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Building and leading a culture of collaboration: an analysis of the influence of a company's social networking tools on employee collaboration

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BUILDING AND LEADING A CULTURE OF COLLABORATION: AN ANALYSIS OF THE INFLUENCE OF A COMPANY'S SOCIAL NETWORKING TOOLS ON EMPLOYEE COLLABORATION

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DEDICATION

This dissertation is dedicated to two people who would have been so proud and happy to celebrate my success in bringing this endeavor to completion: my mother, Mary Lou Nugent, and my second mother/dearest friend, Lorna Baker. Though they are no longer here with me, I feel their love and support every day.

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ABSTRACT

The purpose of this study is to examine the influence of a specific company's intranet social networking tools on building and leading a culture of collaboration in a corporate environment. The problem is the implementation of knowledge management and networking tools by a company for the purpose of collaborating, learning and replicating information across the enterprise without measurement of the receptivity of the corporate culture to use the tools effectively. This study focused on assessing the effective use of social networking tools to enable collaboration success in virtual on-line teams rather than physically co-located teams.

A validated survey, the Wilder Collaboration Factors Inventory, was sent to 650 employees of a large, global technology company and 178 employees responded. The participants were asked to provide demographic information, indicate participation in a virtual, on-line community and respond to 40 statements associated with 20 collaboration success factors.

Study findings indicate that 2 of the 4 demographic characteristics proved to be statistically significant with regard to participation in on-line collaborations using intranet social networking tools: age and company tenure. Preference was strongly indicated for 2 of the 10 intranet tools listed in the survey. Responses for all but 1 of the 20 collaboration success factors were statistically insignificant. Thus, it can be generalized from these results that significant differences exist among the ages and tenure of these virtual group members, as well as the collaboration tools they prefer. In addition, a favorable political and social climate for building and leading a culture of collaboration was found at the company used for this study.

Chapter One: The Problem

Introduction

Over the past 2 decades the American workplace has dramatically changed. The factory worker of the past has largely given over to knowledge worker prominence in today's corporate environment. Large, global enterprises have come to realize that, as they evolve in a knowledge-based economy, employees and the information they carry with them have become a critical competitive asset (Rosen, 2007-2009).

The typical knowledge worker is a member of a project team, or teams, inside a large, geographically scattered organization. He or she may work in an office, but is just as likely to work in a virtual environment, at home or on a travel assignment, as do many members of their project teams. Though they may not be physically near each other, knowledge workers do not work on projects in isolation.

> Rarely do even Big Ideas emerge any longer from the solitary labors of a genius. Modern science and technology is too complicated for one brain. With ever more frequency, Nobel prizes are awarded to collections of people. Scientific papers are authored by small platoons of researchers. (Reich, 1988, p. 126)

Indeed, the creative energy of multiple minds and sets of skills working together toward common goals is greater than any individual's achievement, especially in a turbulent marketplace (Kouzes & Posner, 2002).

Merriam-Webster On-line (2010) defines collaboration as "working together jointly with others or together especially in an intellectual endeavor" (www.Merriam-Webster.com). Until recently, few technologies were available to facilitate communication, information knowledge sharing, and collaboration among colleagues and

teams across a geographically extended enterprise. First-generation web-based resources, Web. 1.0, was based on a fairly primitive technology that did little more than display static pages on-screen. The more sophisticated second-generation approach, Web 2.0, features much more powerful development tools and platforms that can be used to construct collaborative virtual spaces that enable users to actively participate in creating and sharing content (Deloitte & Touche, 2009, p. 10). The term Web 2.0 was coined by Darcy DiNucci (1999), who wrote:

> The Web we know now, which loads into a browser window in essentially static screenfulls, is only an embryo of the Web to come. The first glimmerings of Web 2.0 are beginning to appear, and we are just starting to see how that embryo might develop. The Web will be understood not as screenfulls of text and graphics but as a transport mechanism, the ether through which interactivity happens. (www.cdinucci.com)

Before the introduction of Web 2.0 technologies, face-to-face encounters and phone calls were the norm followed by e-mails, employee contact information directories and document repositories storing content for future use. These person-to-person communication channels limit the capacity for cooperative behavior. The alternative to channels are the Web 2.0 platforms which make employee contributions to digital content globally visible, permanently available and searchable to anyone with access to the company intranet. Moving from channel technologies to platform technologies allows employees from any location or time zone to brainstorm, plan, analyze, share work and make decisions together (McAfee, 2009).

"From an enterprise perspective, it is becoming increasingly important for companies to provide internal social software tools" (DiMicco et al., 2008, p. 719). McKinsey Quarterly (2009) reports that 65% of corporations have adopted Web 2.0 technologies and tools for several different purposes, up from 53% in 2007. In fact, 39% of companies report that they are using social networking tools to foster collaboration and 34% to enhance company culture. In addition, 53% of companies intend to increase future investment in Web 2.0 technologies over the next three years, while 26% plan to make a comparable investment and only 6% of companies plan to decrease their investment.

However, studies have shown time and again that knowledge management efforts, restricted to technological solutions, are doomed to fail (Rosen, 2007-2009). Beyond the challenge of geographically dispersed employees, functional, regional and departmental silos exacerbate the barriers to accessing the knowledge and expertise resident in the workforce. For many, if not most, large enterprises corporate knowledge assets are widely dispersed, unmanaged and their employees simply do not know what other employees know (McAfee, 2009). Network-based communication and collaboration tools can help employees reach across the enterprise, across the silos, to share ideas, best practices, and fresh approaches. But a tool alone is not enough and must be supported by people, processes and a culture that is suited to sustain collaborative efforts.

Background of Problem

Awareness of the need for global enterprises to reduce roadblocks to knowledge sharing and develop an environment conducive to employee collaboration has never been greater. Attention to social networking tools in business has primarily focused on

network-based communication tools and social networking websites (Rosen, 2007-2009). Scrutiny is directed toward the functionality of the knowledge management tools that house information, enable information retrieval and help to find experts.

Corporate IT departments can provide tools and services to support synchronous and asynchronous connectivity and communication. But knowledge flow is optimized by focusing on culture, people, and processes within the enterprise, in addition to technology (McAfee, 2009). The problem is the implementation of knowledge management and networking tools by a company for the purpose of collaborating, learning and replicating information across the enterprise without measurement of the receptivity of the corporate culture to use the tools effectively.

There has been a great deal of research conducted on what constitutes effective or ineffective teamwork and collaborations (LaFasto & Larson, 2001; Mattessich, Murray-Close, & Monsey, 2001; Rosen, 2007-2009). These studies have primarily focused on employee perceptions of success factors attributed to enabling a culture of collaboration in physical environments. However, with the availability of Web 2.0 technologies and company intranet social networking tools to facilitate global collaborative communities, research is needed to assess collaboration success factors in virtual on-line teams.

Corporate leaders realize that long-term success depends on the extent to which their employees collaborate with each other and throughout the extended organization. The ability for employees to quickly and effectively collaborate, communicate and exchange information across the global enterprise drives improved productivity, growth, and successful execution of company programs and services (Schein, 2009). Web 2.0 tools and processes are critical resources that enable employees to extend their

knowledge and information beyond organizational, functional and geographic boundaries. Underlying these processes and tools, a culture of collaboration is necessary to create a web of interconnectivity between people-to-people and people-to-information, enhancing the ability to work together to achieve common business goals.

To protect the anonymity of the subject company, a pseudonym of "Techco" will be used throughout this paper. Techco is a $61 billion business that employs more than 160,000 people across the United States and in 70 countries (Techco, 2010). The majority of employees are considered knowledge workers in a highly technical field, which is comprised of products and services to commercial as well as to U.S. Department of Defense and foreign government customers.

Over the years, Techco's structure has evolved into a hybrid of traditional organization structures. It is, in many ways, a machine bureaucracy (Robbins, 1990), as many of the leaders and employees come from a military background. Techco would be described as a company with "highly routine operating tasks, formalized rules and regulations, tasks grouped into functional departments, centralized authority, decision making that follows the chain of command and an elaborate administrative structure with a sharp distinction between line and staff activities" (p. 283). In addition, Techco organizations compete internally for resources, both financial and key personnel. In spite of these challenges, a culture of collaboration is emerging, enabled in part by the company's investment in network-based collaboration tools and the younger and/or IT-savvy employee users accustomed to personal use of social networking websites (Techco executive, personal communication, June 3, 2009).

