theoretical dimensions (e.g., knowledge vs. action, expertise diversity), or specific kinds of contexts are needed advance team learning research” (p.299). It is with this aim that we now turn to the work that has been done on IS project teams to consider the factors that seem to impact issues of knowledge management and transfer.

2.3 IS PROJECTS AND KNOWLEDGE TRANSFER

An IT project may be the design, development and implementation, or support of a product, process or service. As is the case with any IS project, there is a client constituency for whom the project is executed, and the consultant group which executes the project. In these settings, the ability to effectively manage the exchange of knowledge and skills between clients and consultants is vital to project success. To illustrate, knowledge integration between client and consultants has been shown to impact several dimensions of software development performance, including design effectiveness, defect density and development efficiency (Tiwana, 2004). Knowledge that is critical to the project can reside within the team or outside it (Tiwana et al, 2003), calling potentially for exchanges between those who are formally part of the project and those who are not. Successfully facilitating these interactions can be particularly challenging given that IS projects often unfold outside of the organization’s mainstream structures and control mechanisms (Sahlins-Andersson, 2002).

While early research on knowledge management in projects revolved around use of information technology the limitation of a purely IT based view of knowledge capture and dissemination has now been acknowledged as limiting. Instead there is a strong shift towards understanding the social practices of managing knowledge in project environments (Bresnen, Goussevskaia, & Swan, 2005; De Fillippi, 2001; Garrety et al., 2004; Jun et al., 2007; Levesque et al., 2001; Ruuska & Vartiainen, 2005)). This is because as the social sciences/organizational theory tradition takes root, there is greater awareness of the human

factor of project process and performance. Also, while the project is aimed at achieving a goal for the larger organization, it is in many respects its own microcosm of activity and organization. Project teams create their own distinct team and organizational context, and the socio-cultural knowledge that is generated in this context is a key component of project team learning ((Katzy et al, 1999; (Scarbrough et al., 2004).

2.3.1 Knowledge transfer and project success.

Effective knowledge transfer has been linked to project success across a wide array of operationalizations, such as project performance, project outcomes, system implementation, and benefits to the client (Karlsen & Gottschalk, 2004; Mitchell, 2006). Project-team success also has been linked to members' knowledge of the areas of expertise that reside within the group and their ability to leverage them (Yoo & Kanawattanachai, 2001). Faraj and Sproull (2000) found that the coordination of expertise could lead to performance improvements that are 25% greater than would be obtained through traditional project management practices alone. Research further shows that project-team performance improves when active knowledge exchanges occur with external sources, especially under conditions of structural diversity (Cummings, 2004). Henderson & Cockburn (1994) similarly found that higher project performance was associated with knowledge-transfer mechanisms that actively encouraged the exchange of information across organizational units and organizational boundaries. Additionally, it has been shown that successful product and process design depends on management's ability to integrate fragmented pockets of specialized knowledge (Mitchell, 2006). Consequently, issues of knowledge transfer and integration lie at the core of project performance and deserve our attention

It is apparent then that the ability of the team and its members to gather, share and use knowledge effectively is an important component of project success. In this light, one can make a strong argument that a project manager's primary task is to interconnect the knowledge bases of team members and stakeholders in a manner than leads to superior project outcomes (Reich, 2007). Yet, previous studies suggest that project leaders tend to be ill-equipped to master that task (Reich & Wee, 2006). In order to better understand how

leadership behaviors can impact knowledge transfer, we now turn to a discussion of the types of knowledge needed on projects, as well as the actual role that team leaders play in their execution.

2.3.2 Types of knowledge needed on IS projects

Reich (2007) identified four important categories of knowledge that are needed for projects. The first two are *process knowledge* (i.e., knowledge of project structure, methodology, tasks, time frame, etc.) and *domain knowledge* (i.e., business, technical and product knowledge related to the project). Both have been studied for their links to knowledge integration, learning and coordination (Crowston & Kammerer, 1998); (Faraj & Sproull, 2000) as well as governance of projects (Henry, Kirsch, & Sambamurthy, 2003). Much of what has been published in the IS literature has emphasized the need for cross-domain-knowledge-sharing to achieve goal alignment between IS consultants and the business departments they cater too (e.g., Reich & Benbasat, 2000; Nelson & Coopriider, 1996). The remaining two categories, *institutional knowledge* and *cultural knowledge*, are alleged to be critical to project execution as well. Institutional knowledge is specific to the organization, consisting of a mix of its history, power structure, and values—akin to the corporate/organizational culture of the firm where the technology in question is being implemented. Existing works like Barley (1958) and Orlikowski (2000) have documented the impact that local-site dynamics have on the way technology implementation unfolds. In contrast, cultural knowledge refers to one's awareness of the national and professional cultures that project participants are immersed in. Project learning depends not only on the technical aspects of solution design, but also on the transference of the contextual and social processes that help create the learning outcome (Bresnen, 2003). While project success is dependent on all four knowledge clusters (Fernie et al., 2003; Brensen et al., 2003; Schindler et al., 2003, Nelson & Coopriider, 2002;Tiwana et al 2003; Orlikowski, 2002;- , Barley,1986) their transfer is particularly challenging when the client-consultant dyad is inter-organizational because of the boundaries created by organizational, cultural, and functional differences (Carlile, 2002).

Earlier investigations provide clear evidence that a given type of knowledge can generate different outcomes depending on the context within which it is being used. For example, IS- and business-units have responded differently to shared understandings at the strategic- and operational-levels (Stoel, (2006)). In Deng (2002) study of ERP implementation it was shown that business and technology knowledge again differently impacts product and process outcomes. Hence there is clearly indication that different types of knowledge impacts different outcomes. However, there is not much research to show the differences in the role of context knowledge (i.e. the institutional and cultural knowledge) and content (domain & process) knowledge on product or process outcomes. The role of task contingencies in watering down or strengthening the impact of different types of knowledge is also worth exploring. For instance, more complex projects or ones that disrupt organizational routines might require a higher level of contextual understanding (Orlikowski, 2002) for its success.

2.3.3 Transfer of knowledge- clients and consultants (IS project team)

IS research on this topic can be categorized into three groups. The first two reflect current thinking on ‘what’ is believed to be the core issue when it comes to knowledge transfer between clients and consultants (i.e., expertise and sense making, respectively), while the third focuses on ‘*how*’ the goals of these competing ideological camps are to be reached. All three of discussed in more detail below.

2.3.4 Group 1: The ‘expertise’ focused literature

This literature typically frames the issue of knowledge transfer in terms of ‘shared domain’ knowledge and understanding. IS and line managers have been depicted as speaking different technical and procedural languages (Keen, 1988) with little idea of the problems and opportunities faced by the other party (Henderson, 1990). Consequently, effective transfer hinges one’s ability to bridge the gaps that exist when there is non-overlapping business and IT knowledge. Subramani et al (1999) defined a ‘user gap’ as the difference between the user group’s perspective on project issues and the how the IT team understands the user

perspective. 'IT gap' was defined as the gap between how IT groups perceives project issues and the way user group understands the IT team's perspective. It was found that both user and IT gaps were inversely related to the operational and service performance of IT. Interestingly however the IT related gaps had stronger effect on IT performance than user gaps. This then points to the need for the IT group to interpret issues in terms of the user of technology when it comes to successful IT performance.

Nelson and Cooprider (1996) defined shared knowledge as the understanding and appreciation, between the IS and business unit, of the techniques and processes affecting their mutual performance. Such appreciation embodied "a sensitivity to the frames-of-reference and interpretations of the other group" (p.411). They noted that differences in technical and procedural languages can lead parties to perceive a lack of cooperation and unreasonableness in the demands of others. Mutual trust (i.e., shared expectations that each party will meet their commitments to the other) and perceptions of mutual influence (i.e., countervailing abilities to affect key policies and decisions of the other), were found to be antecedents to the development of shared knowledge between the groups.

Reich and Benbasat (2000) examined four factors believed to influence the alignment of business and IT objectives at the firm level: shared domain-knowledge; communication between business and IT executives; IT implementation success; and connections between business and IT planning. Shared domain knowledge, defined as the amount of IS experience business-unit managers had and the level of business experience IS professionals had, proved to be a very influential antecedent of communication and alignment. They noted the need to investigate the ways in which shared domain knowledge is created in future research. Tiwana et al. (2003) tested a project-level model that incorporated structural as well as cognitive IS-business linkages to explain information system development (ISD) processes and outcomes. These linkages were assumed to facilitate the integration of business and technical knowledge spread across internal business functions and outside sources. Internal knowledge-integration was measured by the extent of idea exchange between the parties, joint problem-solving, understanding of their respective constraints, convergent expectations *et cetera*. Structural linkages encompassed the extent to which IT-unit members had close working relationships with individuals in internal business functions and external partners (e.g., business alliances, software vendors and consultants that worked on the ISD project). In

contrast, the cognitive-linkages variable reflected CIP perceptions of top management's understanding of the business value of IT, as well as the extent to which (a) business- and IS-managers shared a common understanding of IT's role, (b) the firm's strategic planning was tightly integrated with IT strategic- planning, and (c) the IT-unit's work environment was understood by various business functions. It was reported that IS-business linkages alone explained 10 % of the variance in knowledge integration, underscoring its importance at the project level. The authors went further in stressing the importance of business-IS knowledge integration, asserting that (1) helps integrate diverse functional perspectives, (2) facilitates attention shaping to features and constraints that are most relevant for realizing the business potential of technology, and (3) reduces conflict among stake holders (Tiwana et al, 2003).

Since most of the studies in this research stream employ within-firm designs, little consideration has been given to the additional complexities that arise when there are differences in organizational culture. They nevertheless point to an important knowledge boundary that must be overcome for knowledge sharing (i.e., the boundary of functional differences).

2.3.5 Summary of insights from the expertise based literature

As Tiwana et al. (2003) noted "ISD stakeholders not only know different things, but also know things differently". Using the situated-nature-of-knowledge perspective (explored in more detail in the theory section), it is evident that knowledge flows in the direction of shared practice and "gets stuck" where practice is not shared (Brown & Duguid, 2001). Therefore, the creation of shared knowledge between different communities of IS and Business, or clients and consultants, is important. The issues that arise in doing so are no different than those that would come up when integrating knowledge across functional boundaries--the primary one being the ability to understand the 'thought worlds' and knowledge base of the other party (Dougherty, 1992). Due to their specialization, individuals from each group are likely to be good at understanding select information that is considered important for the task at hand, and equally likely to ignore other relevant information that falls outside of their domain of expertise. The previous section makes the case that common knowledge and

shared frames-of-reference are critical linchpins in the knowledge-transfer process between clients and consultants.

It is imperative to move beyond the focus on ‘functional’ differences between clients and consultants, though.

Since most of the studies in this research stream employed within-firm designs, it is not surprising that little consideration has been given to the additional complexities that arise when there are differences in organizational culture. For instances, it is possible for the “client” to be an IS unit that has outsourced part of its technology needs to an independent IT firm, in which case the non-overlapping bases of knowledge would not be framed as IS vs. business. When clients and consultants belong to different cultures, other elements of complexity are added to the mix. Accordingly, there is a need to acknowledge and study this larger set of boundaries (e.g., cultural, organizational, technological) that can impede knowledge sharing and act as barriers to the development of shared understanding.

Carlile (2004) differentiates the relative complexity of knowledge boundaries based on three primary dimensions: *differences in domain-specific knowledge* (amount and type), *dependencies* that must be taken into account if the entities are to meet their goals, and *novelty* of the circumstances. As novelty goes up, the ability of common knowledge to represent the differences and dependencies in the knowledge of actors becomes increasingly important. Equally salient is the actors’ ability to use it. For instance, common language, which can be little more than a lexical issue at the transfer level, constitutes common *knowledge* that should be able to reflect the parties’ system of meanings. At the highest level of complexity, the actors need to be able to leverage their shared lexicon to (1) effectively utilize current knowledge common and domain), and (2) jointly process and apply newly emerging knowledge. In this framework, each level acts as the foundation for the next.

Knowledge boundaries are expected to be particularly formidable in inter-organizational settings given the potential for wide differences in the backgrounds, organizational affiliations, and orientations of the client and consultant team-members. Scaling them places even more of a premium on successfully mobilizing domain and common knowledge.

Finally, previous studies have chosen to operationalize common knowledge and shared understanding in a manner that raises serious measurement concerns with respect to the underlying content domains. Most investigators have limited their attention to the explicit components of cross-domain knowledge (e.g., self reported levels of IS-manager business knowledge and business-manager IS knowledge). The amount of overlap in what the parties report is then treated as their “shared understanding”. Totally absent from this approach are the tacit elements of shared understanding such as insight into the cultural frames-of-reference used by the client, or shared mental models/decision-making schemas. Gouldner (1958) noted that experts (defined on the basis of their knowledge and skill) are going to differ vastly from each other on the basis of norms and values. The literature stream under review here largely reduces these differences to a functional measurement of domain understanding without a compelling explanation.

Table 1: Some key works representing the expertise literature

Author (date)	Key question	Sample & technique	Findings
(Nelson & Coopriider, 1996)	<p>How is performance of IS teams impacted by the shared understanding they develop with the line personnel?</p> <p>How does trust and influence impact the creation of a shared knowledge between both sides?</p>	<p>86 IS departments across 7 organizations.</p> <p>Key informant technique for gathering survey based data. Stake holders provided performance data for teams.</p>	<p>Shared knowledge is achieved through both mutual trust and influence between the IS group and line teams. Removing either from the model causes a problem.</p> <p>Shared knowledge impacts performance positively.</p>
Reich & Benbasat (2000)	<p>What factors influence the social dimension of alignment between business and IT objectives?</p> <p>Alignment was operationalized as the degree of mutual understanding of current objectives, and the congruence of IT vision between IT and business executives (long term)</p>	<p>10 business units in the Canadian life insurance industry.</p> <p>Semi-structured interviews. Secondary data sources such as business and IT strategic plans, minutes of meetings between IT steering committee and other strategy related documents.</p>	<p>While shared domain knowledge, IT implementation success, communication between business and IT executives and connections between IT and business planning influenced short term alignment, only shared domain knowledge influenced long term alignment. Strategic business plans influenced both.</p>
(Tiwana, Bharadwaj, & Sambamurthy, 2003)	<p>How does structural and cognitive linkages between IS and business within a firm influence information system development outcomes and processes ?</p> <p>Structural linkages are the</p>	<p>133 projects.</p> <p>Survey data from CIOs and client site managers.</p>	<p>The structural and cognitive factors influence ISD performance by facilitating the integration of business and technical knowledge dispersed across internal business functions and outside the formal boundaries of the firm.</p>

	<p>strength and frequency of social interaction between IS and business units. Cognitive linkages refer to the shared mutual understanding of collective goals, business strategies, organizational work processes and work environment between the business and IS units.</p>		
(Bassellier & Benbasat, 2004)	<p>How does the business competence of IT professionals influence IT-business partnership? Business competence was defined as areas of knowledge that are not specifically related to IT (eg: interpersonal and management knowledge).</p>	<p>2 insurance companies. 166 IT workers.</p> <p>Survey based data collection</p>	<p>Business competence of IT professionals significantly influences their intention to partners with their business clients.</p>
(Lind & Zmud, 1991)	<p>Does convergence in understanding between providers and user of technology result in greater innovativeness regarding that technology?</p> <p>Convergence was operationalized as the degree of mutual understanding between the technology providers and the buinss people in terms of the importance of the business</p>	<p>Two divisions of a large multi-national firm.</p> <p>Longitudinal causal analysis technique used to collect data over 5 years.</p>	<p>Communication media richness and frequency promote convergence between technology providers and users and result in innovation. Richness is more important than frequency.</p> <p>The key to achieving convergence lies not in educating technology users about the technology but rather in educating technology providers about a firm's core business activity for the organization investigated (early stage of learning about focal technology).</p>

	activity and the technology supporting them.		
(Armstrong & Sambamurthy, 1999)	What influences a firm's ability to assimilate IT and leverage the business value of IT ?	Survey data obtained from CIOs and senior business executives who were members of top management teams.	CIO's business and IT knowledge impacts IT assimilation However the IT knowledge of senior business executives was not a factor in IT assimilation. The sophistication of IT infrastructure influences IT assimilation.
(Ranganathan & Sethi, 2002)	What influences rationality in strategic IT decisions ?	223 senior executives provided survey data	Shared domain knowledge and formalized IT unit structure had a positive impact on rationality. Highly centralized unit structure negatively influences shared domain knowledge.
(Kearns & Sabherwal, 2006)	<p>- How does aspects of IT projects mediate the relationship between business-IT strategic alignment and business effects of IT ?</p> <p>- How do planning behaviors and top management knowledge of IT mediate the effects of contextual factors (organizational emphasis on knowledge management & centralization of IT decisions) on business- IT alignment.</p>	<p>274 senior information officers</p> <p>Survey based data collection</p>	<p>Quality of project planning and implementation problems mediate the relationship between business and IT strategic alignment and business effect so of IT.</p> <p>Organizational emphasis on knowledge management and centralization of IT decisions affect top manager's knowledge of IT. This facilitate the involvement of IS manager in business plans and business managers in IS plans.</p>

2.3.6 Group 2: The ‘sense making’ research.

Work done under this tradition has mostly framed the issue of project success and knowledge transfer as one of gaining deep contextual understanding of the locale in which technology is being implemented. The key issue for this group of researchers is recognizing the role that context plays in project success in general, and technology implementation in particular. This line of studies has actively incorporated institutional and cultural knowledge (Reich, 2007) as significant elements of the research questions being investigated. Issues of sense-making during the requirement-determination phase of a project, as well as during technology implementation, have been a primary focus.

A socio-cognitive approach to the requirement-determination process has emphasized the importance of sense-making among stakeholders, characterizing it as chaotic, non-linear, and continuous (Davidson, 2002, Curtis et al, 1988, Walz et al 1993). Orlikowski & Gash (1994) developed the concept of technological frames-of-reference as an analytic lens for examining how interpretations influence stakeholder actions related to IT development and use. Technology frames are “that subset of members’ organizational frames that concern the assumptions, expectations and knowledge they use to understand technology in the organization. This includes not only the nature and role of the technology itself, but the specific conditions applications and consequences of that technology in particular contexts” (p.178). ISD project-participants draw on technology frames to make sense of contextual information and to understand the implications of project requirements. These frames, in turn, act as templates to interpret and solve problems, providing imprecise, conservative filters for new information as well (Davidson, 2002).

Since requirement determination tends to be driven by key individuals (i.e., executive champions, project leaders), their technology frames can serve as the dominant filter that shapes how IT requirements are articulated and legitimized among ISD participants (Davidson, 2002). These overarching frames should act as a homogenizing influence on project-team members, reducing the likelihood that otherwise divergent frames they personally may hold will bog down the process. ISD disruptions have been associated with differences in the frames that stakeholders are utilizing (Orlikowski & Gash, 1994). Determining what enables project leaders to serve in this capacity thus becomes central to our understanding of effective knowledge exchange between the client and consultant. Structuration theory also has had a tremendous influence on this research stream, viewing technology as situated within a number of nested and overlapping social systems (e.g., hierarchy, cooperative culture, normative rules, etc.) which are enacted in its design and use. Orlikowski (2000)

revealed how the same technology could result in different outcomes depending on the readiness of the group, their structures and the extent of disruption of their existing ways of doing work. Orlikowski makes the point that people engage with technology in varied ways, and it is through the use of agency that existing structures are altered before new patterns are allowed to be established. Similarly, Barley (1980) studied the implementation of CT scan technology in two radiology units in hospitals to determine how technologies alter organizational structures. Again, the same technology led to very different outcomes based on its interaction with pre-existing roles and structures. Several studies on enterprise resources planning (ERP) also have pointed to the importance of understanding user context for successful projects (Alvarez, 2008; Volkoff, Elmes, & Strong, 2004). Consequently, it is very important for consultants to understand the larger context in which technology projects unfold.

2.3.7 Summary of insights from the sense-making literature

The focus on interactions between technology and context is at the other end of the continuum from the expertise-focused literature. Tacit knowledge issues are embedded in its research questions, often captured in rich qualitative descriptions with a case-study orientation. As such, it actively incorporates the institutional and cultural aspects of managing projects and technology implementation.

In addition, themes in the sense-making literature are closely connected to situated-learning-theory's view of knowledge transfer and the work done on the social context of learning through communities-of-practices (i.e., informal aggregation of individuals engaged in common enterprise and distinguished by the manner in which its members interact and share their world view, assumptions, meanings and beliefs; (Lave & Wenger, 1991; Brown & Duguid, 1991). The latter conceptualizes learning as a process of social participation where members interact with more experienced members who convey tacit and explicit knowledge through personal contact. Most empirical studies in this we have examined role-based communities-of-practice where members have similar jobs or occupations (e.g. Bechky, 1991; Brown & Duguid 1991). In the context of clients and consultants of IS projects, however, team members am may be from different organizations and/or occupations—settings that heretofore have not been directly investigated. This deficiency needs to be redressed if one is to identify the best means of fostering contextual understanding and comprehension of the local dynamics for consultants.

Furthermore, little consideration has been given to ways that domain and process knowledge potentially interact with cultural and institutional knowledge. While it is true that both knowledge sets have a role to play in project performance, how they may complement or compete with each other to influence project outcomes is relatively unknown. Scant attention has been devoted to the quality of relationship between the sender and receiver of knowledge as well, much like the expertise-focused literature. Nor is there any talk about 'how' sense-making should be enabled. The 'how' aspects of knowledge transfer has been addressed in what will be described as the 'technique literature,' where we now turn our attention.

Table 2 : some key studies representing the sense making literature

Author (date)	Key question	Sample & Technique	Finding
Barley, 1986	How does technology implementation alter existing organizational structures and roles ?	Ethnographic study to see how new technology impacted the organizational structure and social order of two radiology departments.	Technology implementation can alter the organizational and occupational structure of work (as it did for the radiological work). In doing so technology is treated as social rather than physical object and structure is conceptualized as a process rather than an entity.
(Orlikowski & Gash, 1994)	How do stake holder's socio-cognitive interpretations influence their actions related to IT development and use in organizations?	Study of the adoption of lotus notes software	Development of the idea of technological frames (i.e. assumptions and expectations surrounding technology and its use in a given context). Nature of technology, technology strategy and technology in use were the dominant frames that characterized the way IT and users understands and use of notes.
(Davidson, 2002)	Development of a socio cognitive process model of how frames and	Longitudinal case study in a health care insurance company. The	Requirements are socially constructed through ongoing

	shifts in frame salience influence sense making during requirement definition.	business information system project participants were the subjects of the study.	discourse. Repeated shifts in salience of the business value of IT and IT delivery strategies disrupted the project participant's understanding of the requirement and contributed to a turbulent requirement determination process. Technology frames explain the selective filtering of information by stakeholders.
(Curtis et al, 1988),	Investigate the impact of human and organizational factors on software productivity	Interviews held in 17 large projects.	Three key problems across project included thin spread of application domain knowledge (cognitive issue); fluctuating and conflicting requirement (business related); communication and coordination break down. Consequently the authors advice treating software development as a learning, communication and negotiation process.
Walz et al (1993)	How do group members manage project relevant knowledge in software design teams ? Do the levels of participation in KM activities differ across team	Recording of 19 project meetings and their qualitative coding	Context sensitive learning is very important to the design process. Requirement determination was an activity was a process that shut down more based on project timing

	members?		than on achieving a full understanding of the requirements. Knowledge and expertise was the lead force behind participation and leadership of the design process. Recommendations were made for developing a knowledge profile for each member of the team to balance skills and abilities in the team.
Vlaar et al (2008)	How do geographically dispersed workers co create understanding and value in projects ?	Case study of geographically distributed information systems development project at one of India's largest offshore vendors.	Onsite and offshore teams engage in acts of sense giving, sense making and sense breaking in order to understand their task and environment. This also increases the likelihood that congruent and actionable understanding emerges.

2.3.8 Group 3: The ‘technique’ based literature

The IS project-management literature is replete with studies of techniques to improving user/client and consultant interactions. User participation (mostly from the business side) traditionally has been seen as improving project success (Ives & Olson, 1984; Hartwick & Barki, 1994). Users often are involved in expressing business needs, and some times in testing as well (Ives & Olson, 1984). Consequently, being able to exchange knowledge effectively with them becomes very important. Such techniques as prototype building (Naumann and Jenkins, 1982; Robey & Markus; 1984), steering committees (Gibson & Nolan, 1974; Robey & Markus, 1984), mixed project teams (Bancroft, Seip, & Sprengel, 1998), and the use of project managers, champions and sponsors to establish partnerships and manage dialogue between users and IS providers (Linying, Heshan, & Yulin, 2007; Neufeld, Dong, & Higgins, 2007; Zmud, 1988) have been suggested to enhance learning transfers between clients and consultants.

Another way of classifying the work on IS-user learning emphasizes the directionality of knowledge flows. One camp focuses on contextual and other influences that enable or inhibit learning transfers *to the client* (Ciborra & Lanzara, 1994; Kirsch & Beath, 1996; Santhanam, Seligman, & Kang, 2007)(Ko et al, 2004; Hirschheim and Klein, 1994;., McKeen et al 1994, Newman & Noble, 1990, Boland 1978). The second concentrates on the issues of obtaining information *from the client/user* (Ives et al., 1984; Newman & Robey, 1992; Agarwal & Tanniru, 1990; Urqhart, 2001). To illustrate, Agarwal and Tarnniru (1990) conducted an experimental study testing structured interviewing’s efficacy for knowledge elicitation by untrained interviewers and those that were not trained. While the results for the trained group were better, the study was limited by a single-session approach towards knowledge elicitation. Pitts & Brown (2007) found that procedural prompts enabled analysts to acquire additional meaningful requirements. Prompts designed to mitigate cognitive challenges were significantly more effective than simple interrogatory ones.

However, studies have not always been supportive and encouraging of user involvement. Broadbeck (2001) examined 21 software development (SD) project groups and collected user-communication and project-performance data from participants from diverse

positions (e.g., engineers, user representatives, project managers). A quasi-longitudinal design documented that user participation inhibited effective SD project performance, while the standardization of methods and tools facilitated it. Hierarchical regression analysis further showed that task-related, internal communication was positively related to performance. Communication quality mattered more in the later stages of a project when tool standardization is low.

A notable exception to the otherwise prescriptive literature of techniques is Preston et al. (2006), where executive communication patterns were scrutinized to ascertain how shared understanding could be achieved. CIO use of educational mechanisms to briefing top management teams about IT's capabilities was key for both national samples. 'Social systems' of knowing (e.g., informal learning; socializing) also were useful for establishing shared understanding in the French sample, versus 'structural systems of knowing' (eg: formal interactions; reporting relationships) in the U.S..

2.3.9 Summary of insights from the techniques literature

While there may be some controversy over the extent to which user-involvement helps or hinders project outcomes, it is undisputed that users hold important knowledge bearing on system design and implementation. It nevertheless is disappointing that a body of work that spells out the methods/environment for knowledge transfer does not elaborate on the antecedents to those conditions. For instance, collaborative learning between clients and consultants is highly recommended, but much may need to transpire before such 'opportunities' materialize. Furthermore, client participation is not always under consultants' control, nor are clients necessarily equipped to understand and/or contribute to the process due to different contextual and functional boundaries (as discussed earlier in the chapter). Users' ability to comprehend existing technology--and past experiences with it--can impact their ability to effectively transfer knowledge to consultants. An important construct in this respect is called 'technology cognizance', comprised of the *ability* and *intention* to explore a new technology (Nambisan, Agarwal, & Tanniru, 1999). Technology cognizance is representative of a pre-condition that must exist before clients can effectively transfer

knowledge to the consultant. It also has been shown that interactions between users and IS staff may not be productive unless trust and a positive climate exist (Henderson, 1990; Wheelwright & Clark, 1992). Consultants' ability to become increasingly familiar with the client context and perceptions may be an equally important route to follow. Accordingly, we now turn our attention to works that assess boundary spanning by IS personnel in general, and the role of project leadership in particular.

Table 3 : Some key studies representing the techniques literature

Author & date	Key question	Sample & Technique	Key finding
(Newman & Robey, 1992)	Develop a process model of user analysis relationship to help us understand the research on social dynamics of system development.	Two case studies one at a large US university and the second in an insurance corporation.	It is through design process encounters, and joint development episode that shared understanding is achieved. Unless critical encounters change the trajectory of the project established relationships between users and analyst will persist.
(Agarwal & Tanniru, 1990)	How does the structured interviewing technique fare along the efficiency and effectiveness dimension as compared to the unstructured knowledge acquisition interview ?	Experiment done with both types of interview techniques. Senior managers from the industry served as subjects.	Performance improved with the structured interviewing technique and it was proposed as a sophisticated method for acquiring domain specific knowledge from a source who is an expert. Extracting context specific knowledge is enhanced by the use of this technique.
(Urquhart, 2001)	Exploring the conversational perspective on the issue of analyst client interaction and the impact of social and organizational context on defining a new information system.	Case studies created through video tapes of client analyst conversations and later their reflections on the conversations. Client and analysis were identified from various IS projects in the state of Tasmania (Australia) Themes were developed using grounded theory approach	Client and analysis perspectives on requirement gathering represent the influences of individual issues, conceptual issues, social issues (age and power differential influencing agenda, negotiation on system boundaries), environmental issues (eg- previous negative experience with IT. Lack of resources etc).
(Pitts & Browne, 2004)	Identification of various heuristics or stopping rules used by analysis to gauge	54 system analysts participated in a requirement	Certain stopping rules lead to greater quantity and completeness of requirements elicited from users.

	the sufficiency of the information obtained from users and to terminate information acquisition.	determination problem in a lab setting	Motivational stopping rules (i.e. rules driven by intrinsic factors in the analyst or by external factors such as time budget and environment exert a strong influence on analysts stopping behavior. These rules in isolation or along with cognitive stopping rules influence the amount of information gathered.
(Hirschheim & Klein, 1994)	Exploring the role of a socio-technical systems based methodology called : ETHICS (Effective Technical and human implementation of computer systems).	Theoretical paper	Participation is important for social sense making to create a shared understanding and to meet ethical imperatives of work arrangements. All participants must be in an equal position to ask questions and refuse orders. Participation is not only a necessary device to obtain valid requirements or stimulate commitment but as an intrinsic right or end in itself.
(Newman & Noble, 1990)	Compare four process models of user involvement (learning, conflict, political and garbage can with each other) for successful system development	Case study of computer center staff, department heads and to managers of a state university where a student information system was being implemented.	The four models were not mutually exclusive. The authors suggested a contingency approach to specify the conditions under which one or the other is likely to be more helpful. Organizational characteristic and system design features were proposed as two conditions. Also suggestions were made for testing the different models at different stages in the design process.
(Boland, 1978)	How should a user be involved in a system design process?	Nurses from a large teaching hospital interacted with system designers who did not have experience in hospital systems design, in an experiment. 22 pairs were interviewed.	For ill structured problems the alternative interaction process produced designs which were higher in quality with important implementation advantage.

		A comparison of the traditional interviewing technique vs. a more mutual discussion and critique led technique was carried out.	
(Majchrzak, Beath, Lim, & Chin, 2005)	How does one best facilitate client learning during developer client meetings?	85 developers and clients across 17 projects	Cooperative learning strategy called collaborative elaboration developed by educational psychologists provides a basis for stimulating client learning during an IS design process. When several people try and learn at the same time as is common in requirement analysis then they need to switch between generating their own elaborations and helping others to self elaborate.
(Jun & King, 2008)	Seek an explanation for the equivocal results regarding the relationship between user participation and ISD outcomes.	Meta analysis of 82 empirical studies on user participation in ISD.	User participation is minimally to moderately beneficial to ISD. Its effects are stronger on attitudinal and behavioral outcomes than productivity outcomes. Different strategies should be employed based on specific goals of IS projects. For instance for system acceptance more psychological involvement is needed, and for productivity benefits extracting domain knowledge for developers should be the key.

2.4 PROJECT LEADERSHIP AND MANAGING KNOWLEDGE

IT project manager & his/her skill base has been identified as an important criteria for project success (Bartol & Martin, 1982; Lee, Trauth, & Farwell, 1995; Zimmerer & Yasin, 1998) (Guinan, Coopriider, & Faraj, 1998). The project leader plays a critical role in the coordination of expertise and exchange of knowledge between client and consultant teams. Wallace & Keil (Wallace, Keil, & Rai, 2004)(2004) showed that lack of knowledge within the project team (including gap in project manager experience) can impact both project processes and project outcomes. Empirical work shows that loss of project leaders can have a strong negative impact on project performance. Parker & Skitmore (2005) surveyed 67 project managers in the aerospace industry to show that turnover of a project manager can negatively impact both team and overall project performance. Sauer & Reich (2006) surveyed 471 projects and found that loss of a project manager, which happened in one in every two projects, resulted in a negative impact on project schedule, budget and scope. Similarly, Gemino et al (2007)in a survey of 194 projects showed that the loss of a project manager of executive sponsor was key component of project volatility that impacted process performance.

A PL has to fulfill the project's need for relevant and timely knowledge by being a conduit of knowledge for the two sides. In this role the project manager become the receiver and sender of information at the same time. In both these roles the project leader has to interpret the information that s/he obtains, in the context of the origin of the information. Then s/he must interpret its implication and connection to the people for whom s/he must transfer the knowledge. The process of interpretation involves framing the elements of one community's world view in terms of another community's world view (Pawlowksi & Robey, 2004). This conceptualization of the role of the PL is influenced heavily by the way brokers are defined in the situated learning theory.

The process of 'translation' in situated learning theory involves the framing the elements of one communities world view in terms of another communities world view For local

knowledge and language, which is embedded in situated action, to be transferred to another community of knowing, it must be translated or transformed (Bechky, 2003). In situated learning theory, brokers are defined as individuals who provide connections between communities of practice, transfer elements of one practice into another, enable coordination and through these activities can create new opportunities for learning (Wenger, 1998, p.109). The term knowledge broker is used by Brown and Duguid (1998) to describe people who participated in multiple communities and facilitated the transfer of knowledge among them.

The situated view of learning then demands an immersion into the context of the other to understand the unwritten rules, assumptions, norms that guide the behavior of the group. Language, rules, roles, skills and procedure that are used in the practice must also be grasped to appreciate how the group functions. It is by learning these elements that the project leader as a knowledge transfer agent can perform his role of interpretation more effectively. Situated learning points to the importance of context accessibility for the learner before any translation can take place.

2.4.1 IS studies that focus on boundary spanning:

Pawlowksi & Robey (2004) talk about the knowledge brokering role of IS professionals while not talking about the PL per say. Brokering practices include gaining permission to cross organizational boundaries and challenge assumptions made by IT users, translating, interpreting as well as relinquishing ownership of knowledge. The authors ask how do IT professionals understand knowledge brokering practices ? They also sought insight into what are the conditions and consequences of knowledge brokering by IT professionals. In this study Pawlowski & Robey (2004) undertook a qualitative analysis of interviews conducted with 23 IT professionals and business users in a large manufacturing company. The IT professionals were involved in the implementation of shared IT systems and hence in a unique position to bridge knowledge gaps and transfer knowledge between communities within the firm that were traditionally isolated from each other. Their results showed the choice of governance structures influenced cross-community collaboration. The study noted the influence of decentralization and federated IT management organization, along with shared IT systems on brokering practices. They found that it is through a technical

boundary object and knowledge brokering that knowledge transfer occurs between the IS and business units. This study then further add credence to the conceptualization of IS professionals as knowledge brokers. In this study the IT professionals had very little training with boundary spanning and were not nominated in that role, a difference that could be important when trying to understand the role of PL in transferring knowledge.

Levina & Vaast (2005) discuss the role of nominated vs. boundary spanner in practice and use of boundary objects to create a joint field of understanding. Using two qualitative field studies they argue that for boundary spanning to emerge a new joint field of practice is must be produced. Their article shows that some agents transform their practices in order to accommodate the interests of the other party. These agents are referred to as boundary spanners in practice. These individuals use organization and professional resource including influence associated with the boundary spanner role to create the new joint field. These individuals are different from nominated boundary spanners who are assigned by to the role to span boundaries of diverse fields. The authors point to the importance of selecting different individuals for boundary spanning depending on the type of boundary spanning activity that needs attention.

Guinan et al (1998) discuss the various boundary spanning activities performed within the team in their study of software development projects. Their study examined 66 teams from 15 companies to find that team managerial involvement and little variance in team experience enabled more effective team process than technical tools and expertise within the team. Following the lead of the boundary spanning researchers they examined both visionary and guard activities in managing performance of the team. Guard process was negatively related to stakeholder rated team performance which contradicts Ancona's (1990) research. This different result is attributed to the task and type of team. Authors note that requirement determination may need open sharing of information and this might explain the results. There was a positive link between visionary activity and performance. This shows that teams should understand the importance of managing outward activities with the environment.

Levina & Vaast (2008) Examine issues of boundary spanning in the offshore onsite relationship and how organizational and country boundaries come into play when collaboration is sought. A qualitative study of a large financial services firm was carried out

using grounded theory approach. This firm had outsourced high end IT work to subsidiaries and third party vendors in different countries. Differences in country contexts gave rise to boundaries that inhibited collaboration effectiveness. Differences in organizational contexts were mediated through practices that treated vendor centers and captive units similarly. This is an important study as it shows how onshore manager use their status and resources to overcome some of the boundaries.

2.4.2 Insights from the project leadership literature in IS projects

PLs are seen in a boundary spanning role and as brokers of knowledge between the two sides. Borrowing from the boundary spanning literature, the PLs ability in framing/translating/interpreting issues is seen as critical. Equally important is the ability to grasp the tacit/unsaid component of the knowledge available on the other side of the boundary. The literature does not provide much guidance as to how the leader is able to reach that point where s/he has this ability. The contribution of the existing literature is that it provides a fine grained analysis of how boundary spanning activity is conceptualized within and between the teams, and the role it plays in knowledge integration and team performance. In other words there is evidence to show that these activities matter for IS projects. Additionally the recognition of differences between appointed and emergent boundary spanners is an important one. There may be differences between teams based on the competencies of individuals who are appointed to these roles, and those who emerge to perform the role.

Much of the IS research aimed at PLs is not focused on the knowledge transfer capability of the project leader/ship and project outcomes (for exception see Mitchell, 2006). The business, technical and relationship competence of project managers is seen as important to project success (Tansley & Newell, 2007) but again the discussion around knowledge transfer capability is missing. I believe that assessment of socialization into the client group is an important factor in knowledge transfer because it creates the conditions of shared understanding, social integration and mutual knowledge which in turn could influence all three competencies

2.5 BOUNDARY SPANNING LITERATURE

Boundary management can be a critical factor in the successful performance of organizational work groups (Ancona & Caldwell, 1991; Aldrich & Herker, 1977, Tushman & Scanlon, 1981). Jholke and Duhan (2001) defined external boundary-spanning individuals by three broad descriptions. The first, most obvious characteristic is that the person has interface responsibilities between the firm and its environment. Second, the incumbent is expected to produce innovative solutions to non-routine problems. Finally, it should be the case that (s)he experiences different role expectations from those inside and outside the organization by virtue of their position.

Boundary spanners primarily perform two roles, information processing and external representation, which can serve to buffer, moderate or influence the environment (Aldrich & Herker, 1975, p.218). In the representational role, individuals create or enhance political or social legitimacy and organizational image. For instance, boards of directors link their organizations to the external environment in a highly visible way (Aldrich & Herker, 1977). In contrast, the information processing role demands that boundary spanners act as both filter and facilitator of information. Here, individuals need to access and gather information from outside the unit and disseminate it to internal users (Tushman & Scanlon, 1981). Together, these roles can be crucial to the firm/team's survival, creating a source of power for the individual (Aldrich & Herker, 1977, Spekman, 1979). Project leaders of consulting teams are often called upon to perform both types of roles.