Techco is currently using intranet social networking tools, as many companies are, “to promote collaboration, particularly across distributed organizations, to manage projects and to handle workflow processes” (Pratt, 2007, p. 1). Techco has created a dedicated organization tasked to institutionalize knowledge management and the behaviors associated with collaboration, learning and replication. Yet, there is limited research into the effects of implementing this approach and its impact on building a culture of collaboration with the current multi-generational knowledge workforce.

Purpose of the Study

The purpose of this study is to examine the influence of a specific company’s intranet social networking tools on building and leading a culture of collaboration.

In October, 2007 the Techco CEO asked the company executives to answer the question “How can we better share and reuse ideas within Techco?” (internal Techco documentation). In response, a database was built to register and store employee-contributed ideas. However, the database did not catch on in a viral way, as the CEO had hoped. Techco executives recognized that Web 2.0 social networking tools, such as wikis and blogs, were emerging with great popularity on the public Internet. They suggested that something similar be used within Techco. Since all of the Techco executives were of an older generation and knowledgeable regarding generational communication differences, they invited a few younger employees to join the development team (Techco executive, personal communication, June 3, 2009). The team discerned that the problem with the original database was that it was not open and flexible enough to enable the free-flowing information sharing and networking envisioned by the CEO.

Within 2 years, Techco IT developers created a prototype of an intranet -based social networking tool to be used to find experts, ask questions and facilitate problem-solving. InSite is comprised of three sections: *Find It* (find and discover people and information), *Share It* (share information, links, and files), and *Ask It* (quickly ask and answer questions in a central location). The benefits of the inSite tool are described as:

- A place where every employee has an identity and can establish a profile (resume, skills, expertise, interests) on the Techco intranet.
- A central location where employees can help each other solve problems.
- A quick way to find people based on name, skills, location, etc.
- A forum that allows employees to ask questions and publish their thoughts.
- A way for employees to share information, links, or files with each other.
- A way for people to establish trust relationships with peers throughout the company.
- A community where groups and Communities of Practice (CoPs) can display their identity and members.
- A way for the global workforce to stay connected to each other. (Techco, 2009)

The tool is available enterprise-wide without any restriction to business unit or physical location. Only access to the Techco intranet is needed. Taking a cue from the successful social networking sites on the public Internet, such as Facebook and MySpace, it was determined that the best way to spread the use of inSite would be to let it grow virally. In other words, if employees think it is useful, they will use the tool within their networks and across their communities.

The inSite pilot was deemed successful by a survey of users who reported that they found the tool to be valuable and were excited about the possibilities for increased functionality and capabilities through the internal use of Web 2.0 technology. After nearly 2 years, from the pilot to the present, inSite has:

- 42,178 employee profiles (out of 160,000 Techco employees).
- 114,000 person-to-person connections.
- 956 questions asked and answered in *Ask It*.
- 9,030 articles posted in *Share It.* (Techco, 2009)

The inSite tool is owned and managed by Techco's Collaboration Services organization, reporting to Computing & Network Operations. Their mission is "to provide an integrated suite of collaboration products, tools, and services that support Techco's business activities anywhere, anytime at the lowest possible cost" (Techco, 2009). Techco's Chief Information Officer stated that "collaboration is really about giving employees control of the exchange of information and knowledge they own. These collaborative capabilities can have a tremendous positive impact on our employees' ability to be effective and productive in their jobs and to grow professionally by connecting with and learning from others" (Techco, 2009).

While collaboration tools and technologies have been deployed in the Techco intranet, several barriers, issues and gaps need to be resolved before seamless collaboration and information sharing across the enterprise can be achieved. Business, functional and geographic silos remain. A lack of cohesion across collaboration tools and related technologies block information sharing, team coordination and decision making (McAfee, 2009). A collaboration chasm has emerged, in which some workers expect and

eagerly embrace social computing technologies while others don't understand the benefits and resist the new tools. Some believe the collaboration environment is not supported by established, defined and consistent Techco business processes (Techco executives, personal communications, March 3-9, 2010). Proprietary data content restrictions inhibit information discovery and sharing. Multiple content repositories exist across the enterprise that are not integrated by a common search capability.

The greatest impediment to success, however, is the organizational culture barrier. Technology can help facilitate collaboration, but it does not drive organizational change– people do. Rosen noted that "tools are more likely to break down barriers among departments, functions and regions if the policies, principles and culture encourage collaboration" (Rosen, 2007-2009, p.116). In hierarchical, internally-competitive companies, the organizational culture likely runs contrary to the collaboration corporate leaders encourage. This presents a significant cultural divide.

Thus far, Techco leadership has focused on measuring inSite activity levels which do not provide information on the impact of the social networking tool on employees or efforts to create a culture of collaboration. There is a need for Techco leaders to focus on outcome measures which are predictors or leading indicators of the effectiveness of their social networking tool to achieve a collaborative culture in the company.

Chapter Two contains a literature review of corporate culture, collaborative culture, social networking collaboration tools, and success factors identified that support effective collaborations, based on a meta-analysis of 414 studies on collaboration. The proposed study will survey current employee members of inSite groups from across the enterprise for analysis.

Problem Statement

What relationship, if any, exists between a specific company's use of intranet social networking tools and the collaborative culture of its employees?

Research Hypotheses

In order to answer the main question, an evaluation educational inquiry was employed to determine the effectiveness of the usage of intranet social networking tools to enable successful on-line collaborations. In focusing on a summative evaluation, the following four research hypotheses were tested:

1. There is/is not a significant difference among employees of specific demographics with respect to participation in on-line collaborations using intranet social networking tools.
2. There is/is not evidence of any or all of the 20 factors of a successful collaboration approach present in a specific company's intranet social networking communities.
3. There is/is not a significance difference among the employee usage of an intranet collaboration tool other than inSite.
4. There is/is not a significant difference between those employees who do or do not use the inSite tool with respect to evidence of any or all of the six Wilder CFI categories of a successful collaboration approach present in a specific company's intranet social networking communities.

Significance of this Research

This study evaluated the influence that intranet social networking tools have to move company employees toward a collaborative culture. A validated survey instrument

was administered to select groups of employees across the enterprise who currently belong to an inSite knowledge sharing community. The combination of the research findings, employee survey, and conclusion of this dissertation has real world application and significance to most large, global enterprises evaluating the effectiveness of social networking tools to facilitate knowledge sharing and employee collaboration. This study was undertaken to assess the presence of conditions conducive to creating and leading a culture of collaboration in a virtual environment and to understand the likelihood of success in on-line (as opposed to physical) communities through the use of intranet social networking tools.

Assumptions of this Research

A major assumption underlying this research study is that the methods of inferential and descriptive inquiry and quantitative case study design are sufficiently rigorous to lead the researcher to valuable understandings of the behaviors and beliefs of selected groups of technology workers. It is also assumed that the employees truthfully responded to the survey questions and that the reported behaviors and attitudes accurately describe what was felt by the participants. Another assumption is that the sample set selected is a consistent representation of the larger whole population.

Clarification of Terms

Asynchronous: A form of communication in which the sender and receiver are not concurrently engaged in communication. Information is transferred by the sender, stored or archived, and then later accessed by the receiver (Shen & Dewan, 1992).

Blog: A contraction of the term weblog. A website consisting of short articles (or posts) generated by an individual and displayed in reverse chronological order. Term is also used as a verb, blogging, meaning to add content to the blog (Tapscott, 2006).

Boomers: Refers to the generation born between 1946 and 1964 (internal Techco documentation).

Collaboration: Working together jointly with others or together especially in an intellectual endeavor (www.Merriam-Webster.com).

Communities of Practice (CoP): A group of people who share an interest and/or a profession. CoPs can evolve naturally because of the member's common interests or they can be created specifically with the goal of sharing knowledge. CoPs exist on-line or in a physical environment.

Cooperation: Short-term, informal relationship between organizations without explicitly defined goals, objectives or joint structure (Ray, 2002).

Culture: A collection of shared attitudes, values, goals, and practices that characterizes an institution, organization or group (Schein, 2009).

Emergent: The dynamic appearance of a global structure as a result of local interactions, without a central organization defining a structure. The public Internet is emergent. Company intranets generally are not, since a small group of people usually define the structure and few pages are linked by users (McAfee, 2009).

Executives: Individuals at the highest levels of management who provide top-down leadership to a corporation’s employees.

Generation X (Gen X’ers): Refers to the generation born between 1965 and 1976 (internal Techco documentation).

Intranet: A private computer network that uses Internet technologies to securely share any part of an organization's information or operational systems within that organization. The intranet includes an organization's internal website, as well as its information technology infrastructure as an important component and focal point of internal communication and collaboration.

Internet: A global system of interconnected computer networks that consists of millions of private and public, academic, business, and government networks. It carries a vast array of information resources and services, most notably the World Wide Web (WWW) and the infrastructure to support e-mail (http://en.wikipedia.org/wiki/Public_Internet).

Knowledge Management: A comprehensive system of processes, tools, methods and techniques that enable employees to capture and share information effectively.

Knowledge Workers: Term was first coined by Peter Drucker (1967, 2007), as one who works primarily with information or one who develops and uses knowledge in the workplace. Refers to individuals who are valued for their ability to interpret information within a specific subject area.

Matures (Veterans): Refers to the generation born between 1933 and 1945 (internal Techco documentation).

Millennials (Gen Y'ers): Refers to the generation born between 1977 and 1998 (internal Techco documentation).

Social Networking Tools: Websites that provide users the opportunity to congregate based on common interests or affiliations. Communication is by voice, chat, video, instant message, and blogs, among others.

Synchronous: Communication that takes place in real time, without delay (Shen & Dewan, 1992).

Viral: Refers to a reoccurring practice or pattern of Internet use that moves from person to person through pre-existing social networks (McAfee, 2009).

Virtual distance: The perceived distance between individuals, groups or organizations that is brought on by the constant use of electronic communication rather than face-to face (Lojeski & Reilly, 2007).

Web 1.0: Static pages on the World Wide Web instead of the dynamic user-generated content of Web 2.0 (McAfee, 2009).

Web 2.0: The so-called second generation of web development which enables users to do more than passively receive information. Rather, users can generate content, share information, and communicate via the World Wide Web (McAfee, 2009).

Wiki: An on-line community that provides content publication, collaboration and knowledge-sharing for a contributing group of people. It is typically deployed to serve a project, work group or community of interest (Tapscott & Williams, 2006).

Summary

Currently, in the United States, knowledge workers have gained prominence in the corporate environment. These employees often work in large, geographically dispersed organizations and are likely to be physically separated from their project teammates. Today, Web 2.0 technologies, including on-line social networking tools, can facilitate communication, knowledge and information sharing, and collaboration between colleagues and teams no matter where each team member may be physically located. However, corporate collaboration initiatives that rely solely on technological solutions to

achieve connectivity have historically failed to bring the desired result. A measure of the receptivity of corporate culture, people and internal processes to using on-line social networking tools is needed. With this information, knowledge flow and collaboration among employees in a virtual environment can be assessed and target opportunities for improvement can be defined.

The purpose of this research is to examine the influence of a specific technology company's intranet social networking tools to build and lead a culture of collaboration. The information obtained can then be used to assist in understanding the presence of conditions conducive to knowledge sharing and employee collaboration in largely virtual work teams. The identified characteristics that block the desired culture shift toward being more collaborative could then be used by corporate leaders to determine interventions to remove barriers to successful collaborations. Further, successes can be highlighted and publicized in order to spread these accomplishments across the enterprise.

Understanding how the use of intranet social networking tools can enable and grow a culture of collaboration will help eradicate the physical, functional and organizational boundaries that impede effective knowledge sharing. Corporations will be able to more effectively collaborate and communicate across global enterprises to successfully drive productivity, growth and the achievement of business objectives.

Chapter Two: Literature Review

Introduction

This chapter summarizes the literature with regards to the areas that are relevant to this study: corporate culture, collaborative culture, intranet social networking tools, and success factors identified through a meta-analysis of 414 studies on collaboration (Mattessich et al., 2001). This literature review focuses on the issues, theories, and research related to determining the impact of social networking tools on a technology company's employee efforts to collaborate with others across the enterprise.

The rationale for this literature selection is to provide a basis for understanding the impact of intranet collaboration tools on improved communication and knowledge sharing across functional and business unit boundaries, and the development of a culture of collaboration in organizations. Corporate and collaborative culture process models are explored to assess their relevance to the application of on-line or virtual communities of knowledge workers.

The corporate use of intranet social networking sites is scrutinized to assess the appropriateness of their use in the improvement of employee collaboration. The success factors identified in the validated survey instrument used in this study will be reviewed to gain a better understanding of the options available for Techco leaders.

Corporate Culture

The study of organizational culture has been important to American companies for many years in that culture change is the most common form of organizational change. "A well-conceived and well-managed organization culture, closely linked to an effective business strategy, can mean the difference between success and failure in today's

demanding environments" (Cummings & Worley, 2005, p. 482). It is critical for a company to analyze and understand its culture in order to optimize its ability to achieve its strategic objectives. A cultural assessment can help organizations understand whether or not their prevailing culture can support and drive activities needed to accomplish their goals and identify any gaps between the current and desired states (Haneberg, 2005).

There are many definitions and descriptions of what is meant by the term *culture*. Geert Hofstede (1980) is the theorist most closely associated with research on corporate culture, based on his studies of IBM cultural values from 1967 to 1973. He defined culture as the collective programming of the mind and recognized that culture is deeply rooted in value systems that stabilize over time.

Deal and Kennedy (1982), as well as Harvey and Brown (1988), define organization culture as the way things are done in an organization. Deal and Kennedy believe that describing culture is intangible, elusive, and based on a core set of assumptions and implicit understandings among employees that govern behavior in the workplace. Harvey and Brown describe culture as a system of shared values and beliefs that interact within an organization to produce behavioral norms.

Trompenaars and van Reine (2004) characterize corporate culture as constantly changing, rather than static, with "shared networks of meaning, providing coherence and a sense of commitment even though the pattern of meaning is continuously reconstructed in an ongoing process of reconciliation"–and thus, is "inherently ambiguous and paradoxical" (p. 26).

Schein (2009) cautions against oversimplifying a definition of culture. He suggests that a better way to consider culture is to recognize that it exists at ever deeper levels, as categorized below:

- Artifacts (easiest level to observe, such as visible organization structures and processes).
- Espoused Values (stated strategies, goals, values and principles).
- Shared Tacit Assumptions (unconscious beliefs, perceptions and feelings).

The Artifact level is easy to observe, but it is not clear why employees behave as they do. At the Espoused Values level, inconsistencies are likely to occur between stated values and visible behaviors, indicating a deeper level of thought and perception are in play. Finally, at the deepest level Shared Tacit Assumptions, the ultimate source of values and action, are what drive behaviors. Thus, Schein defines culture as:

> a pattern of shared tacit assumptions that was learned by a group as it solved its problems of external adaptation and internal integration, that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problem. (p. 27)

Schein argues that it is difficult for people to accurately define their culture because so much of what makes up the culture is unconscious. He adds that a corporate culture is difficult to change because it represents the group's accumulated learning and pattern of interconnected assumptions. Further, as organizations grow and mature subcultures emerge based on functions, product lines, geography, or other levels within a hierarchy. In many organizations, subcultures can be as strong as or stronger than the overall organization's culture. When separate subcultures are forced to collaborate to

solve a joint problem, members "begin to pay attention to each other, develop an understanding of their differences and create new ways of working that take advantage of [each other's] cultures" (Schein, 2009, p. 15).

Robbins (2003) identifies several roles that culture plays within an enterprise. Culture creates boundaries or distinctions between one organization and another. It also suggests a common identity for the organization's members, as well as providing a stable social system with standards and rules of behavior. Lastly, culture conveys a commitment to something more than serving one's own self-interest.

"Culture is a property of a group," asserts Schein (2009), and "whenever a group has enough common experience, a culture begins to form" (p. 19). He maintains that, as individuals, we possess multiple cultures (race, gender, background, etc.). Yet, when we spend a great deal of time in an organization or in a profession, we adopt many of the cultural attributes that others in that occupation or organization share. These become tacit assumptions and we cease to be consciously aware of them until someone, perhaps a new group member, challenges them–or until we offend someone with a different cultural background.

Even though research suggests that culture is largely unconscious and unobservable, there are visible characteristics that indicate cultural values that are present in an organization. Robbins (2003) identifies seven signs of employee behavior that indicate a company's values:

- Innovation and risk taking.
- Precision and attention to detail.
- Results and outcomes, rather than technique and process.

- People orientation.
- Team orientation.
- Competitiveness and aggression.
- Maintaining status quo vs. growth and change.

Alternatively, Schein (2009) measures culture at increasingly deeper levels:

- Artifacts.
- Norms.
- Values.
- Basic assumptions.