The liaison who bridges the gap between the external and the internal world of the organization contributes to how well the interaction works. Hence, focusing on the competency of these individuals (such as project leaders) as they try to meet the demands of their boundary-spanning position is an important area of investigation. Our interest lies in the knowledge-transfer competency of boundary spanners, as that is a critical role of project leaders in inter-organizational project teams. Consequently, the review which follows concentrates on the information-processing role, as well as studies that offer insight into what it takes to be successful in that position.

2.5.1 Opportunities and demands of the unique position

The core challenge confronting boundary spanners is the need to grasp the content and context of knowledge that might arise from two very different worlds. Carlile's (2004) discussion on the transfer, interpretation or transformation of knowledge across boundaries makes it clear the ability to bridge the differences, dependence and novelty posed by boundaries is critical for successful role performance. A boundary spanner may act on information immediately or store it for future use. In some cases, the information to be communicated may go beyond facts, requiring interpretation and along with it the responsibility for "uncertainty absorption" (i.e., drawing inferences from perceived facts and passing on only the inferences; (Aldrich & Herker, 1977). Thus, boundary spanners manage information to create shared meanings and construct realities for the firm (Russ, Glang & Ferris, 1998).

Spekman (1979) delves in the conflicting influences boundary spanners may be subjected to from internal constituencies and those outside the firm. Not only must (s)he negotiate with counterparts in other firms who do not share the same goals and preference orderings, but also at times bargain with his own constituents to varying degrees (P.105). The next section highlights key findings from research that has focused on boundary spanners' complex, informational role.

2.5.2 Key literature themes & findings

Most published works have attempted to advance our at understanding of the *frequency, mode, content and direction of communication* that incumbents undertake with those within and outside the organization. Boundary spanners typically are identified by asking respondents how often and with whom they interacted during a given time period. The importance of an individual's technical competence or value as a source of external information often is determined by peer evaluation (e.g., Tushman & Scanlan, 1981). Communicators are then differentiated as follows: those who communicate well with others internally ('internal stars'); those who communicate well with external parties ('external stars'), and those who are both internal and external stars ('boundary spanners').

Another dominant theme has been the statement of how important it is for the boundary spanner to *interpret and transmit information between an organization and its environment*. Knowledge's context-dependent nature, as well as coding schemes that emerge due to specialization, have been central to the investigation of boundary-spanning roles. For instance, Tushman & Scanlan, (1981) assessed the differences in communication patterns and characteristics between internal stars, external stars, a boundary spanners in R&D project teams and technical service projects. They also sought to understand the antecedents of boundary-spanning roles. It was hypothesized that the transfer of information through boundary spanners is a multi-step process due to differentiation and the concomitant specialization in languages and cognitive orientations. Information boundary spanners had to be able to translate across communication boundaries and be aware of contextual information on both sides (p.300). As predicted, those who were well connected both internally and externally were more likely to be successful in informational boundary spanning. Communication was a necessary, but not sufficient, condition for informational boundary spanning, as information gathering and dissemination were important as well. They also found that boundary spanning was not limited to hierarchical positions. Perceived work-related competence was found to be a basic determinant of informational boundary spanning and internal consultation, with formal status enhancing one's ability to serve as a boundary spanner.

Tushman and Scanlan further noted that *different methods* were used to forge linkages within and outside organizational boundaries due to the equivocality of information. Professional linkages were leveraged for external areas with both formal and informal methods being used to connect with external colleagues. Informal relations were utilized within the lab. Although there was a clear recognition of the need to understand and interpret contextual information for those spanning boundaries, *there was no investigation of what supported the interpretation*. The authors simply stated that management can support the evolution and development of boundary-spanning individuals by encouraging external work assignments, travel, special education programs. None of these ideas were empirically tested.

Studies also have probed the relationship between external communication and project performance. Tushman and Katz (1980) investigated the role of gatekeepers in an R&D setting within 61 different project groups. It was proposed that gatekeepers impacted

project performance by virtue of being a source of relevant external information and facilitating external communications for their project colleagues through training, development and socialization. Socio-metric data was used to understand who the individuals talked to and the proportion of times it could be classified as technical communication. Project performance on a technical front was measured through supervisory ratings. They found that the relationship between gatekeeper- and project-performance depended on the project's task characteristics. Three types of projects were being studied: basic research; development; and purely technical services. Research projects with gatekeepers performed significantly lower than research projects without gatekeepers. This counterintuitive outcome was attributed to the possibility that research projects are more effectively linked to external areas through direct-member contact. The correlation between gatekeeper presence and project performance was strongest for development projects, and of no significance in technical-service projects. This difference was attributed to the task being more specialized and locally defined, such that the language and the cognitive differences between the project and its extra-organizational domain, made direct communication difficult. This, in turn, increased the importance of the gatekeeper role. Moreover, development projects involved dynamic technology in contrast to the stable technology underlying technical-service projects. Technology stability could be dealt with by higher supervisory levels without the aid of a gate-keeping function. Their results also supported the idea of gatekeepers training, directing and socializing their project team mates. Again, how or through what process was this made possible -was not discussed.

Ancona & Caldwell (1992), looked at externally dependent, new-product - development teams to document the kind of boundary-spanning activities that exist within the teams, and how those activities link to performance. Not only were there roles that buffered, represented and coordinated team actions to and from various external activities, but their relative importance differed at various points in the project. This work was seminal in advancing our understanding of team boundary-management and the roles that boundary spanners perform. Nevertheless, the boundary spanned was functional in nature, and was studied 'within' teams across five organizations. On the positive side, both leaders and members were included in the study.

Marrone (2004) found that the predictors and outcomes of boundary-spanning activities varied across targets (e.g., clients versus insiders), suggesting that to whom the behavior is directed is of consequence. Her research was focused on the personal and motivational antecedents to boundary spanning in teams. The results showed that self-efficacy in boundary management, proactive personality, and self-monitoring only partially impacted an individual's boundary-spanning behavior. The relationship between individual outcomes (i.e., peer ratings of leadership and contribution to the team) and boundary-spanning behavior was completely mediated by information network centrality.

2.5.3 Summary of insights from boundary spanning literature

The informational boundary-spanning role has been identified as an important function in organizations. To date, investigators have focused more on the activity and nature of boundary spanning steps, as well as its result for the organization and teams, than on *what enables the boundary spanner to effectively perform this role*. All too often, it is assumed that securing outside information and then sharing it internally are unimpeded by contingencies. Access issues, the ability to locate relevant external knowledge, and the motivation to share it internally are not factored into the analysis. It is unrealistic to assume that boundary spanners are equally effective in the sourcing or sharing of knowledge gained. Also, while there is an explicit recognition of the context-dependent nature of knowledge, left unexplored are the means by which boundary spanners master the tacit element of know-how and barriers created by specialization. While boundary-spanning researchers have focused on the communication across intra and extra-organizational boundaries, there exist nuances to the ability to obtain and transfer information which has not been considered by the researchers in the field. And while the general research on knowledge transfer can help provide the elements to look for in understanding the way boundary spanners operate in their informational roles, how this interaction plays out for these individuals still needs to be examined.

Table 4 : Some key studies representing the core themes of boundary spanning literature

Author & Year	Key question	Sample	Technique & variable operationalization.	Results/Observations
(Allen, 1969)	<p>What is the influence of organization structure - formal and informal on the technical communication network in the lab ?</p> <p>What are the information habits and communication choices of gatekeepers ?</p>	<p>R & D firm- aerospace; military and industrial applications. N= 30 and 28 respectively</p>	<ul style="list-style-type: none"> ▪ Sociometric data for determining social relations and the routing of technical information within the lab. ▪ Questions on individual information gathering behavior including reading habits, technical discussion and contact with members outside the organization. ▪ Non-parametric tests used for data analysis. 	<ul style="list-style-type: none"> ▪ The formal organization is more important but not the sole determinant of the structure of the technical communication network of the lab. • Informal network is strongly connected to the technical discussion network but is limited to the general information that flows during technical discussions rather than critical ideas or ideas for new work. • High status members like one another and communicate frequently. Lower status members don't communicate frequently and direct their discussion to those with higher status. • Communication stars in the technical communication network showed greater use of individuals outside the organization or read more than other members in the

				lab.
(Aldrich & Herker, 1977)	<p>Review of boundary roles to show its informational and representational functions.</p> <p>* Examined the variables influencing boundary role creation Eg: time spent with outsiders, number of outside contacts, importance of each contact, size of organization etc.</p>	Not applicable	Not applicable	<ul style="list-style-type: none"> Put forth propositions on link between technology, environmental pressures and boundary role differentiation; role formalization, routinization, discretion and power.
(Tushman & Katz, 1980)	<ul style="list-style-type: none"> What is the link between technological information gatekeepers and project performance? Can gatekeepers facilitate external communication for their more locally oriented colleagues 	R& D firm. 61 projects across seven departments.	<ul style="list-style-type: none"> Sociometric data for analyzing communication links for determining internal and external stars. Project performance measured by subjective evaluations of department managers and lab directors on technical performance of project. ANOVA used to test hypothesis. 	<ul style="list-style-type: none"> Gatekeepers matter for project performance but it depends on task type. Gatekeepers act to reduce communication impedance with external information areas through the training, directing and socializing of their fellow colleagues
(Tushman & Katz, 1980)	How do new ideas and information enter	R&D division of a high tech	<ul style="list-style-type: none"> Report of oral communication alone with internal departments, 	<ul style="list-style-type: none"> Informational boundary spanner must be able to translate across

Scanlan, 1981)	<p>organizations ?</p> <p>What are the antecedents of those individuals who provide this informational link ?</p>	<p>medical instrument function. N= 210. Response rate = 74%.</p>	<p>and external areas- professional areas such as professional societies; and operational areas- vendors, customers, suppliers.</p> <ul style="list-style-type: none"> • • Anova; Regression. 	<p>communication boundaries and be aware of contextual information on both sides of the boundary. This is because language and cognitive orientation makes transfer of information a multi-step process. Hence informational boundary spanning was achieved by those who were both internally and externally strongly linked to others.</p> <ul style="list-style-type: none"> • Extensive internal and external communication is a necessary but not sufficient condition for informational boundary spanning. Gathering and dissemination of information are also required. • Informational boundary spanning not limited to hierarchical position. Perceived competence is a more powerful determinant of internal consultation than formal status. Though formal status further facilitates the ability of individual to serve in the role.
(Golden & Veiga, 2005)	<p>Theoretical piece putting forth propositions on the</p>	<p>Not applicable</p>	<p>Not applicable</p>	<ul style="list-style-type: none"> • Propositions have implications for boundary spanning activities performed by teams. The choice

	link between cultural membership and tendency to encourage or support boundary spanning roles in a team.			between collaborative vs resource gathering activities, impression management tactics and political behavior would be influenced by culture
(Spekman, 1979)	What is the relationship between environmental uncertainty and power attributed to boundary spanner ? What bases of social power does the boundary spanner use for influence ?	11 different industries. Survey purchasing agents and their buying group members. N =322	Sociometric data to ask the names and titles of those constituents with whom the purchasing agent interacted for work related decisions. These individuals then filled survey. * Regression	<ul style="list-style-type: none"> • Boundary spanners influence and power arises from his ability channel the flow of information into the firm, especially during conditions of perceived environmental uncertainty. • Exercise of expert power allows him to sustain a continued dependency thereby assuring him an influence in decision making processes.

<p>Ancona & Caldwell (1992)</p>	<p>What external activities do teams use to manage external environment?</p> <p>What is the relationship between external activity and team's internal process and performance ?</p>	<p>New product development teams. N = 45</p>	<ul style="list-style-type: none"> • Interviews of 38 managers • Daily logs from two teams along with observing their activities. • Survey of 47 new product development teams. 	<ul style="list-style-type: none"> • The type of external communication and not just the amount determines performance. • Teams engage vertical communication aimed at molding views of top management. Horizontal communication aimed at coordinating work, getting feedback and scanning of technical and market environment • Classification of activities- Ambassadorial- access to power structure, secure resources, protect team from interferences. Task-coordinator- coordination, negotiation and feedback. Scouting- adds to information of the group.
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2.6 SOCIALIZATION

Employee socialization has been conceptualized as the process by which individuals acquire the attitudes, behavior and knowledge needed to participate as organizational members (Van Maanen & Schein, 1979). It has been viewed traditionally as an organizational process, and hence deemed to be heavily influenced by organizational structures and activities. Even so, socialization clearly involves both the organization and the employee, and is expected to result in mutual acceptance (Wanous, 1980) and improved performance. The literature identifies several antecedents of successful socialization. The first group operates at the individual level encompassing newcomer characteristics like pre-entry knowledge (Louis, 1980; Nicholson, 1984; Wanous, 1992), as well as organizational tactics (Van Maanen, 1978). Personality-based constructs like self-efficacy (Bauer & Green, 1994; Jones, 1983), self-monitoring (Zahrly & Tosi, 1989), a desire for control (Black & Ashford, 1995); and values (Chatman, 1991) have impacted the socialization process in their own right. The same can be said for individual experience (Bauer & Green, 1998b; Jones, 1983). Fisher (1986) noted how individual attributes might impact newcomers' motivation to be socialized. References also have been made to an interactionist perspective which contends that different socialization outcomes can flow from the interaction of individual proactiveness and organizational tactics (Griffin, Colella, & Goparaju, 2000). This is consistent with Jones (1983), who argued that newcomer differences impact their psychological orientation towards the organization and thereby moderate the impact of organizational processes. Demographic attributes such as gender, racial/ethnic group membership, and different cultural backgrounds have been investigated, but to a lesser extent than have relational demography issues.

Early research on socialization focused on the process(es) (i.e., organizational tactics" by which organizations socialized newcomers (e.g., Van Maanen & Schein, 1979b; Wanous & Collella, 1989). More recently, the focus has been expanded to include inquiries about socialization content. Both areas are reviewed briefly below.

2.6.1 Process research on socialization

(a) Tactics

This line of studies is intent on capturing the changes that occur as a person moves from an outsider- to an insider-position (e.g., Buono & Kamm, 1983; Chao, 1988; Dubinsky, Howell, Ingram, & Bellenger, 1986; Feldman, 1976). The organizational tactics that are used to facilitate socialization can differ in the following ways:

(i) Formal vs. informal; (ii) collective vs. individual; (iii) sequential vs. random; (iv) fixed vs. variable (i.e., whether there is a set timetable for progress); (v) serial vs. disjunctive (i.e., whether newcomer is trained by predecessor or role model); and (vi) investiture vs. divestiture (i.e., whether newcomers are encouraged to keep or reject their prior identity) (Van Mannen & Schein (1979a).

The authors went on to discuss the impact that institutionalized tactics should have on newcomers' role acceptance (custodial orientation) and the individualized approach leading them to change to the role (role innovation). Jones (1986) proposed that these tactics be placed on a single continuum with one end reflecting a highly institutionalized approach where newcomers are socialized in a formal group setting and given clear information about the sequence and timing of the socialization process. The other end demarcated highly individualized, random, variable practices. Empirical studies generally have been supportive of Van Maanen and Schein's thesis (Ashforth & Saks, 1996; Baker III & Feldman, 1991; Jones, 1986; King & Sethi, 1998).

Apart from role orientation, studies also have looked at the impact these tactics have on attitudes. Positive relationships have been found between institutionalized practices and organizational commitment (Ashforth & Saks, 1996; Jones 1986; King & Sethi, 1992), job satisfaction (Ashforth and Saks, 1996; Baker & Feldman 1990; Jones, 1986; Zahrly & Tosi, 1989), intention to remain (Ashford and Saks, 1996; Jones 1986) and role clarity (Jones, 1986; King and Sethi 1992). In contrast, such practices have negatively affected self efficacy (Jones, 1986) and work/family conflict (Zahrly and Tosi, 1989) .

The acknowledgement that newcomers play an active role in facilitating and shaping socialization processes—rather than simply being passive recipients--constituted a major shift in the 'process' based view of socialization. Reichers (1987) proposed that socialization

rates are affected by the extent to which newcomers and insiders are proactive in initiating interaction possibilities with one another. Moreland and Levine (1982) developed a model of stages of socialization at the group level. They noted how group socialization involves changes in the relationship that the group has with its newcomers. They discuss stages from the time that a newcomer is planning on joining a team, to the time he or she spends in there, to a time when after exit the group membership is just a memory. Their model is unique in that it actively notes the changes that the group and the newcomer go through in their interaction with each other during socialization. However their model has not been tested in the field.

Others have emphasized the importance of informal interactions between newcomers and insiders. Peers, supervisors and mentors have been seen as playing an integral role in socialization by providing advice, job instruction and social support (Louis, Posner, & Powell, 1983). The newcomer-manager relationship has been shown to impact various job attitudes in a positive manner (Kramer, 1995; Major, Kozlowski, Chao, & Gardner, 1995), and to moderate the relationship between newcomer role-clarity and performance (Blau, 1988). Sutton and Louis (1987) further proposed that newcomers might impact insiders as well in the process of socializing.

Studies on the role of outsiders in socialization has been somewhat limited, though family members have been looked at as agents of socialization (Settoon & Adkins, 1997). It is possible that clients can impact the socialization process by facilitating sense making process as well as giving information about how the organization is viewed by external constituents (Bauer et al, 1998).

(b) Information seeking

'How' this learning takes place is another aspect of the 'process'-oriented research on socialization. Numerous empirical studies have targeted the information and feedback-seeking behaviors of newcomers with an eye toward understanding the strategies deployed as well as their outcomes (e.g., Ashford 1986; Morrison, 1993c; Bauer & Green, 1998a; Cooper-Thomas & Anderson, 2002). The underlying assumption has been that newcomer information-seeking is related to several indicators of effective socialization. Miller and Jablin (1991) invoked uncertainty-reduction theory to explain what directs newcomers to respond to gaps in the information their organizations provide by seeking referent/role related, feedback

and relational information. In a similar vein, Ostroff and Kozlowski (1992) asserted that individuals unilaterally seek out information about company structure, procedure, products, performance and power distribution as well in an attempt to fit in. Sacks and Ashforth (1997) observed that information acquisition regarding technical, task and social behaviors moderated the link between organizational socialization tactics and distal outcomes (e.g., commitment, job satisfaction, turnover, role orientation, and task mastery) in a positive manner. Kramer (1993) similarly noted the importance of feedback and communication for role adjustment in job transferees.

Other studies, however, fail to support a link between information seeking and effective socialization (Ashford & Black, 1996; Bauer & Green, 1998a; Kramer, 1995). Bauer et al (1998) suggested that the reason for this could be rooted in previous research-design flaws. For instance, studies like Morrison (1993a) did not differentiate information that newcomers passively received from that which was proactively sought.

There also has been research interest in why newcomers opt for some sources over others in their quest to secure needed information. Different types of information seeking may point to different socialization agents. To illustrate, Ostroff and Kozlowski (1992) found that supervisors provided more information about roles, peers about the workgroup. Bauer et al. (1998) noted that although the literature implies newcomer information-seeking will differ from what more experienced organizational members undertake, this assumption has not been empirically tested. Studies can be found that compare the antecedent conditions prompting newcomers with transferees to engage in this task. Brett, Feldman, and Weingart (1990) found that new hires needed to feel confident and accepted *before* they sought feedback, whereas individuals who changed jobs only solICITEd feedback when they felt they were not adjusting well. Their tactics to obtain information might differ as well, with newcomers being more prone to seek information through observation as they are hesitant and need to develop a conceptual framework to process it (Morrison, 1993b). Those who have changed jobs within an organization already have this framework, and consequently may use more overt questioning early on (Bauer et al., 1998). It would be interesting to see the information-seeking dynamics in a client setting, where a balance may need to be struck between securing key information with limited access and projecting vendor competence to deliver a superior product (i.e., impression management).

2.6.2 Socialization content learning

Investigators embracing a content-based approach to socialization have attempted to define the various types of information newcomers need to adjust successfully to their work environment (Morrison 1993b), as well as the strategies they employ to acquire such data (Saks & Ashforth, 1996; Morrison, 2002). Content-based researchers also have studied information-acquisition's effects on distal outcomes like work satisfaction, commitment, etc. (Klein et al., 2006; Saks, 1995; Fisher, 1985; Meglino, DeNisi, Youngblood & Williams 1988; Kammeyer-Mueller & Wanberg, 2003). Still others have speculated that there are closely aligned categories of information that newcomers seek to promote adjust. Delineating the subject matter of these categories has formed an important focus area for content focused researchers.

Fisher (1986) noted four content areas that should be mastered when stepping into a new environment to perform effectively: (a) organizational values, goals, culture; (b) work group values, norms and friendships; (c) how to do the job, the skills and the knowledge; and (d) personal change relating to identity, self-image and motive structure. Preliminary learning in the form of 'what to learn' and 'who to learn from' also is required. Morrison (1995) expanded the range of information that newcomers need to acquire to include technical, referent, social, feedback, normative, organizational and political. Following Fisher's lead, most studies have focused on types of information sought, source and mode of that information seeking as well as its impact on attitudes and behavior.

In one of the most influential studies on socialization content, Chao, O'Leary et al. (1994) developed likert scales for the following content domains: (a) performance/task proficiency; (b) the development of relationships; (c) organizational goals and values (reflecting acculturation); (d) –language/mastering organizational jargon; (e) internal politics (i.e., learning about, and being able to operate within, the formal and informal power-structure); and (f) firm history (i.e., learning about existing rituals, customs, and stories). This was an important attempt to try and delineate the subject matter of what forms the core of socialization learning.

Other content related studies have examined how mastery of content can impact various attitudinal and perceptual outcomes. Klein et al. (2006) noted that socialization

experiences (e.g., realism of pre-entry knowledge, helpfulness of agents) lead to content mastery, which in turn impacted role clarity, satisfaction and commitment. Here content mastery plays a mediational role. They also explored if specific content-domain mastery is related to specific socialization outcomes (e.g., history and goals/values being related to organizational commitment). This approach is useful because not all learning is relevant for all outcomes. Thomas and Anderson (1998) disclosed that socialization learning affected the formation of psychological contracts. Chao et al (1994)'s findings suggested that learning is more challenging when change levels are high, (e.g., while those changing jobs found learning challenging, respondents changing organizations found it even more challenging). In the context of our study, then, while project leaders don't formally renounce their affiliation with the vendor-employer, they do operate in, and often with members of, the client organization—a change analogous in its magnitude to changing firms. The content approach to socialization then has much to offer in the investigation of our research question.

2.6.3 Summary of insights from the socialization literature

Organizational socialization effects are often watered down by more proximal processes that happen within the team, yet there has been few studies of the role of teams as a context in which employee socialization unfolds. Existing research has a closed-system view of the firm, and hence can't account well for socialization issues in settings where (1) employees engage extensively with the outside environment/clients, and (2) doing one's job well requires learning elements of a client firm and its culture. Within-firm learning has been the focus of socialization research because, the elements that lead to doing one's job well in traditional employment relationships are contained within the organization's boundaries. But, as firms enter into more collaborative relationships and outsourcing relationships flourish, there arises a greater need for between-firm learning if vendor employees are to perform effectively. And while there have been studies on between-firm learning, they don't address the process in a transient relationship often governed by different terms than those associated with alliances and joint ventures.

The need for between-firm learning becomes even more acute in an international context, where there could be differences in firm, as well as national, culture. While

expatriation studies have looked at issues of employee 'adjustment,' it has not been in the context of a client-vendor relationship. The *contingent* status of the consultant in the client firm can be a barrier in acquiring knowledge needed to perform effectively in one's role. This is not the case in expatriate assignments where the employee shares a super-ordinate identity with the subsidiary

Furthermore, Saks and Ashforth noted that there is a pressing need for better measures of learning and skill acquisition (e.g., declarative and procedural knowledge) to advance research beyond its current state (p.266). Researchers like Fisher (1986); Saks and Ashforth (1997) and Bauer et al. (1998) asserted that more learning-related outcomes should be incorporated into socialization studies. Despite these calls for research there is not much empirical work that can fill this important gap in our understanding of the impact of socialization on learning related outcomes. By examining the role of dual socialization in knowledge transfer, we will be providing an important line of research for others wanting to pursue this area. Moreover, the impact of socialization on performance has only been examined in terms of technical task performance (Morrison, 1993a, Saks, 1995). This ignores broader conceptualizations of performance that could include ability to share information or integrate expertise or managing the performance of a team. By looking at the impact of the socialization of a key stake holder on his/her ability to transfer knowledge as well as manage the performance of the team, we shall be working towards closing this gap.

Table 5 : Some key studies representing the core themes of socialization research

Author	Key question	Sample type	Sample size	Technique	Findings
(Thomas et al., 1998)	How does the socialization of newcomers impact changes the psychological contract ?	Newcomers and old timers in the British army	314 newcomers and 1157 experienced insiders	MANOVA and multiple hierarchical regression	- A psychological contract is dynamic and changes rapidly over the weeks of organizational entry. Causes include socialization, shift in norms towards existing employees (they did not find this hypothesis to be true due to collective socialization and limited exposure to old timers), and preferences shift of new comers.
(Cooper-Thomas et al., 2002)	How does information acquisition (in the 4 content domains) impact the relationship between organizational socialization tactics and key socialization outcomes such as commitment, satisfaction and intention to quit ?	Newcomers in the British army		Multiple regression and mediation	Institutionalized socialization tactics predict information acquisition in all four information domains, specially for role and organizational knowledge. It did not predict intention to leave. Significant results over a short period of time 8 weeks.
Chao, O'leary, Wolf et al	- What constitutes the. content dimensions of	Study 1 and 2- recent graduates of	Between 780-472 graduates.	5 year longitudinal study; study 1-	-6 dimensions of socialization content

(1994)	<p>socialization domain.</p> <ul style="list-style-type: none"> - How content dimensions of socialization change as employees mature - Relationship between socialization content and career outcomes. Idea was to show that content dimensions compare better than job org tenure as measure of socialization 	<p>engineering and management positions.</p> <p>Study 3- on those who did not change job nor organizations. Most were engineers</p>		<p>principal factor component analysis; Study 2- Manova; Study 3- Hierarchical regression</p>	<p>emerged and a new scale for measuring socialization from the content perspective was developed.</p> <ul style="list-style-type: none"> - The least changes along the socialization content were found for those whose job content changed to reflect a new role. Those who changed jobs within the firm showed greater changes, and most changes in socialization learning were observed for those who changed job to a new firm. This was seen as an indication that socialization is a lifelong learning process. - Those with higher levels of socialization showed greater effectiveness in the role.
Ostroff & Kozlowski (1992)	<p>What is the contribution of different sources to knowledge domains of new comers ? What is the relationship</p>	<p>Seniors in a small management and engineering institute who had just started jobs after degree</p>	<p>N = 154. Avg size of work group 7.58</p>	<p>Repeated measure ANOVA one for each time period. Also hierarchical regression.</p>	<p>For task and role, all sources except objective referents were used. For group and organization domains,</p>

	<p>between the knowledge domains and socialization outcomes ?</p> <p>How do these relationships play out over time ?</p>				<p>observation was heavily relied upon.</p> <p>For task and org domain co-workers and supervisors were equally relied upon.</p> <p>For role related knowledge a greater reliance was observed on supervisor than co-workers. Reverse was true for group domain.</p> <p>For non-interpersonal sources experimentation for task domain and observation for group and org domain. Acquired more information about role than group domain.</p> <p>Pattern of knowledge acquisition did not really change over time.</p> <p>Utility of the information acquired is not the same as amount of info acquired.</p> <p>The knowledge acquired from supervisor was more strongly related to knowledge about organization, even though supervisor and co-</p>
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					workers provided same amount of knowledge.
(Rollag, 2004)	How does an individual's relative position in the firm's tenure impact variance in newcomer status perception, social network position and information providing behavior in comparison to absolute tenure ?	Small entrepreneurial firms, little experience with mergers, turnover etc. Direct hiring. Few subdivisions	4 firms-250 employees	Socio-metric survey and percentile calculation of tenure; Hierarchical regression	<p>New comer status and cultural mastery are distinct and highly interdependent constructs in org soc.</p> <p>Learning and cultural mastery facilitate but are not pre-requisites to Newcomer to old timer transition. You can master domains and still be regarded as a newcomer.</p> <p>Alternately you can go from Newcomer to oldtimer and this influences learning behavior and social integration but does not necessarily mean cultural learning.</p> <p>Newcomer status is determined more by relative tenure -decouple the concept of Newcomer from socialization.</p> <p>Rapid turnover can make Newcomer feel like old timers without mastering culture or developing</p>

					social network
Klein, Fan and Preacher (2005)	<p>- How early socialization experiences (as defined by realism of pre-entry knowledge and helpfulness of agents) impacts content mastery(the mediator) and socialization outcomes (defined as role clarity, job satisfaction and affective commitment to organization).</p> <p>- Also explored if specific content domain mastery is related to specific socialization outcomes eg: history and goals/values to related to organizational commitment. People dimension to commitment.</p>	University employees, not students and faculty. 3 different cohorts entering at 3 different times	N =156	Survey and SEM. 1st survey looked at demographics, realism of knowledge, agent helpfulness and demographic. Second looked at content mastery, role clarity, job satisfaction. Used SEM	<p>Significant relationships between the independent and dependent variables.</p> <p>Goals and values mediate impact of RPK on affective commitment.</p> <p>People dimension partially mediated effect of RPK on role clarity, job satisfaction and affective commitment.</p> <p>History dimension partially mediated the effects of RPK on affective commitment. Politics dimension mediated effect of RPK on role clarity and job satisfaction. Performance mediated RPK effect on role clarity but not on job satisfaction.</p>
(Ashforth, Saks, & Lee, 1998b)	How does the context of work impacts socialization and new comer adjustment ?	Business school graduates.	start 295, end 223.	Hierarchical moderated regression for moderator effects; Model testing using Lisrel	- Institutionalized socialization is positively associated with mechanistic structure and organization size. Jobs of

					<p>moderate to high potential are protected using this set of tactics. GNS and bureaucratic orientation did not moderate the relationship between socialization, job design and new comer adjustment.</p> <p>Institutionalized socialization and job design were positively related to newcomer adjustment.</p>
(Pinder & Schroeder, 1987)	<p>What impacts time to proficiency when individuals experience a transfer: a relatively permanent change within the organization. May not or may include a change in hierarchical or function but importantly a change in geography for self and family</p>	<p>Managerial employees in 7 canadian companies who had been transferred. Various industries banking, engineering, fast food etc. Mean number of transfers experienced was 3.54</p>	<p>340 usable responses</p>	<p>- Self report measures of time to proficiency; simple linear regression. On difference. Median split procedure to classify employees into 4 groups of above and below the median of difficulty</p>	<p>Change in function was significantly related to time to proficiency but increase in rank was not, nor was experience with transfers.; support scales were significant predictors of time to proficiency in both high difficulty/low similarity group and high difficulty and high similarity groups. Subjective measures such as level of perceived support and perceived difference between old and new job were more predictive of</p>

					proficiency than objective measures.
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2.7 CONCLUSION

As can be seen from the literature review, the context of inter-organizational project teams has much to merit from the study of leadership role and knowledge transfer. At the same time socialization research can benefit from expanding its scope to a two firm context. This thesis then makes contributions to both the project management and socialization literatures by filling important gaps in our understanding as it stands today.

In the next chapter we draw upon socialization theory and research, as well as explore the parallel streams of dual commitment and dual socialization to frame testable hypotheses.

3.0 CHAPTER 3- CONCEPTUAL MODEL AND PROPOSED HYPOTHESES

Literature reviewed in the previous chapter demonstrated that the barriers to accessing and interpreting knowledge across inter-organizational project teams include, but are not limited to, the issues of (a) in-group versus out-group status for clients and consultants, (b) the lack of time and resources for consultant team members to learn the nuances of a given client's viewpoint and context, (c) equipping project leaders to cross boundaries and grasp the tacit components of client context that bear on the task at hand, and (d) the criticality of creating a common ground between the clients and consultants before knowledge can be effectively utilized. While there can be several approaches to solving these inter-linked issues, the research focus here is on the role project leaders play due to their cognitive centrality to the team, and for being the ones vested with power and responsibility to guide its efforts (as discussed in chapter 1).

Important gaps do exist in our understanding of how leaders can best transfer knowledge from the client to the home project-team. While the boundary-spanning literature acknowledges the criticality of the project leader in bridging knowledge gaps, it does not shed light on the antecedents which position him/her to execute this role successfully. Additionally, neither the expertise-based nor the sense-making one provides a complete answer to what can best equip the leader for his /her informational boundary spanning and leadership roles. Accordingly, we will draw from the best these different perspectives have to offer to develop a model and testable hypothesis that enrich our understanding of these issues

3.1 CONCEPTUAL MODEL

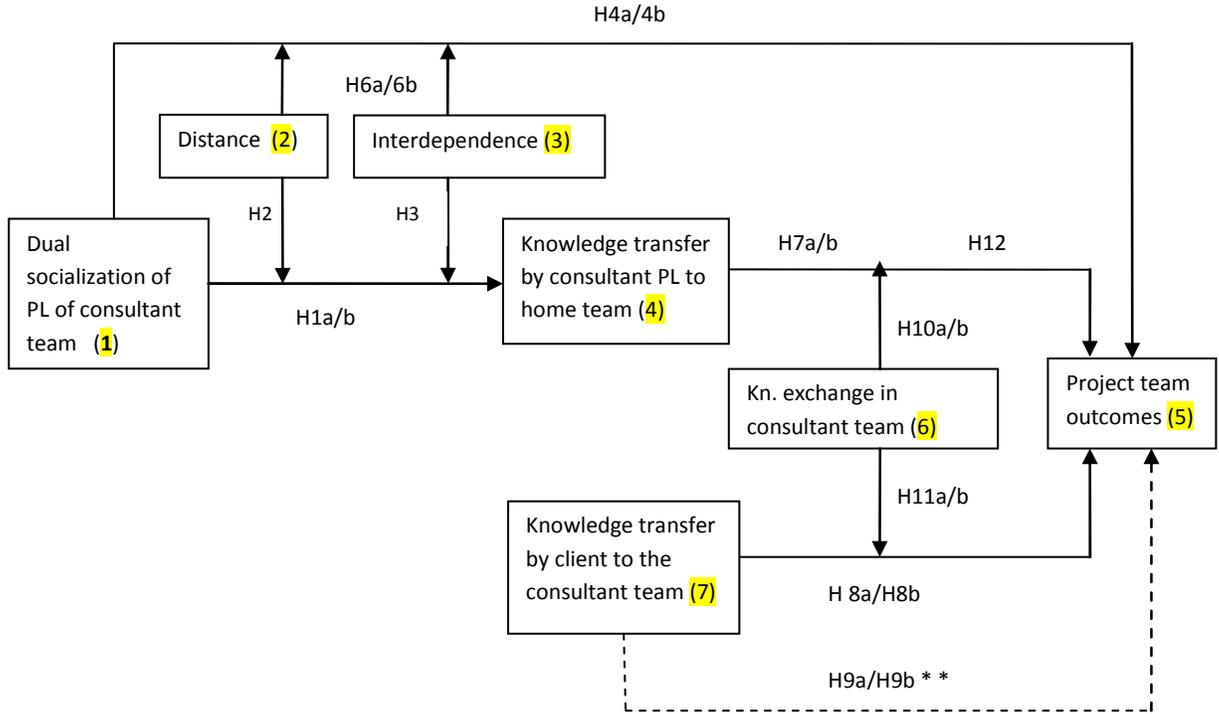
Lindsay and Norman (1977) indicated that knowledge may be nominally acquired but not well utilized unless the individual possesses the appropriate contextual knowledge necessary to make the new knowledge fully intelligible. This is because specialization and existence of organizational boundaries are associated with the evolution of local, norms, values and languages that fulfill a particular purpose for the task undertaken by those within the boundaries (March & Simon, 1958; Lawrence & Lorsch, 1967; Ritti & Gouldner, 1969). For example, sub-unit members have their own social constructions of the world around them (Berger & Luckman, 1966). Since organizational boundaries often coincide with communication boundaries, it is important to recode at the boundary in order to transfer knowledge (Tushman & Scanlan, 1981). The boundaries encountered by members of inter-organizational project teams can be even more perplexing, and their leaders must work around them to achieve the task at hand.

It is proposed that socializing the project leader in the client- and home-team contexts (i.e. dual socialization) can be an important learning mechanism for overcoming the knowledge-transfer challenges posed by organizational and/or functional boundaries. This is because knowledge transferred through the socialization process has the aim of allowing one to adjust and perform his/her role more effectively by understanding the task- and social-knowledge of the firm/team/task (Cooper-Thomas et al., 2002; Cooper-Thomas, van Vianen, & Anderson, 2004; Kim, Cable, & Kim, 2005; King et al., 1998; Reio & Callahan, 2004). The knowledge content of socialization leads to both declarative (e.g., what to do/say in your role, what are the goals, values of the team) and procedural knowledge (how to do it) (Chao, O'Leary-Kelly, Wolf, Klein, & Gardner, 1994; Hart & Miller, 2005; Haueter, Macan, & Winter, 2003; Klein et al., 2006; Taormina, 1994). This knowledge has explicit (e.g., our history, goals, values) and tacit (e.g., norms, politics) components to it. Figure 1 advances a model that will supply the basis for hypothesis development and testing:

We propose that dual socialization of the project leader (Block 1) can act as an antecedent to knowledge transferred by the project leader to his home team (Block 2.) This in turn impacts project team outcomes (Block 5). However dual socialization does not impact transfer of knowledge alone. It has a direct impact on the ability of the leader to take the project and its performance as well. These relationships are impacted by a set of moderators that are inherent in the client-consultant

relationships. For instance, contextual distance (block 3) and interdependence on client (block 4) moderate the extent to which dual socialization enables the project leader to transfer knowledge effectively, and manage the performance of his team. Also, knowledge exchange (block 6) enhances the impact that the knowledge transferred by PL will have on project team outcomes, as knowledge exchange allows a team to pool and expand their intellectual capital.

While our main research question revolves around the project leader and his/her dual socialization we also examine the ancillary question of the comparative impact of different sources of knowledge. Knowledge transfer by client or KTCL (block 7) and knowledge transfer by project leader (KTPL) both end up impacting project team outcomes in different ways (explored in detail in the next section). Knowledge exchange (KNX) moderates the impact of KTCL on project team outcomes as well. This is because as mentioned earlier, KNX is a process variable that allows the conversion of any knowledge input to a performance related output. In the next section we elaborate on these paths further using theory and current empirical evidence to provide the logic for the various paths in the model.



* Comparing impact of KTPL and KTCL

Figure 1: Conceptual model

In the next section we develop a series of hypothesis around dual socialization, knowledge transfer and project team outcomes to test this model. We also compare and contrast the role of knowledge transferred by the PL with that transferred by the client to have a more detailed understanding of the knowledge-transfer phenomena across inter-organizational project teams.

3.2 HYPOTHESES

3.2.1 Dual socialization of project leader and knowledge transfer

Grant (1996) argued that the key inefficiencies in inter-organizational knowledge transfers relate to tacit knowledge. Tacit knowledge has been defined as the inarticulate component of all knowledge (Polanyi, 1966). While explicit knowledge is available through means such as knowledge management databases, getting hold of, and understanding, the tacit element of the other organization's knowledge is much more difficult. Tacit knowledge encompasses not only that which is not explicit, but also what cannot be separated from the individual 'practicing of their practice' (Carlile, 2002). Therefore, tacitness is not easy to articulate as a dimension of knowledge, and is situated (i.e. closely tied) to the context of its origin and user. As a result, tacit knowledge must be converted into explicit knowledge in such a way that the explicit knowledge becomes usefully tradable (Brown & Duguid, 2001, p.204).