At the most visible level, artifacts include observable behaviors such as clothing, language, procedures and rules. Rosen (2009) agrees with Schein that "an organization's culture can be observed formally through its policies and procedures and informally through the use of jargon and common habits and behaviors among employees" (p. 47). However, Schein (2009) warns that artifacts often represent deeper assumptions within the organization, but can be misleading in that interpretation of meaning by an outsider, or sometimes even by an insider, can be wrong.

At the next deeper level, norms include the unwritten rules of behavior. Still deeper, values tell members what is important to the organization. Finally, basic assumptions are the taken-for-granted beliefs that tell members what they should think and feel. These cultural elements are outcomes of strategic and organizational design experiences and choices. They can either facilitate or hinder change and organizational transformation.

Trompenaars (1998) originally developed his Seven Dimensions of Culture to comprehend national differences. Application of his framework has since been used to understand, reconcile and integrate organizational cultures changing as a result of mergers. Acquisitions and mergers have occurred numerous times at Techno. His Seven Dimensions of Culture (pp. 26-29) are:

1. Universalism vs. particularism (What is more important, rules or relationships?).
2. Individualism vs. collectivism (Do we function as a group or as individuals?).
3. Neutral vs. emotional (Do we display our emotions?).
4. Specific vs. diffuse (How separate we keep our private and working lives).
5. Achievement vs. ascription (Do we have to prove ourselves to receive status or is it given to us?).
6. Sequential vs. synchronic (Do we do things one at a time or several things at once?).
7. Internal vs. external control (Do we control our environment or are we controlled by it?).

Trompenaars and van Reine (2004) created a model of corporate culture that depicts sets of combinations of the seven dimension of culture. The model emphasizes two value dimensions that cover most of the important differences between corporate cultures: person versus task orientation (related to universal and specific versus particularistic and diffuse) and hierarchical versus egalitarian (related to achievement versus ascription).

Trompenaars and van Reine (2004) emphasized that changing a corporate culture is not about throwing out the old culture and instituting something completely new. They said:

> Changing organization cultures is a dilemma in itself. One the one hand, organization cultures provide consistency, order, a core of the company that is strong and enduring. On the other hand they need to be adaptable to a changing environment. Changing corporate cultures is about finding a balance between radical change and organic modifications, between bold moves and incremental adjustment. It is important to ensure that the strengths of the current corporate culture do not get lost in the process. (p. 171)

Leadership plays an important role in establishing cultural change. Leadership style, communication style, conflict management, personnel issues, and approaches on motivating employees can have a profound influence on shaping a corporate culture. Leaders who espouse corporate values that reflect the desired culture, and yet fail to turn them into observable actions, will likely damage a culture and create cynical employees. (Trompenaars & van Reine, 2004).

A deeply embedded culture can become a liability to an organization (Robbins, 2003). When the cultural values held are not consistent with those needed to move the organization forward toward meeting its goals and objectives, the organization is not likely to be successful. This is particularly true in a dynamic, rapidly changing environment, such as Techco's. Further, strong cultures put pressure on employees to conform, stifling the very diversity and creativity needed to make the organization succeed.

Traditional corporate leaders may attempt to exert control and predictability into their management systems through a strong, hierarchical structure made up of organization charts, job descriptions, and intricately described RAAs–corporate-speak for responsibility, accountability and authority (Brafman & Beckstrom, 2006). Corporate cultures that excessively rely on order and predictability, elaborate structures and rules, and detailed performance goals with associated metrics fight the tide of an increasingly complex and unpredictable world economic environment. “The world is far more sensitive than we had ever thought. We may harbor the hope that we will regain predictability as soon as we can learn to account for all variables, but in fact no level of detail can ever satisfy this desire” (Wheatley, 1994, p. 127).

Wheatley (1994) suggests that though corporate leaders “are very good at measuring activity,” they can never account for all the variables in a given situation (p. 129). The “futility of searching for ever finer measures of discrete parts of a system” distracts them from looking at their organizations as whole systems rather than a linear series of discrete tasks–searching for themes and patterns, rather than focusing on isolated events (p. 130). Wheatley believes that “despite the experience of fluctuations and changes that disrupt our plans, the world is inherently orderly. And fluctuation and change are part of the very process by which order is created” (p. 18).

Lorenz (1993) described this phenomenon as the “butterfly effect”–in other words, chaos theory (p. 206). “Does the flap of a butterfly’s wings in Brazil set off a tornado in Texas? If the flap of a butterfly’s wings can be instrumental in generating a tornado, it can be equally instrumental in preventing a tornado” (p. 181). Lorenz, a meteorologist at MIT, developed his theory while running a computer model of weather

patterns. He noticed the effects of running the model multiple times with miniscule changes resulting in completely different outcomes each time (p.183). Organizations, like other chaotic systems such as weather, are very sensitive to small changes that can lead to significant and unintended consequences and chain reactions. But, as Wheatley (1994) attests, inherent orderliness emerges when looked at over time–a "ballet of chaos and order, of change and stability, as two complementary aspects of the process of growth, neither of which is primary" (p. 21).

Wheatley (1994) maintains that effective leaders communicate governing principles, guiding visions, strong values and organizational beliefs, in other words corporate culture, so that every employee can use them to shape their own behavior. This results in similar behaviors at every level of the organization while maintaining flexibility and responsiveness to changing conditions (p. 133).

Cummings and Worley (2005) add that an organization's culture and ability to change can indirectly impact performance. "A particular pattern of values and assumptions, that was once a source of strength for a company, can become a major liability in successfully implementing a new strategy" (p. 484). Change can fail if the culture does not support the new strategy.

Cummings and Worley (2005) maintain that fundamental cultural change is a very difficult and long-term process, and may be impossible for large companies with deeply entrenched cultures. It is their opinion that, when organizations are successful, the process takes approximately 6-15 years. According to Schein (2009), a cultural evolution and gradual change is the only alternative for old, well-established enterprises, such as Techco.

Research suggests that new technology can be a catalyst for cultural change. The introduction of computers and information technology, both in the workplace and at home, has had a profound impact on how employees work (Schein, 2009). Cultural assumptions are being challenged as Web 2.0 technologies remove time and space limitations.

Technology alone cannot create a new culture. Users must discover from their own experiences what works best in terms of getting tasks accomplished and managing internal relationships. “[M]embers of the organization will not internalize new ways of working or thinking and make them part of the culture unless, over time, the new ways are actually better” (Schein, 2009, p. 218).

Collaborative Culture

Collaboration refers to “a mutually beneficial and well-defined relationship entered into by two or more organizations to achieve common goals” (Mattessich et al., 2001, p. 4). Ideally, the collaboration consists of a commitment to the relationship; a jointly developed organizational structure; shared responsibility, accountability and authority; and sharing of both resources and rewards.

Not every joint effort between two organizations is considered collaboration. The term “cooperation” is used to describe a shorter-term, informal relationship between organizations without explicitly defined goals and objectives or a joint structure. The term “coordination” describes a longer-term relationship. However, each organization retains its independence as they work together on special projects (Winer & Ray, 1994).

Cooperation, coordination and collaboration are respectively more complex and difficult for the organizations involved. Collaboration requires much more commitment

and interdependence in solving challenging problems that each organization cannot solve on its own. As organizations work together to define their mission, structure and so forth, they may discover that a less intense process, cooperation or coordination, is more appropriate (Ray, 2002).

In traditional command-and-control enterprises such as Techco, collaborative efforts within a deeply embedded competitive culture occur along a spectrum. Select functional, regional or business unit groups participate in collaborations, with the hope that a collaborative culture will spread throughout the enterprise. Rosen (2007-2009) notes that this is particularly prevalent in scientific or research and development companies. “Hybrid and transitional cultures present leadership challenges and provide insight into the disconnect between people accustomed to traditional versus collaborative approaches” (p. 208).

In corporations there are business units, functions and regions which often compete for resources and recognition. Individual achievements are rewarded rather than collaborative achievements. Thus, leadership efforts to create a culture of collaboration run counter to the organizational systems in place. Rosen (2007-2009) suggests that it is not impossible to spread a collaborative culture throughout a command-and-control hierarchical enterprise, though it will likely take years to achieve the benefits of the culture shift. He recommends small, fast-moving teams with a flattened hierarchy that emphasize sharing, innovation and use of collaborative tools be used to proliferate the culture shift across the enterprise. It is this decentralization, permitting groups of diverse individuals across functions, regions or other organizational boundaries to share their

tacit knowledge and solve complex problems, that allows the corporation to benefit from what Surowieki (2004, 2005) refers to as the wisdom of crowds.

Page (2007) describes the four conditions under which the benefits of diversity in collaborations become significant:

- The problem is difficult.
- The team members are knowledgeable and able to solve the problem.
- The solution desired represents a significant improvement over the status quo.
- The group of problem solvers have diverse perspectives.

For technologically-advanced enterprises such as Techco, difficult problems are the norm, and thus it becomes ever more critical that collaborative approaches be adopted. Complicated, multi-dimensional projects in which no solution exists require new organizational learning, creativity, and agility to respond to rigorous customer requirements in dynamic market environments, such as those typically experienced by Techco (Schein, 2009). Corporations are looking for ways to work more effectively across functional and other boundaries to attack complex challenges more innovatively and collaboratively.

Research conducted by the Center for Creative Leadership (CCL) classifies complex challenges into three categories: technical, adaptive and critical. Technical challenges are those that can be solved using existing skills, resources and processes. Only about 43% of problems fall into this category. Adaptive challenges require new perspectives, capabilities and extend across organizational boundaries, requiring new solutions and ways of working together. This category comprises approximately 37% of problems. Finally, critical challenges are those that also require new and innovative

thinking, but in a more unpredictable environment. This may include economic, social or political issues that demand immediate action and account for about 10% of problems. A problem or challenge may involve just one of these categories or may be even more complex and include elements from more than one category. This study found that half of the managers surveyed reported an increase in working across functions to collaborate and more effectively address these complex challenges in order to create value for their organizations (Hesselbein & Goldsmith, 2006). Note that the percentages given add up to 90% but these are the values cited by Hesselbein and Goldsmith in the referenced book.

Value creation can be measured as reduced cycle or product development time, entering new markets or developing a new product for an existing market, faster problem solving, or increased sales to name a few. The reason corporations collaborate is not for their own sake, but to create value. Consequently, organizational conditions and environments conducive to collaborating and creating value for enterprises have been extensively studied. Rosen (2007-2009) identified ten cultural elements that culminate in value for a corporation:

- Trust.
- Sharing.
- Goals.
- Innovation.
- Environment.
- Collaborative chaos.
- Constructive confrontation.
- Communication.

- Community.
- Value.

He also recognized ten common attributes of collaborative cultures:

- Frequent, cross-functional interaction.
- Leadership and power spread across the organization.
- People are accessible regardless of their level.
- Reduce fear of failure.
- Broad input into decisions.
- Cross-pollination of people.
- Spontaneous or unscheduled interaction.
- Less structured interaction.
- Formal or informal mentoring.
- Tools fit work styles.

Similarly, Robbins (2003) describes the key components in four categories that make up an effective team and provide objective measures of productivity, team performance and member satisfaction. His team effectiveness model, described below, echoes many of the attributes of successful collaborations as well as incorporating the benefits of diversity described by Page (2007).

- Work Design: Working together and taking collective responsibility to complete significant tasks. Includes:
    - Autonomy.
    - Skill variety.
    - Task identity.

    - Task significance.

- Composition: Variables relating to how the team is staffed. Includes:
    - Ability.
    - Personality.
    - Roles and diversity.
    - Size.
    - Flexibility.
    - Preference for teamwork.
- Context. Includes:
    - Adequate resources.
    - Leadership.
    - Climate of trust.
    - Performance evaluations.
- Composition: Variables relating to how the team is staffed. Includes:
    - Common purpose.
    - Team efficacy (teams believe they can succeed).
    - Conflict.
    - Specific goals.
    - Social loafing.

Alternatively, LaFasto and Larson (2001) assert that the keys to successful collaborative teamwork, derived from the experiences of team members, can be summarized as the following:

- Expect collaborative behavior from each team member.

- Require people to build collaborative work relationships.
- Practice collaborative problem solving.
- Demonstrate collaborative leadership.
- Build a collaborative work environment.

To create these conditions, according to Kouzes & Posner (2002), it is necessary to foster leadership that will "create a climate of trust, facilitate positive interdependence and support face-to-face interactions" (p. 243).

While the elements cited here are crucial to cultivating a culture of collaboration, several key factors can "make or break" a collaborative effort according to Winer and Ray (1994). These factors are listed below.

- Ideology (differences in beliefs or values).
- Leadership (no leader or the wrong leader to bring people together).
- Power (inequities between members is balanced–if a substantial difference in power exists, the group cannot achieve an essential melding of power).
- History (past history of unsuccessful collaborations or disagreements).
- Competition (inherent competition for resources or funds).
- Resources (lack of skills or ability to contribute to the collaboration).

Companies may desire to develop a culture of collaboration, but the degree in which these factors (see Table 4) disrupt the shared organizational environment can impede success. Rosen (2007-2009) maintains that there could be a gap between a company leader's desire to collaborate, or appear collaborative, and both the personal and organizational comfort zones that emphasize control. As Rosen states, "organizations traditionally favor chain-of-command decision-making over on-the-fly resolutions,

scheduled encounters over ad hoc or spontaneous interaction and the more manageable nature of e-mail over the relative free-for-all of instant messaging" (p. 7). Also, personal comfort zones "embrace the status quo over change, procrastination over resolution and hoarding over sharing information" (p. 8). To break out of these traditional patterns of behavior and collaborate effectively, a culture shift is needed to adapt to a new way of working.

In spite of the popularity and corporate support for the concept of value creation through collaboration, there are some executives who find the reality of collaboration negative or threatening. Some feel that the impetus toward collaboration is a result of more women in the workplace, in that men traditionally favor "bravado and command-and-control leadership" over a more cooperative work style (Rosen, 2007-2009, p. 16).

A more prevalent concern is the tendency to hoard information rather than share. In a culture that tends toward hoarding instead of sharing, subject matter experts in complex technology fields are rewarded for what they learn (at conferences, professional gatherings, etc.) rather than for what they share with others in collaborative projects. Information hoarders avoid joint efforts beyond their own organizations and reject opportunities to spread their knowledge throughout the enterprise. Rather, they hold their knowledge as power or leverage as a valued employee. Companies can incentivize knowledge sharing and cross-organizational contribution and shift their cultures toward collaboration by rewarding employees for disseminating knowledge gathered instead of hoarding it (Rosen, 2007-2009).

LaFasto and Larson (2001) agree, stating that it is important to consistently reinforce collaborative behavior through rewards and recognition. They argue that "it is

not unusual to find organizations that ask, and even require, people to work in teams toward common objectives, but then offer a traditional reward system that focuses on individual performance rather than the achievement of a team goal" (p. 188). It is a leader's job to ensure that people understand that there is something to be gained individually for cooperating in joint efforts. Rewards and recognition are the organizational systems that legitimize that message (Hackman, 2002; Kouzes & Posner, 2002).

In other research on team behavior, 15 multinational companies were studied revealing that large groups of highly-educated, diverse, and virtual team members assigned to complex projects were more competitive than collaborative. Compared to project teams working on less complex assignments, it was observed that these teams were more reluctant to share information and resources, learn from each other, or help each other meet deadlines and complete tasks (Gratton & Erickson, 2007).

Given the traditional pull toward competitive rather than collaborative behavior, there are approaches that corporations can implement to overcome these difficulties and shift their cultures in a more effective direction. It is not enough to direct teams to collaborate or to provide collaboration technology tools to geographically dispersed teams and expect relationships to magically jell. Enterprise leaders must create conditions to facilitate collaborative behavior, including developing cooperative goals and roles, support reciprocity, and reward group rather than individual accomplishments (Kouzes & Posner, 2002).

Rosen (2007-2009) identifies ten actions a corporation can take to instill a culture of collaboration:

- Establish a mentoring program to promote the notion of knowledge sharing and input from others.
- Advocate constructive confrontation to increase team member comfort with candid expression and open information flow.
- Integrate collaborative tools into work styles, including synchronous and asynchronous technologies to ensure geographically dispersed team members can reach each other as needed.
- Facilitate cross-functional brainstorming in an informal environment to encourage diversity and creativity.
- Reward information sharing and ensure people understand the long-term benefits to the enterprise.
- Incentivize team innovation with recognition and rewards.
- Promote collaborative leaders who demonstrate that multiple perspectives lead to better decisions and products.
- Practice collaborative leadership by seeking contributions from all levels of the organization.
- Use collaborative language, rejecting unnecessary authoritative verbiage and behaviors.
- Avoid internal competition by pitting teams against each other for resources, recognition or rewards.