All knowledge is seen as having a tacit component. However the way tacit knowledge has been treated and defined can vary amongst researchers. For instance, Boisot (1999) notes that there are 3 distinct variants of tacit knowledge: (1) Things that are not said because everybody understands them and takes them for granted (2) Things that are not said because nobody fully understands them. They remain elusive and inarticulate (3) Things that are not said because while some people understand them, they cannot cost-lessly articulate them. Polanyi is from the second camp and Nonaka from the third.

Of the four types of knowledge that are needed on the project, process and domain knowledge can fall in the realm of knowledge that is more easily explicable by being put in documentation such as manuals, agreements etc. Institutional and cultural knowledge on the other hands is more in the realm of tacit knowledge that is difficult to explicate. This is because the norms, values, interpretive schema of the employees of an organization while a part the already socialized old timers, are not so obvious to those new to the set up. To that extent the ability to deal with the institutional and cultural knowledge would fall into variant 1 of Boisot's discussion on tacit knowledge. Socialization is precisely the process that impacts the ability to recognize and operate with the institutional and cultural elements of an organization/team's context. This is because

grasping the tacit component of a context is a strong undercurrent in socialization theory (Van Maanen & Schein, 1979).

The socialization literature has strong roots in the sense-making (Miller et al., 1991; Lois, 1980) which point to the importance of recognizing the context-specific nature of knowledge and knowing. As Ashforth and Saks (1997) noted, “... *We maintain that the socialization process is one key mechanism that renders the context of work both salient and meaningful to the individual.....the meaning of a given context is inherently ambiguous and socialization helps highlighting and interpreting aspects of the context by structuring early work experiences and facilitating accounts of those experiences*” . Newcomers seek different types of information (technical, normative, referent) through various means to reduce their uncertainty about the environment, (Bauer & Green, 1998, Ostroff & Kozlowski, 1992, Cooper-Thomas & Anderson, 2005). Through this information seeking, there is a learning of attitudes and behaviors that are needed to participate in the organization (Van Mannein, 1975). Socialization enables both enculturation and the understanding of norms and values of a system (Feldman, 1976, Morrison, 2002). In short, it provides the ‘newcomer’ with a deep contextual understanding of the work environment.

Socialization provides project leaders with familiarity regarding the ‘frames-of-reference’ used by clients and home firm. Weick (1979) postulated that a firm’s environments consist of equivocal information, and that it tries to create order and predictability by paying attention to certain parts while ignoring the rest. This creates mental “cause maps’ that explain relationships among variables of interest. To function in a group or environment, newcomers need to view the “enacted environment’ of insiders as the most legitimate lens to understand and control what goes on around them. By recognizing and understanding this prevailing frame-of-reference, the individual can then make choices and behave in a manner appropriate and consistent with communal definitions of reality (Fisher, 1986). Dual socialization therefore is a learning mechanism which bequeaths on the project leader an advantage that is not available through training, documentation or other codified mechanisms. Knowledge’s ‘tacit component’ is thereby made available to project leaders, which gets reflected in the quality of knowledge shared with the home team. Accordingly, it is expected that:

H1a: Dual socialization of the PL has a positive relationship with quality of knowledge transfer to the home team.

3.2.2 Dual socialization and knowledge integration

While client and home socialization have their distinct roles to play, a far greater value is to be obtained through the interaction of the two types of socialization. The interaction of client and home socialization should enable greater integration of knowledge by the PL.

Jansen, Van Den Bosch and Volberda (2005)³ found that socialization capabilities strengthen a firm's ability to transform and exploit knowledge. Organizational mechanisms associated with socialization capabilities had a much greater impact knowledge transformation and exploitation than did ones associated with coordination (cross-functional interface, participation, job rotation) or systems (formalization and routinization) capabilities (p.1008). They also reported that socialization capabilities explained the assimilation of new external knowledge more strongly than other coordination mechanisms.

The 'knowledge integration' construct has been referred to often in the literature on knowledge transfer (e.g., Grant, 1996, Lawrence & Lorsch, 1967; Okhuysen & Eisenhardt, 2002). Others researchers have used comparable labels such as knowledge combination (Kogut & Zander, 1992) and knowledge configuration (Henderson & Clark, 1990). In the context of knowledge sharing across business- and IS-domains, knowledge integration has been defined as the "process of absorbing knowledge from external sources and blending it with the technical and business skills, know-how, and expertise that reside in the business and IS units of a firm" (Tiwana, Bharadwaj, Sambamurty, 2003). The current study views it as- the synthesis of disparate specialized knowledge into situation specific systemic knowledge (Alavi & Tiwana 2002). This synthesis is only possible by the interaction of the client and home socialization aspects. Thus, while client and home socialization have distinct roles to play in knowledge integration, far greater value should be attained through their joint interaction, Consequently, it is hypothesized that:

H1b: The combined impact of PL's client and home socialization on knowledge transfer is greater than impact of either socialization considered alone. (interaction)

³ This research was conducted for exchanged of knowledge between different branches of a single firm within the same country.

3.2.3 Contextual distance and dual socialization

The degree of dissimilarity between two organizations' business practices, institutional heritage and culture matters most for knowledge transfer. This is because organizational distance contributes to the embeddedness and ambiguity of knowledge which, in turn, hampers its communication (Simmonin, 1999; Szulanski, 1996). Most empirical evidence brands organization distance as an impediment to knowledge transfer in inter-organizational relationships (Lyles and Salk 1996). Yet, Espinosa et al.'s (2003) study of inter-organizational software teams showed that knowledge transfer may be facilitated by similarities in team-level sub-cultures despite significant culture differences at the organizational level. In the Espinosa study unlike the client team's organization, the consulting-team organization was marked by low levels of bureaucracy. This fostered a preference in the client to work with the outside vendor over other teams of their own organization. Conversely then it is possible that even when the organizational cultures of client and consultant team may be similar, sub-cultures differences between the two interacting teams might make knowledge transfer difficult. As noted earlier, project teams create their own distinct team context, and the socio-cultural knowledge that is generated therein is a key component of project-team learning (Scarbrough et al., 2004). Since socialization enables a deep understanding of the context, it should enable to see points of similarity and differences between the two teams, and leverage this capability to transfer knowledge effectively. Hence, we hypothesize:

H2: Contextual distance moderates the relationship between dual socialization and knowledge transfer. The greater the distance the higher the impact dual socialization on knowledge transfer by PL.

3.2.4 Interdependence on client and dual socialization

Another important moderator of the relationship between dual socialization and KTPL is the consultant team's interdependence on the client for taking project tasks forward. Interdependence in teams is one of the most commonly studied structural features of team interaction (Janz, Colquitt, & Noe, 1997). This is because interdependence among employees has been shown as a major challenge

in coordinating collective action (Tushman et al., 1978). When tasks between units are highly interdependent then there is a greater need for communication and coordination (March and Simon, 1958;(Thompson, 1967); Tushman & Nadler, 1978). Team's ability to take action and decision gets impacted when it is highly dependent on other team for inputs (Janz & Noe, 1997).

In this thesis we are focusing on the extent of coordination of knowledge and effort with the client as a source of interdependence. As the interdependence on client goes up for the consultant team, the greater the need for the PL to understand the context of the client and the knowledge available from them. Consequently we hypothesize:

H3: Interdependence on client moderates the relationship between dual socialization and KTPL. The higher the interdependence, the greater the impact of dual socialization on KTPL.

3.2.5 Dual socialization and project team outcomes

Project teams require extensive coordination with members (Kraut & Streeter, 1994). This coordination requires communication and the management of conflict within the group. Differences in organizational affiliation can reduce shared understanding of context and hamper the development of a shared identity (Carlile, 2004; Carlile & Reberntisch, 2003). Participants may come and go during the course of a project; each bringing new sets of knowledge, assumptions, and expectations into the project that need to be managed effectively for project execution. For instance, the socio-cognitive approach to the requirement-determination process has emphasized the importance of sense-making among stakeholders, and characterized the process as chaotic, non-linear, and continuous (Curtis, Krasner, & Iscoe, 1988; Davidson, 2002; Walz, Elam, & Curtis, 1993). The dynamic nature of projects and their evolution can, in turn, be its own source of coordination and conflict between the two teams. Dual socialization can help under these circumstances by impacting (a) the way a leader manages the interaction between the two teams, and (b) directs the action and priorities of his/her own team.

The PL's boundary-spanning position allows him/her to become familiar with what are likely to be very different perspectives and expectations about the project. Dual socialization increases his/her ability to create shared norms and knowledge improving the two parties' capacity to understand each other and work towards a common goal (Argote, 1999; Hansen, 1999). Nahapiet & Ghoshal (1998) discuss the idea of shared narratives, as well as shared codes and language, as vehicles to access the knowledge of other parties for the exchange and combination of intellectual

capital. Crampton (2001) puts forward the notion of mutual knowledge as knowledge that communicating parties share in common and know they share. It also has been referred to as common ground, and considered integral to the coordination of action. She even notes that the absence of mutual knowledge can lead to the failure to communicate and retain contextual information, unevenly distributed information, difficulty in communicating and understanding the salience of information, differences in the speed of access to information, as well as difficulty interpreting the meaning of silence. Shared understanding can also help overcome the barriers to knowledge transfer created by in-groups and out-groups by showing the concerned party commonalities in the style and method of issue interpretation.

Socialization to both sides enables the creation of mutual knowledge and appreciation of the other party's perspective (Carlile, 2002; Nelson & Coopriider, 1998). Deeper appreciation of the expectations and limitations of the other party should enhance collaboration and performance. Dual socialization also helps direct the attention of the leader to those aspects of the client environment that are most significant for the task at hand. This is because cultural norms and social practices determine which ideas get accepted as facts and acted upon (Cetina, 1981; Latour & Woolgar, 1979). Socialization leads to the awareness and understanding of these norms.

Socialization also has been show to improve *role clarity and goal clarity* for the individual (Ashforth & Saks, 1996; Eldredge, 1995; Black, 1992). Greater clarity on both dimensions should enhance the leader's capability to move the project forward. The role of dual socialization is even more critical if the contextual distance between the teams is high, as issues of conflict and coordination are likely to be greatly exacerbated. These points lead one to expect that:

H4a: Dual socialization has a positive relationship with project team performance.

H4b: Dual socialization has a positive relationship with inter-team coordination.

Additionally the role of dual socialization is even more critical if the contextual distance between the teams is high, as issues of conflict and coordination are greatly exacerbated when the distances are high. The number of boundaries to be scaled is higher when contextual distance is high than when it is low. Hence we hypothesize:

H5a: Contextual distance moderates the relationship between dual socialization and project team performance. The higher the distance the greater the impact of dual socialization on project team performance.

H5b: Contextual distance moderates the relationship between dual socialization and inter-team coordination. The higher the distance the greater the impact of dual socialization on inter-team coordination.

The consultant team's interdependence on the client for taking project tasks forward is another important moderator of the relationship between dual socialization and project- team outcome.. This is because interdependence among employees has been shown to be a major challenge in coordinating collective action (Tushman & Nadler, 1978). When tasks between units are highly interdependent, there is a greater need for communication and coordination (March & Simon, 1958; Thompson, 1967; Tushman & Nadler, 1978). The extent to which the consultant team is dependent on the client for information and resources that are essential for project execution matters immensely in inter-organizational project teams. There should be a greater need to obtain a detailed understanding of the client context when interdependence is high than when it is low. Furthermore, while socialization is a highly valuable and desirable method of transferring knowledge, it is not an easy one, requiring considerable resources in a time- and goal-limited setting. If therefore interdependence does moderate the relationship between dual socialization and project team outcomes, then organizations can tailor their socialization efforts for project leaders accordingly. These considerations support the following hypothesis:

H6a: The relationship between dual socialization of the project leader and project team performance is moderated by interdependence on client. Higher the interdependence, greater the impact of dual socialization on project team performance.

H6b: The relationship between dual socialization of the project leader and inter-team coordination is moderated by interdependence on client. Higher the interdependence, greater the impact of dual socialization on inter-team coordination.

3.2.6 Different sources of knowledge and the role of knowledge exchange.

Since greater knowledge sharing does not guarantee improved performance, there is a need to go beyond the facilitators of knowledge-sharing and study how various knowledge resources are utilized by task units to improve performance (Haas & Hansen, 2007; Kane et al., 2005; Menon et al., 2003; Schindler & Eppler, 2003; Thomas-Hunt et al., 2003).. These investigators recorded that different types of knowledge (obtained from documents vs. through advice) were not always substitutes for each other and impacted task outcomes differently (Haas & Hansen, 2007). They go on to note that existing research has only partially investigated how different types of knowledge sharing may impact task performance differently. Since teams get inputs from many sources (e.g., project leaders, clients, teammates), we will compare the way the knowledge transferred from the PL (KTPL) and client (KTCL) influences select project-outcome variables. This comparison allows us to observe not only how different sources vary in the value they bring, but also provides further evidence of the importance of dual socialization of the PL.

Existing literature shows the positive link between knowledge transfer and team effectiveness for both traditional and virtual teams (Cummings, 2004; Hong, Doll, Nahm, & Li, 2004; Majchrzak, Rice, King, Malhotra, & Ba, 1995). The knowledge transferred by the PL has the unique advantage borne by the boundary spanning position s/he occupies between the client and home team. PL's ability to share knowledge in a manner that is both *acceptable and understandable* to the team members on either side (Davidson, 2002; Levina et al., 2005); can impact the way the project teams coordinate their actions and perform. The transfer of this advantage to the team in-turn impacts the ability of the team to perform. Hence,

H7a: The higher the knowledge transferred by the project leader, the greater its impact on inter-team coordination

H7b: The higher the knowledge transferred by the project leader, the greater it impact on project team performance.

The task-related knowledge that is available from a client and an organizational expert are likely to be non-overlapping (Cummings, 2004). Using the strength-of-weak-ties argument (Levin &

Cross, 2004), the client is in a position to supply more non-redundant data that may not be available through the project leader. Such data is of critical value as inputs into the final product. Moreover, several studies have shown that knowledge from the client/user has significant impact on project-team performance through the accuracy of requirement determination, as well as implementation of technology into the client firm (Ives & Olson, 1984; Hartwick & Barki, 1994; Newman & Robey, 1992; Agarwal & Tanniru, 1990). Consequently we hypothesize that:

H8a: Knowledge transfer by the client is positively related to inter-team coordination.

H8b: Knowledge transfer by the client is positively related to project team performance.

Also, the standards of performance expected from the consultant team are more directly available from client-transferred knowledge. Project-team outcomes often are evaluated by highly-developed, firm-specific quality criteria (Cummings, 2004; Haas, 2006), and this knowledge is best available from the client. Clients often demand analysis that is creative and customized to their needs, making it necessary for the team to produce a high-quality product that exceeds expectations (Haas & Hansen, 2007). Consequently the knowledge provided by the client would impact performance more than the knowledge provided by the project leader. At the same time the team must ensure that it adequately exchanges all piece of information and knowledge available to it, irrespective of the source the knowledge comes from. Exchange of knowledge within the team increases its ability to bring together “elements of previously unconnected or developing new ways of combining elements previously associated” (Nahapiet & Ghoshal, 1998, 248). Hence we hypothesize:

H9a: Project team performance will be impacted more by KTCL than KTPL. The impact of both variables will be positively moderated by KNX within the team.

Sometimes, the creation of shared meanings is not a matter of translating different meanings but negotiating interests and managing tradeoffs (Carlile, 2004). When differences of interests create barriers to shared meanings, these differences have to be reconciled to define common interests. When it comes to knowledge transfer and the creation of shared understanding, project leaders end

up having a substantial edge over the client. This is because the client does not have the worldview afforded to the leader by virtue of dual socialization. Since members of the client team share a superordinate identity with the PL, they are more apt to accept knowledge transferred by him/her when it comes to issue of conflict resolution or cooperation (Kane et al., 2005). To that extent, inter-team coordination will be impacted more by KTPL than by KTCL. Also as mentioned earlier, irrespective of the source of knowledge, its values will be realized only if the team is adept at exchanging knowledge available to it. Hence we hypothesize:

H9b: Inter-team coordination will be impacted more by KTPL than by KTCL. The impact of both variables is positively moderated by KNX within the team

Therefore, knowledge transferred by both the PL and the client have value, but end up impacting the process and final outcomes differently. KTPL should exhibit a greater impact on inter-team coordination by enabling collaborative processes with the client, while KTCL should provide the critical pieces missing in the knowledge needed for greater performance.

3.2.7 Knowledge exchange within the team and project team outcomes

Performance and innovation are closely linked to the idea of knowledge exchange (Nahapiet & Ghoshal, 1998). It has been shown that knowledge exchange is positively related to the performance of high-technology firms as well (Collins & Smith, 2006). Irrespective of the amount and source of knowledge, unless a team exchanges and combines the knowledge available to them, one cannot expect the high returns associated with knowledge transfer. Consequently, irrespective of the amount and source of knowledge (KTPL or KTCL), unless a team exchanges and combines the knowledge available to them, one can not expect the high returns associated with knowledge transfer. Knowledge exchange increases the team's knowledge base and sharing of expertise is an important process for team effectiveness (Cohen & Bailey, 1997; Cohen, Beyerlein, Johnson, & Beyerlein, 1994). Hence:

H10a: KNX moderates the relationship between KTPL & inter-team coordination. The higher the KNX the stronger the relationship.

H10b: KNX moderates the relationship between KTPL and project team performance. The higher the KNX the stronger the relationship between KTPL and project team performance.

H11a KNX moderates the link between KTCL and inter-team coordination. The higher the KNX the stronger the relationship between KTCL and inter-team coordination.

H11b: KNX moderates the relationship between KTCL and project team performance. The higher the KNX the stronger the relationship between KTCL and project team performance.

3.2.8 Transferred Knowledge domains and their impact

As noted earlier, dual socialization enables the PL to translate and transfer knowledge to the team more effectively. PL transfers technical knowledge as well as context knowledge from the client. Each may have different roles to play. Deng's (2002) study of ERP implementation noted that business and technology knowledge impacts product and process outcomes differently. Stoel (2006) noted how shared understanding at the strategic and operational levels differed in its impact on business- and IT-unit performance. As a discussion on technological frames shows, technical knowledge can be seen as necessary but not sufficient for inter-team coordination or project team performance.

An important analytical lens developed by Orlikowski & Gash (1994) is that of technological frames-of-reference. Technological frames⁴ allow one to understand how context-specific interpretations influence stakeholder actions related to IT development and use in organizations. These technological frames vary from one organization/team to another. Executive champions, project leaders and their technology frames often becomes the dominant filter that shapes how IT requirements are articulated and legitimized among ISD participants (Davidson, 2002). Contextual

⁴. Technology frames are "that subset of members' organizational frames that concern the assumptions, expectations and knowledge they use to understand technology in the organization. This includes not only the nature and role of the technology itself, but the specific conditions applications and consequences of that technology in particular contexts" (p.178).

understanding would enable a team to grasp critical aspects of how the client views and understands the project. As the discussion on technological frames shows, technical knowledge can be seen as necessary, but not sufficient, for inter-team coordination or project-team performance.

It is hypothesized that understanding context (i.e., institutional and cultural) knowledge is critical not only for framing the issue between teams, but also for utilizing the content (i.e. domain and process) knowledge made available by the client or already present in the team in a more effective manner. In this way, context knowledge can be conceptualized as a shell around the content/domain/technical knowledge, which allows for more effective use and exploitation of the technology and domain knowledge available to the team. The problem of dealing with tacit knowledge bearing on the institution or culture is not only the conversion of tacit into explicit, but that tacit knowledge is required to make explicit knowledge usefully tradable (Brown & Duguid, 2001, p.204). Hence, it is hypothesized:

H12: The joint impact of context and technical knowledge transferred by project leader will be higher than either types of knowledge considered alone.

3.3 CONCLUSION

The model proposed in this chapter has several advantages. It not only facilitates simultaneous testing of the roles of home- and client-socialization, but also compares and contrasts the way knowledge flows into the team impact team performance. Neither of aspect of project-team performance has been considered in the past. Having proposed various relationship between dual socialization, knowledge transfer and team performance, we turn our attention to the issues of research design and measurement in the next chapter. Given the fact that this thesis hopes to consider hitherto under-explored areas, there will a detailed discussion of the development and adaptation of various scales/items that were used in the pilot and final analyses.

4.0 CHAPTER 4 : MEASURES: DEVELOPMENT AND REFINEMENT

This chapter is devoted to a discussion of the research design that was developed and implemented to test the model under consideration. Nunnally (1967) believed that theory development can advance only through the development of rigorous measures. Toward that end, this research initiative adapted several pre-existing instruments to reflect the distinctive aspects of project settings, and introduced a limited number of new scales (*See summary table 7 at the end of the chapter*). Further details are provided below.

4.1 RESEARCH DESIGN

When seeking answers to research questions, several methods of data collection are available including case studies, field experiments, surveys, ethnographic works, *et cetera*. The choice of method needs to be dictated by the (1) objective of study, (2) nature of the phenomena under investigation, and (3) resources and time available to do research (Babbie, 1990; Miller, 1991). Our research objective is to understand how the learning dimensions associated with socialization impact boundary-spanners' ability to transfer knowledge to their home-team members. To test this relationship, one must account for learning by the individual, the relationships she/he manages to forge across boundaries, as well as the ability to transfer knowledge.

Given the type of work done by the sample and the geographic spread, a survey-based methodology design was chosen—one that would afford participants opportunities to respond in their own time from any location. Research shows that when it comes to survey administration the response rates obtained via internet surveys vs. paper and pencil based surveys are similar, and may be slightly higher for internet surveys due to ease of administration (Baruch & Holtom, 2008). The instrument was administered in a web-based environment, and constructed via the tailored-design method (Dillman, 2000). We followed the guidelines suggested by literature to increase participation rates such as sending out personalized invitations to participate in the survey (see invitation emails in

appendix B on page 179) as well as reminders close to the deadline of the survey. Simple and distinguishable font styles were utilized throughout the survey following Dillman (2000) design principles. Response units (such as weeks, %) were specified in order to get standardized response. Also drop down menus with pre-specified response and radio buttons were altered in the answer section to prevent fatigue and random responses associated with long surveys. In order to encourage respondents to complete the survey once they began, visual cues were made available to show how far they were from survey completion (Couper, Traugott, & Lamias, 2001)

Since this survey was launched on the web we also took into account suggestions from research done on internet based surveys (Cook, Heath, & Thompson, 2000; Simsek & Veiga, 2001). For instance the literature noted that often times there might be invalid or misleading answers by curious respondents who were not meant to answer the survey or parts of it (Stanton, 1998; Stanton & Rogelberg, 2001). Consequently the use of access controls has been suggested. Towards this end we decided to give teams a password which was to be given to the participating team members. This password was unique to each team. This was done with the aim of weeding out casual visitors to the survey. Also as suggested by Simsek & Veiga (2001) no ‘cookies’ were enabled for the survey. Cookies collect data about individual response behaviors and can raise concerns around privacy, and would have required further consent. Furthermore since majority of these individuals are located at client sites, the use of cookies may have been prohibited by the organizations and would have interfered with the ability of the respondents to take the survey. However, the down side to this choice was that individuals could not save their responses and come back to it later, and would have to take the survey in one sitting. It was decided that this was an option worth exercising to increase response rate. Consequently, the respondents were informed of the need to budget enough time to take the survey in one sitting before starting on it. This information was given to them on the welcome page itself.

4.1.1 Respondents:

Data for the independent and dependent variables were collected from differently positioned respondents to minimize the threats to validity from single-source or method bias (Crampton & Wagner, 1994). Project leaders supplied information for the independent variables, their supervisors for the dependent ones. Information for the mediator and moderator variables was obtained from a

third source, team members. Upon entering the survey, the respondents were asked to select their designation within the team. Their choice then directed them to the corresponding block of questions.

4.2 OPERATIONALIZATION OF CONSTRUCTS

The way that a model's constructs are operationalized directly impacts how well its proposed relationships can be tested (Straub, 1989). Several things were done to strengthen the reliability and validity of the measures chosen. First, a conscious effort was made to identify published scales that required little, if any, adaptation to suit our context. Second, multi item, rather than global, scales were use whenever possible to account for the multi-faceted nature of each construct. Third, where established measures could not be found, new ones were created drawing on an extensive literature review. Prototype instruments were formulated and refined based on feedback from a series of focus groups and pre-testing. Figure 2 provides an overview of the steps that were undertaken for instrument development and the larger research process.

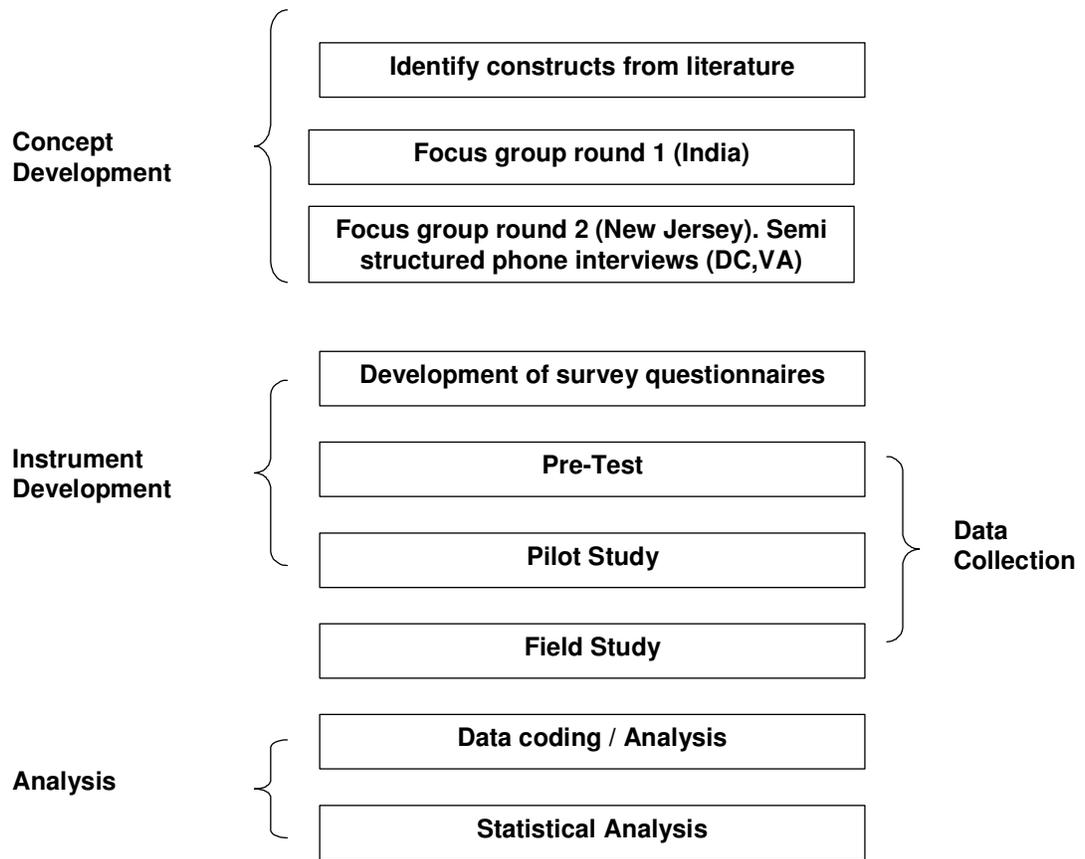


Figure 2: Data collection plan

4.2.1 Knowledge transfer

In general terms, knowledge transfer has been described as the process by which one unit of an organization is affected by the experience of another (Argote & Ingram, 2000). In this thesis, a more specific definition is used: the communication of knowledge from a source (*project leader*) that is applied or used by a recipient (*team member*). When examining the issue of knowledge transfer, the primary interest is in establishing whether, and to what extent, transferred has occurred. We begin with a short discussion of the theoretical and empirical rationales for choosing to study the transfer of

particular types of knowledge in international project teams, as well as the procedure for measuring it.

(a) Types of knowledge

Knowledge is a complex and multidimensional construct whose transfer can be measured at various levels (for details see Chapter 2). It can be characterized along many dimensions such as declarative-procedural know how (Kogut & Zander, 1992), tacit-explicit (Martin & Salomon, 2003; Polanyi, 1966; Spender, 1996), simple-complex, congruence-diversity, and interdependence-independence dichotomies (Winter, 1987). Which dimensions are pertinent, as well as the level of analysis, will be dictated by the question and setting under investigation.

As was evident from the project management literature review, project learning depends not only on the technical aspects of solution design, but also on transferring elements of the context and social process that help create the learning outcomes (Brensen, 2003; Reich, 2007). The creation of shared meanings and understanding between clients and consultants therefore becomes important for relevant knowledge-exchange to take place (Nelson & Coopriider, 1996; Tiwana et al., 2003; Reich & Benbasat, 2000; Orlikowski & Gash, 1994). Hence, we shall be measuring whether project-leader socialization impacts the transfer of technical and social knowledge to others in the team. Designating the team as the level-of-analysis makes sense because project leadership is conceptualized as a characteristic of the team rather than an individual, and performance differences between teams are seen as a result of the quality of knowledge transferred to the team as a whole.

(b) Measuring transfer

Having decided upon the type of knowledge to study, one needs to decide how to measure transfer itself. Two approaches have been used in this regard focusing on behaviors and cognition, respectively. Both schools of thought define transfer in terms of the changes taking place in recipients' behavioral (Cyert & March, 1963; Levitt & March, 1988; March & Simon, 1958; Nelson & Winter, 1982) or cognitive (Duncan & Weiss, 1979; Huber, 1991) repertoire. In the cognitive approach, change need not manifest as behavioral changes so long as it increases one's potential thinking repertoire (Huber, 1991). Argote and Ingram (2000) similarly advocated that knowledge transfer can be measured either as changes in knowledge or changes in performance. In this thesis, the knowledge shared by the project leaders is measured as improvements in the team's ability to

“understand and use” technical and non-technical information about the client. Consequently, changes to both behavioral and cognitive aspects will be examined.

It also is the case that transfer can be studied from the perspective of the knowledge sender and/or receiver. Our central interest is on transfer from the recipient’s perspective. When a knowledge recipient understand the rationale and consequences associated with the knowledge received, and learns and applies that knowledge in performing their task, then it is considered as transferred (Ko et al., 2005; Deng, 2005).

Self-reports of learning are an accepted way of capturing knowledge transfer. For example, perceived learning has been used as a proxy for actual learning in the education literature (Campion et al., 1994). Their approach is similar to other studies which have used self-report measures, and asked the knowledge recipient’s evaluation of knowledge transferred (based on the learning that takes place) (Faraj & Sproull, 2000; Ko, Kirsch & King, 2005; Sarker & Sahay, 2004) Deng (2006) relied on a two-item, self-evaluation scale to measure knowledge transfer, averaging the responses to arrive at a composite score. Ko et al. (2005) used a six-item, five-point Likert scale to assess the learning, application and performance components of what was transferred. A sample item was, “during this module-implementation project my interactions with (consultant X) improved my ability to ask penetrating questions about this module.” The items were developed for use in an ERP-implementation context, and were asked of both the recipient and sender of knowledge. Internal-consistency values were calculated to evaluate scale reliability as proposed by Fornell and Larcker (1981). The knowledge-transfer scale developed by Ko et al. (2005) had a reliability coefficient of .81, and acceptable levels of convergent and discriminant validity with an average variance extracted of at least .5.

(C) Item generation

Situated-learning theorists note that practice involves doing and awareness of both explicit (language, tools, concepts, roles, procedures) and tacit (rules-of-thumb, embodied capabilities, shared worldviews) elements (Sole & Edmondson, 2002). Carlile (2004) noted that both domain and common knowledge are required for knowledge transfer in his work on exchange of knowledge at the boundaries. Reich (2007) specified that IT-projects need four type of knowledge: *process*

knowledge (i.e., knowledge of project structure, methodology, tasks, time frame); *domain knowledge*⁵ (business, technical, product knowledge); *institutional knowledge*, (organizational history, power structure, values)⁶. ; and *cultural knowledge* (disciplined-based such as the culture of IT personnel, national culture). In their land mark study of managing knowledge in project teams Faraj and Sproull (2000) measured technical, design and domain knowledge of software project teams in their sample. Consequently, it was decided that both technical and contextual knowledge transfer items must be generated for the survey.

Ten items were generated to cover the technical and non-technical domains of knowledge required in project settings. Instead of asking participants if they agreed or disagreed with particular statements, or if a particular type of knowledge had transferred, it was thought more relevant to assess the ‘extent’ to which the transfer of project-related knowledge from the consultant team-leader had improved their thinking or performance capability in different knowledge domains. This allows one to assess the impact of socialization of the project leader in positively improving the team-member’s client-related understanding and performance. (*See appendix A for items*).

Since teams receive knowledge from multiple sources such as clients, to team experts and other members (Tyre & von Hippel, 1997), it is important to discern how the knowledge transfer from each source impacts project performance. Also, because task-related knowledge coming from different sources could be non-overlapping and provide new perspectives or ideas (Ancona & Caldwell,1992; Hansen, 1999), it would be useful to measure the respective knowledge transfer from them. This will be measured along the same lines as knowledge transfer from the project leader, and the same scale will be utilized. Only the respondent will be asked to rate client and team members for the ‘unique’ knowledge received through them.

⁵ Deng (2006) uses business domain knowledge (as acquired by consultants) and ERP knowledge (technical knowledge as acquired by clients) and its impact on project outcomes.

⁶ It is transferred by means of stories, anecdotes by insiders and observers of the organization. It is not so much about facts as it is about how facts can be interpreted to understand what is really going on. This knowledge can be “particularly important for an external project manager or vendor to access in order to get difficult problems dealt with and key decisions made in the course of a project”.

4.2.2 Socialization

Organizational socialization is a the process by which a person secures relevant job skills, acquires a functional level of organizational understanding, attains supportive interactions with coworkers and generally accepts the established way of a particular organization (Taormina, 1997). Organizational socialization entails the learning of a cultural perspective i.e a perspective for interpreting one's experiences in a given sphere of the work world (Van Maaanen & Schein, 1979).

Measurement & its History: The idea of newcomer adjustment into the role and organization s/he enters lies at the heart of socialization measurement. The primary concern has been adequately capturing the task- and social-transitions that newcomers make following organizational entry (Bauer at al., 2007). Researchers have used such indicators as role clarity, self-efficacy, and social acceptance to measure the adjustment resulting from socialization learning (Morrison, 1993; Bauer et al., 1998), an approach that taps the latent construct of learning (Bauer & Green, 1998; Feldman, 1976). Others have measured adjustment in terms of the actual learning and knowledge that newcomers have acquired. For instance, Chao et al. (1994) use scales that tap into more specific aspects of job- and organizational-learning such as dimensions of organizational politics, language, and history, along with task mastery and social integration. The advantage of using the domains-of-knowledge approach is the ability to measure the contribution of various types of learning on the outcomes of interest, as well as the way learning domains interact with each other to lead to different outcomes (Chao et al., 1994; Cooper-Thomas & Anderson, 2005). See Table 6 on the next page which summaries the various knowledge domains that have been measured under the rubric of socialization research.

While Chao et al.'s (1994) scale remains the most popular, it has been shown to measure conceptually overlapping domains due to moderate correlations between the content areas, thereby limiting its discriminant validity (Thomas & Anderson, 1998). There is insufficient measurement of role-related issues, and it is not completely representational of all content areas including work group socialization (Ashforth & Saks, 1998). Others like Thomas & Anderson (1998) have used dimensions which more clearly load onto the role (individual level), interpersonal resources (individual level), social (work-group level), and organization (organizational level) adjustment. Similarly, Hauter et al. (2003) separated the measurement of socialization into the task, group and organizational levels.

As boundary spanners, project leaders need to be socialized not only to his job and home organization, but also to his/her client organization. Accordingly, the wording of Chao et al.'s(1994) scales were adapted to better focus on the knowledge/learning needs of consultant teams. The original scales had reliabilities of at least .78, and statistically significant relationships between the content domain learning and the outcome measures (e.g., career involvement, adaptability) were treated as signs of discriminant validity. This then was an important distinction as learning and performance are two separate ideas, and one does not necessarily lead to the other.

Modifying the learning domains. The scales were repositioned to varying degrees based on what the literature noted as critical knowledge-domains for project-related work. It is not uncommon in socialization research to measure different domains by using established scales in a mix-and-match manner (Morrison, 1993; Kammer-Mueller & Wanberg, 2003). This is because all domains considered important for measuring socialization are conceptually distinct, and can be expanded to include other domains that are considered relevant for the samples being studied.

Table 6 : Key studies on modifying the socialization scale

Author & year	Domains used
Morrison (1993)	<ul style="list-style-type: none"> ▪ Task mastery ▪ Role clarity ▪ Acculturation to the organization ▪ Social integration to the work group
Chao (1994)	<ul style="list-style-type: none"> ▪ History ▪ Language ▪ Politics ▪ People/social integration ▪ Goals & values ▪ Performance proficiency/task mastery
Hauter (2003)	<ul style="list-style-type: none"> ▪ Organizational socialization (including knowledge of history, structure, goals, rules, products, language etc). ▪ Group socialization (including knowledge of contribution of group to organization, supervisors management style, awareness of expertise of each member, rules, policies etc) ▪ Task socialization (including knowledge of customer, performance standard, operating tools, responsibilities, priorities,

	who to ask for support etc)
Mueller & Wanberg (2003)	<ul style="list-style-type: none"> ▪ Task mastery ▪ Role clarity ▪ Work group integration ▪ Political knowledge
Thomas & Anderson (1998)	<ul style="list-style-type: none"> ▪ Social resources (work group level) ▪ Interpersonal resources (eg: advice, technical help) ▪ Role clarity ▪ Organizational socialization
Taormina (2004)	<ul style="list-style-type: none"> ▪ Training (“The training in this company has enabled me to do my job very well”) ▪ Co-worker support ▪ Understanding (“ I have a good knowledge of the way this organization operates”) ▪ Future prospects (“There are many chances for a good career within this organization”)

The choice of items and their modification were guided by the literature on managing knowledge in projects, which pointed primarily to domain- and context-knowledge as being critical for IS projects (Reich, 2007). Hence, the measures of socialization would need to include adequate measurement of both these types of knowledge. Other considerations should be noted. First, the underlying assumption around the aim and extent of socialization in stable, one-firm settings does not mesh well with the transitional context in which my research unfolds. Socialization traditionally is aimed at allowing those crossing boundaries within or between firms to become more proficient at their job. It is also aimed at enabling their assimilation into the firm and aimed at helping them adopt the normative attitudes, values, goals and culture of an organization (Schein, 1968, 1988; Van Mannen, 1976; Van Mannen & Schein, 1979). Implicit in this is the indoctrination of newcomers into organization practices so as to create task and role competence as well as acceptance into the work group/organization (Miller & Jablin, 1991).

In a two-firm context--and the transitory involvement of a consultant in the client organization—there is neither a need nor an expectation of the individual’s indoctrination. At the same time, however, there is a need for understanding the norms and culture, as well as well as practices of the client that can help comprehend the context of technology implementation and the individuals impacted by it (Barley, 1958; Orlikowski & Gash, 1994; Davidson, 2002). This is because cultural norms and differences arising out of organizational and national context assume relevance for communication and performance in international teams (Cusumano, 2008; Earley & Gibson, 2002; Earley & Mosakowski, 2000; Zimmermann & Sparrow, 2007).