Gratton and Erickson (2007) echo many of these recommendations and add others to help companies overcome obstacles to creating a collaborative culture. They suggest:

- Executive support (modeling collaborative behaviors across the enterprise, coaching and mentoring).
- Human Resources support (skill training in collaborative practices).
- Relationship-oriented team leaders.
- Team structure and role clarity on challenging assignments that demand creativity (to incentivize team members to invest time and energy in interesting projects).

Winer and Ray (1994) break down the path to a collaborative culture into four stages, as follows:

- Stage 1: Envision results by working individual-to-individual.
    - Bring people together.
    - Enhance trust.
    - Confirm shared vision.
    - Specify desired results.
- Stage 2: Empowerment by working individual-to-organization.
    - Clear authority from home organizations.
    - Confirm organizational roles.
    - Organize the effort.
    - Support tem members.
    - Resolve conflicts.
- Stage 3: Ensure success by working organization-to-organization.
    - Build relationships by finding formal ways to work together.
    - Manage the work.

    - Develop joint systems.
    - Evaluate results.
    - Renew the effort.
- Stage 4: Endow continuity by working collaboration-to-community.
    - Institutionalize success.
    - Seek support from more people and organizations.
    - Create visibility.
    - Involve entire community.
    - Change outdated systems.
    - Conclude this collaborative effort and start new projects.

Drucker (2001) maintains that the effective employee focuses on contribution instead of merely developing his or her own skills, function and specialty within the home department. This is particularly important for specialized knowledge workers who produce ideas, concepts, and information rather than a physical product. He states: “By itself, a specialty is a fragment and sterile. Its output has to be put together with the output of other specialists before it can produce results” (p. 212).

Reinforcing the benefits of a more collaborative culture is an important step toward instilling those values enterprise-wide. The message from corporate leaders should encourage team members to think like owners, develop innovative ideas, and share them with others across organizational boundaries. Collaborative leaders “welcome strategic thought and input from everybody” and understand that “creating value involves asking people from all levels of the company to develop a vision and share it with others”

(Rosen, 2007-2009, p. 220). In contrast, command-and-control leaders expect employees below them in the hierarchy to do as they are told.

Today, successful leaders of large, global enterprises must become skilled at managing collective effort and fostering a more inclusive approach in order to optimize the use of their available resources. “Leaders who embrace and develop these skills are finding that many times effective solutions to pressing challenges exist, embedded deep within the collective knowledge and experience within any given member of an organization” (Hesselbein & Goldsmith, 2006, p. 93).

With the introduction of personal computers and the ability to widely disseminate information and collective knowledge throughout the workplace, one might assume that decentralization and the delayering of management levels would naturally follow (Tapscott & Williams, 2006). However, traditional hierarchical, command-and-control organization structures are still common in mature, large, global enterprises. Web 2.0 technologies and the changing nature of complex knowledge work are forcing a re-examination of this outdated model. Cognitively complex projects require highly-specialized and diverse talents that are likely not located geographically or functionally in the same proximity (Rosen, 2007-2009).

The current workforce is equipped to cope with these challenges. Today’s knowledge workers are, for the most part, technologically proficient, mobile and accustomed to working autonomously. Current projects require employees to be more team-based and collaborative; socially competent, empowered and decisive; and able to communicate both inside and outside their organizations. Networking technologies, such as wikis, blogs, and social networking tools, link virtual teams and equip the knowledge

worker with unprecedented power to reach across the enterprise to engage and procreate more effectively. (Tapscott & Williams, 2006).

This fundamental shift should help organizations become more interdependent, coordinated, and aligned, and thus more successful in performing tasks that are too complex and costly to accomplish alone (Cummings & Worley, 2005). Additionally, Rosen states:

> The struggle between the control paradigm and the culture of collaboration continues. These extremes, rooted in human nature, clash in many organizations. However, the necessity of maximizing time, talent, and tools in the global economy gives the culture of collaboration an edge. (Rosen, 2009, p. 254)

Intranet Social Networking Collaboration Tools

Friedrich Hayek's economic theories include an observation that society must create a way to distribute knowledge among all its members in order to facilitate better decision-making. Hayek (1945) believed that "knowledge of the circumstances of which we must make use never exists in concentrated or integrated form, but solely as the dispersed bits of incomplete and frequently contradictory knowledge which all the separate individuals possess" (p. 519). Hayek maintained that this knowledge should be accessible to everyone, but recognized that this "disregards the fact that the method by which such knowledge can be made as widely available as possible is precisely the problem to which we have to find an answer" (p. 530).

Sixty years later, Web 2.0 provided an answer to that problem. The second generation of the Internet enables users to generate content, find experts, collaborate in communities of interest, share information, and communicate through various social

networking sites (Hoover, 2007). There was a time when many bureaucratic companies refused or severely limited employees' access to the Internet, fearing information leaks or time-wasting. Today, even the most command-and-control companies recognize that the Internet, as well as intranets, have become crucial information access tools. InformationWeek conducted a survey in 2007, finding that 48% of responding companies use social networking sites for peer networking, collaboration, coordination and communication (Hoover, 2007). More recent research, such as McKinsey Quarterly (2009), has shown that corporate use of this technology has grown significantly and will continue to do so.

There are many public web-based social networking tools, such as wikis, blogs, Facebook, Twitter, and so on. For the past few years, several trends have accelerated the common usage of these Web 2.0 social networking resources:

- The wide-spread use of on-line social networks for exchanging information, photos, etc.
- Easy-to-use (intuitive) software.
- Ongoing interest in finding more productive uses for information sharing across on-line networks.
- Increasing population of knowledge workers who depend on information technologies and systems to access, analyze, share and synthesize data in order to do their jobs (Dearstyne, 2007).

The establishment of social networking capabilities, inside the protected walls of the company intranet, leverages the advantages of public sites for professional use. This includes connecting on a personal and professional level with people across the company

as well as advancing one's career by broadening participation and influence across a large enterprise (DiMicco et al., 2008).

A key difference between the public Internet and most corporate intranets is the number of contributors to the content. The Internet is decentralized and developed by millions of people in an emergent fashion (meaning that a global structure forms naturally based on the local interactions of the users). In contrast, a company intranet is designed and built by a relatively small number of IT developers. Social networking software provides the opportunity for emergence to occur behind company firewalls as people rendezvous, connect, collaborate and form on-line communities of interest (McAfee, 2009).

Through freeform social software and emergent mechanisms, such as tagging and linking, patterns and structures based on people's interactions become visible over time. The benefit to this approach is that the resulting networks are free of imposed structure and thus more likely to spread virally; egalitarian, and indifferent to hierarchies; and accepting of many types of data from all kinds of sources (McAfee, 2009). The result is networks that are able to leverage the wisdom of crowds (Surowieki, 2005).

Surowieki (2005) cites four conditions that characterize what he refers to as "wise crowds" (p. 10). They are:

- Diversity of opinion (each person should have some private information, even if it is just interpretation of publicly known facts).
- Independence (opinions not dependent on others).
- Decentralization (people can access specialized knowledge without restriction).

- Aggregation (some method of compiling private judgments into a collective decision).

Decentralization is perhaps the most critical component in the capturing and the managing of corporate knowledge assets. Widely-dispersed information cannot easily or effectively be reused when it is stored in a static data repository (Child & Shumate, 2007; McAfee, 2009). Yet, for many company leaders, the use of static data repositories is their first step toward attempting knowledge management. Research has shown that a focus on data storage may not be worth the investment in that it does not measurably increase team effectiveness.

Child and Shumate (2007) found that connecting people to experts, rather than providing knowledge directly in a collective repository, increased team member perceptions of the effectiveness of their collaborations. They reported that corporate leaders could instead derive more benefits from communication training, relationship building, development of communities of practice (CoPs) and connective knowledge management technologies. Surowieki (2005) agreed that connecting people to other people is the most effective way to solve problems. “If you set a crowd of self-interested, independent people to work in a decentralized way on the same problem, instead of trying to direct their efforts from the top down, their collective solution is likely to be better than any other solution you could come up with” (p. 70).

Long before Web 2.0 made emergent social software platforms commonplace, the first of the annual Computer-Support Cooperative Work (CSCW) conferences was held in Cambridge, Massachusetts in 1984 to explore computer-assisted activities of collaborating individuals. CSCW acts as a cross-discipline forum that intends to “guide

the thoughtful and appropriate design and development of groupware" (Baecker, Grudin, Buxton, & Greenberg, 1995, p. 741).

Groupware is defined as information technology used to help people work together as members of a project group. The focus of CSCW members is on a paradigm shift in computer usage–from using computers as human-machine interaction (the computer acting as a purely computational device) to human-human interaction (facilitating human communication). The evolution of groupware technology over the last 25 years has expanded the notion of collaborative work conducted primarily in physical environments to allowing team members to transcend the need to be in the same place at the same time. It is helpful to envision CSCW's Time/Space Groupware Matrix in the context of its use in group activities. The model is described below.

- Quadrant 1: same time/same place (synchronous/collocated).
    - Face-to-face interactions (decision rooms, shared table, wall displays).
- Quadrant 2: same time/different place (synchronous/remote).
    - Remote interactions (video conferencing, instant messaging, chats, virtual spaces, shared screens).
- Quadrant 3: different time/ same place (asynchronous/collocated).
    - Continuous tasks (team room, working in shifts, large team displays).
- Quadrant 4: different time/different place (asynchronous/remote).
    - Communication and coordination (e-mail, blogs, wikis, group calendars, bulletin boards). (Shen & Dewan, 1992)

The groupware matrix reflects collaborations along two dimensions: first, whether individuals are co-located or geographically dispersed, and second, whether group

members work together synchronously (at same time) or asynchronously (not relying on others to be present at the same time). Most collaborative groups can be more effective when they use tools from more than one cell depending on the different activities and needs of the members.

Before computer-based collaboration software entered the workplace, team members who wished to participate in group projects were restricted to face-to-face interactions (top left quadrant). Attempting to include team members from other locations or time zones, no matter how critical they may be to the success of the project, disrupted collaborative efforts. This is no longer the case. In a large, global enterprise, collaboration tools have made synchronous and asynchronous collaboration a more robust experience than relying strictly on face-to- face interactions (Rosen, 2007-2009).

Collaboration never happens solely because of tools; rather it happens because the organizational culture supports collaborative activity. The tools are “critical enablers in that they let us eliminate or reduce time and distance as barriers” (Rosen, 2007-2009, p. 171). Social networking tools, when used in an enterprise that desires movement toward a more collaborative culture, can be a positive influence by virally spreading tool usage among groups of employees, thus helping to evolve the culture (Tapscott & Williams, 2006).

Although social networking options are now available, traditional workplace software tools continue to dominate many large companies. These methods focus on single user generating documents and attempt to collaborate with others in the organization via e-mail. The problem with long e-mail threads, and even telephone or face-to-face meetings in the workplace, is that there is no organizational memory of the

interaction. Solutions derived during these encounters are lost or reside in the memories of the participants. (Tapscott & Williams, 2006).

To a large degree, reliance on e-mail and telephone for collaboration is still the predominant communication mode in many large, mature companies. Corporate cultures are often slow to adopt new tools, clinging to the status quo and resisting change, especially when change fundamentally transforms how people work (Rosen, 2007-2009).

For example, Techco executives recently deployed video teleconferencing equipment to many organizations across the company. They hoped to reduce employee travel by using video technology to retain the benefits of face-to-face meetings over email and telephone. Micromessages, the smile or nod of agreement–or the shake of the head or crossed arms of disagreement–are lost without the visual presence of the other person (Young, 2007). Unfortunately, these tools were deployed to organizations whether or not the people wished to use them, resulting in most video equipment being pushed into corners of conference rooms gathering dust.

Research suggests that cultures, such as Techco's, were not ready to accept such a democratizing tool. Had the company leaders integrated the video capability into the culture and workflow of its organizations, rather than merely promoting the tool, the viral adoption of video teleconferencing may have had a better chance to catch on. Rosen (2007-2009) suggests that "if you have a corporate mandate to deploy collaboration tools, that doesn't work as effectively as if you develop tools that are so good that business users want to adopt them for the effectiveness and efficiency of their organizations and for better collaboration" (p. 149).

Lojeski and Reilly (2007) developed a framework to explain the issues associated with teamwork and collaboration that they call *virtual distance*. They argue that whether or not a team is collocated or widely separated by distance and time zones, it is subject to the effects of virtual distance. Understanding where an organization falls in the virtual distance model will enable a more appropriate selection of collaboration tools.

Virtual distance is defined as the perceived distance between individuals, groups or organizations that is brought on by the constant use of electronic communication rather than face-to-face. The greater the virtual distance among members of a team, the more problems that team will experience such as miscommunication, role confusion, and personal or cultural conflicts (Lojeski & Reilly, 2007, p. 2).

Low virtual distance is when team members know each other well. Though they may not see each other often, when they do they pick up right where they left off. Among team members there is an easy exchange of tacit knowledge, clear communication, and a common connection to the overall team mission. In contrast, high virtual distance describes team members who do not know each other well. Communication occurs primarily through electronic tools. Information exchange that is solely mediated by technology makes innovation, trust, commitment and collaboration difficult resulting in reduced team effectiveness–especially when team members are on more than one project team at a time (Lojeski & Reilly, 2007).

The virtual distance index is comprised of 11 factors in three categories: physical, operational and affinity. Lojeski and Reilly (2007) found that any or all of these factors may be present in varying degrees within a virtual team (pp. 5-6). These factors are listed below.

- Physical Distance Factors:
    - Geographic distance (the degree to which members are separated by physical distance).
    - Temporal distance (the degree to which members are separated by time zone or work schedule differences).
    - Organizational distance (the degree to which members work for the same, different or multiple organizations).
- Operational Distance Factors:
    - Team size (how large or small the team is).
    - Face-to-face (the extent to which members communicate face-to-face versus electronically).
    - Multitasking (the extent to which members face competing demands from multiple projects).
    - Skill and support (the extent to which members are able to use the technology tools provided to them).
- Affinity Distance Factors:
    - Cultural distance (the extent to which members share cultural values, similar communication styles and attitudes toward work).
    - Interdependence distance (the extent to which members feel interdependent on one another for their own success).
    - Relationship distance (the extent to which members have worked together before or know some of the same people socially).

- Social distance (the extent to which each member's status is derived from his or her hierarchical position in the organization and contribution to the team effort).

Understanding the virtual distance of a team aids in selecting the most appropriate software tools to facilitate optimal team effectiveness. When virtual distance is low, software considerations include ease of use, matching up to the tasks at hand and perceived usefulness by its members. However, when virtual distance is high, additional criteria must be taken into account:

- Is the software the right fit for this team and will they accept it?
- Is the software appropriate for use at all skill levels?
- Do the tools encourage more live meetings among team members?
- Does the software have executive support?
- Are leaders in place trained to use the software tools to reduce virtual distance? (Lojeski & Reilly, 2007, p. 9)

Since more and more work is mediated by technology, "working efficiently now requires the ability to use a wide variety of information and communications technology effectively and seamlessly" (Lojeski & Reilly, 2007, p. 10). The researchers found that correct software selection alone cannot solve the problem created by high virtual distance. Yet, software can be a highly effective tool to reduce the effects and enables teams to work together more effectively. As an example, there are the software considerations for the Physical Distance factors (three of the 11 factors listed previously) which are shown below:

- Physical Distance Factors:

- Geographic distance (the degree to which members are separated by physical distance).
    - Software considerations: Does the software promote presence? (Presence is the perception that the persons interacting are physically present to each other. Face-to-face meeting provides the highest presence.)
- Temporal distance (the degree to which members are separated by time zone or work schedule differences).
    - Software considerations: Does the software allow smooth, asynchronous communication? (The software enables users to know when team members are available for phone calls, meetings or instant messages.)
- Organizational distance (the degree to which members work for the same, different or multiple organizations).
    - Software considerations: Does the software allow team members to develop a common identity quickly and easily? (Organizational distance occurs when team members identify themselves with their own organizations rather than the team itself. Common norms, symbols, or team vision can facilitate team identity and reduce virtual distance.) (Lojeski & Reilly, 2007, p. 13).

Software selection and integration can only take organizations so far. The results of the Ziff Davis Enterprise 2008 Collaboration Survey found that 80% of IT executives

believe that collaboration and workflow technologies will boost productivity and decision-making (Alter, 2008). Surveys from 180 respondents revealed that the two biggest obstacles to successful adoption of collaboration tools into most organizations are a resistance by the corporate culture and insufficient executive support.