While the consultant must be deeply aware of the written and un-written factors that guide the thinking and behavior of the client, there is no requirement of him/her to adopt the same. The indoctrination and allegiance of the consultant to the client's norms and culture would represent an affective dimension of socialization aimed at obtaining commitment to the client firm vs. the cognitive dimension of the socialization experience aimed at enabling sense-making and coordination between the client and consultant firms. The latter is possibly of more importance in transitional, inter-organizational settings because the goals of project execution include effective knowledge transfer and project success rather than complete assimilation into the client firm. For the project leader, client culture only counts to the extent that has to be understood for goal attainment (Torbion, 1985).

This distinction warranted that some scale items, particularly those to do with organizational goals and values (e.g., "I would be a good example of an employee who represents my organization's values, be modified to reflect what can be considered 'successful' socialization into the client firm. One can use a term such as 'bounded' socialization to indicate the focus on learning and understanding of socialization content and the associated sense-making. The use of a term like 'bounded' signals the relaxing of the assumptions of indoctrination and commitment, which though important as outcomes of socialization, do not apply to the context being investigation.

Second, when measuring the various knowledge domains from a 'client organization' perspective, some of the items need to be reworded to appropriately reflect the reference. This can increase not only the face validity of the question, but also content validity for the respondents (Fowler, 2002).

Socialization scale:

(a) **Task proficiency dimension:** In Chao et al. (1994) task proficiency was self reported by individuals by responding to items on a 5 point likert scale from strongly disagree to strongly agree. While the Chao et al scale touched upon very generic issues of task proficiency (Eg:) we adopted two specific dimension of IT project work that have relevant for all project leaders. The first is the technical capabilities of the project leader and the second being the generic project skill needed.

Other dimensions in the Chao et al scale assessed the way the individual fit in with the socio-cultural context of the firm and integration into the social circle at work. These dimensions are defined and considered below. Most items are close replications/modifications of the original scale.

(b) Awareness of expertise-

The extent to which the project leader is aware of the skills present on the client team. While this was not a part of the original Chao scales, given the importance of this dimension for team performance it was decided that this dimension should be added. The scale has been adapted from the one used by Faraj & Sproull (2000) in their study of coordination of expertise in software development teams.

While their study was on within team expertise, ours has to do with knowledge of expertise across team boundaries. Consequently the items were adapted to reflect this dimension. Also some items did not make sense in our context (E.g., Team members are assigned to tasks commensurate with their task relevant knowledge and skills) and hence this item was replaced with item four. Also item four was created to be a reversed coded variable in order to create greater reliability of response. (*See appendix A for scale*)

4.2.3 Project leader socialization to the home firm

(a) Definition: Organizational socialization is a the process by which a person secures relevant job skills, acquires a functional level of organizational understanding, attains supportive interactions with coworkers and generally accepts the established way of a particular organization (Taormina, 1997). Organizational socialization entails the learning of a cultural perspective i.e. a perspective for interpreting one's experiences in a given sphere of the work world (Van Maanen & Schein, 1979).

(b) Measurement history: As noted in the discussion in the previous section, the scales put forth by Chao et al. (1994) examined socialization along the dimensions of the individual's mastery of the history, politics, language domains, and the social integration, understanding of goals and values and performance proficiency that the person had in the role. The original scales that Chao et al. (1994) used had a total of 32 items from the 6 socialization subscales. Individuals self reported their level of proficiency across the various scales. In this study however the BRM assesses the project leader in the home firm socialization.

The subscales used for home firm socialization in this thesis capture the major socialization dimensions identified by Chao et al. (1994) and other researchers (Haueter et al., 2003; Morrison, 1993d; Taormina, 1994). However since the context of study was IS projects, the performance

proficiency subscale were adopted from the IS literature to measure technical & generic capabilities needed in IS projects (see section on client socialization for scales). For context knowledge of the home firm, 9 items based on socialization research were generated, of which 4 were from the Chao et al. scale (1994).

Due to the long length of survey, the context of study being IS project specific and the ability to move away from self report data it was felt that items that capture the essential dimensions of socialization processes could be used resulting in a total of 21 items vs. 32 of Chao et al. (1994). Most items dropped from the original scale were mostly items reframed as variations of previous questions that had been created to the purpose of redundancy in the scale for statistical purposes.

4.2.4 Project interdependence

(a) Definition: The extent to which the consultant team is dependent on the client for information and resources that are essential for performing project related tasks.

(b) Measurement history: Thompson (1967) examined the flow of work between units in an organization and the type of coordination that would be best suited for task interdependencies. March and Simon (1958) also noted the importance of higher need for communication and coordination when units have higher level of interdependence. Interdependence has been measured at intra and inter-unit levels as well as in inter-agent interactions (Aiken & Hage, 1968; Kettinger & Grover 1997; Goodhue & Thompson ,1995). Typically the members of a team are asked to rate items such as “In my group, the products of my work are independent of others’ work’ (Steinfeld, 1986), “The business problems I deal with frequently involve more than one business function” (Goodhue & Thompson, 1995). Kiggundu (1981) in his review of studies of job interdependence notes that interdependence can be differentiated along lines of scope, resources and criticality of interdependence. We are focusing on the extent of knowledge and effort coordination with the client as a source of interdependence.

We chose to use scales from Sharma and Yetton (2003) which exhibited high scale reliability in their meta-analytic research work, with Cronbach alphas being more than .88, and intra-class correlation of .90 for inter-rater reliability. The items were adapted to reflect the context of client consultant relationship. While the original survey asked respondents to report on

their own individual task, in this modified scale the project leader rates the extent to which the project as a whole is dependent on coordination of effort and information with the client

4.2.5 Contextual distance

(a) Definition: The degree of dissimilarity between the partners' business practices, institutional heritage and organizational culture (Simmonin, 1999).

(b) Measurement history: It has been noted that differences in success of business partnerships can be attributed to the organizational culture (Easterby-Smith, Lyles, & Tsang, 2008; Huxham & Hibbert, 2008; Lyles & Salk, 1996; Qin, Mudambi, & Meyer, 2008). In this thesis we have proposed that socialization would be most useful in circumstance where the distance between the client and the consultant firm is large. The scale on organizational distance is borrowed from Simonin (1999) who reported a Cronbach alpha of .85. While the original scales measured the distance at the firm level, we adapted it to reflect distance at the team level. (See appendix A for items)

4.2.6 Knowledge exchange and combination capability

(a) Definition: Extent to which employees could exchange and combine knowledge (ability) within the team.

(b) Measurement history This measure was developed by Collins and Smith (2006) with the help of managers and MBA students who had experience in high technology firm. The scale consists of 8 items which measure the team's motivation and ability to exchange knowledge. The reliability was .91. Motivation items measured the extent to which the knowledge workers believed that the "...exchange and combination of knowledge would yield personal or organizational value" (p. 551). In the current research however actual ability to share knowledge was considered more important than the motivation and hence, we used only one of the subscales with 5 items. (See appendix A for items).

4.2.7 Team performance

(a) Definition: The extent to which the project team meets the goals on various project performance parameters.

(b) Measurement history

Multidimensionality of team performance as a construct is widely noted in literature (Denison, Hart, & Kahn, 1996; Hackman, 1987; Pinto, Pinto, & Prescott, 1993). Broadly speaking team performance may be defined as the extent to which a team meets its established objectives (Hoegl et al., 2004). Effectiveness and efficiency of the knowledge team are two important dimensions of performance when trying to understand how teams perform (Ancona & Caldwell, 1992; Henderson & Lee, 1992; Leonard-Barton & Sinha, 1993). Berger (1988) and Cooperider (1990) have also differentiated between operational ‘inward’ activities of production and development and the ‘outward’ activities of customer service.

IT project performance has also been examined along the lines of product/outcome performance and process performance (Mitchell, 2006) which refers to the quality of the development process such as effective planning and implementation on time and on budget completion being used as indicators of process performance. Learning and quality of interaction with client has also been used as process performance measures (Nidumolu, 1995). Product performance has been measured through evaluation of the product/information system itself through dimensions such as system reliability and information quality use (Karlsen & Gottschalk, 2004).

In this study the focus will not be on a particular product but rather at a more generic level of performance and the ability of the team to meet the performance expectations that the client makes of it. Process performance will also be measured using not just the cost, quality and timeline criteria but also the extent to which the team was able to coordinate its processes effectively with the client i.e. inter-team coordination, and was able to maintain a high quality of relationship with the client as measured through customer relationship management measure.

Research shows that subjective measures of effectiveness provided by knowledgeable managers have a high level of convergence with other objective measures of performance (Bourgois, 1980; Venkatraman & Ramanujan, 1987; Faraj & Sproull, 2000). Studies like Janz and Noe (1997) and Zellmer-Bruhn & Gibson (2006) have used various stake holders to rate team performance on scales aimed at capturing goal achievement and effectiveness using items such as “ This team

accomplishes, its objectives; This team serves the purpose it is intended to serve” (Zellmer-Bruhn & Gibson, 2006). We decided to use Campion, Papper & Medsker’s scale for measuring work team effectiveness. This scale has also been used by Chen (2005) in a study on new comer socialization in IS project teams. The scale was used by Chen to get team performance ratings from the employees, as well as group leader at two different points in time. In Campion et al.’s work (1996) the scale had originally recorded an internal reliability of .87 and higher at different points in time in the study. The inter-rater reliability was .66 and higher. When used by Chen (2005) at two different time points the scale reported alphas =.96 &.98. . The scale consist of 9 items of which two items-the first dealing with level of innovation, and the second dealing with job satisfaction of members in the team were dropped due to their irrelevance to the performance parameters of interest. (See appendix A for items)

4.2.8 Inter-team coordination

Inter team coordination was measured using Hoegl et al.’s (2004) scales which are focused at lateral collaborative processes occurring at the inter-team level . The scale consists of 5 items adapted from Mott (1972) which assess the quality of coordination and operating characteristics between the teams such as constructive discussions. In their study, the original reported Cronbach alpha was .85. (See appendix A for items)

4.2.9 Control Variables

A number of variables were used for control based on prior research on knowledge transfer within project teams.

1. **Team size:** A number of studies have controlled for team size as larger teams may have greater knowledge resources than smaller ones and face additional process challenges that can impact project performance (Zellmer-Bruhn & Gibson, 2006; Faraj & Sproull, 2000). Team size could also be indicative of the size of the project where bigger teams are associated with larger projects. Team size was controlled by ensuring that all teams in the sample were between 3 and 15 people teams.

2. **Prior knowledge of team member:** If the team already knows most of what it needs to know then the impact of knowledge transfer by project leader will not be that high. On the other hand, it can also predict the absorptive capacity of the team members to assimilate the knowledge being made available from various sources. For both these reasons it was decided to control for prior knowledge of team members. To measure this dimension, all the team members were asked
3. **General managerial skill and project leadership skills-** While these dimensions were included as part of socialization, in the final data analysis they will be used as control variables as our focus is on the socialization to the client team and not the ‘task’ or organizational level dimensions.

4.3 SAMPLE & SITE SELECTION

The preliminary search for a target organization was driven the criteria that the firm had to be a consulting organization engaged in knowledge work in an international setting. Discussions with the CEO of a large multinational consulting firm (henceforth labeled TechCon) brought forth an opportunity to conduct field research on the profiled issues of knowledge transfer between clients and consultants. TechCon operates in over 55 countries, and has work force of over 300,000 professions working for multi-cultural clients. For this organization, the intensifying integration of global economies is greatly intensifying the need to rapidly socialize consultants to client firms and their cultures.

Executing the chosen research design in TechCon offered several advantages. First, by focusing on a single firm, one reduces variance that could arise from organizational-level influences (e.g., corporate culture). This becomes very crucial as it would help separate out individual/team-level variations from those functioning at an organizational level. Second, this firm clearly was encountering issues of knowledge exchange with it clients, offering an ideal setting to analyze the hypotheses discussed in chapter 3. Third, having top-management sponsorship increased the likelihood that data targeted respondents would participate fully in data collection.

4.4 PROPOSED STATISTICAL ANALYSES

The data collected will be prepared for analysis by testing for non-response bias and representativeness. Identification and removal of inconsistent respondents, and a descriptive analysis of variables will be undertaken. Further construct reliability and validity tests will be assessed using cronbach's coefficient alphas, and exploratory factor analysis. Additionally given that this data and the model proposed is at the 'team level' of analysis, test of agreement and aggregation (such as ICCs and Rwg(j)) will be used to ensure that all criteria for utilizing team data are met. Finally the hypotheses will be tested using multiple regression techniques for each of the paths in the model.

4.5 CONCLUSION

In this chapter we noted the details of survey design as well as operationalization of the constructs. We also identified the various statistical analysis that will be undertaken for verifying our model. In the next chapter are details of the pre-test and pilot that were conducted to refine the survey further.

Table 7: Key constructs: source and respondents

Variable	Source	Number of items & Sample	Scaling	Respondent
Socialization to client and home.	Adapted from Chao et al. (1994) . Items added from Faraj & Sproull (2000)	15 items Sample: <ul style="list-style-type: none"> • I understand how to act in a manner that is consistent with the client’s values and ideals. • I have learned how things ‘really work’ on the inside of the client team. 	5-point Likert	PLs rated the same item first for home, and then for client team.
Knowledge transfer	Adapted from Ko et al. (2002) and Deng (2006)	10 items. Sample: <p>The knowledge transferred by the PL/Client/team members:</p> <ul style="list-style-type: none"> • Improved your ability to meet the technical requests made by the client. • Improved your quality of relationship with the client. 	5 point Likert	Team members
Project performance	Campion, Papper & Medsker (1996)	8 items Sample: <ol style="list-style-type: none"> 1. Meeting project objectives 2. Meeting project timelines 3. Staying within budget 	5 point Likert	BRMs
Inter-team coordination	Hoegl et al. (2004)	5 items <ol style="list-style-type: none"> 1. Duplication and overlapping activities are avoided 2. The team has no problem coordinating its efforts with the client 	7 points Likert	PLs
Organizational distance	Simonin (1999)	2 items Sample: <ul style="list-style-type: none"> • The business practices and operational 	7 points Likert	PLs

		mechanisms of the client team are very similar to yours		
Project interdependence	Adapted from Sharma & Yetton (2003)	6 items Sample: 1. This project can be performed fairly independent of the client (reverse coded) 2. This project can be planned with little need to coordinate with the client (Reverse coded)	7 points Likert	PLs
Knowledge exchange in team	Collins & Smith (2006)	5 items Sample: 1. Individuals in this TechCon project team are proficient at combining and exchanging ideas to solve problems or create opportunities	7 points Likert	Team members
Prior knowledge	Created for this study	5 items Sample: Prior to the start of the project: 1. How well versed were you in the technical knowledge required to work on this project. 2. How closely was the project related to your areas of expertise	5 points Likert	PLs and team members
PL generic skills	Adapted from Lee (1995)	5 items Sample: Please rate the PL's: 1. Ability to teach others 2. Ability to plan, organize and lead projects	5 point Likert	BRMs

<p>PL generic technical and business domain knowledge</p>	<p>Adapted from Basselier & Benbasat (2004) & other IS works</p>	<p>4 items Sample: Please rate the PL's: 1.Ability to interpret business problems and develop appropriate technical solutions. 2.Understanding of technology trends in his/her area</p>	<p>5 point Likert</p>	<p>BRMs</p>
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5.0 CHAPTER 5- PRE-TEST AND PILOT

We now turn our attention to ensuring that the variable operationalization presented in the last chapter are reliable, measures. Given the hitherto unexplored extension of the dual-socialization construct, there is a special need to pay attention to the psychometric properties of our adapted and new scales. Narrowing the search to measures that have been published in top journals was a helpful first step. Concerted efforts also were made to achieve substantial facial and content validity in the revision/construction of items given the highly specialized nature of work undertaken by these high-technology employees. Focus groups and semi-structured interviews provided the requisite guidance. Pre-testing and pilot testing of the survey instrument further aided efforts to achieve this objective.

The research design is relatively complex, requiring a roll out across multiple audiences (BRMs (branch resident managers who supervise PLs) and PLs and team members) and locations simultaneously. An internet-based survey was the best-suited modality for data collection, even though the decision necessitated that the possibility of technology glitches be factored into the pre-testing initiative. The pre-test, in turn led the way for a small-scale pilot study which ultimately would allow us to refine and purify our measures and data-collection strategy. Each stage is discussed in greater detail below, highlighting the incremental contributions that were made.

5.1 CONTEXT DESCRIPTION

In the initial conversation with the CEO of TechCon, he had been quick to notice how culture influences work values, attitudes, thinking, and decision-making styles has spurred cross-cultural, work-related training for over a decade. Despite its effort at technical- and cultural-training, there were stark differences in the performance of overseas projects and leaders responsible for them. The concerns raised by clients were not related to technical skills (which TechCon had provided to its employees through extensive training and work experience with multiple clients). Instead, clients often expressed concerns over problems arising from differences with the vendor over the approach, understanding and expectations of project execution. To the CEO, it seemed that client satisfaction and project outcomes were better in projects staffed with leaders and employees who had extensive prior exposure to the client. -Thus, client reassignment was the prevailing, 'unwritten' policy for project staffing, especially for clients deemed critical to the firm's growth and revenue. Clients too had started demanding that projects be staffed with such individuals.

This policy was not without drawbacks, though.. First, it often restricted the career- and skill-prospects of such employees, not to mention their motivation as knowledge workers often want to work with the latest technology and new challenges. Second, there were not always enough individuals who had prior exposure to the client. In the CEO's opinion, it was critical to capitalize on the project leader's role and his/her relationship with the client as a means of overcoming some of the knowledge-transfer and collaboration issues. It was felt that if one could identify what enabled project leaders to successfully lead teams in unfamiliar contexts and transfer knowledge effectively from clients to consultants, then the firm could better imbued PLs with this characteristic through training and experience. A focused approach towards developing project leaders also would reap benefits across clients and projects by creating a positive ripple effect through the teams s/he led.

The CEO was mailed a proposal of study which he subsequently approved. The global head of human resources become involved afterwards, reinforcing senior management's interest in the project and confirmed participation. This paved the way for the first focus group session at their headquarters in Mumbai to get an assessment of how the

target population felt about the issues at hand. They also supplied a US contact for the investigator to conduct a second focus group and pre-test upon my return.

5.2 FIRST FOCUS GROUP: MUMBAI

Identifying a random representative sample. The main aim of the interviews and focus groups was to ascertain the importance of, and challenges encountered during, knowledge exchanges with clients. Boundary-spanning activities of teams were targeted as well, along with the best means of assessing ongoing-project performance. A meeting was scheduled with a representative group of project personnel aided by HR staff. Emails were sent to all account managers, group leaders and project leaders in the location with available time slots to choose from. Only 12 of the 20 who originally volunteered were able to participate due to last-minute, client-related work. However, two of the unavailable project leaders sent members from their teams, increasing the sample size to 15 (6 BRMs; 4 Group leaders; 2 project leaders; 2 team members). BRMs have extensive experience working with clients across multiple locations and projects. They typically rise through the ranks based on a track record of exceptional performance in forging client relationships in their stint as project leaders. All of the PLs and team members that participated had worked for overseas clients. Consequently, while this was a convenience sample, it is reasonable to assume that their insights were comprehensive reflections of the realities of knowledge exchange and project execution.

Discussion and insights. Three one-hour sessions were devoted to focus groups interviewing. Since each group was hierarchically stratified, multi-level perspectives were obtained. One also could to see how the same issue played out in varied settings since respondents came from different projects. All participants were given ten minutes to reflect on (1) key activities they had spent time on while interacting with the client; and (2) how they gathered knowledge from the client and the issues encountered during that effort. An open-ended discussion took place after they had completed their notes. Email addresses and phone numbers were provided for follow-up interviews if required.

It was apparent from the discussion that BRMs maintained strategic-level relationships with clients, while PLs had more operational, day-to-day interactions. Team members mostly handled execution-related activities. For instance, BRMs reported focusing on quality-related tasks, keeping themselves updated on various projects, resource planning and discussion of future opportunities with the client. Project leaders did most of the informational representation for the team and worked at maintaining a good working relationships with clients. Team members concentrated on crafting solutions and the delivery of targets. All three groups indicated that client-related knowledge was highly valuable because it (a) enhanced the relationship and bolstered control and confidence during dealings, (b) helped solve client issues, enable quick turnaround, and facilitate the seamless integration of activities between client- and consultant teams, and (c) prompted thinking beyond current requirements and action beyond client expectations. It also helped in cross-selling and up-selling the competition.

Important differences surfaced in the substantive aspects of client knowledge that each level focused on. BRMs gravitated toward cultural and political knowledge with the aim of winning future projects, while PLs focused on technical and domain knowledge. Another important idea that emerged was that client culture mattered immensely for not only the acceptance of solutions, but also for their attitude towards project activities in general. One PL noted:

“Culture matters: Europeans don’t want ad-hoc changes; with American clients last minute planning is ok. Japanese don’t mind giving more time but the utilization should be good”

From this discussion, it was obvious that employees at all levels recognized the need for a deeper understanding of the client context and the ability to ‘read between the lines’. It was equally evident that the study had to control for country-level factors. Consequently, the decision was made to confine the study to one of TechCon’s main regions, the US, with the firm’s understanding and commitment that the researcher would have a large spread of projects to choose from.

As for assessment of performance of ongoing projects, while some projects had client satisfaction indices available it was felt that the BRM was in a better position to reflect what was the ground reality of the team and project leader’s relationship with the client.

5.3 SECOND FOCUS GROUP: NEW JERSEY

While key insights had been gained from the offshore team, it was important to discuss the idea of roll-out and project selection with project leaders that were functioning onsite. Upon return to the US, a two- hour discussion was held with four senior project leaders. These individuals had been selected at random by the human resource department based on their availability on one of the weekdays of my scheduled visit. The ensuing conversation established that it was important to control for project size as there could be several projects co-existing within a larger account. It was recommended that drawing a random sample of projects sporting no more than 15 team members would ensure that mega-projects were left out. When asked if we should focus on high-end projects like ERP implementation alone, an interesting idea was put forth. The project leaders felt that knowledge transfer is critical not just for the high-end projects which are more complex (e.g., software design), but also for smaller, relatively simple projects since it allowed TechCon to make suggestions on technology use to the client and potentially bring in new business. It was also emphasized that even technologically straightforward projects present occasions where knowledge transfer becomes critical. They further noted that clients oftentimes felt that teams got bogged down in technologies and act like “techies” rather than consultants, hindering their ability to properly serve the clients.

These insights lead to the selection of projects based on size and the inclusion of both high- and low-end technology projects. Participants further corroborated the role of BRMs in providing the most insightful and accurate data on project-team performance. They also felt that the team-oriented survey should be launched through the BRM as it would maximize the perceived legitimacy and ensure higher return rates.

Four telephone interviews also were conducted with the BRMs of projects in Virginia and Maryland to acquire further insights about knowledge-exchange issues with cross-cultural clients. The goal was to know what type of knowledge they felt project leaders needed, and identify critical incidences that showed what the challenges of knowledge sharing can be. Again, these contacts were identified by the human resource department. While acknowledging the presence of ‘deep industry- and technical-expertise within

TechCon, the BRMs felt that client knowledge was a critical success factor that project leaders all too often fail to account for. While agreeing that getting client-context knowledge is not easy in these projects, they did note that it could vary from client to client. For example, some clients were more open in sharing information with the team, while others were not. One BRM recounted leading a team in Brazil where client employees were convinced that the involvement of consultant could lead to job loss. He noted:

“They would not let us get stationary from the office pool. Water coolers were shut of. Knowledge sharing was hardly a priority for us or them under the circumstances. We finally withdrew. We could not work in such a hostile environment.”

While extreme in nature, this anecdote shows how consultants can be cast as outgroup members and experience low cooperation as a result. This further validated our belief that it was very important to get a very large client mix for the survey so as to provide ample variance in the data. The BRMs also agreed to pre-test some the survey in select teams.

5.4 PRE-TEST

Having validated the hunches about the importance of the research question and gained important insights into the project selection and roll out process, a survey pre-test was launched in two steps:

- (a) Face to face validation: Twenty senior PLs were given the survey to complete in a face-to-face meeting at TechCon headquarters. The project leaders were from a random mix of clients, and identified by the personnel department. All had been briefed as to the purpose of this research study and their role in the survey’s development. While this was a random sample of ‘conveniently available’ PLs, there was no reason to believe they were not representative of the final population to which the survey would be rolled out. Respondents took 40 minutes to go through the survey, after which they discussed its wording and face validity section by section. Most felt that the survey was very long and would lose its audience before all of the data was gathered. They felt that some of the language-oriented questions (e.g., “I understand the jargon and acronyms used by client”) were redundant since there

already were questions on the technical capabilities of PLs and the understanding of the context. Accordingly, a decision was made to drop the language dimension entirely. They also suggested it was important to explicitly reference knowledge transfer from the client given past clients sometimes had conducted team meetings to make sure everyone was on the same page. There were other minor suggestions on wording and the need to make the instructions more simple and short.

- (b) Online testing: The survey also was sent online to three teams to get feedback from the affiliated BRMs, PLs and team members as to the format and clarity of questions. Respondents were assured that answers would be used exclusively for refinement purposes. The following question was posed to respondents at the end each webpage: *“Please list the questions that you found were either unclear or should have had more options to fit your particular project. Briefly describe what the issue was with the question.”*

Most of the ensuing feedback advocated using more straightforward language when framing the questions and raised technology-related issues regarding the survey’s administration (e.g., being unable to enter data in some fields). Suggestions also were made to add more questions about project-team resources and industry affiliations. Sample comments are given below:

- *“Insurance” industry practice-affiliation is not there separately. In question # 3 it is not clear whether the question is still about only TechCon employees or it includes client employees who are working in the project.”*
- *“Since this is a maintenance / enhancement engagement, the definition of project as used in the response is different than when applied to a turnkey situation. We deal with 10-12 enhancement projects in a month. Please provide more categories to choose from.”*
- *“Table 2 does not show data upon clicking it”. Text Response*
- *Assimilate :- It’s better if we use simple words as words like these are sometimes difficult to understand The questions are not put up in simple words. It takes some time to understand the questions. It will be better if the questions are put in a simple and understanding language.*

Response limitations and technology glitches that emerged from the pre-test were then rectified. We also went back and reworded several of the instructions and newly developed items with the aim of simplifying the survey.

5.5 PILOT STUDY

5.5.1 Sample selection

Forty project teams were targeted for the pilot study. A conscious effort was made to include teams that worked with clients from different industries and performed a variety of activities (e.g., insurance, biotechnology, and manufacturing). All teams were U.S.-based working for American clients. None had more than 15 members to control for the more complex team dynamics inherent in larger groups.⁷ To be included in the survey, teams also had to be in existence for at least six months consistent with the socialization literature's general finding that most socialization takes place in the initial months after joining a firm (Allen, 1990; Bauer et al., 1994; Thomas et al., 1998). Also six months would have provided enough time for the BRM (branch resident managers who supervised PL's and their projects) to form an opinion about the project performance as well as the PL. It would also allow the team members to become familiar with the PL and the client. By analogy, project leaders were expected to need a similar timeframe to capitalize on opportunities to be socialized into the client environment. Finally, teams that had recently completed their projects were excluded from the pilot to avoid retrospection bias.

⁷ As was evident from the focus groups, most teams larger than this tend to be a part of a mega project as smaller modular forms.

5.5.2 Survey administration.

Permission for conducting the study was obtained from Pitt's Institutional Review Board which classified the study as 'exempt' (IRB No. PRO07030049). The survey was to be administered at the project-team level, which was the unit of analysis. BRMs, project leaders and team members completed different parts of the survey based on their roles. BRMs provided performance-related data as well as assessments of the generic technical and project-management skills of their PLs. PLs contributed self-reported, socialization data (typical in socialization research) as well as some project-related data. Team members reported on knowledge transfer into the team from the project leader and other sources, as well as on project-related constructs like intra-team knowledge exchange.

Consistent with the input from focus groups, BRMs were the first point-of-contact in rolling out the survey. TechCon's HR department helped to initiate the contact protocol by providing email addresses for BRMs associated with the set of firm-approved projects referenced above. Contacted BRMs were asked to forward the survey invitation email (see Appendix B) to individual project leaders, who in turn would forward the request to team members. Including BRMs in this manner was designed to strengthen the perceived legitimacy of the study and convey visible, top-management support. Each team was given a unique access code to enter at the start of the survey, enabling the investigator to cluster team responses together during the data-analysis stage. Confidentiality was ensured by not collecting any information that could be linked back directly to individual respondents. The survey was launched on September 27, 2007, and was hosted for two weeks on the Qualtrics website. BRMs received a customized email reminder a day before the data-collection period expired identifying the team responses that were still missing (also found in Appendix B). Responses were received from a total of 144 individuals which included 22 BRMs, 32 PL and 90 team members.

5.5.3 Response rates.

Thirty of the forty teams that were contacted signaled a willingness to participate in the study. Twenty teams contributed at least some data from all three subject groups, a

preliminary response rate of 50%. A decision rule was adopted regarding the minimum level of PTM participation (50%) to be able to aggregate their responses into team-level variables in pending data analyses. This has been a common threshold in knowledge-transfer studies (Sarin & McDermott, 2003; Cummings, 2000). This added requirement reduced the pilot sample to 14 teams, yielding a final response rate of 35%. To ensure that there was a sufficiently large data for analyzing the psychometric properties of our scales, a sample of excluded teams was included as well. This resulted in an N of 90 team members, 34 project leaders and 22 BRMs. factor analysis values and cronbach alphas were calculate from this larger pool. One clear identifier was detected when comparing responding and non-responding BRMs. BRMs who had more than one project to evaluate tended not to personally participate in the survey targeting their subgroup. However, they otherwise tended to follow-through and forward the survey invitation and accompanying URL to the teams under them.

The mean organizational tenure of PL-respondents was 7.7 years, suggesting that they were likely to be well socialized in the home-firm context. This familiarity and understanding was much less likely to be present with respect to the client environment, however, given that 60.6% of the project leaders had no prior exposure to the business entity they were servicing. This, in turn, suggested that there would be ample variance on client contextual-knowledge to foster meaningful statistical analysis. In contrast, team members' average tenure with TechCon was 3.5 years. Not surprisingly, BRMs were most likely to be well-versed in both organizational settings. On average, they had been with TechCon for nine years and worked with the client(s) of interest for three years outside of the current project. This statistic is important as it shows that the BRMs would be a suitable source to comment on PL familiarity with the client culture, as well as project-performance metrics pertaining to a particular client.

5.6 PILOT DATA ANALYSIS.

The main aim of the pilot data collection was to assess the (a) psychometric properties of scales and (b) test the roll-out plan. The next section examines scale reliabilities as well as the outcomes of an exploratory factor analysis to establish discriminant validity of these scales.

5.6.1 Factor analysis

(a) Dual socialization scale- Dual socialization was operationalized as distinct socialization to the home- and client settings. Two scales were utilized, Socialization-to-the-client scale was a modification of Chao et al.'s (1994) scale. The politics, goals and values, language and people dimensions were adapted, and the history dimension dropped. The performance proficiency measures in the Chao scales were too generic to be useful in this setting. Hence, general technical knowledge and general project-leader-skills scales were taken from the IS literature on project teams (See previous chapter for details of items). Awareness of expertise was added as a dimension given its salience when interacting with the client and gathering relevant knowledge. This scale adopted from Faraj & Sproull (2002).

The home socialization scale was a much shorter, 9-item version of Chao et al.'s scales, covering the key dimension of politics, social integration, history and language (as it had relevance in the home context), goals and values and people. Unlike the client-socialization scale that was administered to PLs, BRMs provided inputs on the home-socialization scale.

Given the modification and adaptation of the scale, it was important to use exploratory factor analysis to see how the items loaded onto the modified subscales, and whether respondents interpreted them in a manner that corresponded to the categories of interest.

The items were factor analyzed using principle component analysis and varimax rotation. The exploratory factor analysis was conducted without pre-specifying the number of factors to be extracted. Loading greater than .40 on a factor typically are considered

acceptable in socialization research (Chao et al., 1994), and that was the cut-off utilized here. The factor analysis of PL socialization to client (n= 35) yielded an unclear factor structure for the subscales. Many items cross loaded on more than one factor. Instead of the usual expected five context-related factors, there were eight⁸. On closer analysis, it was noted that the reverse items were particularly problematic. Most had been put in place to ensure that respondents did not mindlessly respond to the items. Two language items also failed to load, leading the variable as a whole variable being dropped. These same items also had been considered redundant by several project leaders in the focus groups.

The analysis was rerun pre-specifying five as the number of factors to be extracted. Several items, specially the negative ones, failed to load, prompting their removal. The remaining items were factor analyzed without pre-specifying the number of factors to be extracted. Three factors emerged pursuant to this decision rule: social integration (3 items), knowledge of expertise (3 items), politics and culture (4 items). All have Eigen values greater than 1. Since some of the items associated with politics and culture approached double loadings, it seemed advisable to attempt to further reduce the number of factors. The items were then constrained to fit into 2 factors. Politics, culture, and knowledge-of expertise loaded cleanly onto one factor (which can be called 'knowledge of client context') and social integration onto another. The 10 items that had strong factor loadings and represented the key content area that the socialization subscale was intended to capture (i.e. knowledge of client context).

All of the home-socialization items were subjected to exploratory factor analysis and varimax rotation as well. This scale had been responded to by BRMs who were commenting on the socialization of their respective project leaders. The scale could not be rotated as all items loaded onto one single factor, which explained 65% of the total variance. This outcome was not surprising given that discrete sub-scales were not envisioned through the items. Instead, the items were closely related to home-firm culture and PLs having been adequately socialized therein.

⁸ The technical proficiency variables were factor analyzed separately. They were considered part of 'expert/tehnical' knowledge of the project leader and not the main focus of socialization to the team context.

<< Insert tables 15 & 16 on socialization to client from appendix C >>

Nevertheless, some weakness can be expected in early stages of scale testing (Chin, 1998). Since this scale was being tested for the first time with a small n, a decision was made to keep all items for analysis in the final data collection. Chao et al scale was developed in the context of college students, and other studies on socialization have worked with samples of military (Cooper-Thomas et al 1994, Mael & Ashforth, 1995), and accounting personnel (Chatman, 1991; Fogarty, 2000), not highly experience professionals such as the ones found in our sample (For an exception see Chen 2005). It is quite possible that the unique nature of the job and consideration of socialization in a context external to the firm may have influenced the factor loadings in a different manner. Also Chao et al.'s scale was focused mostly at the organizational level, where employees may be better able to distinguish between subtle aspects of politics and culture than they can with external firm. Since we are not going to be examining the influence of various sub-domains of socialization in this thesis, it was considered more important to have highly reliable and valid measure of client socializations than ones that perfectly adhered to the pre-defined categories. All the same, to test our scale, all of the items originally drafted were retained to check if the pattern repeated itself in a larger sample. Given the newness of the scale, it would be hasty to throw items out at this stage of the analysis.

The proficiency dimension of the socialization scale was operationalized by having BRMs rate PLs on general technical- and project-leadership skills. Since both variables embodied the expert knowledge of project leaders (as opposed to the context knowledge seen earlier in the client- and home-socialization scales), the scales were factor analyzed together to see if they loaded as two different dimension. Upon running the items through varimax rotations, they cleanly loaded onto two separate factors as seen below.

<< Insert table 17 from appendix C about here >>

(b) Knowledge transfer scales- The fact that project teams were asked to simultaneously assess the amount of knowledge-transfer stemming from three distinct sources (i.e., PLs, clients and peers) raises concerns about the independence of their ratings. To correct for this, each person's average rating across the three targets was calculated and subtracted from his/her score for each source, yielding residual values which minimize the bias that emerges

from within-group effects (Howell, 1998). This method removes subject-linked variance by utilizing the following formula:

$$X'_{Subject} = (X_{Subject} \quad \bar{X}_{Subject})$$

Source-specific analyses were then conducted utilizing these modified inputs. The rotation values are given below:

As can be seen, the last two technical items seem to have a low, but nonetheless existent, cross-loading with context items. This could be signaling confusion about the type of knowledge transfer being investigated. Accordingly, the survey's instructions were revised to more explicitly emphasize the word "technical" to better focus attention on the subject matter of interest. Otherwise, the intended split between the technical knowledge transfer and context knowledge transfer was quite good given the sample size (n=90).

<<< Insert tables 18, 19, 20 from appendix C about here>>>

(c) Project-team performance and Inter-team coordination- Project-team performance and inter-team coordination were two outcome variables for which the BRM provided data. Exploratory factor analysis initially supported combining all of the project-performance items into a single variable, since everything loaded on one factor with no scope for rotation. A similar result was obtained for inter-team coordination using this procedure. However, problems arose when the respective items were subjected to discriminant analysis. When inter-team coordination and project performance were factor analyzed together, item 3 (i.e., Connected processes and activities are well coordinated with the client) was standing apart on a separate factor. Dropping this item produced the desired solution with project performance and inter-team coordination questions loading cleanly on their respective factors. tgtk

<< Insert tables 21 & 22 from appendix C about here>>

Knowledge exchange within the team : Knowledge exchange within the team is a construct aimed at capturing how well the team exchanges and combines knowledge that is made available to it through various sources. Exploratory factor analysis identified that the reverse-coded items in this scale were splitting into a second factor. Two iterations were run,

each time dropping one of the reversed-coded items. A one-factor solution emerged ultimately with the remaining three items. While it would be possible to get an estimate of knowledge exchange within the team based on the three of the five variables, it was decided to keep all variables for the final data analysis. The small sample size may have influenced the lack of clear loadings. This is because factor loadings are based on correlation matrices which are influenced by sampling errors associated with small samples. Another problem associated with small samples is the ‘splintering’ of factors into smaller groupings of items that really constitute a larger factor (Costello and Osborne, 2005)

<< Insert table 23 from appendix C about here >>

(d) Interdependence on the client scale- A one factor solution emerged here, as expected. The last item had weaker loaded more weakly than other items, but was still above the .40 value cut off to be retained.

<< Insert table 24 from appendix C about here>>

On balance, nearly all of the scales exhibited sound structural properties. The dual socialization items which displayed some loading problems will were retained for the reasons mentioned earlier. We now turn our attention to the issue of scale reliability which will be assessed by using Cronbach alphas as a criteria. The value of alpha depends on the *size* of the average inter-item covariance, while unidimensionality depends on the *pattern* of the inter-item covariances consequently cronbach alpha would provide further evidence towards retaining items for the final study.

5.6.2 Reliability

Cronbach alphas were computed for all scales to obtain internal-consistency estimates. Nunnally (1978) recommended a cut of .70 for established scores and .60 for exploratory ones. Using this criterion, all reliabilities were at acceptable levels. The knowledge transfer scales were analyzed both as a composite 10- item scale, as well as discrete subscales (technical vs. context knowledge transfer. The contextual distance items were correlated at .68

Following Chao et al.’s lead, the socialization scale was analyzed at the sub-scale level (politics, culture, goals and values). This approach allows one to establish the importance of retaining the whole scale for the final data analysis. While Chao et al. reported

sub-scale alphas of .78 or higher, values generated in the pilot were considered sufficient to move forward in light of the modifications made to certain items and the small sample (n=34).

<< Insert table 25 from appendix C about here >>

5.6.3 Data aggregation

Before individual-level data can be aggregated meaningfully to the team level, within-group agreement should be examined to verify that it is appropriate to do so. In this study, multiple respondents (team members) rated the quality of knowledge transfers from project leaders, clients, and peers. They also assessed the level of knowledge exchange taking place within the team. Since the model is being tested at the team level, it is important to note inter-rater agreement in the scores for these constructs. Other team-level constructs (i.e., socialization, team performance and inter-team coordination) were being quantified by single raters, rendering moot the need for calculating agreement on those variables.

The Rwg (J) index for multiple items (James, Demaree & Wolf, 1984) is a widely used measure of within-group agreement. The formula for this statistic is :

$$r_{WG(J)} = \frac{J \left(1 - \frac{\bar{S}_{x_j}^2}{\sigma^2_E} \right)}{J \left(1 - \frac{\bar{S}_{x_j}^2}{\sigma^2_E} \right) + \left(\frac{\bar{S}_{x_j}^2}{\sigma^2_E} \right)}$$

where the mean of the observed variances on the J items is given by

$$\bar{S}_{X_j}^2$$

Values are calculated separately for each group. The closer the index is to one, the higher the level of agreement in the group. A value of .70 or higher is considered satisfactory agreement (George, 1990, James et al., 1984). The Rwg(j) values for knowledge transfer were calculated using the residual scores created after removing individual bias (see

discussion on knowledge transfer scale). On average, the within group agreements for the variables are greater than .70 hence aggregation is justified

<< Insert tables 26 & 27 from appendix C about here>

5.7 CONCLUSION

Despite a low n , most scales performed well on the factor analysis as well as the reliability assessments. The pilot provided us with an initial confidence in the validity and reliability of the scale a lot of which were either developed from scratch or substantially modified. One of the most important scales for the study was the dual socialization which had been measured using two different version of the scale. Upon further reflection, a decision was made to measure client- and home-socialization through self reports from the project leader using identical scales. This decision was made in light of the realization that while the *context* referred to in measuring socialization might be different, the *construct* remains the same. For instance, one can assess job satisfaction with reference to current job and previous job with the same scale with the context reference being the only difference. This would ensure greater consistency of results and enable ease of comparison of home socialization values with client socialization values. On the down side, this would mean the pilot data could not be merged with the final data to increase our n This step was seen as necessary nevertheless to keep the sanctity of the research design and measurement.

The need to tighten up the instructions related to knowledge transfer was another valuable lesson. The changes made more effectively brought forth emphasize the difference between technical and context knowledge more forcefully. The instructions also were re-worded to ensure that the ‘unique’ transfer from each source was referred to when team members were issuing their ratings. The high values of $Rwgs$ strengthened the case for and analyzing the variables in question at the team level-of-analysis.

Finally, the pilot also validated our view that emails sent by BRMs carried a lot of weight with PLs and team members alike. It also became apparent that the survey should be hosted for a maximum of 8-10 days as reminder emails beyond that point did not impact response rates. It seemed like sampled respondents had become accustomed to working

under high-pressure deadlines and tended to treat any task without a proximate deadline with a degree of casualness. This view was confirmed through a conversation with the human resource department

In the next chapter we carry out similar analysis for our final data collection and run a series of regressions to test the hypotheses put forth in the previous chapters.

6.0 CHAPTER 6- DATA COLLECTION AND ANALYSIS

In the previous chapters we discussed the refinement of measures as well as the pilot testing of the survey with TechCon employees. In this chapter we describe the final data collection and analyze data for testing the hypotheses put forth earlier. This chapter is divided into five sections. The *first* describes the survey procedure and the collection of data, response rates and characteristics of respondents vs. non respondents. The *second* section includes the preliminary analysis of data (descriptive statistics, correlations) and the tests for construct reliability and validity. In the *third* section we discuss the statistical tests performed to ensure that data could be aggregated to the team level of analysis by performing Rwg(j) and ICC tests of agreement and aggregation. In the *fourth* section we test the research hypotheses put forth in chapter 3 using multiple regression analysis at the team level. In this section each path is analyzed separately and alternate hypotheses tested as necessary. In the *fifth* section we test the secondary hypotheses around comparing sources of knowledge transfer into the team. Together these sections provide a comprehensive test of the theory and hypotheses put forth in the previous chapters.

6.1 THE LAUNCH OF THE SURVEY

As discussed in chapter 5, the US based employees of a global software consulting firm (TechCon) were targeted for the survey. The employees of TechCon were highly educated individuals engaged in various aspects of IT design and implementation projects. Given the extensive need for client interaction in their work, and the problems faced by this firm in knowledge exchange and coordination with the client, this firm provided a perfect opportunity to test our hypotheses. By focusing on a single firm with multiple clients, we could easily control for the organization culture related variance that would arise in data from

multiple organizations. By gathering data from one consulting firm we can focus more on the variance arising from differences due to client context, as well as individual level factors.

The recommendations made by Dillman (1978), Couper et al 2001, & Cook et al (2000) were followed in the launch of the survey to ensure clarity of purpose and elicitation of a high response rate (see chapter 4 for more details). The survey was launched via the internet. Since employees of TechCon are spread all over the globe, the firm frequently utilized internet based surveys to conduct opinion polls and gather data related to various initiatives launched in the firm. Consequently, there was no issue in conducting this survey online vs. a pencil and paper format.

The survey was launched by the head of HR for the US division in an email to the BRMs (see appendix B) inviting their participation. A follow up email was sent by the researchers to the BRM with a link to the survey and a request for their participation. The BRMs were also requested to forward the survey to the project leader of the specified project (see appendix B). This launch protocol ensured that top management support for the survey was visible to all participants, and the confidentiality of the PL and his team was maintained. The use of different respondents for measuring independent and dependent variables enables us to avoid common method bias (Crampton & Wagner, 1994).

The survey was launched in the 200 teams identified by the human resources department of TechCon. The criteria used for selection was similar to that used in the pilot team selection. (i.e. teams selected were to have between 5 and 15 members, have been in existence for at least 6 months. Further the projects were to have a duration of no more than 2 years. These criteria were selected with the aim of ensuring that variance created due to team size and length of project was eliminated. The criteria of six month of existed was chosen for several reasons. First it allowed enough time to lapse for there to be some performance related data to be available for the team, and secondly because socialization research has shown that this is the typical duration needed for newcomers to be socialized into the new environment (Ashforth, Saks, & Lee, 1998b; Cooper-Thomas & Anderson, 2005).

6.2 FINAL SURVEY RESPONSE

A total of 662 completed survey were received at the end of the survey. This sample consisted of 80 Supervisors, 137 PL, 445 team members. On further classification of data we found that there had been at-least one respondent from 80 of the 200 teams invited to participate in the survey.

We then exercised a multilevel criteria for the inclusion of a team in the final analysis. The following were the criteria utilized:

1. Both BRM and PL of a team must have responded for the team to have been included. This is because the dependent variable data (performance) was to come from the BRMs and the independent data was to come from the PL . This took the number of teams in the final sample from a total of 80 to 72
2. At-least 3 or more team members from a team should have responded. This criteria was used to ensure that there was some representativeness in the responses of the team members. Often times in the past research has used the criteria of ‘atleast 3 team members’ for inclusion of a team in the final sample. This resulted in a further loss of teams and the number went from 72 to 58.
3. We then screened for outlier and, inconsistent respondents (see preliminary data analysis section below). This brought the team numbers down from 58 to 54.
4. Apply_Dawson statistic (Dawson, 2003) for representativeness of teams. The selection rate formula $(N-n)/Nn$ where N denotes the size of the team and n denotes the number of respondents in the team. This statistics assesses the accuracy of incomplete group data and has been used in prior research (Richter, West, van Dick, & Dawson, 2006) We included only those groups whose selection rate did not exceed the cutoff point of .32 selection rate. Dawson (2003) has shown that the scores of groups with selection rate below .32 are correlated with true scores at .95 and higher. The selection rate was at or below .32 for 9 teams. This brought down the final number of teams to 45. These teams together consisted of 45 BRMs & PL and 258 team members.

A Non-response bias test involved conducting t-tests around the various key constructs did not reveal significant differences. T-tests were performed on all key constructs between the 45 teams that were included and the 30 that did not get included in

the final sample. There were no major differences between the two groups (see table 8 below). Of the final sample used for data analysis the average tenure of the BRM with Techcon was 10.78 years, PL in Techcon was 7.35 years, of the team members was 3.86 years. All the BRMs in the final sample were male, and all PLs except one were also male. This trend of primarily male leadership is the rule rather than the exception for TechCon managers posted overseas. TechCon found it easier to relocate men with their families when it came to sending their employees overseas.

Table 8 : Non-response bias test

Construct	T-test	Significance
Total IT experience of BRM	-.83	.40
Tenure in TechCon Of BRM	-2.10	.04 (Mean = 8 for those not included and 10 for those included)
Project team performance	.44	.657
Inter-team coordination	-.46	.641
Socialization to home (PL)	-.668	.505
Socialization to client (PL)	.096	.923
Total IT experience of PL	-1.92	.060
Knowledge transfer by PL	.55	.573
Knowledge transfer by Client	.875	.157
Knowledge transfer by team members	-.761	.447
Prior knowledge of team	.351	.725

6.3 PRELIMINARY DATA SET UP

The discussion in this section centers around ensuring that the data that is available is suitable for testing the hypotheses put forward in chapter 3. For this we analyze descriptive statistics, correlations, construct reliability and validity. Given below are the series of steps related to initial data analysis.

(a) Identifying missing, inconsistent or invalid response- For this a two step method was followed. In the first step, all individuals who had more than 80% of the question

unanswered were deleted from the final survey. Since team members were entering their responses under their assigned team code and we had no individuating information on these respondents, it was not possible to analyze why these individuals decided to not complete the survey. Also, it is possible that the same individuals came back and completed the survey at another time. Since survey data was not saved if the respondent quit in between the survey this was a reasonable assumption to make. We then analyzed the remaining respondents for missing values. Total number of missing answers consisted of less than 3% of the total population under consideration. The missing value analysis showed that the pattern of missing responses was random. Most missing values were on demographic variables.

Secondly, those individuals who were scoring in the same direction even on reversed score items were deleted. The reversed score items had been put in with the explicit aim of ensuring that respondents were not mindlessly selecting answers without paying attention to the question. Reverse coded items are supposed to be negatively correlated with other items. For those individuals where we did not observe the pattern it was obvious that there were not paying careful attention to the survey and hence should not be included in the final data set.

It should be noted that incomplete surveys and inconsistent response led to the loss of 3 PL and 7 team members which in turn impacted the total number of teams that were included in the final analysis.

(b) The descriptive statistics were calculated based on the remaining teams in the sample. As one can see from the table below (Table 9) on most variables there was a spread of responses from the minimum to the maximum, with some constructs being bunched towards the top end of the spread. For instance the project performance and the inter-team coordination values seem to be at the higher end. This leads us to speculate how the results of our hypotheses tests might turn out if the values were more evenly spread out. In a sample of projects with low performance indicators, for instance, the dual socialization of the project leader could prove to be the missing link between effort and performance of the team. This would provide a strong alternate test for our hypotheses. Although, while it is true that in this sample the projects are displaying high performance levels, such a concentration of projects does not detract from our ability to test whether dual socialization matters for project outcomes. This is because if any of the hypothesized relationships turn out to be insignificant then we would have evidence for when dual socialization does or does not

translate to higher performance. If on the other hand, all the relationships turn out to be significant, we would then need to gather data with greater variance to show that the results obtained are not a spurious artifact resulting from the data in our sample.

The skewness values ranged from -1.38 to .712, and for kurtosis they ranged from -.734 to 6.30 West *et al.* (1995) have argued that techniques that require normal data will function reasonably well as long as the absolute value of variable skew is less than 2 and the absolute value of variable kurtosis is less than 7. To that extent the data in our final sample is within the bounds of normality.

Table 9 : Descriptive statistics

Descriptive Statistics							Skew	Kurtosis
	N	Minimum	Maximum	Mean	Std. Deviation	Variance		
KTPL	45	-.70	.49	-.1051	.26485	.070	.712	.404
KT by client	45	-.63	.92	.1503	.31488	.099	.364	.370
KT by team members	45	-.47	.48	-.0452	.24511	.060	.591	.630
Kn. exch within team (KNX)	45	4.35	6.40	5.2038	.50606	.256	-.944	4.03
Contextual distance	45	1.00	5.00	2.9333	.97468	.950	-.114	2.177
General skills of PL	45	2.40	5.00	4.2044	.56325	.317	-.740	3.92
Technical skills of PL	45	2.75	5.00	4.0667	.56508	.319	.035	2.457
PL's Soc 2 home team	45	3.47	5.00	4.2919	.37072	.137	.263	-.734
PL Soc 2 client team	45	3.47	4.80	3.9674	.32679	.107	.643	.163
Interdependence on client	45	2.67	6.83	4.9889	1.16417	1.355	.194	.006
Performance	45	3.50	5.00	4.3889	.46559	.217	-1.383	6.30
Inter-team coordination	45	4.40	7.00	6.2044	.49998	.250	-1.021	5.11
Prior knowledge	45	2.2	5.00	3.55	.69	.478	.369	2.41

(C) Correlations: There was a significant and negative correlation between knowledge transfer by PL and knowledge transfer by client (-.65**). This could mean that as knowledge transfer by one source goes up, the knowledge transfer by another source goes down. Similarly, knowledge transfer by client and knowledge transfer by team members are significantly and negatively correlated (-.57**). Again this is indicative of the differences in the inflow of knowledge into the team. It provides us with further evidence that comparing the impact of various sources of knowledge for a team could prove to be a worthwhile exercise.

There exists a positive and significant relationship between general skills of the PL and project team performance (.509**) and inter-team coordination (.471**). Similarly there is a significant and positive relationship between technical skills of the PL and project team performance (.496*) and inter-team coordination (.313*). These relationships are expected as the general skills of a PL along with his/her technical skills are expected to influence project outcomes positively. There was no significant correlation between socialization to client/home and project team performance or KTPL. Socialization to home though was significantly and positively correlated to inter-team coordination (-.367*). This could possibly indicate that when it come to inter-team coordination greater familiarity with one's own team enhances the ability to smoothly interact with the other team.

PL's socialization to home and socialization to client showed a positive and significant correlation with KTTM. It is possible then that if the PL is socialized well to either context, s/he in-turn enhances the ability of the team members to bring useful knowledge into the team. The PL may be functioning as an agent of socialization for the rest of the team. The positive significant correlation between inter-team coordination and team performance is in line with the findings of previous literature where teams with good coordination processes perform better (Adler, 1995; Hoegl et al., 2004; Klimoski & Mohammed, 1994)

Table 10: Correlations

Correlations													
	Perf	Coord	KTPL	KTCL	KTT M	KNX	Gen of pl	skills of pl	Tech skills of pl	Contex t dist	Interdep	Soc client	2 Soc home
Perf	1												
inter-team coord	.683**	1											
KTPL	.093	.196	1										
KT by client	.011	.095	.655**	1									
KTTM	.086	.090	.239	.577**	1								
Kn. exch within team	.038	.112	.425**	.372*	.019	1							
gen skills of pl	.509**	.471**	.239	.254	.068	.061	1						
Tech skills of pl	.496**	.313*	.047	.080	.051	.122	.567**	1					
Context dist	.162	.018	.029	.080	.071	.047	.008	.148	1				
Interdep on client	.080	.065	.313*	.289	.032	.112	.157	.183	.184	1			
PL Soc 2 client	.079	.170	.154	.117	.316*	.055	.055	-.097	.174	.134	1		
PL Soc 2 home	.227	.367*	.056	.188	.301*	.058	.03	.15	.53	.240	.087	.658**	1

** Correlation significant at .01, * correlation significant at .05

6.4 FACTOR ANALYSIS

6.4.1 Socialization to home team: Exploratory factor analysis.

The items of socialization to home team were factor analyzed using varimax rotation technique for exploratory factor analysis. Three factors emerged upon rotation. The first set of items 1 to 8 which consisted of items from culture and politics dimension and it loaded onto a single factor which can be called culture of the home team. The second factor that emerged consisted of items 9 to 11 which together formed the people or social integration dimension. The third factor that emerged was the knowledge of expertise within the team (items 12-15). The splitting of the factors this way is similar to the alignment that emerged preliminarily in the pilot study. Only this time the factor loadings were much cleaner and a solution emerged more easily. All values less than .40 were suppressed. Given that we aim to capture the contextual knowledge of the team through this construct, these 15 items give us a good solution to the construct of interest. See table 8 appendix D for the detailed split of factors.

6.4.2 Socialization to client : exploratory factor analysis.

In the exploratory factor analysis of socialization to client we found that a factor structure similar to socialization to the home team emerged. The three factors that emerged could be classified as client culture, people and knowledge of expertise within the team. However there were some items that had double loadings (items 5 and 6). It is not uncommon in modified and new scales to see some amount of double loadings, also since in the end we are not going to be separating out the effects of the sub dimensions of socialization, we decided to retain these items. It is possible that the double loadings emerged due to the PL

note being able to distinguish between the finer elements of politics and culture of the client (items 5 and 6) to the extent that s/he can of the home team. Given that the scale had good internal consistency we decided to retain these items. See table 9 appendix D for the detailed split of factors.

6.4.3 Knowledge transfer scales: Exploratory factor analysis

Upon the exploratory factor analysis of knowledge transfer (varimax rotation) by team members (KTTM) and knowledge transfer by PL (KTPL) as well as knowledge transfer by client (KTCL) we found a similar factor structure across all three constructs. The first 5 items which pertained to technical knowledge transfer split into one factor and the next five which pertained to the transfer of context/social knowledge split into the second factor. Identical factor splits across the three measurement gives us confidence as to the robust psychometric properties of this scale. All factor loadings less than .40 have been suppressed. See tables 10, 11 & 12 in appendix D for details of factor loadings.

In order to ensure that these two variables- KTPL and KTCL were being adequately distinguished by the respondents we conducted exploratory factor analysis on both scales by including their items all together before subjecting them to varimax rotation. There was again a clean split where all items of KTCL loaded onto one factor and that of KTPL loaded onto another, thereby providing evidence of discriminant validity between the two types of scales. See table 13 appendix D.

Further we subject the project team performance items, inter-team coordination items, and knowledge exchange items to exploratory factor analysis and found that one factor solutions emerged, providing us with the confidence to use these scales. (see table 14-17 in appendix D).

6.5 RELIABILITY

Reliability of the constructs under consideration was assessed by looking at the Cronbach alpha scores of each scale. All scales have alphas exceed .70 threshold recommended by Nunnally (1978) except for inter-team coordination which is at .70 and hence will be retained in the mix.

Table 11: Reliability

Variable	N	Alpha	items
Team performance	86	.91	8
Coordination	86	.70	5
KTPL	283	.932	10
KTCL	283	.923	10
KTTM	283	.92	10
Gen skills of PL	85	.81	5
Tech skills of PL	83	.77	4
KNX	283	.78	5
Context distance	283	.79	2
Interdependence	137	.76	6
SOC 2 CLIENT	137	.78	15
SOC 2 HOME	137	.83	15

6.6 AGGREGATION STATISTICS

Before we can successfully aggregate individual level data to the team level of analysis, it is important to assess agreement within the team on the scores provided. In the face of lack of agreement, aggregation to the team level cannot be justified. For meaningful aggregation there needs to be inter-rater agreement as tested by the Rwg(j) statistic (James et al., 1984). This index is calculated by comparing an observed group variance with an

expected random variance. An Rwg (j) value of .70 or higher is typically considered acceptable. In our study all the KTPL variables were candidates for an assessment of agreement. The median value of Rwg(j) for the various knowledge transfer as well as knowledge exchange score was .85 or higher. Consequently we felt confident of having met this criteria for aggregation. (see tables 18 & 19 in Appendix D). However Rwg(j) assesses only within group agreement and not between group variability. Consequently for testing the latter we turn to the ICC (1) and ICC (2) indices.

ICC (1) assess between group variance relative to total variance, and ICC (2) measures reliability of group means. In other words we first ask if the groups differ substantially on the criteria of interest and if they do how reliably do the mean differentiate between groups. For ICC 1 we look at significance of the F statistic, and for ICC (2) typically higher values are better values. Often times researchers will note that ICC (2) should be higher than .70 but this is not an agreed or universal cut off point. Several published studies have reported ICC (2) values considerably below .70 (Brown & Treviano, 2006; Bunderson et al., 2003; Chen & Bliese, 2002). Aggregation in these studies was justified due to F test being significant for ICC (1) and theoretical reasons to believe that the construct made sense at the team level.

The F statistic for ICC (1) KTPL and KTCL was significant and the ICC (2) values were acceptable. However the KTTM values did not meet the cut off. This may be due to the fact that while client and PLs are common to the whole team, the team member exchanges that take place could in a manner where there are substantial dyadic differences. Also variance techniques such as ANOVA can suggest when it is inappropriate to perform analysis at the aggregate level but they tend to suffer from false negative error (Muthen , 1991). Also, given the high Rwg values (see next section) and theoretical reasons we decided aggregate this variable to the team level. KNX and contextual distance values also justified their aggregation.

Table 12: ICC 1 & 2 values

Construct	ICC 1	ICC2	F	Sig
KTPL (10 items)	0.05695	0.25712	1.36	0.0805
KTCL (10 items)	0.08316	0.34207	1.53	0.0250
KTTM (10 items)	0.01039	0.05678	1.07	0.3659
KNX(5 items))	0.12917	0.45763	1.86	0.0020
Contextual distance (2 items)	0.10207	0.39451	1.67	0.0094

6.7 HYPOTHESES TESTING

The various paths in the model will be tested using multiple regression as a statistical technique. In places where moderation is hypothesized we will follow techniques for moderated multiple regression as suggested by Aiken & West (1991). This will be done by first introducing the control variables, then the independent and moderating variables will be centered and introduced into the equation, and finally the interaction term will be added to the equation. By introducing the variables in different blocks we are able to see the contribution of the interaction term over and above the interaction of the individual variables. If the term is significant then plots will be examined to see how the interaction plays out, as well as a test of simple slopes will be conducted to see if the lines are different from zero (Aiken & West, 1991). Hypotheses tables 4 -16 provide more detailed views of the steps taken for testing interaction.

6.7.1 Dual socialization, knowledge transfer & project team outcomes

H1a: Dual socialization of project leader positively impacts knowledge transfer by project leader to the home team.

As can be seen from the data the overall model turned out to be significant (Adj R sq = 15.4%). Prior knowledge of the team emerged as an important variable with a positive relationship with knowledge transfer by project leader. The emergence of this factor is in line with prior findings of the literature where learning is shown to have a path dependent nature (Cohen & Levinthal, 1991; Zahra & George, 2002). The prior exposure of the team to a

similar type of project increases their receptivity and understanding of the current knowledge transfer by project leader.

Interdependence on client turned out to be significant and negatively related to knowledge transfer by project leader. This would mean that as interdependence on client goes up, the value of knowledge transfer by project leader goes down. This may be due to greater reliance on the client in those circumstances. However, we have hypothesized interdependence as a moderator and will be testing for it to see how it impacts the relationship between dual socialization and knowledge transfer.

The dual socialization variables did not turn out to be significant but by virtue of being in a model that is significant do make a contribution towards knowledge transfer by project leader.

(Refer to equation 1 in Hypotheses table 1 in the appendix)

H1b: The joint impact of home and client socialization together on KTPL will be higher than either of the two constructs considered separately.

The overall model is significant ($F=1.8$; $p < .10$). Prior knowledge of team continues to have the same significant values with similar impacts as observed in the previous model. However the coefficient of interaction between dual socialization's component parts is not significant. Given that individually neither socialization to home or client impacted KTPL, it is possible that their interaction may not yield significant results. It is possible that the impact of the two aspects of socialization is enhanced through other moderating variables such as knowledge exchange within the team. It is towards the consideration of such moderators that we now turn our attention.

(Refer to equation 5 in Hypotheses table 1 in the appendix)

H2: The relationship between dual socialization of project leader and knowledge transfer are moderated by contextual distance. The greater the contextual distance, the higher the impact of dual socialization on KTPL.

The full model is not significant. Prior knowledge continues to emerge as a significant and positive influence on knowledge transfer. Interdependence on client continues to have a significant negative influence. As discussed in chapter three, past research has shown contextual distance to be an important factor in impeding knowledge transfer. However, there could be alternate explanations as to why in this particular research setting

we are not finding the expected results. Given that several of the consultant teams are located onsite at client premises, and given that the projects have been in existence for over 6 months, some of the barriers created by contextual distance may have been overcome by the teams. Co-location could have contributed to the lack of findings in this case.

(Refer to equation 4 in the Hypotheses table 1 in the appendix)

H3: Relationship between dual socialization and knowledge transfer by project leader is moderated by interdependence on client. Higher the interdependence, higher the impact of dual socialization.

There are interesting observations to be made about individual coefficients. Prior knowledge turns out to be significant in the model again thereby once again showing its importance in knowledge transfer by project leader. The overall model did not turn out to be significant and nor did the interaction terms. A possible explanation for lack of findings here could have to do with the characteristics of the moderator. Interdependence on client is a factor that is an external structural reality for the consultant team. It is possible that factors internal to the team, such as knowledge exchange, are able to overcome the barrier posed by external factors. We shall propose an alternate hypothesis to test this idea in the next section. Additionally it is also possible that interdependence on client may have higher or lower impact depending on the stage of the project. For instance interdependence on client may have a higher implication at the requirement gathering stage or closer to a critical milestone rather than at all stages.

(Refer to equation 3 in Hypotheses table 1 in the appendix)

6.7.2 Synopsis & Alternate hypothesis exploration

In the previous section we found that while some overall models did turn out to be significant the hypothesized interactions and the individual dual socialization coefficients did not turn out to be significant. Given that the overall models are significant but the individual coefficients are not, current data is not teasing apart the influence of socialization to home and socialization to client. Given that the adjusted R square for the various models ranges

from 13 % to 19 % there is scope for exploring as to what might be an be plausible explanation for our current findings. Also given that this research study is the first of its kind to explore the research questions at hand, it is even more imperative that adequate thought be given to alternate explanation in order to encourage future research and more robust findings. Below we explore three such alternatives – (a) Co-location; (b) Stage of project and (c) structural vs. process factors that are specific to the type of projects we are study and could possibly explain the lack of findings.

One possible explanation for contextual distance not turning out to be a significant moderator of the relationship between dual socialization and KTPL might be that several of the consultant teams are physically located at the client sites, the contextual distances may be overcome by observation/interaction with the client and their environment. Research shows that physical work environment can influence the development of social capital and exchange of information (Zagenczyk, Audrey J. Murrell, & Gibney, 2007). Consequently, the impact of dual socialization of PL for KTPL may not be that high for such teams. However, this does not explain our findings for teams that are not co-located.

Another feature of our research study that might possibly account for our findings is that data is collected with at least 6 months of project existence (the range of projects in our study is from 6 months to 18 months tenure). The timing of project tenure was chosen to allow for collection of other key variables such as BRM assessment of project quality, team assessment of PL, and socialization opportunity for PL in order to adequately assess and study the relationships in the model. Consequently, all projects had moved beyond the initial stage of project start up. It is possible that some factors which are material at startup time for the project are not equally applicable at other stages. For instance importance of dual socialization of the project leader for KTPL may be more critical at requirement determination stage or close to an important milestone than in the middle of the project. Similarly, issues of contextual distance, and interdependence on client may not have the implication at every stage of the project to create variation in the impact of dual socialization on KTPL. This could be an important consideration in studying the impact of dual socialization on KTPL in project teams. It once again points to the importance of creating and testing theory around project teams as opposed to only relying on findings from traditional teams.

As a final explanation for the lack of significance at the main effects level, we hypothesize the difference between the impact of structural factors such as contextual distance and interdependence on client and the impact of process factors like knowledge exchange within the team. While contextual distance and interdependence on client are contingencies that are external to the team, knowledge exchange within the team is an integral part of the internal process. If indeed knowledge exchange turns out to be a significant moderator, and is able to tease out the impact of dual socialization then we can say that perhaps for knowledge transfer to home team, the internal process contingencies (knowledge exchange) are more important than external contingencies (contextual distance and interdependence on client) which may be more relevant for KTPL to the client team. The hypothesis are thus stated are tested below:

A1: Impact of dual socialization on KTPL will be moderated by KNX such that higher the KNX greater the impact of dual socialization.

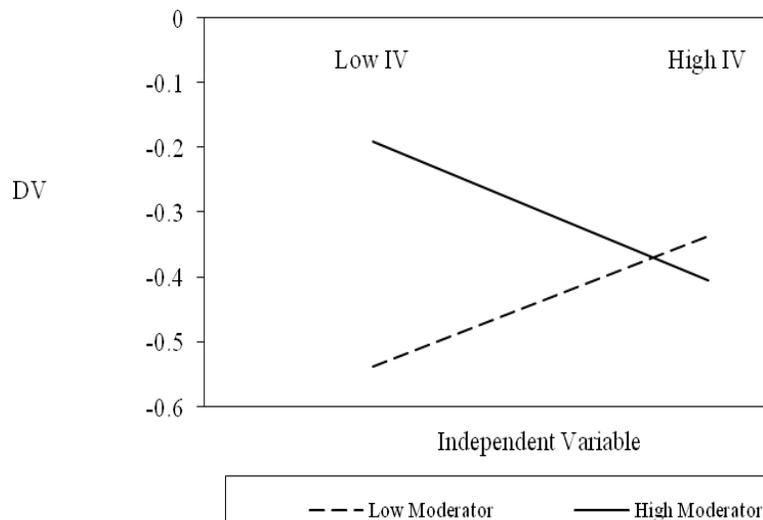
As can be seen the overall model is significant ($F = 2.78$, $p < .01$). Unlike most models where adjusted r square goes down, in this model the adjusted r square goes up substantially from 19.1 % to 23 % upon the addition of knowledge exchange within the team. The interaction with dual socialization pushes the adjusted R square up even further to 28.9 % pointing to the importance of internal knowledge sharing within a team. This validates our hypothesis that internal process factors may be more important than external contingencies when it comes to KTPL to his own team.

In the interaction between dual socialization and knowledge exchange, we find that PL's socialization to the client team significantly interacts with KNX. However the beta is negative. To see how this interaction is playing out we will plot the interaction scores.

(Refer to equation 6 in Hypotheses table 1 in the appendix)

The plot below shows the interaction between socialization to client (IV) and knowledge exchange within the team (Moderator) impacting KTPL (DV). The impact of socialization of project leader to the client team on KTPL goes down at high levels of KNX in team (solid line). The impact of socialization to client on KTPL goes up at low levels of KNX in team (broken line). This shows that when team members are not exchanging knowledge effectively then the impact of the PL's socialization to the client is high for KTPL. However when the team is effectively exchanging knowledge, then the impact of

PL's socialization to client goes down for KTPL. This is potentially an important observation that could mean that either knowledge exchange within the team is a substitute for KTPL or alternately that once the team becomes effective at exchanging knowledge within itself then they tend to not pay much attention to the knowledge transfer by PL as they feel equipped to handle tasks on their own. If this is true then the practical implication is that with an effective process of knowledge exchange within the team the reliance on dual socialization of the PL can be reduced. Since socialization is a time consuming and effortful process, this findings can help reduce the burden on the socialization of the PL for KTPL. It needs to be noted though that the impact of this observation is limited to the knowledge transfer process as we have yet to explore the impact of dual socialization on the project team's performance outcomes.



While a plot allows for a quick visual interpretation of the interaction effect and the direction of the slopes can be interpreted based on face validity, a simple test of slopes is highly recommended (Aiken & West, 1991). The test of slopes is a post hoc test aimed at providing descriptive data about the slopes under consideration. The aim of this test is to see if each slope is different from zero. To that extent the test is an absolute test, i.e. provides information about a slope independent of the behavior of the other slope(s). In testing the

impact of X on Y moderated by Z, upon finding a significant interaction there are three steps involved in the test of simple slopes (Aiken & West, 1991)-

(a) Create a new variable Z_{cv} which is the original moderator variable Z at a conditional value of interest. The conditional value of interest is typically set at one standard deviation above and below the mean of the moderator variable. Therefore we get Z(high) and Z(low) conditional values.

(b) Form the cross product terms of the new term Z_{cv} with the independent variable X, and

(c) Regress the criterion Y on X, Z_{cv} and $(X)(Z_{cv})$

In the resulting regression equation the resulting b_1 term and its t test forms the test of simple slope.

Upon running the test of simple slopes of socialization to client with knowledge exchange (at the 1 std. deviation above value) we find that the slope is significantly different from zero ($b=3.9$, $P=.100$). The slope is also significantly different from zero at knx (low) values ($b=3.2$, $p=.100$). Consequently not only are the lines different from each other, they are also significantly different from zero.

H4a: Dual socialization of project leader positively impacts Project team performance

The model is significant ($F=3.4$, $p<.01$). Both coefficients of socialization to home and socialization to client also turn up as significant. However the coefficient of socialization to client is negative and this would mean that if there is a high socialization to client then team performance suffers. It is possible that this may be due to what can be termed as a distraction effect i.e. the project leader gets deeply involved with the client side of things and that interferes with his/her ability to guide the team effectively. Alternately, the team may think of the PL as having 'gone native'. A term used in anthropological works where a visitor to a new land sometimes gets very deeply involved and identified with the culture being visited such that s/he no longer differentiates between self and the culture. This in turn reduces the ability of the researcher to effectively examine the field.

Another interesting observation is the significant but negative coefficient of prior knowledge. In the relationship between dual socialization and knowledge transfer this construct had a significant and positive effect. It is possible that while for knowledge transfer prior knowledge acts as a facilitator (enabling absorptive capacity), when it comes to

execution, prior knowledge can become an impediment. Previous mental models and assumptions from the past interfere with the team's ability to perform effectively.

(Refer to equation 7 in Hypotheses table 2 in the appendix)

H 4b: Dual socialization of project leader positively impacts inter-team coordination

The overall model is significant ($F = 2.25, P < .01$) as is the change in F statistic. In the case of dual socialization only socialization to home has a positive and significant impact on inter-team coordination. This could be because we have operationalized inter-team coordination as managing interactions effectively; resolving conflicts etc. and the PL may have little or no influence on the client team. Another possibility that cannot be ruled out is the strong desire on the part of the consultants to please the client, and do what is needed to minimize issues of conflict. This is because the consultants hired by the American clients have been selected from a highly competitive pool of vendors. The chances of repeat business and a future relationship, not to mention recommendation to other clients could create a lop sided power equation where the consultant team bears most of the load of keeping interactions smooth and free of conflict. Consequently socialization to home is what enables the PL to manipulate and manage the interactions with the client more effectively.

(Refer to equation 10 in Hypotheses table 3 in the appendix)

H5a: The relationship between dual socialization of project leader and project team performance is moderated by contextual distance between the two teams. As contextual distance goes up, the impact of dual socialization goes up as well.

The overall model is significant ($F = 2.8, P < .01$) as are the coefficients of socialization to home and socialization to client. As in the previous model, socialization to client continues to have a negative beta with relationship to team performance. This can be possibly attributed to a distraction effect discussed earlier. Prior knowledge too is negatively significant. The interaction term however did not turn out to be significant. As discussed earlier, the possibility of co-location with the client and/or the stage of the project may be a factor in explaining the lack of findings.

(Refer to equation 8 in Hypotheses table 2 of appendix)

H 5b: The relationship between dual socialization of project leader and inter-team coordination is moderated by contextual distance. When the distance is high, dual socialization has greater impact.

The overall model is significant ($F = 2.1$ $P = .05$) but the interaction is not. As conjectured earlier it is possible that due to co-allocation contextual distance matters less. Alternately, contextual distance may not be equally relevant at all stages of the project. Consequently we may find that dual socialization matters more at the start or a project or close to a critical milestone. It is under such circumstances that contextual distance would prove to be a bigger barrier than at other points in the project's lifecycle.

(Refer to equation 11 in Hypotheses table 3 of appendix)

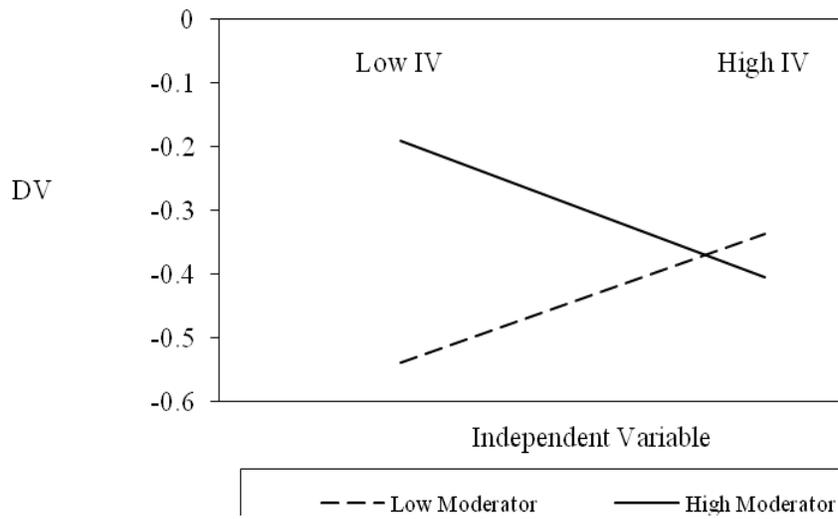
H6a: Relationship between dual socialization and project team performance is moderated by interdependence on client. The greater the interdependence on client the greater the impact of dual socialization.

The overall model is significant ($F=3.8$, $p<.01$). Change in F statistic is also significant ($P <.05$) and the adjusted R square goes up to 43 % showing the predictive power of this model.

In the interaction of interdependence with dual socialization only socialization to home is negatively significant. We will need to plot this interaction to get a better understanding of how this relationship might be playing out. Prior knowledge continues to be negatively significant (interference with performance as noted in earlier models). General technical skills have a positive and significant impact on performance.

(Refer to equation 9 in Hypotheses table 2 in appendix)

Interaction of socialization to home and interdependence on client.: Upon plotting the interaction it can be seen that when interdependence on the client is high (Solid line) then socialization to home has a negative impact on project team performance. In other words when interdependence is high then the PL's socialization to home team can impede the team's performance. We can not speak with conviction about how socialization to client impacts performance when interdependence is high as that coefficient did not turn out to be significant. When interdependence on client is low (broken line) then socialization to home has a positive impact on project team outcomes.



Upon running the test for simple slopes we find that both slopes are different from zero. For socialization to home at high value of interdependence ($b=2.2, p<.01$) and low value of interdependence ($b= 1.6, p <.01$) we find significant results.

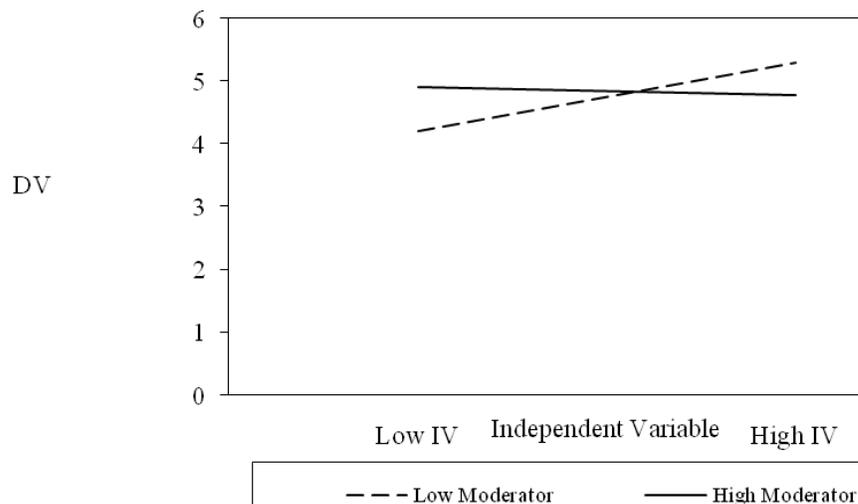
H 6b: The relationship between dual socialization of project leader and inter-team coordination is moderated by interdependence on client. When interdependence is high, dual socialization has greater impact.

The overall model is significant ($F = 2.69; p = .01$). Change in F statistic is also significant ($F<.05$). Socialization to home ($P=.018$) has significant beta, and socialization to client is almost significant ($p=.108$) when interacting with interdependence on client. We will plot both the interactions to see how the relationship plays out for both the variables.

(Refer to equation 12 in Hypotheses table 3 in appendix)

(a) Interaction of socialization to home with interdependence on client

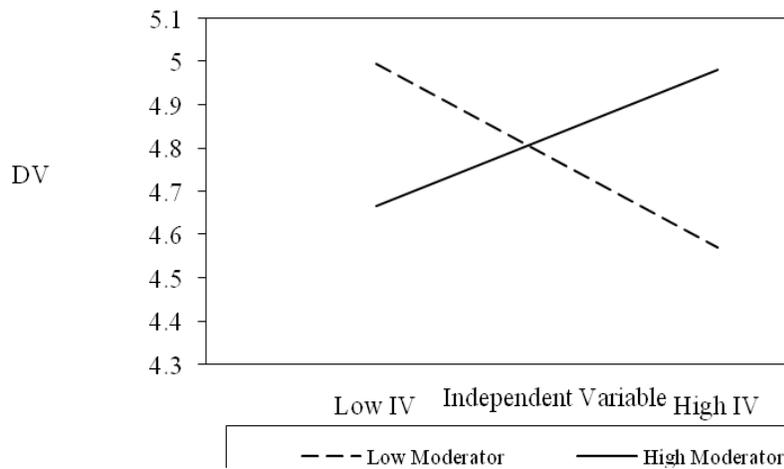
As can be seen from the plot when the moderator (interdependence on client) is low (broken line) then socialization to home positively impacts inter-team coordination. However, when interdependence is high (solid line) then impact of socialization to home on inter-team coordination starts to go down. This finding is similar to the impact of home socialization on project performance as well where socialization to home negatively impacted team performance when interdependence was high.



Upon conducting the test for simple slopes we get significant values for socialization to home at high interdependence ($b=1.14, p<.05$) and low levels of interdependence ($b=2.08, p < .05$). Consequently both slopes are different from zero and from each other.

(b) Interaction of socialization to client team with interdependence on client

While the interaction term of socialization to client with interdependence was only marginally significant at .108, we feel that the relationship does have substantial practical significance. Consequently, while a test of slopes would not be possible due to low levels of significance, a plot could provide us some insight into how this relationship might play out. The tentative conclusions drawn from the plot can provide us with the ability to test the hypothesis in further detail in future studies as well. As can be seen from the plot, at low levels of interdependence (broken line) an increase in socialization to client leads to low returns on inter-team coordination. This would make sense as socialization to client under low interdependence is a waste of cognitive and intellectual resources. However, when interdependence is high (solid line) an increase in socialization to client leads to an increase in inter-team coordination. Clearly then when interdependence is high, PL need to be encouraged towards socialization to the client.



6.7.3 Synopsis of findings:

In the relationship between **dual socialization and performance**, the overall models all have been significant which points to the fact that dual socialization matters for project performance. What is also interesting is that socialization to home always has a positive impact on team performance (except when interdependence on client is high and then socialization to home has a negative impact) and the socialization to client always has a negative impact. This goes to show that socialization to home and socialization to client don't always influence outcomes in a similar manner. They could act in competing ways or complementary ways depending on the dependent variable and moderators under consideration. Prior knowledge emerged as a significant and negative impact on team performance and this goes to show that past experience can act as a barrier to effective execution of tasks. Consequently, while organizations may try to put teams together in which individuals have worked on similar projects in the past, it is not always a guarantee of success.

In the relationship between **dual socialization and inter-team coordination**, socialization to home shows up as a positive and significant impact with an edge over socialization to client. This shows that when it comes to managing interactions with the outside team, a PL's socialization to his/her own team enables them to exert their influence more effectively. It is possible that socialization to client may have an influence on inter-

team coordination through its interaction socialization to home team but not independent of it. When we consider the moderating impact of interdependence on client though, home socialization has a significant and negative impact. Clearly showing that when interdependence on client is high, then socialization to home can have a negative impact as the leaders should be focusing on socialization to the client and not the home team.

The above analysis shows that while dual socialization has significant impact on inter-team coordination and project team performance, the choice of which aspect of socialization should be emphasized at what point in time is dependent on multiple contingencies. Also it is interesting to note that while for knowledge transfer the external and structural factors (contextual distance & interdependence on client) were not significant. In both project team outcomes the overall model for contextual distance was significant, and the overall model and individual interactions with interdependence were also significant. This further strengthens our hypothesis that external contingencies may not have as strong an impact on internal knowledge transfer, as they may have on variables that are clearly influenced by external interactions (i.e inter-team coordination and project team performance)

6.8 HYPOTHESES TEST: KNOWLEDGE TRANSFER AND TEAM OUTCOMES

H 7a: The higher the Knowledge transfer by project leader, the greater its impact on inter-team coordination

The overall model is significant ($F = 2.25$, $p < .05$) and adjusted R square = 22%. However, due to multi-collinearity between knowledge transfer by client and knowledge transfer by project leader, the regression model drops one of the two variables out randomly. The tolerance statistic = .00 showing high multi-collinearity between KTCL and KTPL. Hence we are not in a position to make a comment on the individual significance of either of these variables. It should be noted though that multi-collinearity does not impact our ability to arrive at conclusions about the overall model or about any of the other coefficients that are not impacted by multi-collinearity (Allison, 1999). So for instance socialization to home and general skills of the project leader emerge as significant for this model.

(Refer to equation 13 in Hypotheses table 3 in appendix)

6.8.1 Exploring multi-collinearity.

Considering the fact that the scales of knowledge transfer by project leader and knowledge transfer by client showed high discriminant validity in factor analysis both in the pilot and final data collection. Coupled with the high cronbach alphas (.90 and above) in both pilot and final data collection, we turned to the qualitative data for any clues on why the data was showing multi-collinearity. We had observed at the time of data collection that there seemed to be a ‘theory in practice’ of repeat staffing of PLs on accounts and clients they had already worked on before. It seems as though Techcon had informally been acting upon the idea of dual socialization already. The qualitative comments provided further suggested this when the PL’s claimed that they felt they were losing touch with TechCon and become more aligned to the client ways. For example a PL reported in the survey the following comment:

“ I have felt over the time that when you work overseas with client at their locations, where there are very few (Techcon) resources you loose (Techcon) touch...I mean to say you feel like you are part of client organization. If I am a BRM or Site Manager (in the future) I will be taking care of such resources at least speaking with them over the phone once in a month if they are far away or meeting with them at least in a month.In my case after working so closely with client on many assignments in this project I was recommended by client manager to work on some other role with different challenges, As an individual it was a great opportunity for me to enhance my skill set, I was forced by my (TechCon) leadership team to stay where I am on the name of stability to current project. If (TechCon) wants to really groom their manpower for high end consulting this needs to be stopped. Their should be resource mobilization I am feeling stranded here because Client think that I know too much and no one will be able to replace me from (TechCon) side. I don't understand it is good or bad for my career and (TechCon). Please do share this with (TechCon) leadership. Thanks in Advance”

Upon going back and checking the data for tenure of PL with client in projects other than the current one we found the mean tenure to be around 54 months or approximately a year. It is possible then that the PLs have started aligning closely to the client’s view point and conceptualization of the project. Consequently our assumption that the project team

members are receiving very different project insights from client and PL would not hold here. For example if the client tells the team that the project is best framed around problem X, then it is unlikely that the PL will say that it should be framed around problem Y. Consequently, while dual socialization impacts knowledge transfer in a positive manner, it also influences the “content and tone” of knowledge transferred. It does so by making the knowledge transferred by the PL & client becomes qualitatively similar. While this in and of itself is not a bad thing, and a highly desirable situation from the client’s point of view, it does interfere with our ability in this study to make different predictions around the effects of KTPL and KTCL.

Also we found from the qualitative data that the team members were not always getting substantial direct input from the client. For instance some of the team members noted in the survey:

“Team effort is very important and team knowledge sharing and growth are also important. Sessions should be taken to understand client team in a collective manner , target areas to be strengthened and they handle them in a team discussion.”

“ There should have a direct client interaction with individual team members to know the clients needs and serve them best.”

These comments further validate the idea that while the team members were able to successfully distinguish between knowledge transfer from the PL and knowledge transfer from the client, the ‘content’ of what was being transferred by the PL was perceived to be in close alignment to what was being transferred by the client.

A possible solution to the issue that can be carried out for future research is that the team members supply the scores for KTPL and the project leader supplies the scores for KTCL. By separating out the estimate of knowledge flows we can make comparative predictions about how these two variables impact project related outcomes.

H7b, H 8a and H8b are all hypotheses that get impacted by the issue of multicollinearity. Consequently given below are the overall models and significant variables found for these hypotheses:

Table 13: Hypotheses impacted by multicollinearity

Hypothesis	Anova	Adj R sq	F change statistic	Significant coefficient
H 7 b: KTPL to perf	F = 3.4 (.004)	35%	.004	Prior kn. (.038) Neg B Socialization to home (.015) Socialization to client (.065) Neg B
H8a: KTCL to inter team coordination	Exact results as KTPL to inter-team coordination i.e. overall model is significant, as are socialization to home and general skills of the PL.			
H8b: KTCL to project team performance	Exact results as KTPL to performance. (see row 1 of this table).			

H 9a: Project team performance will be impacted more by KTCL than by KTPL. The impact of both variables is moderated by KNX within the team.

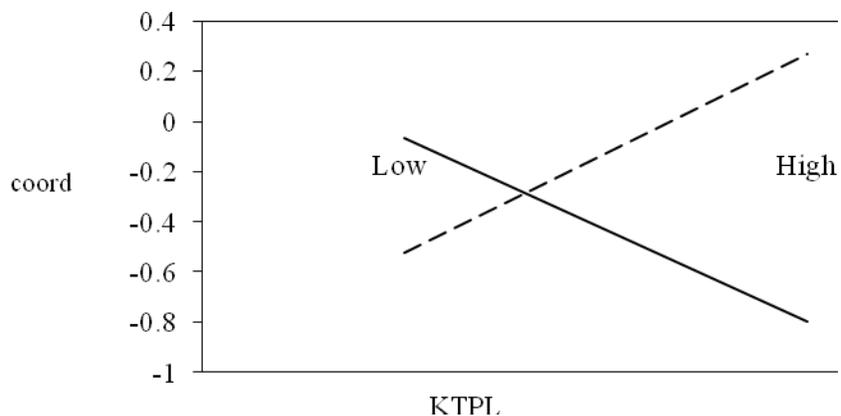
As can be seen from the data, the overall model is significant ($F = 2.4$, $p < .05$). Adjusted R square = 27 %. However again KTCL has been dropped from the model due to collinearity issues and consequently it is not possible to do a comparative analysis as hoped for. The KTPL however is still in the model, allowing us to examine the impact of its interaction with KNX. The interaction though is insignificant.

(Equation 16 in Hypotheses table 3 in appendix)

H9b: Inter-team coordination will be more strongly impacted by KTCL than KTPL. The impact of both variables will be moderated by KNX within the team.

In this the overall model is significant ($F = 2.6$, $P = .01$). The adjusted R square goes up to 29.7 % so the model has good predictive validity. In this model since KTPL is retained

we are able to make definitive statement about the significance of the interaction between KNX and KTPL which his significant at $P = .014$. So while are not able to do a comparison of impact between KTPL and KTCL we can see that KNX and KTPL interact in a manner that matters significantly for inter-team coordination. Socialization to home and general skills of the PL are also significant. Consequently, the impact of KNX within the team clearly impacts how KTPL will impact inter-team coordination. This points to the need and importance for strengthening internal team processes for utilizing any knowledge made available from different sources. As can be seen from the plot below, at high levels of KNX within the team, the greater the KTPL the better the inter-team coordination. At low levels of KNX within the team, even if KTPL goes up the inter-team coordination suffers. This shows that in the absence of effective internal processes knowledge transfer does not create the desired outcomes.



When conduct a test of simple slopes while we do not get b_1 values for KTPL due to multi-collinearity, however we do get significant values for the product terms of KTPL and High KNX ($B=3.3, p < .041$) and KTPL with low KNX ($b=2.76, p < .05$).

H10a: The relationship between KTPL and inter-team coordination is moderated by knowledge exchange. The higher the knowledge exchange the greater the impact of knowledge transfer by PL.

The overall model is significant ($F = 2.67$, $p < .01$), and change in F statistic is significant ($P < .05$). The adjusted R square goes up with the addition of the interaction term to 29.5%. While the interaction term is significant ($P < .05$) in the absence of the main effect of KTPL we are not able to interpret this interaction meaningfully (see previous discussion on multicollinearity). However, in the previous section where KTPL was retained in the equation we did see that as in the absence of high levels of KNX the KTPL does not lead to the desired outcomes.

(Refer to equation 14 in Hypotheses table 3 of appendix)

Remaining hypotheses

Given below is a summary of the overall model and key statistics for the remaining hypotheses involving KTCL and KTPL. As noted earlier, since either one of these variables is dropped from the model we can only make predictions about the overall model level & those coefficients which don't suffer from multi-collinearity.

In the hypotheses below, over all models are all significant. As for the significant coefficients, we find that control variables: socialization to home and client, and prior knowledge, have similar patterns of significance and beta signs as found in other hypotheses related to team performance. This indicates that there is stability in patterns emerging from the data.

Table 14: KTPL & KTCL hypotheses

Hypothesis	Anova	Adj R sq	F change	Significant coefficient
H 10b: KTPL to perf mod by KNX	F = 3.8 (.002)	36%	N.S	Prior kn. (.031) Neg B General Skills of PL *.10) Socialization to home (.012) Socialization to client (.05) Neg B
H 11a: KTCL to inter team coordination mod by KNX	Exact results as KTPL to inter-team coordination moderated by KNX			
H 11b: KTCL to perf moderated by KNX	Exact results as KTPL to performance moderated by KNX.			

H 12: The joint impact of technical and context knowledge transferred by PL will be higher for project team outcomes than either type of knowledge taken alone.

We are unable to test this hypothesis in its entirety as KTPL gets dropped from the model and individual coefficients of Technical knowledge and context knowledge as transferred by project leader are not significant for either types of knowledge. Given that previous hypothesis tests have yielded a significant impact of KTPL on project team outcomes, it is possible that both these types of knowledge are closely related. Upon looking at the correlations we find a significant correlation of .67. This relationship bears out in line with the situated learning theory which shows that both all knowledge is closely related to the context of its origin. In this case it seems that KTPL matters only when the two types of knowledge are considered together and not separately (as we were trying to test in this hypothesis).

6.9 CONCLUSION

In this chapter we tested three groups of hypothesis, the first related to dual socialization and its impact on knowledge transfer by PL. While main models were significant, the individual coefficients were not. We advanced three possible alternate explanations for our findings – contextual distance, stage of project and structural vs. relational factors. Upon testing for the third alternative we found that indeed process factors internal to the team mattered for the impact of PL's socialization to client and KTPL.

In the second set of hypotheses, that centered around the direct impact of dual socialization on project team performance and inter-team coordination we found several main and interaction effects to be significant. This provides evidence that dual socialization impacts team outcomes in important ways that merit further investigation. We also found that socialization to home and socialization to client act in competing and complementary ways depending on the hypothesis and moderators being investigated. One of the most interesting findings being that socialization to home could potentially have a down side to it when it comes to managing performance of inter-organizational project teams. The role of prior knowledge as a facilitator as well as an impediment provides important insights into how project team's prior experience plays into project performance.

In the final set of hypotheses, which were framed around the impact of KTPL on project performance and inter-team coordination, as well as the relative impact of KTCL on the same, we ran into issues of multi-collinearity. While this reduced our ability to make predictions about the individual coefficients we did note the significance of overall models. In the next chapter we talk about the implications of our findings, the limitations and the scope for future research.

7.0 CHAPTER 7: CONCLUSION

This thesis began with the aim of investigating issues of managing knowledge and collaboration across the boundaries of inter-organizational project teams. Given that projects are a structural form of organizing industrial activity that cut across industries (such as healthcare, construction, information technology and education), this area is bound to garner increasing attention from scholars and practitioners alike. This study examined an important but under studied area of the role played by the dual socialization of project leaders in the transfer of knowledge and project team outcomes. To date there have been no studies examining this aspect of project teams. Consequently this thesis makes contribution to theory, measurement and practice by proposing and testing a model on this topic, as well as the introduction of the construct of ‘dual socialization’.

The theoretical base for this thesis was drawn from a wide and diverse set of literature- project management, socialization, boundary spanning, knowledge transfer, and leadership. The resulting model expanded the domain of socialization as a construct from being considered a variable of interest only in a ‘within’ firm setting, to a variable that had considerable importance in a ‘between’ firm/team setting. This domain expansion was identified as a valuable means of understanding issues of knowledge transfer and performance in teams that actively exchange knowledge and resources with the outside environment.

We proposed that socialization in general, and dual socialization in particular was a key learning mechanism that gave individuals an opportunity to grasp the tacit elements of a context. The uniqueness and value of the socialization perspective lies in its ability to initiate a newcomer to a context in a manner that enables him/her to grasp the idiosyncratic nature of knowledge. While not all hypotheses were supported, the data provided substantial support for the claim that it is imperative for scholars in organizational behavior to start actively considering and incorporating the dual aspect of socialization in their research agenda.

In this final chapter we shall discuss the theoretical and practical implications of our research findings. We will discuss the significance of our model and how it makes a contribution that is both novel and valuable for others pursuing research in this domain. We shall also touch upon the limitations of this study and make suggestion for future research.

7.1 CONTRIBUTIONS

1. Operationalization of dual socialization: As noted in chapter 1, we had theoretical reasons to believe that for individuals who actively interact with teams outside their own firm, the idea of being socialized to an external setting was an important one. Dual socialization i.e. socialization to home and socialization to client team was a construct that deserved the attention of scholars. Given that there existed no prior investigations on this topic, the first challenge was the operationalization of the construct in a manner that was both reliable and valid. While many researchers can draw on established scales for their work, the side effect of working on a novel construct is the significant effort and attention involved at the construct conceptualization and measurement stage. While, the scales demonstrated good reliability and validity they had to go through multiple iterations, pre-test and pilot testing. This dissertation has done much of the ground work that would provide scholars with a stronger footing when they work on further refining and validating this construct of dual socialization.

Based on Chao et al (1994)'s model we proposed the operationalization of dual socialization as consisting of separate measures of both client and home team socialization. The distinctiveness of both these aspects of socialization was supported through the various hypotheses tests. The impact of socialization to each of the teams on the outcomes of interest, was at times complementary and at other times competing. It seems that measuring dual socialization in this manner yields a fine grained view of socialization as a construct. The alternative of conceptualizing dual socialization as a monolithic variable and asking individuals to rate how well they felt 'socialized to *both* client and home team' would substantially reduce our ability to predict and analyze outcomes in an in-depth manner. Thus, this research has isolated an important way of conceptualizing and measuring dual socialization that should prove useful in understanding not only issues of knowledge transfer

and team performance, but other aspects such as commitment, identification, and leader-member exchange that researchers may wish to consider in such settings.

2. Team level of analysis: Teams provide an important context in which individual behavior unfolds. This study makes a critical contribution to our understanding of socialization at an important but relatively unexamined level of analysis i.e. the team. Also as noted in chapter one, an employee's knowledge of the work group and their knowledge of the task at hand are worthy of separate treatment from organizational socialization. This is because in a knowledge based economy and project based organizations, people often change work groups and tasks, and the rate of change in an employee's team and job socialization proceeds at a much higher speed than organizational socialization. This study is further proof, that researching socialization issues at the team level yields important insights that merit further attention.

3. Incorporating the influence of status: This is also the first study that considers the team level impact of socialization of key stake holders (project leader). Socialization researchers have primarily been focused on individual level of analysis, or the interaction between a 'new comer' and team. Despite the general recognition that not all newcomers are equal, there are no studies that actively examine the differential impact of newcomer's status on socialization outcomes. While there may be several ways of conceptualizing status in a team, (for instance formal and informal or influence of surface and deep level differences etc.) this thesis has examined an important and common means of measuring status in project teams- the role of the formally appointed project leader.

4. Findings from the study: This research has provided strong evidence for the role of dual socialization in settings where boundaries impede understanding and hamper collaboration. The research on boundary spanning has for long pointed to the importance of understanding internal and external environments (Adams, 1980; Aldrich et al., 1977; Im & Rai, 2008; Tushman et al., 1981), and examined the various activities performed for this purpose (Ancona & Caldwell, 1992a; Caldwell & O' Reilly, 1982; Carlile, 2002b; Keller et al., 1975; Kellogg, Orlikowski, & Yates, 2006; Levina et al., 2005). However, there has been little discussion on what enhances those activities or supports the boundary spanning roles. For instance, we know that strong ties and trust with external parties help transfer knowledge (Becerra, Lunnan, & Huemer, 2008; Chowdhury, 2005; Jarvenpaa & Leidner, 1999; Levin et

al., 2004; Staples & Webster, 2008) but what would lead to those strong ties and trust has not been paid adequate attention. By defining the construct of dual socialization then we have made available an important variable that can be examined for this purpose. In the next section we examine the contribution made by the specific findings of the study.

The finding that socialization to the home team can act a facilitator when it comes to inter-team coordination but an impediment when the team is highly interdependence on client, supports a contingency theory perspective of socialization. This perspective is not only unique and novel, it opens up a line of investigation around socialization which as a process has almost always been viewed with positive undertones. Here is empirical evidence that socialization can actually have a down side to it. Similarly, socialization to client acts as facilitator for inter-team coordination but as an impediment to home team performance due to possible distractions created for the PL. These findings then make important contributions by providing boundary conditions to the theory and research on socialization.

Another interesting finding that has implications for the wider research on knowledge transfer is the role played by prior knowledge of the team members. The path dependent view of learning has been widely accepted in literature and much has been written about the role prior learning plays in the creation of absorptive capacity (Cohen & Levinthal, 1990). However, recently as Zahra & George (2002) have noted two different dimension of absorptive capacity worthy of separate treatments i.e. the dimension of potential (acquisition & assimilation of knowledge) and realized (exploitation of knowledge) absorptive capacity. In our findings, while prior learning made a positive contribution to the team's ability to receive knowledge from the PL (potential absorptive capacity), it played a negative role in inter-team coordination and project team performance (exploitation of knowledge). This then provides evidence that prior learning may help in exploration but can actually hinder exploitation of knowledge received. Our findings then stand in support of the emerging literature on different aspects of absorptive capacity.

This dissertation has only touched upon the tip of the iceberg of the puzzle of leadership, socialization and knowledge transfer in project teams. Undoubtedly there are various other variables that can be incorporated into the current conceptualization and probably will be. However it is important to start establishing and articulating some initial

constructs that can then lead to the development of a more robust chain of causal arguments. Towards this the thesis makes very critical contributions.

7.2 PRACTICAL IMPLICATIONS

Dual socialization provides a very important perspective to managers of teams struggling with issues of knowledge transfer. It can act as an important diagnostic tool to understand why teams may not be able to create a common ground for exchange of knowledge. While currently teams tend to put be together more on the basis of technical expertise, the current study points to the importance of understanding team context in influencing outcomes. Managers can use the scales developed and easily adapt it for distribution to their team and evaluate the extent and domain of inputs needed through either formal training programs or informal practices such as mentoring. Employees could do self assessments of their contextual understanding or have key stake holders do the evaluation. One of the respondents of the survey for instance commented *“This is the first time I have given thought to how I need to understand different aspect of the client and my team. It helps to think of it this way...”*

Beyond the evaluation of levels of socialization, the recognition that factors such as interdependence on client and contextual distance heighten the need for socialization, can allow managers to decide how to allocate resources for socialization of the members. It needs to be remembered that socialization is a very effective but also a very time consuming and resource intensive means of knowledge acquisition. In teams where there is not such high interdependence or contextual distance there isn't a need to emphasize the socialization issue to such an extent.

Also the current study points to the importance of the knowledge exchange process as a critical factor in team performance. It helps bring attention to the fact in the absence of a good knowledge exchange mechanism within the team, even a high quality of input may not realize its potential value. Also knowledge exchange processes within the team can act as substitutes for availability of knowledge from one or more sources.

While in this thesis we not able to assess the effect of knowledge flows from the client vs. the project leader separately, it is important for teams to actively consider how they are utilizing the knowledge available from various sources. This in turn would help managers assess the usefulness of different sources for impacting outcomes of interest. Asymmetries in knowledge flows could also be corrected by actively monitoring the contribution of various sources. Upon the administration of the survey in TechCon we got numerous comments which indicated that the teams had not actively considered this aspect of knowledge flows into the team and the administration of the survey actively brought this idea into their field of consideration.

Additionally, while teams are often assembled with people who may have worked on similar areas in the past, the fact that prior learning could prove to be an impediment in the effective execution of tasks, emerges as an important red flag for managers. They should actively watch out for the potentially negative aspect of prior knowledge. The idea of ‘unlearning’ might be an important consideration that needs to be built into managing expertise within the team.

7.3 LIMITATIONS

There exist no studies without potential limitations, and this study is no exception to the rule. In particular given that this was research that was being carried out on a topic where no previous work had been done, several factors must be kept in mind while interpreting the findings or using the measure put forth.

Firstly, while we were able to get good reliability and validity for our measures of dual socialization, we had to drop several items due to cross loading or lack of loadings. While for the final set of items retained, the two aspects of socialization loaded onto their intended constructs, the cross loadings between the items dropped may point towards another aspect of socialization. It is possible that there may exist at a dimension at a higher order which encapsulates both type of socialization. For instance, there could be socialization to home team, socialization to client team, and then socialization to the common culture created

due to the interaction of the project teams. Alternately, it may be useful to get ratings of socialization of the PL from other stake holder such as the client, or a supervisor. The advantage of getting ratings other than self is that it allows us to tap into individuals who either has greater insight into the culture of the other party (to say if the socialization of the PL is adequate or not), or have a stronger ability to distinguish between the culture of both teams. This may eliminate the issue of cross loadings that emerged.

Secondly, this is a cross sectional design. Depending on the contingencies that might emerge at various stages in the project there could be differences in the impact of dual socialization and the issue of knowledge transfer. We selected six months as a cut off criteria to provide the BRM with ample time to evaluate projects, and teams ample time to evaluate a PL . Also the six month criteria was meant to provide PL adequate opportunity at socialization. However this meant we may have missed the dynamics of project start up or a critical incident involving a deliverable. It would be useful to be able to study our model at different points in a project lifecycle. However, given that this was the first study of its kind aiming to establish the importance of the dual socialization as a construct, the cross sectional nature of data does not prevent us from making a compelling argument for the importance of the construct and its impact on knowledge transfer and team performance.

Thirdly, an important question that arises is the issue of external validity of the findings. This study was done with a sample of expatriate professionals involved in information technology projects. How far would these findings apply to other sub-populations in different settings is questionable. However, the theory that was used for the creation of hypothesis and the issue of overcoming boundaries to knowledge transfer is not limited to the field of IT projects or to expatriate workers. The issue of dual socialization could be equally relevant to the exchange of knowledge sharing between surgeons and physicians (health care projects) and engineers and sales divisions (manufacturing set up). Also while this data was collected from project teams of a single consulting organization, the client with reference to whom the dual socialization matters were from different industries and organizations.

Fourthly, the project team performance indicators that were collected at a time that the projects were still underway. The alternative to this would have been to collect data after project completion. In which case there would have been possibilities of retrospective bias.

Consequently, while our findings need to be interpreted with caution due to the live nature of the projects, it does not detract from the assertion that dual socialization has important implications for knowledge transfer and team performance. How this relationship plays out over time can be a subject for future research towards which we now turn our attention.

7.4 FUTURE RESEARCH

Given that this research is the first of its kind, there exist a tremendous potential for further research arising from (a) some of the limitations identified in the previous section and (b) the type of research question that this line of research will generate. In response to the first aspect, a longitudinal study with data collection at the start, middle and end of project could provide a far more detailed view of the relationships proposed than was possible in this study. Alternately, the data collection could be guided by the milestones that are reached in each project. As was discussed in the previous section, the ability to see how the dual socialization construct gains prominence at various points in the project life cycle would provide robust ground for theory development and testing.

A stronger test of generalizability could be done by testing these relationships in other settings with the incorporation of theoretically relevant moderating variables, or in teams that have less stability (eg: emergency trauma teams). This type of replication would provide important insights into how the variables interact to influence the outcomes of interest in various settings.

A very important area of investigation that can be undertaken as a direct offshoot of this study is to see how dual socialization of the project leader impacts the exchange of knowledge with the client team. It is possible that socialization to home and socialization to client may have different impact on the way a leader can transfer knowledge to the client team. In the case of knowledge transfer to the home team the PL had the advantage of organizational and functional affiliation with the home team, this would not be the case when it comes to knowledge transfer to the client. Under the circumstances, the impact of dual

socialization for knowledge transfer to the client may provide even stronger evidence for the importance of the construct.

The foundations laid by this study could be fruitfully used by researchers to study the other related questions involving dual socialization to the team, and the antecedents that matter most for dual socialization. For example, is it more profitable to have one vs. multiple individual's who are dually socialized? Do team members contribute to each other's dual socialization more effectively than socialization through the project leader? Is the dual socialization of informal leaders more important than the dual socialization of the formal leaders given the emergent nature of the former?

The conceptualization of the differential impact of knowledge flows from various sources (PL vs. client) also stands as a contribution to research that can be incorporated in future work. In our study, the team member recognized the PL, client and other team members as separate contributors to knowledge in the team. However, no work prior has made an attempt to simultaneously consider this aspect and its impact on performance. With a more refined approach to measurement, there lies a source for substantial contribution to research. For instance, knowledge transfer by PL can be measured by team member ratings and knowledge transfer by client could be measured by PL ratings. This would enable very different views of the knowledge flow into the team (unlike the current study where team members provided all three ratings of knowledge transfer by client, PL and team members).

While our investigation of dual socialization and its impact was done at the team level, the construct can be conceptualized as having cross level influences. For instance, the construct of dual socialization can be incorporated into the resourced based view (Barney, 1991) of the firm, where one could test if dual socialization allows the creation of rare, inimitable and competitive advantage to firms. Dual socialization may influence the way dyadic exchanges take places between members as well between leader and members. In other words, there is value in examining the impact of this construct by its incorporation in other theories and at different levels of analysis.

7.5 CONCLUSION

While research on managing knowledge in project teams has actively identified the importance of creating a common ground, and alignment of the business and IT aspects of project execution, systematic attention has not been paid to the role of the project leader. Nor have there been many studies that have examined factor enhancing the effectiveness of the PL in this role. While socialization as a construct holds tremendous value for informing our research agenda, it an theoretical lens that has been used only for examining outcomes in a 'within' firm setting, and with a focus on traditional OB concerns (eg: the focus on commitment, satisfaction, turnover, role clarity).

This study is the first to systematically examine socialization at the team level of analysis, and in a 'between' firm context. We have also focused on dependent variables that are more directly related to learning and of tremendous interest to researchers working on current issues of organizing work. At a time when the extent of collaborative work is growing exponentially, this construct holds tremendous potential for increasing the understanding of researchers and practitioners alike on to managing team performance and influence effective knowledge transfer.

This thesis represents a very nascent and exploratory attempt at mapping out the domain and impact of dual socialization and its relationship with knowledge transfer. The theoretical model proposed hold tremendous potential for further refinement and sophistication. It is hoped that the work done in this thesis will provide other researchers with the impetus to incrementally build and enhance our understanding of this phenomena.

The field of organizational behavior needs to actively test its theories and their boundary conditions in settings which may not have been common in the past, but are fast becoming a norm for execution of work. Assumptions of long term employment, involvement with only one organization, and stability of teams are just some of the boundary conditions of several theories, including the ones on socialization. This study shows that socialization as a construct has important contributions to make in the new forms of work arrangement as well. Researchers would do well to pay attention to this aspect of theory development and testing in order to keep up with the changing world of work.

APPENDIX A

Survey items

1. Knowledge transfer

(a) Technical knowledge transfer

While working on this project, you get project relevant knowledge from various sources such as the project leader, other TCS team members, and sometimes the client directly.

Knowledge, whether written or verbal, is valuable if you are able to apply it to the task at hand or improve in some ways in your thinking or skill level.

Think back from the time you joined this project up to the present moment, and recall the communication of project related knowledge from your project leader, TCS team members and/or the client to you.

Then rate the extent to which the unique *knowledge gained from 'each' source allowed you to improve on the following areas:*

1 = Not at all and 5 = To a very large extent; In case of the client transfer questions an option of 6 = not applicable was also given.

1. Improved your understanding of the technical needs of client
2. Improved your ability to come up with technically sound solutions for the client .
3. Improved your understanding of how your work fits in with what the client wants.
4. Improved your ability to assess if your work meets the quality standards of the client
5. Improved your ability to meet the technical requests made by the client.

(B) Context knowledge transfer

Think back from the time you joined this project up till now. Rate *how useful was the unique knowledge provided to you* by the following sources in helping you improve on the following dimensions.

1 = Not at all and 5 = To a very large extent; In case of the client transfer questions an option of 6 = not applicable was also given.

1. Improved your understanding of how things 'really work' in the client organization vs. how they say it works.
2. Improved your ability to read between the lines when interacting with the client
3. Improved your quality of relationship with the client.
4. Improved your understanding of the unwritten rules that guide the client's approach to this project.
5. Improved your confidence in how well you can anticipate changes in client requirements

2. Socialization of the project leader

(a) Political knowledge

To what extent do you agree or disagree about the following statements related to your understanding of the client's way of working ? (1 = strongly disagree and 5 = strongly agree)

1. I have learned how things 'really work' on the inside of the client team.
2. I know who the most influential people in the client team are.
3. I do not have a good understanding of the politics in the client team
4. I understand the motives that guide the actions of the client team members
5. I have a good understanding of those 'things not said' by the client but which matter for moving this project forward.

(b) Culture and values:

To what extent do you agree or disagree with the following statements about your insight into the culture of the client team ? (1 = strongly disagree and 5 = strongly agree)

1. I understand the relevance of this project to the larger goals of the client firm.
2. I am aware of the hierarchy of values that drives the client's decision making process.
3. I am highly aware of the thinking and decision making style of the client's key stakeholders involved in this project.
4. I have a good sense of how easy or difficult it will be to get the client to accept a new idea or solution pertaining to the project.
5. I am not familiar with what are the acceptable ways of defending ideas and proposals at the client firm
6. I understand how to act in a manner that is consistent with the client's values and ideals.

(c) Social integration with the client

To what extent do you agree with the following statements about your relationship with the client team ? (1 = strongly disagree and 5 = strongly agree)

1. I do not consider any of my client team members as my friends.
2. The client team members seem to accept me as one of them
3. I am usually excluded in informal networks or gathering of people in the client team. Client team members usually tell me the team gossip/news
4. I enjoy spending time with members of the client team
5. I am not good at understanding the slang, buzz words and special jargon used in the client organization

6. When in a meeting with the client, I find it easy to follow the acronyms and abbreviations that they use.

7. I often invite client team members to informal gatherings of Techcon employees

(d) Awareness of expertise-

How well do you know the client team's knowledge and skills ?

(1 = Not at all; 7= To a very large extent)

1. I have a good mental map of the client team's talents and skills
2. I know who on the client team has specialized skills and knowledge that are relevant to this project.
3. I can easily find the relevant people from the client team who will have the answer to my project related questions.
4. I am uncertain as to what project related skills and knowledge each of the client team members possess.

3 . Project leader socialization to the home firm (only used in Pilot)

A project leader represents TechCon to the client and his/her team. To what extent do you agree or disagree that the current project leader (1 = strongly disagree ; 5 = strongly agree)

1. Is a good representative of TCS culture and values
2. Has a good understanding of how things 'really work' in TCS.
3. Knows who the key decision makers and influential people in TCS are.
4. Has a good understanding of TCS vision, mission and strategic priorities.
5. Knows the strengths and interests of TCS as an organization
6. Has a good rapport and communication with other TCSers.
7. Is a good resource for leading other TCS projects in the future.
8. Has a management style compatible with the 'TCS way' of doing things.

5. Contextual distance

How similar is the client team's culture to the TechCon way of doing things ?

(1 = Highly disagree, 7 = highly agree.)

1. The business practices and operational mechanisms of your client are very similar to yours
2. The corporate culture and management style of your client is very similar to your.

6. Knowledge exchange and combination capability

To what extent do the following statements reflect your *team's ability to exchange knowledge with each other* ?

1 = strongly disagree; 7 = strongly agree

1. Individuals in this TechCon project team are proficient at combining and exchanging ideas to solve problems or create opportunities.
2. Individuals in this TechCon project team do not do a good job of sharing their ideas to come up with new ideas, products, or services.
3. Individuals in this TechCon project team are capable of sharing their expertise to bring new projects or initiatives to fruition.
4. Individuals in this TechCon project team have learned to effectively pool their ideas and knowledge.
5. It is rare for individuals in this TechCon project team to exchange and combine ideas to find solutions to problems

7. Interdependence on the client team

To what extent do you agree with the following statements about client input associated with this project:

3. This project can be performed fairly independent of the client (reverse coded)
4. This project can be planned with little need to coordinate with the client (Reverse coded)
5. To complete this project information is rarely needed from the client. (Reverse coded)
6. This project is relatively unaffected by the performance of the client team (reverse coded)
7. This project requires frequent coordination with the effort of the client
8. Performance of the project task is dependent on receiving accurate information from the client.

8. Prior knowledge of team members

Prior to the start of this project how would you have rated the extent of your capability on the following knowledge/skill dimension (1 = Not at all and 5 = To a very large extent)

1. How well versed were you in the technical knowledge required to work on this project.
2. How closely was the project related to your areas of expertise
3. How adequate were your managerial competencies to deal with the type of problems posed by the client.
4. How familiar were you with the industry the client works in
5. The extent to which your past client's had a similar organizational culture

9. Team performance

Compared to other similar projects being executed by TCS, how would you on 'average' rate the performance of this team so far:

1 = Very poor, 5 = Excellent

4. Meeting project objectives
5. Meeting project timelines
6. Staying within budget
7. Using resources productively
8. Quality of output
9. Customer service to the client
10. Quick to respond to problems and opportunities
11. Overall performance

10. Inter-team coordination

To what extent do you agree or disagree, with the following statements about the way this project team coordinates tasks with the client 1= strongly disagree; 7 = strongly agree

3. Connected processes and activities are well coordinated with the client
4. Duplication and overlapping activities are avoided
5. The team has no problem coordinating its efforts with the client
6. Conflict with the client is settled quickly
7. Project related discussions with the client are conducted constructively

11. Technical skills of project leader:

Keeping in mind other PLs in similar projects, how would you rate current project leader's generic technical and domain knowledge? (1 = Very poor, 5 = Excellent)

1. Ability to interpret business problems and develop appropriate technical solutions.
2. Understanding of technology trends in his/her area
3. Level of business domain knowledge
4. Ability to recognize potential ways to exploit new business opportunities that can use IT.

12. Generic managerial skills of the project leader

Keeping in mind the skill level of a typical PL in TCS, how would you on average rate this project leader's skills and abilities on the following dimensions:

1. Ability to plan and execute work in a collaborative environment
2. Ability to deal with ambiguity
3. Ability to accomplish assignments
4. Ability to teach others
5. Ability to plan, organize and lead projects,
6. Ability to develop and deliver effective, informative and persuasive presentations and memos
7. Ability to be self- directed and proactive

13. To classify our results better we would appreciate some information

about you:

1. Please tell us about your work experience (list 0 if no experience)
2. Total years of work experience in TechCon (list numeric value-1,2,3 years)
3. Total years of IT industry experience
4. Outside of this project, total weeks of work experience with this client.(list 0 if no experience)
5. Highest educational degree obtained
6. Gender

14. If you have any experiences or suggestions on enhancing learning and knowledge sharing within and between TCS team working in international set ups, please do share it with us here

APPENDIX B

Sample of communication with respondents

Email sent by head of HR of TechCon launching the survey:

Dear Colleague,

As you know, effectiveness at managing the knowledge and learning processes in a firm, is a key factor in the success of any organization. We rely heavily on exchange of knowledge with each other and our clients in order to do our jobs effectively. Given our global spread and cross cultural mix of clients and employees, we need to constantly evaluate and improve on our ability to share knowledge effectively.

You will be pleased to know that we are assessing ways to enhance the quality of our knowledge management processes. Towards this end TechCon is participating in some very interesting research on “Managing knowledge in international project teams’, being carried out at the University of Pittsburgh.

One or more of your projects has been identified for participation in this survey. You will be receiving a link to the survey that needs to be taken online by the BRM, the project leader and the team members for each project identified.

Your online responses will be transmitted directly to the researchers at the University of Pittsburgh and will be treated as confidential. Neither I nor any managers at our firm will have access to your individual results. After the response has been analyzed the researchers will prepare a summary report of recommendations for senior management.

While participation is voluntary, I would deeply appreciate your cooperation with this important research. Please complete the questionnaire by the deadline that will be mentioned in the email to follow.

Dr. Gary Florkowski & Ms. Tanvi Gautam, who are the contacts for this research at the University of Pittsburgh will be emailing you further details.

Thank you for your participation in advance

Mr. John Doe

Emails sent to the BRM as a follow up to the message from John Doe

Dear Mr <<Insert name>>

Further to the email sent by Mr. John Doe, I am writing to share with you more details on the knowledge management study being done in TechCon. This study involves a survey in which the BRM, PL and team members of identified projects need to participate, and answer questions related to knowledge exchange and some self assessment on knowledge competencies in the project team.

The BRM survey is a short 15 minutes survey of 3 pages, which asks questions about project performance, project leadership and knowledge needs of projects. This is a very important part of the study as it allow us to see how knowledge sharing processes links with performance parameters.

You are requested to please send an email to the project leader of the identified project:

Project number: <<Num>>

Project name: <<Name>>

Survey link: <<URL>>

Access code: <<code>

And request them to fill the survey by Friday <<date>>

For your convenience, we are providing a small draft (below) explaining the survey, the link to the website, as well as the 4 digit code below, that you can cut and paste, and modify if needed, for the project leader email.

In advance, we wish to thank you for your participation in this study. We are confident that results of this study will benefit your organization and will provide important insights into ways of increasing effectiveness of knowledge management systems and processes.

Draft for project leader:

Dear project leader,

The success of a consulting firm depends on how well it manages the knowledge and experiences of its employees. Prior research has shown that effective knowledge transfer in IS projects can improve project performance, by enhancing team capability, as well as open doors for future business opportunities with the client.

You will be pleased to know that TechCon is assessing ways to enhance the quality of the knowledge management practices in the firm. Towards this end the firm is participating in a global study on “Managing knowledge in international project teams”, being carried out at the University of Pittsburgh. The research is aimed at understanding knowledge exchange within and between the team of clients and consultants, and factors that enhance or detract from the process. Participation of the BRM, PL and team members in the survey is needed to accurately conduct the study.

Your responses will be kept confidential, and will be transmitted directly to the researchers. No one in TechCon is able to access your responses. The results will be shared with TechCon management at the aggregate level once the study is complete. Individual level responses will not be a part of the report.

Please fill the survey, as well as forward the link below the rest of the team along with the access code. The deadline for completing the survey is....

Survey link: <<URL>>

4 digit code : <<Code>>

Thanks for taking the time to do this.

<<BRM name>

Reminder emails for survey completion

To BRMs whose teams are missing substantial team member data

Dear all,

As of 9 AM (EST) this morning, **we have your and your PLs data** on the knowledge management survey. We really appreciate the time taken to participate.

We are **still missing a substantial number of team member responses** from the projects. Since you and the PL have invested time in this survey, and provided valuable inputs, we would like to get a more complete picture from the rest of your team members in the US.

Today/3 days from now is the final deadline for the survey. We are confident that a reminder to the team members from you and the PL would help in gathering more responses.

Thanking you for your support,

Tanvi Gautam & Gary Florkowski

University of Pittsburgh

APPENDIX C

Pilot study data tables

Table 15: Factor analysis of socialization to client team

	Component			
	1	2	3	4
I have learned how things “really work” on the inside of the client team.	.466	.648	.026	.211
I know who the most influential people in the client team are.	.044	.750	.035	.227
I understand the motives that guide the actions of the client team members	.006	.104	.112	.889
I understand the relevance of this project to the larger goals of the client firm.	-.096	.831	.155	.084
I am highly aware of the thinking and decision making style of the client’s key stakeholders involved in this	.409	.700	.184	.029
I have a good sense of how easy or difficult it will be to get the client to accept a new idea or solution pertaining	.804	.102	.191	.017
Client team members usually tell me the team gossip/news	.047	.051	.747	.353
I enjoy spending time with members of the client team	.145	.256	.762	.221
I often invite client team members to informal gatherings of TechCon	.055	.111	.829	.372
I have a good mental map of the client team’s talents and skills	.702	.423	.205	.280
I know who on the client team has specialized skills and knowledge that are relevant to this project.	.631	.418	.236	.410
I can easily find the relevant people from the client team who will have the answer to my project related question	.625	.479	.239	.027
I am uncertain as to what project related skills and knowledge each of the client team members possess.	-.747	.216	.189	.118

Table 16: Factor analysis of socialization to client (2 factor split)

	Component	
		2
-I have learned how things “really work” on the inside of the client team.	.809	.049
-I know who the most influential people in the client team are.	.607	.042
I understand the relevance of this project to the larger goals of the client firm.	.493	.221
I am highly aware of the thinking and decision making style of the client’s key stakeholders involved in this project.	.759	.192
-Client team members usually tell me the team gossip/news	.054	.754
-I enjoy spending time with members of the client team	.314	.772
I often invite client team members to informal gatherings of TechConers	.046	.806
I have a good mental map of the client team’s talents and skills	.840	.192
I know who on the client team has specialized skills and knowledge that are relevant to this project.	.813	.234
-I can easily find the relevant people from the client team who will have the answer to my project related questions.	.770	.221
-I have a good sense of how easy or difficult it will be to get the client to accept a new idea or solution pertaining to the project.	.612	-.255

Table 17: Factor analysis of project leader's generic and technical skills

	1	2
Level of technology related knowledge.	.108	.826
Ability to interpret business problems and develop appropriate technical solutions.	.240	.817
Understanding of technology trends in his/her area	.252	.843
Level of business domain knowledge	.313	.895
Ability to recognize potential ways to exploit new business opportunities that can use IT.	.286	.832
PL generic skills-Ability to plan and execute work in a collaborative environment	.721	.402
PL generic skills-Ability to deal with ambiguity	.832	.223
PL generic skills-Ability to accomplish assignments	.785	.386
PL generic skills-Ability to teach others	.642	.336
PL generic skills-Ability to plan, organize and lead projects,	.895	.169
PL generic skills-Ability to develop and deliver effective, informative and persuasive presentations and memos	.899	.000
PL generic skills-Ability to be self- directed and proactive	.639	.404

Table 18 : Factor analysis of knowledge transfer by project leader

KTPL resid 1	0.2228	0.7935
KTPL resid 2	0.2053	0.8557
KTPL resid 3	0.4071	0.7008
KTPL resid 4	0.4944	0.8132
KTPL resid 5	0.2783	0.7935
KTPL resid 6	0.7892	0.1778
KTPL resid 7	0.7478	0.3410
KTPL resid 8	0.7573	0.3927
KTPL resid 9	0.7892	0.2414
KTPL resid 10	0.7703	0.3199

Table 19 : Factor analysis of knowledge transfer by client.

KTCL resid 1	0.0659	0.7696
KTCL resid 2	0.0763	0.8888
KTCL resid 3	0.4903	0.6482
KTCL resid 4	0.4893	0.6377
KTCL resid 5	0.4091	0.7101
KTCL resid 6	0.6874	0.4150
KTCL resid 7	0.8652	0.4150
KTCL resid 8	0.8163	0.1133
KTCL resid 9	0.8688	0.1205
KTCL resid 10	.8604	0.2078

Table 20 : Factor analysis of knowledge transfer by team members.

KTTM resid 1	-0.0795	0.7995
KTTM resid 2	0.1628	0.7802
KTTM resid 3	0.4235	0.6335
KTTM resid 4	0.4082	0.5789
KTTM resid 5	0.4012	0.6782
KTTM resid 6	0.5935	0.2220
KTTM resid 7	0.8177	0.1586
KTTM resid 8	0.8211	0.1145
KTTM resid 9	0.8075	.1399
KTTM resid 10	0.8316	.1884

Table 21: Factor analysis of inter-team coordination

Component	
Dropping item 3 – no problem coordinating effort	
Connected processes and activities are well coordinated with the client	.855
Duplication and overlapping activities are avoided	.807
Conflict with the client is settled quickly	.845
-Project related discussions with the client are conducted constructively	.634

Table 22: Factor analysis of team performance scores

Component	
	1
project performance-Meeting project objectives	.902
project performance-Meeting project timelines	.845
project performance-Staying within budget	.672
project performance-Using resources productively	.545
project performance-Quality of output	.785
project performance-Customer service to the client	.743
project performance-Quick to respond to problems and opportunities	.804
project performance-Overall performance	.863

Table 23: Factor analysis of KNX scores

Component Matrix^a		
	Component	
	1	2
Individuals in this TechCon project team are proficient at combining and exchanging ideas to solve problems or create opportunities.	.832	.168
Individuals in this TechCon project team do not do a good job of sharing their ideas to come up with new ideas, products, or services. ®	-.570	.659
Individuals in this TechCon project team are capable of sharing their expertise to bring new projects or initiatives to fruition.	.845	.332
Individuals in this TechCon project team have learned to effectively pool their ideas and knowledge.	.845	.379
It is rare for individuals in this TechCON project team to exchange and combine ideas to find solutions to problems ®	-.513	.712

Table 24: Factor analysis of interdependence on client

Component Matrix^a	
	Component
	1
This project can be performed fairly independent of the	.835
This project can be planned with very little need to	.881
To complete this project information is rarely needed from	.813
This project requires frequent coordination with the effort	.521

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Table 25: Scale reliabilities.

Knowledge variables		N	Alpha
Knowledge transfer technical by project leader	5	90	.89
Knowledge transfer technical by Client	5	90	.85
Knowledge transfer technical by team member	5	90	.80
Knowledge transfer-context by project leader	5	90	.90
Knowledge transfer- context by client	5	90	.88
Knowledge transfer context by team members	5	90	.86
Overall Knowledge transfer (PL)	10	90	.91
Overall Knowledge transfer (CL)	10	90	.90
Overall knowledge transfer (T M)	10	90	.86
Knowledge exchange and combination	5	90	.76
Prior knowledge of team members	5	90	.86
Project interdependence	4	90	.79
Contextual distance	2		.68

Table 25 (continued)

Socialization variables		N	Alpha
Context knowledge of PL about client (political)	5	34	0.69
Context knowledge of PL about client (culture and values)	6	34	0.62
Context knowledge of PL about client (social integration)	4	34	0.72
Context knowledge of PL about client (Expertise location)	4	34	0.74
Socialization to the client		4	.65
Generic technical skills of PL	5	22	.92
Generic Managerial skills of PL	7	22	.91
Home firm context knowledge	9	22	.93
Performance variables			
Project performance	8	22	0.89
Inter-team coordination	5	22	0.83

Table 26 : Rwg(J) scores of KTPL, KTCL, KTTM

Team Code	# Respondents	RWG Score					
		KTPL 1-5	KTPL 6 – 10	KTCL 1- 5	KTCL 6 – 10	KTTM 1 – 5	KTTM 6 – 10
2702	6	0.9652	0.9244	0.9349	0.9736	0.9098	0.9166
2706	3	0.9939	0.9683	0.9369	0.9185	0.9334	0.8839
2708	4	0.969	0.9796	0.9725	0.9555	0.9785	0.9743
2710	5	0.9676	0.9806	0.9233	0.9256	0.9514	0.9426
2711	4	0.9951	0.9869	0.9661	0.9583	0.969	0.9328
2713	5	0.9668	0.9769	0.9814	0.9869	0.979	0.9862
2717	6	0.9342	0.9535	0.8614	0.9251	0.9178	0.9491
2718	9	0.9743	0.9431	0.9378	0.9072	0.9432	0.9559
2720	2	0.8206	0.957	0.8647	0.7692	0.894	0.9152
2723	5	0.9333	0.934	0.9128	0.9463	0.9701	0.9264
2724	6	0.9649	0.9235	0.9121	0.8868	0.9261	0.9499
2725	4	0.9871	0.9802	0.9459	0.9375	0.9659	0.9181
2728	6	0.9409	0.9718	0.9318	0.6689	0.9751	0.8092
2732	2	0.9729	0.992	0.9809	0.9409	0.9729	0.9645
2733	3	0.9198	0.9729	0.6661	0.8775	0.9774	0.9701
2735	3	0.9358	0.9654	0.7111	0.9437	0.9729	0.9683
2737	3	0.9615	-0.6897*	0.8566	0.9286	0.9392	0.8824
2738	2	0.894	0.9673	0.9132	0.9539	0.992	0.9715
2740	4	0.6441	0.4983	0.5626	0.074	0.9448	0.9649
2741	2	0.9659	0.9508	0.9211	0.9809	0.9375	0.9688

Table 27: Rwg(j) of KNX scores

Team Code	# Respondents	RWG
		Know
2702	6	-
2703	2	0.75
2706	4	0.9281
2708	5	0.7765
2710	6	0.8305
2711	4	0.9753
2713	6	0.9327
2717	7	0.7034
2718	10	0.9189
2720	3	0.9091
2723	6	0.9359
2724	7	0.7419
2725	5	0.9806
2726	2	0.9783
2728	7	0.8673
2732	2	0.9722
2733	4	0.6985
2734	2	0.787
2735	4	0.8333
2737	4	0.9106
2738	3	0.6641
2739	2	0.9375
2740	5	0.8757
2741	2	-

APPENDIX D

Final data analysis tables

Table 28: Socialization to home factor analysis

	Component		
	1	2	3
1. How things really work (Pol1)	.747		
2. most influential people (home pol2)	.778		
3. understand motive (home pol4)	.690		
4. Most important (home pol6)	.575		
5. Relevance to larger goal (Cultho1)	.756		
6. Thinking decision making style(Cult-home3)	.744		
7. Easy or difficult- (Cult-home4)	.655		
8. Act in a manner consistent with values (Cult-home6)	.677		
9. Accept me as one of them (PPL2)			.398
10. Tell me gossip news home (PPL4)			.864
11. Enjoy spending time (ho PPL5)			.811
12. good mental map (Home-exper1)		.668	
13. possess skills (HOMe exper2)		.792	
14. find relevant for questions (Home exper 3)		.812	
15. uncertain as to skills possessed (Home exper4)		-.637	

Table 29: Socialization to client factor analysis

	Component		
	1	2	3
How things really work (CL pol1)		.706	
Most influential people CLpol2		.610	
Understand motive CLpol4		.704	
Most important CLpol6		.548	
Relevance to larger goal Clcult1	.430	.519	
Thinking and decision making style CLcult3	.444	.453	
Easy or difficult Cultcl4		.509	
Act in a manner values CultCL6		.465	
Accept me as one of them CL PPL2			.544
Tell me gossip news CL PPL4			.782
Enjoy spending time with them CL PPL5			.801
good mental map CL-exper1	.832		
possess skills CLeper2	.846		
find relevant for questions Clexper3	.711		
uncertain as to skills possess Clexpr4	-.473		

Table 30: Factor analysis of KTTM

Rotated Component Matrix ^a		
	1	2
KTTMresid1		.757
KTTMresid2		.817
KTTMresid3		.797
KTTMresid4		.811
KTTMresid5		.816
KTTMresid6	.785	
KTTMresid7	.844	
KTTMresid8	.842	
KTTMresid9	.822	
KTTMresid10	.816	

Table 31: KTCL factor analysis

Rotated Component Matrix ^a		
	Component	
	1	2
KTCLresid1		.764
KTCLresid2		.805
KTCLresid3		.829
KTCLresid4		.762
KTCLresid5		.820
KTCLresid6	.727	
KTCLresid7	.818	
KTCLresid8	.864	
KTCLresid9	.859	
KTCLresid10	.800	

Table 32: KTPL factor analysis

Rotated Component Matrix^a		
	Component	
	1	2
KTPLresid1	.804	
KTPLresid2	.807	
KTPLresid3	.788	
KTPLresid4	.775	
KTPLresid5	.802	
KTPLresid6	.402	.661
KTPLresid7		.835
KTPLresid8		.827
KTPLresid9		.802
KTPLresid1		.801

Table 33: KTPL & KTCL factor analysis

Rotated Component Matrix ^a		
	1	2
KTCLresid1		.605
KTCLresid2		.624
KTCLresid3		.649
KTCLresid4		.714
KTCLresid5		.659
KTCLresid6		.766
KTCLresid7		.823
KTCLresid8		.805
KTCLresid9		.809
KTCLresid10		.742
KTPLresid1	.772	
KTPLresid2	.784	
KTPLresid3	.794	
KTPLresid4	.757	
KTPLresid5	.816	
KTPLresid6	.675	
KTPLresid7	.645	
KTPLresid8	.710	
KTPLresid9	.727	
KTPLresid10	.690	

Table 34: Factor analysis of project team performance.

Component Matrix^a

	Component
	1
project performance-meeting project objectives	.754
project performance-meeting project timelines	.669
project performance-staying within budget	.623
project performance-using resources productively	.725
project performance-quality of output	.817
project performance-customer service to the client	.733
project performance-quick to respond to problems and opportunities	.697
project performance-overall performance	.780

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Table 35: Factor analysis of inter-team coordination

Component Matrix^a

	Component
	1
Inter-team coord-Connected processes and activities are well	.581
Inter-team coord-Duplication and overlapping activities are	.752
Inter-team coord-The team has no problem coordinating its ef	.566
Inter-team coord-Conflict with the client is settled quickly	.559
Inter-team coord-Project related discussions with the client	.762

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Table 36: Factor analysis of KNX scores

Individuals in this TechCon project team are proficient at combining and exchanging ideas to solve problems or create opportunities.	.779
Individuals in this TechCon project team do not do a good job of sharing their ideas to come up with new ideas, products, or services.	-.738
Individuals in this TechCon project team are capable of sharing their expertise to bring new projects or initiatives to fruition.	.801
Individuals in this TechCon project team have learned to effectively pool their ideas and knowledge.	.794
It is rare for individuals in this TechCon project team to exchange and combine ideas to find solutions to problems	-.651
Individuals in this TechCon project team are proficient at combining and exchanging ideas to solve problems or create opportunities.	.779

Table 37: Factor analysis of interdependence on client**Component Matrix^a**

Int1- This project team's tasks can be performed independent of client inputs	.744
Int 2-Tasks of this TechCon project team remain unaffected by performance of client on project	.694
Int 3- We rarely need to obtain information from client to complete task	.792
Int 4- This project can be planned without need to coordinate with client	.697
Int 5-This project requires frequent coordination of effort with client	-.568
Int 6- Performance dependent on receiving accurate information from client.	-.551

Table 38: Rwg (j) of KNX scores

Team Code	# Respondents	RWG Score
		Knowledge Exchange
1127	10	0.8542
2027	5	0.8248
2502	5	0.7836
2504	8	0.6882
2507	7	0.8718
2516	15	0.7045
2517	4	0.8824
2519	14	0.8625
2524	6	0.8949
2525	4	0.9122
2529	5	0.8735
2533	8	0.8785
2539	11	0.6874
2547	4	0.7692
2750	7	0.8803
2756	6	0.8424
2759	8	0.4284
2761	8	0.4973
2763	7	0.8582
2765	4	0.2500
2767	6	0.6373
2770	5	0.8129
2771	8	0.9092
2774	5	0.8442
2776	6	0.9311
2781	4	0.7661
2782	5	0.8949

Team Code	# Respondents	RWG Score
		Knowledge Exchange
2785	6	0.9680
2789	5	0.8519
2793	9	0.5756
2796	4	0.9914
2798	7	0.9412
2801	6	0.9170
2802	5	0.8929
2803	7	-2.9839*
2804	4	0.7813
2809	6	0.8794
3327	9	0.8781
4027	7	-0.0243*
7703	10	0.8982
7704	7	0.9091
7707	9	0.5556
7715	6	0.7982
7716	7	0.5000
7719	5	-5.0000*
7724	5	0.9359
7726	6	0.9327
7729	8	0.8881
7747	8	0.9031
8027	4	0.4521

Table 39: Rwg(j) of KTPL, KTCL, KTTM scores

Team Code	# Respondents	RWG Score					
		KTPL 1 – 5 (Tech)	KTPL 6 – 10 (Context)	KTCL 1- 5 (Tech)	KTCL 6 – 10 (Context)	KTTM 1 – 5 (Tech)	KTTM 6 – 10 (Context)
1127	9	0.8463	0.8769	0.8910	0.8711	0.9313	0.9400
2027	4	0.9570	0.9736	0.8725	0.8394	0.9392	0.9349
2502	4	0.8883	0.1786	0.9049	0.6319	0.8737	-0.4291*
2504	7	0.9483	0.9356	0.8559	0.8107	0.9160	0.9429
2507	6	0.9425	0.9629	0.9277	0.8865	0.9060	0.9052
2516	14	0.8739	0.9030	0.7104	0.8562	0.8929	0.9379
2517	3	0.9448	0.9701	0.9947	0.9809	0.9310	0.9392
2519	13	0.9692	0.9672	0.9288	0.9439	0.9382	0.9638
2524	5	0.9645	0.9440	0.9627	0.9592	0.9156	0.9315
2525	3	0.9404	0.9404	0.9916	0.9711	0.9625	0.9843
2529	4	0.9647	0.9593	0.9223	0.9532	0.9588	0.9230
2533	7	0.9489	0.9660	0.9399	0.9305	0.9892	0.9747
2539	10	0.8247	0.8960	0.8659	0.8782	0.9307	0.8058
2547	3	0.9892	0.9859	0.9404	0.9783	0.9261	0.9524
2750	6	0.9482	0.7944	0.9423	0.8981	0.9656	0.9619
2756	5	0.9693	0.9433	0.9375	0.9433	0.9821	0.9819
2759	7	0.9324	0.8203	0.9313	-0.0027	0.9565	0.9472
2761	7	0.8988	0.9057	0.8428	0.8833	0.9227	0.9196
2763	6	0.9737	0.9697	0.8899	0.9534	0.9737	0.9860
2765	3	0.9513	0.9635	0.3756	0.7825	0.9346	0.9481
2767	5	0.9336	0.9748	0.9282	0.9772	0.9653	0.9764
2770	4	0.9695	0.9789	0.8699	0.9585	0.9695	0.9840
2771	7	0.9796	0.9864	0.9872	0.9788	0.9890	0.9867
2774	4	0.9508	0.9933	0.8018	0.9115	0.8190	0.8955
2776	5	0.9824	0.9286	0.9430	0.7133	0.9555	0.9062
2781	3	0.9867	0.9955	0.9470	0.9426	0.9791	0.9286
2782	4	0.9711	0.9666	0.9298	0.9802	0.9550	0.9630
2785	5	0.9365	0.9514	0.8735	0.9300	0.9041	0.9701
2789	4	0.9828	0.9734	0.5099	0.5709	0.7065	0.8265

Team Code	# Respondents	RWG Score					
		KTPL 1 – 5 (Tech)	KTPL 6 – 10 (Context)	KTCL 1- 5 (Tech)	KTCL 6 – 10 (Context)	KTTM 1 – 5 (Tech)	KTTM 6 – 10 (Context)
2793	8	0.9716	0.9507	0.9636	0.9548	0.9750	0.9715
2796	3	0.8839	0.8807	0.8977	0.4724	0.9654	0.9415
2798	6	0.9497	0.9365	0.9408	0.9552	0.9405	0.9436
2801	5	0.9761	0.9482	0.9368	0.9124	0.9679	0.9665
2802	4	0.9824	0.9734	0.8910	0.8771	0.8429	0.9407
2803	6	0.9409	0.9405	0.9589	0.9462	0.9740	0.9614
2804	3	0.9615	0.9132	0.9322	0.9783	0.9524	0.8071
2809	5	0.9761	0.9552	0.9536	0.9685	0.9737	0.9466
3327	8	0.9568	0.9148	0.8905	0.8408	0.9529	0.9767
4027	6	0.8317	0.7914	0.6337	0.7095	0.9261	0.9474
7703	9	0.9608	0.9758	0.9521	0.9114	0.9683	0.9680
7704	6	0.9370	0.9327	0.9377	0.8701	0.9295	0.4780
7707	8	0.9510	0.9695	0.9472	0.8973	0.9565	0.9489
7715	5	0.9811	0.8885	0.9087	0.9696	0.9673	0.9627
7716	6	0.8735	0.5433	0.9413	0.8760	0.9058	0.8917
7719	4	0.9603	0.9798	0.9270	0.6884	0.9352	0.7988
7724	4	0.9914	0.9715	0.9809	0.9715	0.9815	0.9756
7726	5	0.9726	0.9693	0.9917	0.9466	0.9859	0.9844
7729	7	0.9524	0.9598	0.9347	0.9301	0.9342	0.9392
7747	7	0.9561	0.9851	0.8893	0.8765	0.9329	0.8979
8027	3	0.9867	0.9791	0.9470	0.9404	0.8977	0.9503

Hypothesis table 1

Variables	Equation 1		Equation 2		Equation 3		Equation 4		Equation 5		Equation 6	
	Standardized β (std. error)	Sig.	Standardized β (std. error)	Sig.	Standardized β (std. error)	Sig.	Standardized β (std. error)	Sig.	Standardized β (std. error)	Sig.	Standardized β (std. error)	Sig.
PL general skills	.155 (.084)	.388	.179 (.088)	.349	.148 (.091)	.451	.163 (.089)	.397	.201 (.093)	.316	.143 (.083)	.420
PL technical skills	-.095 (.086)	.606	-.105 (.089)	.585	-.065 (.093)	.746	-.097 (.093)	.625	-.125 (.093)	.532	-.185 (.083)	.304
Prior team knowledge	.401 (.080)	.007	.420 (.087)	.010	.419 (.089)	.012	.415 (.094)	.017	.421 (.088)	.011	.268 (.090)	.101
Context distance	-.026 (.039)	.857	-.010 (.042)	.951	-.013 (.044)	.937	.073 (.076)	.634	-.003 (.043)	.984	.052 (.040)	.727
Interdependence on client	-.283 (.034)	.069	-.274 (.036)	.094	-.314 (.038)	.686	-.261 (.035)	.102	-.255 (.038)	.136	-.205 (.034)	.183
PL home socialization	-	-	-.111 (.143)	.582	-.136 (.151)	.937	-.149 (.158)	.505	-.086 (.151)	.687	-.122 (.133)	.518
PL client socialization	-	-	.071 (.165)	.727	.085 (.170)	.524	.094 (.186)	.685	.022 (.192)	.927	.036 (.155)	.851
Home socialization x interdependence	-	-	-	-	-.195 (.178)	.426	-	-	-	-	-	-
Client socialization x interdependence	-	-	-	-	.083 (.160)	.736	-	-	-	-	-	-
Home socialization x context distance	-	-	-	-	-	-	-.038 (.368)	.855	-	-	-	-

Variables	Equation 1		Equation 2		Equation 3		Equation 4		Equation 5		Equation 6	
	Standardized β (std. error)	Sig.	Standardized β (std. error)	Sig.	Standardized β (std. error)	Sig.						
Client socialization x context distance	-	-	-	-	-	-	-.098 (.330)	.655	-	-	-	-
Home socialization x client socialization	-	-	-	-	-	-	-	-	.072 (.312)	.678	-	-
Knowledge exchange	-	-	-	-	-	-	-	-	-	-	.226 (.074)	.121
Knowledge exchange x home socialization	-	-	-	-	-	-	-	-	-	-	.182 (.263)	.183
Knowledge exchange x client socialization	-	-	-	-	-	-	-	-	-	-	-.305 (.333)	.066
F-statistic	2.14		2.14 P<.10		1.71		1.7		1.8 #		2.78**	
Adjusted R ²	.191		.154		.12		.13		.13		.29	

Hypothesis table 2

Variables	Equation 7		Equation 8		Equation 9	
	Standardized β (std. error)	Sig.	Standardized β (std. error)	Sig.	Standardized β (std. error)	Sig.
PL general skills	.266 (.139)	.123	.261 (.142)	.138	.222 (.131)	.171
PL technical skills	.395 (.140)	.026	.381 (.147)	.040	.416 (.133)	.014
Prior team knowledge	-.328 (.151)	.038	-.350 (.162)	.040	-.259 (.143)	.082
Context distance	.071 (.064)	.377	.074 (.117)	.584	-.024 (.063)	.858
Interdependence on client	-.068 (.060)	.604	-.090 (.057)	.532	-.124 (.057)	.390
PL home socialization	.461 (.225)	.015	.504 (.252)	.017	.532 (.217)	.004
PL client socialization	-.342 (.256)	.065	-.373 (.293)	.079	-.407 (.243)	.023
PL knowledge transfer	-	-	.027 (.283)	.867	.065 (.263)	.666
Team member knowledge transfer	-	-	-.220 (.267)	.128	-.133 (.255)	.330
Knowledge exchange	-	-	-.033 (.135)	.825	-.070 (.122)	.600
Home socialization x context distance	-	-	-.147 (.570)	.431	-	-
Client socialization x context distance	-	-	.054 (.523)	.785	-	-
Home socialization x interdependence	-	-	-	-	.148 (.257)	.461
Client socialization x interdependence	-	-	-	-	-.436 (.232)	.039
F-statistic	3.4 P<.005		2.8 P < .001		3.84 P<.001	
Adjusted R ²	.35		.67		.44	

Hypothesis table 3

Variables	Equation 10		Equation 11		Equation 12	
	Standardized β (std. error)	Sig.	Standardized β (std. error)	Sig.	Standardized β (std. error)	Sig.
PL general skills	.378 (.164)	.048	.338 (.165)	.001	.353 (.155)	.052
PL technical skills	.094 (.165)	.617	.167 (.171)	.078	.087 (.157)	.627
Prior team knowledge	-.072 (.178)	.668	.001 (.189)	.395	-.006 (.170)	.971
Context distance	-.098 (.076)	.513	-.010 (.137)	.997	-.199 (.074)	.178
Interdependence on client	.084 (.069)	.604	.085 (.067)	.944	.078 (.067)	.620
PL home socialization	.389 (.265)	.056	.223 (.293)	.588	.495 (.256)	.014
PL client socialization	.022 (.302)	.911	.149 (.341)	.312	-.059 (.287)	.754
PL knowledge transfer	.084 (.327)	.631	.089 (.329)	.508	.130 (.311)	.435
Team member knowledge transfer	-.234 (.309)	.132	-.243 (.311)	.615	-.144 (.301)	.338
Knowledge exchange	.105 (.152)	.499	.061 (.157)	.122	.046 (.145)	.756
Home socialization x context distance	-	-	.240 (.664)	.704	-	-
Client socialization x context distance	-	-	-.306 (.609)	.237	-	-
Home socialization x interdependence	-	-	-	-	.342 (.304)	.018
Client socialization x interdependence	-	-	-	-	-.557 (.275)	.108
F-statistic	2.25 P<.05		2.01 P<.05		2.69 P<.01	
Adjusted R ²	.22		.22		.10	

Hypothesis table 4

Variables	Equation 13		Equation 14		Equation 15 (coord)		Equation 16 (perf)	
	Standardized β (std. error)	Sig.						
PL general skills	.378 (.164)	.048	.352 (.156)	.053	.366 (.158)	.047	.241 (.150)	.192
PL technical skills	.094 (.165)	.617	.015 (.160)	.935	-.019 (.162)	.917	.305 (.154)	.112
Prior team knowledge	-.072 (.178)	.668	.077 (.169)	.632	-.106 (.177)	.528	-.374 (.156)	.024
Context distance	-.098 (.076)	.513	-.095 (.072)	.506	.092 (.072)	.521	-.142 (.062)	.368
Interdependence on client	.085 (.069)	.604	.052 (.066)	.739	.045 (.065)	.770	.062 (.069)	.671
PL home socialization	.389 (.265)	.056	.470 (.257)	.019	.440 (.247)	.022	.395 (.234)	.042
PL client socialization	.022 (.302)	.911	.021 (.287)	.912	.046 (.271)	.798	-.212 (.257)	.249
PL knowledge transfer (KTPL)	-	-	-	-	-.082 (.325)	.635	-.115 (.308)	.515
Team member knowledge transfer	-.311 (.393)	.115	-.159 (.401)	.425	-.154 (.315)	.325	-.162 (.299)	.310
Knowledge exchange	.105 (.152)	.499	.105 (.145)	.479	.079 (.144)	.589	-.080 (.136)	.595
Client knowledge transfer (KTCL)	-.100 (.327)	.631	.053 (.331)	.802	-	-	-	-
KTPL*KNX	-	-	.333 (.498)	.041	.453 (.827)	.062	-.012 (.588)	.960
KTCL * KNX	-	-	-	-	.132 (.620)	.567	.168 (.784)	.530
F-statistic	2.25 p<.05		2.6 P<.01		2.6 P<.01		2.4 P<.05	
Adjusted R ²	.22		.29		.30		.27	

Hypothesis table 5

	BLOCK 1			BLOCK 2		
		Standardized Coefficients	Sig.		Standardized Coefficients	Sig.
	Std. Error	Beta		Std. Error	Beta	
(Constant)	.412		.115	.655		.334
Gen. skill of PL	.084	.155	.388	.088	.179	.349
Gen. technical skill of PL	.086	-.095	.606	.089	-.105	.585
Prior team Kn.	.080	.401	.007	.087	.420	.010
Contextual distance	.039	-.026	.857	.042	-.010	.951
Interdependence on client	.034	-.283	.069	.036	-.274	.094
Soc 2 home team				.143	-.111	.582
Soc 2 client team				.165	.071	.727
	Model 1	Model 2				
F statistic	3.07 (.020)	2.14 (.062)				
Change in F statistic	0.02	0.85				
Adjusted R square	19.10%	15.40%				

H1a: Dual socialization of project leader positively impacts knowledge transfer by project leader to the home team.

Hypothesis table 6

	BLOCK 1			BLOCK 2			BLOCK 3		
	Std. Error	Beta	Sig	Std. Error	Beta		Std. Error	Beta	Sig
(Constant)	.359		.008	.428		.104	.447		.102
Gen. skill of PL	.079	.267	.121	.085	.183	.319	.089	.163	.397
Gen. technical skill of PL	.080	-.214	.215	.085	-.115	.529	.093	-.097	.625
Prior team Kn.	.081	.402	.008	.089	.401	.015	.094	.415	.017
Contextual distance				.074	.081	.584	.076	.073	.634
Interdependence on client				.034	-.270	.082	.035	-.261	.102
Soc to home_C				.140	-.115	.560	.158	-.149	.505
Soc to client_C				.165	.086	.675	.186	.094	.685
Soc 2 client * Contextual distance							.368	-.038	.855
Soc 2 home * Contextual distance							.330	-.098	.655
F statistic	F = 3.7 (.01)			F = 2.2 (.05)			F = 1.7 (.117)		
Change in F									
Adjusted R sq	5.90%	1		6.10%	1		3.10%	1	

H2: The relationship between dual socialization of project leader and knowledge transfer are moderated by contextual distance. The greater the contextual distance, the higher the impact of dual socialization on KTPL.

Hypothesis table 7

	BLOCK 1			BLOCK 2			BLOCK 3		
	Std. Error	Beta	Sig.	Std. Error	Beta	Sig.	Std. Error	Beta	Sig.
(Constant)	.374		.009	.401		.012	.407		.013
Gen. skill of PL	.081	.273	.119	.088	.179	.349	.091	.148	.451
Gen. technical skill of PL	.082	-.225	.207	.089	-.105	.585	.093	-.065	.746
Prior team Kn.	.082	.401	.009	.087	.420	.010	.089	.419	.012
Contextual distance	.039	.046	.748	.042	-.010	.951	.044	-.013	.937
Interdependence_C				.036	-.274	.094	.038	-.314	.070
Soc to home_C				.143	-.111	.582	.151	-.136	.524
Soc to client_C				.165	.071	.727	.170	.085	.686
Soc 2 client * interdependence on client							.178	-.195	.426
Soc 2 home * interdependence on client							.160	.083	.736
F statistic	2.7 (.03)			2.14 (.06)			1.71 (.122)		
Change in F statistic	0.039			0.317			0.644		
Adjusted R square	14.10%			15.4%			12.80%		

H3 : Relationship between dual socialization and knowledge transfer by project leader is moderated by Interdependence on client. Higher the interdependence, higher the impact of dual socialization.

Hypothesis table 8

	BLOCK 1			BLOCK 2			BLOCK 3		
	Std. Error	Beta	Sig	Std. Error	Beta	Sig	Std. Error	Beta	Sig
(Constant)	.412		.115	.433		.175	.433		.393
Gen. skill of PL	.084	.155	.388	.084	.205	.260	.083	.143	.420
Gen. technical skill of PL	.086	-.095	.606	.085	-.148	.422	.083	-.185	.304
Prior team Kn.	.080	.401	.007	.087	.319	.046	.090	.268	.101
Contextual distance	.039	-.026	.857	.040	-.006	.968	.040	.052	.727
Interdependence on client	.034	-.283	.069	.035	-.222	.157	.034	-.205	.183
Soc to home _C				.137	-.062	.748	.133	-.122	.518
Soc to client _C				.158	.018	.925	.155	.036	.851
KNX centered				.074	.311	.034	.074	.226	.121
Soc 2 home * KNX							.263	.182	.183
Soc 2 client * KNX							.333	-.305	.066
F statistic		3.07	0.02		2.68	0.02		2.78	0.01
Change in F			0.02			0.17			0.108
Adjusted R sq		19.10%			23.40%			28.90%	

A1: Impact of dual socialization on KTPL will be moderated by KNX such that higher the KNX greater the greater the impact of dual socialization goes up.

Hypothesis table 9

	BLOCK 1			BLOCK 2		
	Std. Error	Beta	Sig	Std. Error	Beta	Sig
(Constant)	.980		.005	1.220		.024
Gen. skill of PL	.144	.347	.054	.139	.266	.123
Gen. technical skill of PL	.146	.366	.046	.140	.395	.026
Prior team Kn.	.151	-.207	.182	.151	-.328	.038
Contextual distance	.065	.122	.377	.064	.071	.604
Interdependence on client	.060	-.068	.654	.059	-.083	.575
KTPL	.295	.039	.818	.277	.045	.778
KTTM	.264	-.177	.211	.262	-.228	.108
KNX	.136	-.071	.636	.129	-.027	.848
Soc 2 home team				.225	.461	.015
Soc 2 client team				.256	-.342	.065
F statistic		3.01	0.01		3.4	0.004
Change in F			0.01			0.04
Adj R square			26%			35%

H4a: Dual socialization of project leader positively impacts project team performance

Hypothesis table 10

	BLOCK 1			BLOCK 2			BLOCK 3		
	Std. Error	Beta	Sig	Std. Error	Beta	Sig	Std. Error	Beta	Sig
(Constant)	.966		.002	.914		.000	.933		.000
Gen. skill of PL	.142	.320	.070	.134	.247	.137	.142	.261	.138
Gen. technical skill of PL	.142	.395	.028	.134	.413	.016	.147	.381	.040
Prior team Kn.	.154	-.222	.161	.152	-.340	.033	.162	-.350	.040
Interdependence on client	.058	-.101	.496	.056	-.108	.444	.057	-.090	.532
KTPL	.297	.029	.863	.277	.035	.825	.283	.027	.867
KTTM	.265	-.163	.250	.262	-.230	.104	.267	-.220	.128
KNX	.137	-.073	.627	.129	-.027	.846	.135	-.033	.825
Contextual distance	.121	.094	.497	.115	.086	.514	.117	.074	.584
Soc to home _C				.221	.475	.011	.252	.504	.017
Soc to client _C				.258	-.318	.087	.293	-.373	.079
Contextual distance * soc 2 client							.570	-.147	.431
Contextual distance * Soc 2 home							.523	.054	.785
F statistic		2.9	0.012		3.4	0.003		2.8	0.009
Change in F			0.012			0.037			0.673
Adjusted R square			26%			35%			33%

H5a: The relationship between dual socialization of project leader and project team performance is moderated by contextual distance between the two teams. As interdependence goes up, the impact of dual socialization goes up as well.

Hypothesis table 11

	BLOCK 1			BLOCK 2			BLOCK 3		
	Std. Error	Beta	Sig	Std. Error	Beta	Sig	Std. Error	Beta	Sig
(Constant)	.927		.004	.899		.001	.851		.000
KTTM	.261	-.173	.215	.262	-.228	.108	.255	-.133	.330
Gen. skill of PL	.136	.370	.031	.139	.266	.123	.131	.222	.171
Gen. technical skill of PL	.136	.339	.047	.140	.395	.026	.133	.416	.014
Prior team Kn.	.148	-.214	.160	.151	-.328	.038	.143	-.259	.082
Contextual distance	.062	.138	.296	.064	.071	.604	.063	-.024	.858
KTPL	.282	.058	.718	.277	.045	.778	.263	.065	.666
KNX	.135	-.068	.644	.129	-.027	.848	.122	-.070	.600
Soc to home _C				.225	.461	.015	.217	.532	.004
Soc to client _C				.256	-.342	.065	.243	-.407	.023
Interdependence _C				.059	-.083	.575	.057	-.124	.390
Soc 2 client * interdependence							.257	.148	.461
Soc 2 home * interdependence							.232	-.436	.039
F statistic		3.49	0.006		3.4	0.004		3.84	0.001
Change in F			0.006			0.092			0.042
Adjusted R sq			28.40%			35.40%			43.70%

H6a: Relationship between dual socialization and project team performance is moderated by Interdependence on client. The greater the Interdependence the greater the impact of dual socialization.

Hypothesis table 12

	BLOCK 1			BLOCK 2		
	Std. Error	Beta	Sig.	Std. Error	Beta	Sig.
(Constant)	1.161		.003	1.437		.231
Gen. skill of PL	.170	.487	.016	.164	.378	.048
Gen. technical skill of PL	.173	.003	.987	.165	.094	.617
Prior team Kn.	.178	-.039	.817	.178	-.072	.668
Contextual distance	.077	.022	.887	.076	-.098	.513
Interdependence on client	.071	.180	.286	.069	.084	.604
KTPL	.349	.093	.617	.327	.084	.631
KTTM	.313	-.107	.489	.309	-.234	.132
KNX	.161	.075	.650	.152	.105	.499
Soc 2 home team				.265	.389	.056
Soc 2 client team				.302	.022	.911
F statistic		1.68	0.137		2.25	0.038
Change in F			0.137			0.038
Adjusted R square			11%			22%

H4b: Dual socialization of project leader positively impacts inter-team coordination

Hypothesis table 13

	BLOCK 1			BLOCK 2			BLOCK 3		
	Std. Error	Beta	Sig	Std. Error	Beta	Sig	Std. Error	Beta	Sig
(Constant)	1.113		.002	1.085		.001	1.086		.001
Gen. skill of PL	.165	.482	.014	.160	.408	.030	.165	.338	.078
Gen. technical skill of PL	.165	.010	.956	.159	.059	.742	.171	.167	.395
Prior team Kn.	.176	-.038	.819	.181	-.072	.674	.189	.001	.997
Interdependence on client	.068	.174	.279	.066	.118	.448	.067	.085	.588
KTPL	.344	.093	.613	.330	.088	.619	.329	.089	.615
KTTM	.308	-.106	.488	.311	-.230	.140	.311	-.243	.122
KNX	.159	.074	.648	.153	.105	.501	.157	.061	.704
Soc to home _C				.262	.366	.068	.293	.223	.312
Soc to client _C				.306	.008	.969	.341	.149	.508
Contextual distance_C				.136	-.022	.878	.137	-.010	.944
Soc2client*distance							.664	.240	.237
Soc2home*distance							.609	-.306	.160
F statistic		1.9	0.09		2.1	0.04		2.01	0.057
Change in F statistic			0.09			0.1			0.355
Adjusted R square			13%			21%			21.60%

H5b: The relationship between dual socialization of project leader and inter-team coordination is moderated by contextual distance. When the distance is high, dual socialization has greater impact.

Hypothesis table 14

	BLOCK 1			BLOCK 2			BLOCK 3		
	Std. Error	Beta	Sig	Std. Error	Beta	Sig	Std. Error	Beta	Sig
(Constant)	1.113		.001	1.059		.000	1.007		.000
Gen. skill of PL	.164	.427	.026	.164	.378	.048	.155	.353	.052
Gen. technical skill of PL	.163	.075	.686	.165	.094	.617	.157	.087	.627
Prior team Kn.	.178	-.019	.908	.178	-.072	.668	.170	-.006	.971
Contextual distance	.075	-.021	.886	.076	-.098	.513	.074	-.199	.178
KTPL	.338	.042	.817	.327	.084	.631	.311	.130	.435
KTTM	.313	-.117	.450	.309	-.234	.132	.301	-.144	.338
KNX	.162	.068	.681	.152	.105	.499	.145	.046	.756
Soc to home _C				.265	.389	.056	.256	.495	.014
Soc to client _C				.302	.022	.911	.287	-.059	.754
Interdependence_C				.069	.084	.604	.067	.078	.620
InterdepC *Soc 2 client							.304	.342	.108
InterdepC* Soc 2 home							.275	-.557	.018
F statistic		1.7	0.129		2.25	0.038		2.69	0.01
Change in F			0.129			0.052			0.05
Adjusted R square			25%			15%			10%

H6b: The relationship between dual socialization of project leader and inter-team coordination is moderated by Interdependence on client. When interdependence is high, dual socialization has greater impact.

Hypothesis table 15

	Std. Error	Beta	Sig
(Constant)	1.437		.231
Gen. skill of PL	.164	.378	.048
Gen. technical skill of PL	.165	.094	.617
Prior team Kn.	.178	-.072	.668
Contextual distance	.076	-.098	.513
Interdependence on client	.069	.084	.604
KTTM	.393	-.311	.115
KTCL	.327	-.100	.631
KNX	.152	.105	.499
Soc 2 home team	.265	.389	.056
Soc 2 client team	.302	.022	.911
F statistic		2.25	0.038
Adjusted R squared		22%	

H7a: The higher the KTPL the greater its impact on inter-team coordination.

Hypothesis table 16

	BLOCK 1			BLOCK 2			BLOCK 3		
	Std. Error	Beta		Std. Error	Beta		Std. Error	Beta	
(Constant)	.615		.001	.637		.000	.667		.000
Gen. skill of PL	.139	.333	.054	.146	.257	.155	.150	.241	.192
Gen. technical skill of PL	.141	.309	.079	.145	.346	.058	.154	.305	.112
Prior knowledge	.135	-.215	.124	.146	-.333	.031	.156	-.374	.024
Contextual distance	.065	.116	.398	.068	.060	.673	.069	.062	.671
Interdependence on client	.057	-.067	.642	.061	-.124	.424	.062	-.142	.368
KTTM	.245	-.135	.302	.272	-.178	.222	.299	-.162	.310
Soc to home				.226	.352	.059	.234	.395	.042
Soc to client				.254	-.213	.241	.257	-.212	.249
KNX centered				.133	-.080	.583	.136	-.080	.595
KTPL centered				.280	-.047	.769	.308	-.115	.515
KNX* KTCL							.588	-.012	.960
KNX* KTPL							.784	.168	.530
F statistic		4.3	0.003		2.9	0.01		2.4	0.021
Change in F			0.003			0.354			0.573
Adjusted R sq			27%			28%			27%

H9a: Project team performance will be impacted more by KTCL than by KTPL. The impact of both variables is moderated by KNX within the team.

Hypothesis table 17

	BLOCK 1			BLOCK 2			BLOCK 3		
	Std. Error	Beta	Sig	Std. Error	Beta	Sig	Std. Error	Beta	Sig
(Constant)	.711		.000	.706		.000	.704		.000
Gen. skill of PL	.160	.497	.009	.162	.376	.046	.158	.366	.047
Gen. technical skill of PL	.163	.009	.963	.161	.083	.651	.162	-.019	.917
Prior knowledge	.161	.016	.914	.174	-.052	.752	.177	-.106	.528
Interdependence on client	.066	.141	.365	.068	.075	.636	.065	.045	.770
Contextual distance	.075	.019	.896	.075	-.100	.498	.072	-.092	.521
KTTM	.283	-.121	.389	.301	-.223	.140	.315	-.154	.325
Soc to home				.251	.365	.058	.247	.440	.022
Soc to client				.281	.051	.783	.271	.046	.798
KNX centered				.148	.093	.537	.144	.079	.589
KTPL centered				.311	.064	.702	.325	-.082	.635
KNX* KTCL							.620	.132	.567
KNX * KTPL							.827	.453	.062
F statistic		2.6	0.035		2.5	0.023		2.6	0.014
Change in F			0.035			0.114			0.1
Adjusted R sq			16.10%			24%			29.70%

H 9b: Inter-team coordination will be more strongly impacted by KTCL than KTPL. The relationship between KTCL and KTPL will be moderated by KNX.

Hypothesis table 18

	BLOCK 1			BLOCK 2			BLOCK 3		
	Std. Error	Beta	Sig	Std. Error	Beta	Sig	Std. Error	Beta	Sig
(Constant)	1.223		.073	1.233		.072	1.174		.069
Gen. skill of PL	.161	.361	.054	.164	.378	.048	.156	.352	.053
Gen. technical skill of PL	.162	.110	.550	.165	.094	.617	.160	.015	.935
Prior team Kn.	.174	-.052	.752	.178	-.072	.668	.169	-.077	.632
Contextual distance	.075	-.098	.509	.076	-.098	.513	.072	-.095	.506
Interdependence on client	.069	.080	.617	.069	.084	.604	.066	.052	.739
Soc 2 home team	.261	.373	.062	.265	.389	.056	.257	.470	.019
Soc 2 client team	.298	.035	.860	.302	.022	.911	.287	.021	.912
KTTM	.384	-.334	.085	.393	-.311	.115	.401	-.159	.425
KTCL	.301	-.152	.428	.327	-.100	.631	.331	.053	.802
KNX_C				.152	.105	.499	.145	.105	.479
KNX*KTPL							.498	.333	.041
F statistic		2.4	.026		2.25	.038		2.67	.014
Change in F			.026			.499			.041
Adjusted R square		23 %			22%			29.5 %	

H 10a: The relationship between knowledge transfer by project leader and inter-team coordination is moderated by knowledge exchange. The higher the knowledge exchange the greater the impact of knowledge transfer by PL.

Hypothesis table 19

	BLOCK 1			BLOCK 2			BLOCK 3			BLOCK 4		
	Std. Error	Beta	Sig.									
(Constant)	.412		.115	.430		.106	.449		.103	.467		.097
Gen. skill of PL	.084	.155	.388	.087	.175	.351	.088	.179	.349	.093	.201	.316
Gen. technical skill of PL	.086	-.095	.606	.088	-.109	.565	.089	-.105	.585	.093	-.125	.532
Prior team Kn.	.080	.401	.007	.081	.401	.008	.087	.420	.010	.088	.421	.011
Contextual distance	.039	-.026	.857	.041	-.006	.970	.042	-.010	.951	.043	-.003	.984
Interdependence on clientient	.034	-.283	.069	.036	-.268	.096	.036	-.274	.094	.038	-.255	.136
Soc to home_C				.105	-.064	.665	.143	-.111	.582	.151	-.086	.687
Soc to client_C							.165	.071	.727	.192	.022	.927
Soc 2 home*soc 2 client										.312	.072	.678
F statistic		3.07	0.02		2.5	0.03		2.1	0.06		1.8	0.09
Sig change in F			0.02			0.66			0.72			0.67
Adjusted R sq		19.10%			17.40%			15.40%			13.50%	

H12: The joint impact of home and client socialization together will be higher than either of the two constructs considered separately.

APPENDIX E

Screen shots of survey

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http://new.qualtrics.com/SE/?EID=U0IEPVNWxzNqVDirbIFGNHvkRVZL5SZTVkIEPVByb2QmUHJldmldz1TdXJ2ZkxkQnJhbmRJRDR1rYXR6

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Please enter the 4 digit code that accompanied the survey link in the email.

>>

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Welcome to the survey on managing knowledge in international project teams.

Please read the following information before proceeding:

1. ***Please take this survey in one sitting, because if you exit in between then results will not be saved.*** On average, the teams that pre-tested this survey took between 20 to 40 minutes to complete the survey. So please budget your time accordingly.
2. ***There are no trick questions:*** this is NOT a test, so there are no right or wrong answers. Also, you will probably find some redundancy in the questions. This is deliberate and is done for statistical reasons. Please answer the questions even if they seem similar to ones you've already answered; you need not go back to the previous questions.
3. The results of the study are confidential and will consist of an aggregate level report with data from over 50 teams, such that individual and team responses can NOT be linked back to your feedback/data.

If the project, about which you are responding in the survey, concluded recently then please answer the questions retrospectively.

We thank you in advance for participation in this research. We are sure that your inputs will help design more robust knowledge management systems and processes.

Regards,

Dr. Gary Florkowski & Tanvi Gautam
Katz Graduate School of Business
University of Pittsburgh

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Please begin by selecting your position on the project team

BRM	Project Leader	Team member
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Previewing Survey

This is a short 4 page survey aimed at getting your assessment of:

1. Project performance of this team in comparison to other similar projects in TCS.
2. Project leaders's knowledge and abilities in the current role in comparison to other TCS PLs in similar roles.

We are asking the PL and team members questions on knowledge exchange processes and other activities within the team. That data coupled with your evaluation helps us understand how teams and leaders perform under various scenarios of knowledge availability and use.

This evaluation will not be shared with the team members, and will be aggregated with the results of other teams in the final report.

***Please budget 20 min (Approx) for this survey as the survey must be completed in one round.
If you exit the survey before completion the responses will not be saved.***

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Page 1 of 4

Compared to other similar projects being executed by TCS, how would you on 'average' rate the performance of this team so far:

	Very poor	Poor	Fair	Good	Excellent
Meeting project objectives	<input type="radio"/>				
Meeting project timelines	<input type="radio"/>				
Staying within budget	<input type="radio"/>				
Using resources productively	<input type="radio"/>				
Quality of output	<input type="radio"/>				
Customer service to the client	<input type="radio"/>				
Quick to respond to problems and opportunities	<input type="radio"/>				
Overall performance	<input type="radio"/>				

To what extent do you agree or disagree, with the following statements about the way this project team coordinates tasks with the client

Connected processes and activities are well coordinated with the client	<input type="text"/>
Duplication and overlapping activities are avoided	<input type="text"/>
The team has no problem coordinating its efforts with the client	<input type="text"/>
Conflict with the client is settled quickly	<input type="text"/>
Project related discussions with the client are conducted constructively	<input type="text"/>

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Keeping in mind the skill level of a typical PL in TCS, how would you on average rate this project leader's skills and abilities on the following dimensions

Ability to plan and execute work in a collaborative environment

Ability to deal with ambiguity

Ability to accomplish assignments

Ability to teach others

Ability to be self- directed and proactive

Page 3 of 4

Keeping in mind a typical TCS PL working on a similar project, how would you "on average" rate the current project leader's generic technical and domain knowledge ?

	Very poor	Poor	Fair	Good	Excellent
Level of technology related knowledge.	<input type="radio"/>				
Ability to interpret business problems and develop appropriate technical solutions.	<input type="radio"/>				
Understanding of technology trends in his/her area	<input type="radio"/>				
Ability to recognize potential ways to exploit new business opportunities that can use IT.	<input type="radio"/>				

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Page 4 of 4 (FINAL PAGE)

Please tell us about your work experience (list 0 if no experience)

	list answer
Total years of work experience in TCS (list numeric value-1,2,3 years)	<input type="text"/>
Total years of IT industry experience	<input type="text"/>
Outside of this project, total weeks of work experience with this client.(list 0 if no experience)	<input type="text"/>
Highest educational degree obtained	<input type="text"/>

The following questions are about your overseas experience

List all countries you have worked in (incl US) and approx duration of time spent there

List all countries you have been educated in

List all countries you have vacationed in

To help us note any differences in responses between men and women who take the survey, please specify your gender.

Male	Female
<input type="radio"/>	<input type="radio"/>

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List all countries you have been educated in

List all countries you have vacationed in

To help us note any differences in responses between men and women who take the survey, please specify your gender.

Male Female

If you have any experiences or suggestions on enhancing learning and knowledge sharing within and between TCS team working in international set ups, please do share it with us here.

PLEASE CLICK ON THE BUTTON BELOW SO THAT YOUR DATA IS SAVED.

CLICKING ON THE BUTTON BELOW SUBMITS THE RESPONSES TO THE DATABASE.

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Please begin by selecting your position on the project team

BRM	Project Leader	Team member
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Project leader survey

This is a **4 page** survey consisting of different sections.

Page 1: Project profile questions.

Page 2: Self assessment on understanding of client and TCS context

Page 3: Questions on knowledge exchange activities in the project team.

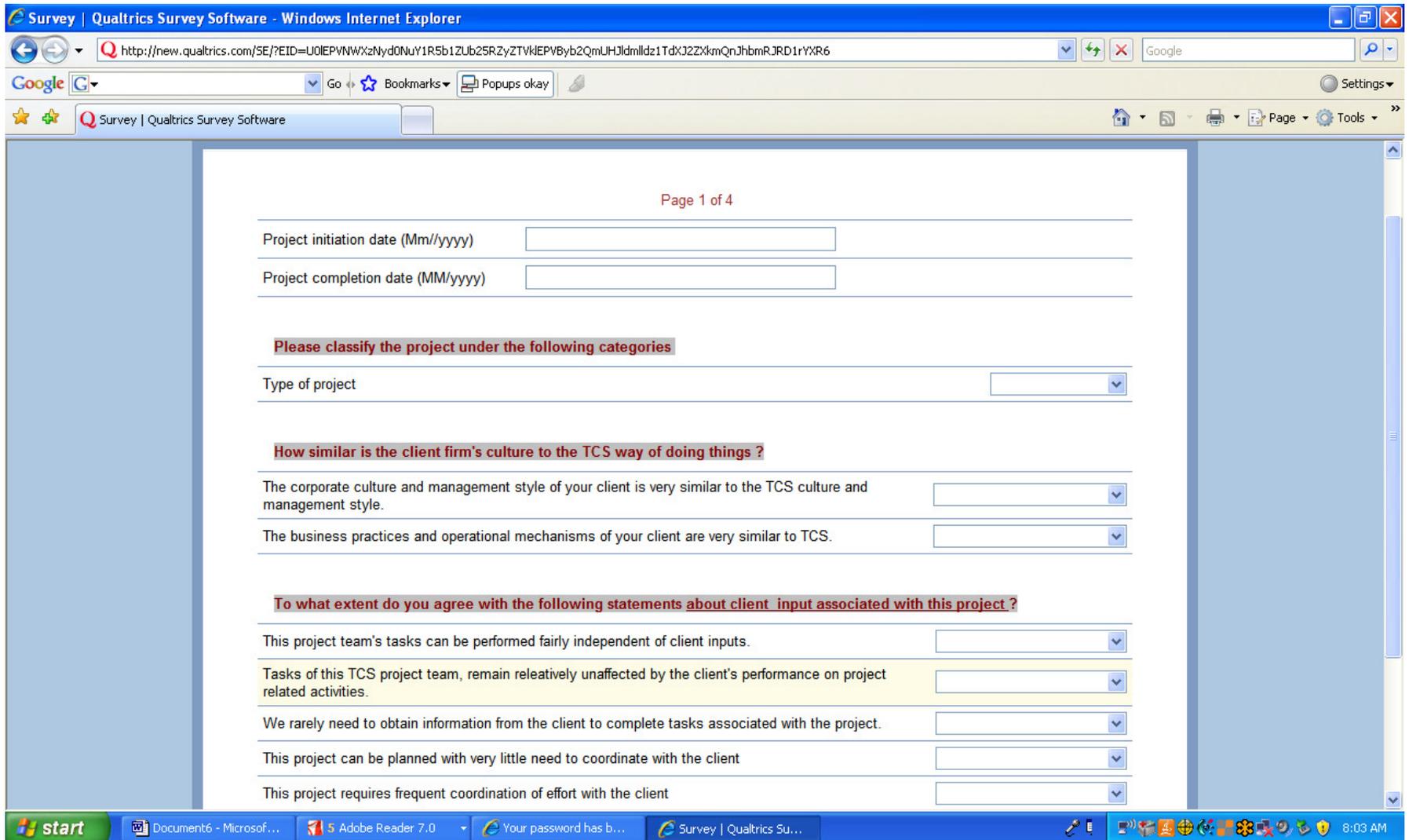
Page 4: Questions on your work experiences.

Please budget 30-45 minutes for the survey, as it must be completed in one round.
If you exit the survey before completing it, your responses will NOT be saved.

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Page 2 of 4

To what extent do you agree or disagree, with the following statements related to the client and TCS project team's way of working:

	CLIENT project team	TCS Project team
I have learned how things 'really work' on the inside of the team.	<input type="text"/>	<input type="text"/>
I know who the most influential people in the team are.	<input type="text"/>	<input type="text"/>
I do not have a good understanding of the politics in the team	<input type="text"/>	<input type="text"/>
I understand the motives that guide the actions of the team members	<input type="text"/>	<input type="text"/>
I have a good understanding of those 'things not said' by the team members but which matter for moving this project forward.	<input type="text"/>	<input type="text"/>
I can identify the people in the team that are most important for getting work done .	<input type="text"/>	<input type="text"/>

How well do you know the history and background of this TCS project team -

I know very little about the history behind this TCS project team	<input type="text"/>
I would be a good resource for describing the background of this TCS project team	<input type="text"/>
I am very familiar the problems and opportunities that this team has encountered while working with this client in the past.	<input type="text"/>
I am not really aware of interpersonal or work related conflicts that have arisen within this TCS project team in the past.	<input type="text"/>
I can easily share a story or two about how some/all of the team's members over came an important deadline/challenge/glitch in the project.	<input type="text"/>

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I am very familiar the problems and opportunities that this team has encountered while working with this client in the past.

I am not really aware of interpersonal or work related conflicts that have arisen within this TCS project team in the past.

I can easily share a story or two about how some/all of the team's members over came an important deadline/challenge/glitch in the project.

To what extent do you agree or disagree with the following statements about your insight into the culture of the two project teams ?

	CLIENT project team	TCS project team
I understand the relevance of this project to the larger goals of the firm.	<input type="text"/>	<input type="text"/>
I am well aware of the hierarchy of values that drives the team members decision making process.	<input type="text"/>	<input type="text"/>
I am well aware of the thinking and decision making style of the key stakeholders involved in this project.	<input type="text"/>	<input type="text"/>
I have a good sense of how easy or difficult it will be to get the team members to accept a new idea or solution pertaining to the project.	<input type="text"/>	<input type="text"/>
I am not familiar with what are the acceptable ways of defending ideas and proposals in the team.	<input type="text"/>	<input type="text"/>
I understand how to act in a manner that is consistent with the team's values and ideals.	<input type="text"/>	<input type="text"/>

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Page 3 of 4

To what extent do you agree with the following statements about your relationship with the client and TCS project team members ?

	CLIENT project team	TCS project team
I do not consider any of the team members as my friends.	<input type="text"/>	<input type="text"/>
The team members seem to accept me as one of them	<input type="text"/>	<input type="text"/>
I am usually excluded in informal networks or gathering of people in the team.	<input type="text"/>	<input type="text"/>
The team members usually tell me the team gossip/news	<input type="text"/>	<input type="text"/>
I enjoy spending time with the team members	<input type="text"/>	<input type="text"/>
I am not good at understanding the slang, buzz words and special jargon used in the team.	<input type="text"/>	<input type="text"/>
When in a meeting with the team members, I find it easy to follow the acronyms and abbreviations that they use.	<input type="text"/>	<input type="text"/>

To what extent do the following statements reflect your team's ability to exchange knowledge with each other ?

Individuals in this TCS project team are proficient at combining and exchanging ideas to solve problems or create opportunities.

Individuals in this TCS project team do not do a good job of sharing their ideas to come up with new ideas, products, or services.

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To what extent do the following statements reflect your *team's ability to exchange knowledge with each other* ?

Individuals in this TCS project team are proficient at combining and exchanging ideas to solve problems or create opportunities.

Individuals in this TCS project team do not do a good job of sharing their ideas to come up with new ideas, products, or services.

Individuals in this TCS project team are capable of sharing their expertise to bring new projects or initiatives to fruition.

Individuals in this TCS project team have learned to effectively pool their ideas and knowledge.

It is rare for individuals in this TCS project team to exchange and combine ideas to find solutions to problems

How well do you know the client and the TCS project team members' knowledge and skills ?

	CLIENT project team	TCS project team
I have a good mental map of the project team's talents and skills		
I know which are the team members who possess specialized skills and knowledge relevant to this assignment.		
I can easily find the relevant people from the project team who will have the answer to my work related questions.		
I am uncertain as to what project related skills and knowledge each of the team members possesses		

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	CLIENT project team	TCS project team
I have a good mental map of the project team's talents and skills	<input type="text"/>	<input type="text"/>
I know which are the team members who possess specialized skills and knowledge relevant to this assignment.	<input type="text"/>	<input type="text"/>
I can easily find the relevant people from the project team who will have the answer to my work related questions.	<input type="text"/>	<input type="text"/>
I am uncertain as to what project related skills and knowledge each of the team members possesses.	<input type="text"/>	<input type="text"/>

Prior to the start of this project how would you have rated the extent of your capability on the following knowledge/skill dimension:

	Not at all	To a small extent	To a moderate extent	To a large extent	To a very large extent
How well versed were you in the technical knowledge required to work on this project ?	<input type="radio"/>				
How closely was the project related to your areas of expertise ?	<input type="radio"/>				
How adequate were your managerial competencies to deal with the type of problems posed by the client ?	<input type="radio"/>				
How familiar were you with the industry the client works in ?	<input type="radio"/>				
The extent to which your past client's had a similar organizational culture ?	<input type="radio"/>				

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This is the final page and it contains questions about you and your work experience that will help us categorise and analyze our results better.

Have you been a part of this project team since its inception ? If not, list the number of weeks the project was running before you joined it.

Please answer the following questions about your association with this project.

Prior to this project have you ever worked with your branch resident manager on another project (yes/no). If yes, please give approximate duration you worked together outside this project (in weeks).

How many projects are you working on apart from this project ? (list 0 if none)

If you are working on other projects, do they belong to the same client ? (yes/no/not applicable)

What percentage of the current TCS team members on this project did you know from associations prior to this project ?

Please tell us about your work experience (list 0 if no experience)

list answer

Total users of work experience in TCS (list number plus 1-3 users)

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Please tell us about your work experience (list 0 if no experience)

	list answer
Total years of work experience in TCS (list numeric value-1,2,3 years)	<input type="text"/>
Total years of IT industry experience	<input type="text"/>
Outside of this project, total weeks of prior work experience with this client (in weeks)	<input type="text"/>
Highest educational degree obtained	<input type="text"/>

The following questions are about your overseas experience

List all countries you have worked in (incl US) and approx duration of time spent there

List all countries you have been educated in

List all countries you have vacationed in

How comfortable are you living and working in the American culture (eg: socializing with American friends, discussing American sports, understanding the cultural nuances of American lifestyle)

Not comfortable at all	Somewhat comfortable	Moderately comfortable	Highly comfortable	Very highly comfortable
<input type="checkbox"/>				

To help us note any differences in responses between men and women who take the survey, please specify your gender.

Male Female

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To help us note any differences in responses between men and women who take the survey, please specify your gender.

Male	Female
<input type="radio"/>	<input type="radio"/>

If you have any experiences or suggestions on enhancing learning and knowledge sharing within and between TCS teams working in international set ups, please do share it with us here.

PLEASE CLICK ON THE BUTTON BELOW TO SUBMIT YOUR RESPONSES.

WHEN YOU SEE THE THANK YOU PAGE YOU KNOW THAT YOUR DATA HAS BEEN RECORDED IN THE DATABASE.

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We thank you for your time spent taking this survey.
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Please begin by selecting your position on the project team

BRM	Project Leader	Team member
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Previewing Survey

This survey consists of different sections related to:

1. Knowledge transfer that takes place between you, your project leader, as well as the client.
2. The knowledge exchange and combination that takes place within the team
3. Information about your work experiences.

*Please budget approx. 45 minutes for the survey, as it must be completed in one round. If you exit the survey before completing it, your responses **will NOT be saved**.*

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Page 1 of 4

How similar is the client firm's culture to the TCS way of doing things ?

The corporate culture and management style of your client is very similar to the TCS culture and management style.

The business practices and operational mechanisms of your client are very similar to TCS.

While working on this project, you get project relevant knowledge from various sources such as the project leader, other TCS team members, and sometimes the client directly. Knowledge, whether written or verbal, is valuable if you are able to apply it to the task at hand or improve in some ways in your thinking or skill level.

Think back from the time you joined this project up to the present moment, and recall the communication of project related knowledge from your project leader, TCS team members and/or the client to you.

Then rate the extent to which the **" TECHNICAL KNOWLEDGE"** gained by you from **'EACH' source, allowed you to improve on the following areas:**

	Transfer from TCS PROJECT LEADER	Transfer from the CLIENT DIRECTLY	Transfer from TCS PROJECT TEAM MEMBERS
Improved your understanding of the technical needs of client	<input type="text"/>	<input type="text"/>	<input type="text"/>
Improved your ability to come up with technically sound solutions for the client	<input type="text"/>	<input type="text"/>	<input type="text"/>

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	Transfer from TCS PROJECT LEADER	Transfer from the CLIENT DIRECTLY	Transfer from TCS PROJECT TEAM MEMBERS
Improved your understanding of the technical needs of client	<input type="text"/>	<input type="text"/>	<input type="text"/>
Improved your ability to come up with technically sound solutions for the client	<input type="text"/>	<input type="text"/>	<input type="text"/>
Improved your understanding of how your work fits in with the technical needs of the client.	<input type="text"/>	<input type="text"/>	<input type="text"/>
Improved your ability to perform technical tasks to meet the quality standards of the client	<input type="text"/>	<input type="text"/>	<input type="text"/>
Improved your ability to meet the technical requests made by the client.	<input type="text"/>	<input type="text"/>	<input type="text"/>

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Think back from the time you joined this project up till now. The project leader, TCS team members and/or the client would have shared non-technical project related knowledge with you. The sharing of this knowledge would have impacted your understanding of the context in which the client operates.

Rate the extent to which the "unique knowledge" from "each" source helped you improve upon the following dimensions

	Transfer from TCS PROJECT LEADER	Transfer from CLIENT DIRECTLY	Transfer from TCS project team members
Improved your understanding of how things 'really work' in the client team vs. how they say it works.	<input type="text"/>	<input type="text"/>	<input type="text"/>
Improved your ability interact with the client in a manner that fits in with client team's norms and values	<input type="text"/>	<input type="text"/>	<input type="text"/>
Improved your ability to read between the lines when interacting with the client	<input type="text"/>	<input type="text"/>	<input type="text"/>
Improved your understanding of the 'unwritten rules' that guide the client's approach to this project.	<input type="text"/>	<input type="text"/>	<input type="text"/>
Improved your ability to understand the cultural aspects of the client team's work style and behavior.	<input type="text"/>	<input type="text"/>	<input type="text"/>

To what extent do the following statements reflect your *team's ability* to exchange knowledge with each other ?

Individuals in this TCS project team are proficient at combining and exchanging ideas to solve problems or create opportunities.

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when interacting with the client

Improved your understanding of the 'unwritten rules' that guide the client's approach to this project.	<input type="text"/>	<input type="text"/>	<input type="text"/>
Improved your ability to understand the cultural aspects of the client team's work style and behavior.	<input type="text"/>	<input type="text"/>	<input type="text"/>

To what extent do the following statements reflect your *team's ability* to exchange knowledge with each other ?

Individuals in this TCS project team are proficient at combining and exchanging ideas to solve problems or create opportunities.

Individuals in this TCS project team do not do a good job of sharing their ideas to come up with new ideas, products, or services.

Individuals in this TCS project team are capable of sharing their expertise to bring new projects or initiatives to fruition.

Individuals in this TCS project team have learned to effectively pool their ideas and knowledge.

It is rare for individuals in this TCS project team to exchange and combine ideas to find solutions to problems

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Reviewing Survey

Prior to the start of this project how would you have rated the extent of your capability on the following knowledge/skill dimension:

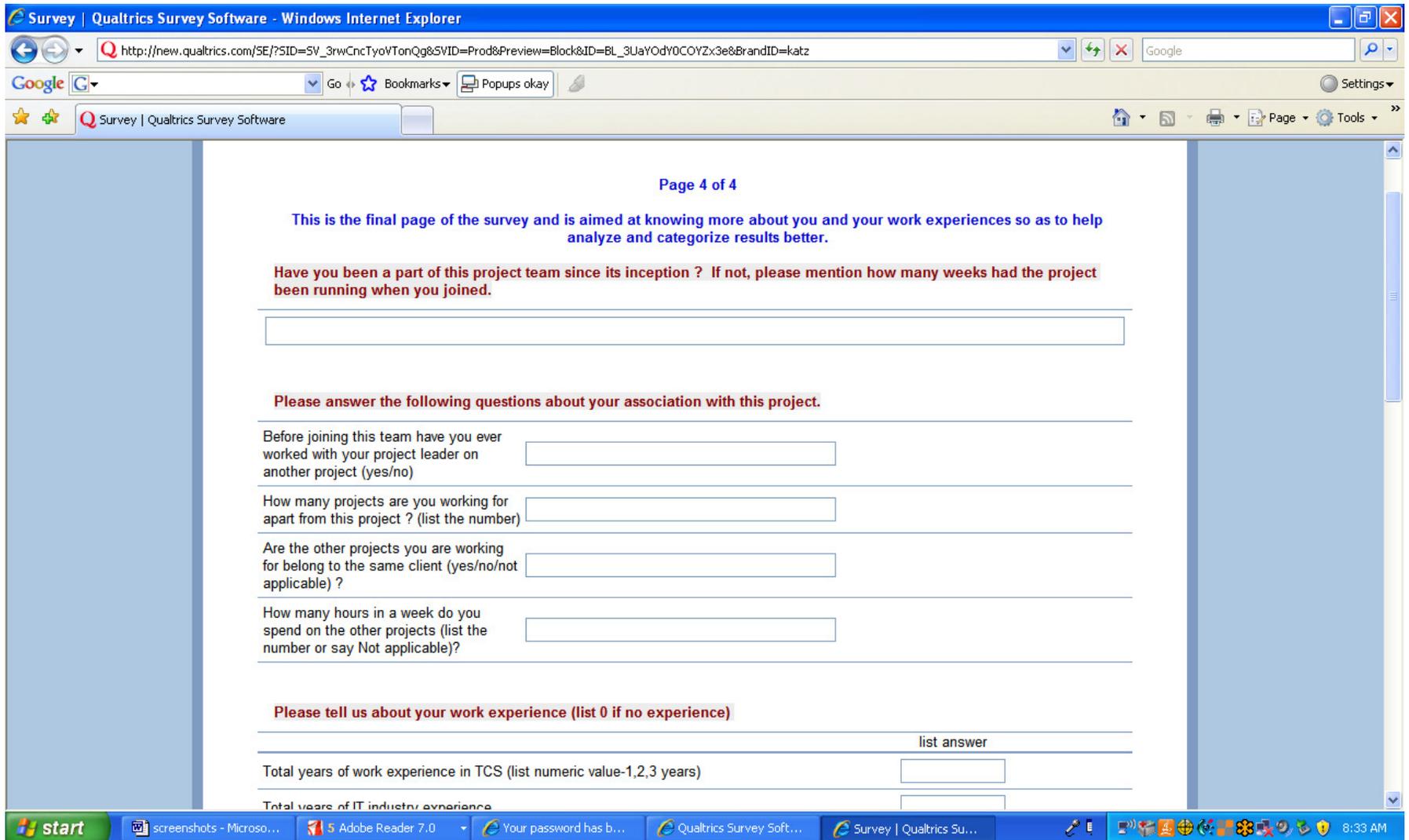
	Not at all	To a small extent	To a moderate extent	To a large extent	To a very large extent
How well versed were you in the technical knowledge required to work on this project ?	<input type="radio"/>				
How closely was the project related to your areas of expertise ?	<input type="radio"/>				
How adequate were your managerial competencies to deal with the type of problems posed by the client ?	<input type="radio"/>				
How familiar were you with the industry the client works in ?	<input type="radio"/>				
The extent to which your past client's had a similar organizational culture ?	<input type="radio"/>				

How would you describe your communication and relationship with the current project leader ?

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I find it easy to communicate with the project leader on work related issues	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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number or say Not applicable?)

Please tell us about your work experience (list 0 if no experience)

	list answer
Total years of work experience in TCS (list numeric value-1,2,3 years)	<input type="text"/>
Total years of IT industry experience	<input type="text"/>
Outside of this project, total weeks of work experience with this client. (list 0 if no experience)	<input type="text"/>
Highest educational degree obtained	<input type="text"/>

The following questions are about your overseas experience

List all countries you have worked in (incl US) and approx duration of time spent there

List all countries you have been educated in

List all countries you have vacationed in

Which country are you physically located in while working on this project - US, India, or some other country ?

How comfortable are you living and working in the American culture (eg: socializing with American friends, discussing American sports, understanding the cultural nuances of American lifestyle)

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How comfortable are you living and working in the American culture (eg: socializing with American friends, discussing American sports, understanding the cultural nuances of American lifestyle)

Not comfortable at all	Somewhat comfortable	Moderately comfortable	Highly comfortable	Very highly comfortable
<input type="checkbox"/>				

To help us note any differences in responses between men and women who take the survey, please specify your gender.

Male	Female
<input type="radio"/>	<input type="radio"/>

If you would like to leave feedback about the survey or make any suggestion on how to strengthen learning within and between TCS project teams and clients, you can do so here.

Also feel free to mention what you think are the challenges of working and knowledge sharing in cross cultural teams, and how you deal with such issues.

PLEASE CLICK ON THE BUTTON BELOW TO SUBMIT YOUR RESPONSES. WHEN YOU SEE THE THANK YOU PAGE YOU KNOW THAT YOUR DATA HAS BEEN RECORDED IN THE DATABASE.

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Previewing Survey

We thank you for your time spent taking this survey.
Your response has been recorded.

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