Researchers found that most executives tend to underuse collaboration technologies, preferring email and telephone (Alter, 2008; Markus, 1994). Security is often thought to be their main concern, but the data has shown that culture and inadequate training are the primary roadblocks (Alter, 2008). Younger employees, who are quick to adopt new technologies, are leading the change in most corporations. Alter (2008) argues that even though executives may not need to use collaboration tools as much as project teams would, corporate culture is heavily influenced by executive behavior. “When executives set an example of collaboration, other collaboration-friendly behaviors–providing adequate training, encouraging experimentation, and rewarding employees who collaborate, for instance–are more likely to emerge” (p. 22).

McAfee (2009) notes that it is easy to be frustrated by what may seem to be a slow pace of the adoption of intranet social networking and collaboration tools in large, global corporations. “One of the deep insights underlying the shift from Web 1.0 to Web 2.0 was the realization that software should be social–that, in addition to making individuals more productive and automating their roles in a process, software could and should also be used to let people find one another and form communities” (p. 129). He suggests that the challenge for intranet social networking advocates is to increase the percentage of users who contribute to on-line communities by understanding the

roadblocks that are present and taking actions to remove them. These possible roadblocks might include:

- Technologies that are too primitive or difficult to learn.
- Managers who block adoption because they don't want information to flow more freely.
- Entrenched practices and mindsets, including technophobia, that slows the migration from platforms to channels.

In order to overcome these challenges, McAfee concludes that patience, evangelism and training are needed.

Collaboration Success Factors

In 1992 the Wilder Research Center (now Fieldstone Alliance) conducted a meta-analysis research project which established theoretical groundwork for successful collaboration practices. They set out to answer the questions: "What are the ingredients of successful collaboration? What makes the difference between success and failure in joint projects? What makes collaboration work?" (Mattessich, et al., 2001, p. 4). All research related to collaboration (133 studies) were identified. Those studies that did not meet their criteria for validity and relevance were screened out and the 18 remaining studies were analyzed to identify factors that influence success. The result was that 19 factors were identified.

In 2001 the Wilder researchers used the same basic methodology, identifying an additional 281 studies related to collaboration. Again they screened out studies that did not meet the criteria for relevance and validity, and 22 studies remained to be analyzed. Their findings were added and compared to the original research confirming,

contradicting or expanding on the original analyses. As a result, the original 19 factors remained and one additional factor was added (Mattessich, et al., 2001).

The 20 factors were grouped into six categories to establish the dimensions of the conceptual framework. The result was given the name Wilder Collaboration Factors Inventory and is shown in Table 1.

Table 1

Wilder Collaboration Factors Inventory

Categories	Factors
Environment	1. History of collaboration in the community 2. Collaborative group seen as a legitimate leader in the community 3. Favorable political and social climate
Membership Characteristics	4. Mutual respect, understanding and trust 5. Appropriate cross section of members 6. Members see collaboration as in their self-interest 7. Ability to compromise
Process and Structure	8. Members share a stake in both process and outcome 9. Multiple layers of participation 10. Flexibility 11. Development of clear roles and policy guidelines 12. Adaptability 13. Appropriate pace of development
Communication	14. Open and frequent communication 15. Established informal relationships and communication links
Purpose	16. Concrete, attainable goals and objectives 17. Shared vision 18. Unique purpose
Resources	19. Sufficient funds, staff, materials and time 20. Skilled leadership

Note. From *Collaboration: what makes it work* (2nd ed.) by P.W. Mattessich, M. Murray-Close, & B.R. Monsey, 2001, Fieldstone Alliance.

Mattessich et al. (2001) cite over forty subsequent studies conducted by other researchers using the Wilder CFI instrument to measure success in the collaboration process and to predict the likelihood of success. Eight additional studies conducted over the last decade, that also used the Wilder conceptual framework, were reviewed (Czajkowski, 2006; DeRose, Beatty, & Jackson, 2004; Fogler, 2006; Greene, 2010; Mason, 2006; Perrault, 2008; Schmaltz, 2010; Townsend & Shelley, 2008). Further, an in-depth literature review on each of the six factor categories (Table 8) lends confidence to the factors and supporting data as identified by Mattessich et al. These factors provide a solid theoretical foundation that is corroborated by a significant amount of published research in all six Wilder CFI categories. Each of the six categories and 20 factors (Mattessich et al., 2001) in Table 1 are described below.

Factors related to the category *Environment* are:

1. *A history of collaboration in the community* which is further defined as "offer[ing] potential collaborative partners an understanding of the roles and expectations required in collaboration and enables them to trust the process" (p. 12).
2. *The collaborative group is seen as a legitimate leader in the community*, meaning that the group, including the agencies within the group, "is perceived within the community as reliable and competent–at least related to the goals and activities it intends to accomplish" (p. 13).
3. *A favorable political and social climate* made up of "political leaders, opinion-makers, persons who control resources, and the general public [who]

support (or at least do not oppose) the mission of the collaborative group" (p. 13).

Factors related to the category *Membership Characteristics* are:

4. *Mutual respect, understanding and trust* defined as when "members of the collaborative group share an understanding and respect for each other and their respective organizations: how they operate, their cultural norms and values, their limitations, and their expectations" (p. 14).
5. *An appropriate cross section of members*, "to the extent that they are needed, includ[ing] representatives from each segment of the community who will be affected by [the collaborative group's] activities" (p. 16).
6. *Members who see collaboration as in their self interest*. This is defined as "collaborating partners [that] believe that they will benefit from their involvement in the collaboration and the advantages of membership will offset costs such as loss of autonomy and turf" (p. 16).
7. The collaborating partners have the *ability to compromise*, "since the many decisions within a collaborative effort cannot possibly fit the preferences of every member perfectly" (p. 17).

Factors related to the category *Process and Structure* are:

8. *Members who share a stake in both process and outcome*, meaning that "members of the collaborative group feel ownership of both the way the group works and the results or products of its work" (p. 18).
9. *Multiple layers of participation*, where "every level (upper management, middle management, operations) within each partner organization has at least

some representation and ongoing involvement in the collaborative initiative" (p. 19).

10. *Flexibility* in that "the collaborative group remains open to varied ways of organizing itself and accomplishing its work" (p. 20).
11. *The development of clear roles and policy guidelines* so that "collaborating partners clearly understand their roles, rights, responsibilities, and they understand how to carry out those responsibilities" (p. 20).
12. *Adaptability* so that "the collaborative group has the ability to sustain itself in the midst of major changes, even if it needs to change some major goals, members, etc., in order to deal with changing conditions" (p. 21).
13. *An appropriate pace of development* meaning that "the structure, resources and activities of the collaborative group [can] change over time to meet the needs of the group without overwhelming its capacity, at each point throughout the initiative" (p. 22).

Factors related to the category *Communication* are:

14. *Open and frequent communication* where "collaborative group members interact often, update one another, discuss issues openly, and convey all necessary information to one another and to people outside the group" (p. 23).
15. *Established informal relationships and communication links* so that "in addition to formal channels of communication, members establish personal connections–producing a better, more informed, and cohesive group working on a common project" (p. 24).

Factors related to the category *Purpose* are:

16. *Concrete, attainable goals and objectives* that "are clear to all partners and can realistically be attained" (p. 25).
17. *A shared vision* with "a clearly agreed-upon mission, objectives, and strategy. The shared vision may exist at the outset of the collaboration, or the partners may develop a vision as they work together" (p. 26).
18. *A unique purpose* so that "the mission and goals, or approach, of the collaborative group differ, at least in part, from the mission and goals, or approach, of the member organizations" (p. 26).

Factors related to the category *Resources* are:

19. *Sufficient funds, staff, materials and time* in that the "collaborative group has an adequate financial base, along with the staff and materials needed to support its operations. It allows sufficient time to achieve its goals and includes time to nurture the collaboration" (p. 27).
20. *Skilled leadership*, meaning that "the individual who provides leadership for the collaborative group has organizing and interpersonal skills, and carries out the role with fairness. Because of these characteristics (and others), the leader is granted respect or legitimacy by the collaborative partners" (p. 28).

Based on these factors and their applicability to on-line collaborative groups, the Wilder Research Center CFI instrument with supporting methodology and analyses was selected as the most appropriate framework for use in this study. Use of this tool by other researchers (Czajkowski, 2006; Derose et al., 2004; Fogler, 2006; Greene, 2010; Mason, 2006; Mattessich et al., 2001; Perrault, 2008; Schmaltz, 2010; Townsend & Shelley, 2008) across a variety of collaborative organizations demonstrates the flexibility of the

instrument. This study imposes a yet untried application of the CFI by using the instrument to assess the presence of collaboration factors in virtual teams using intranet social networking tools. Of lesser concern, though worth noting: the previous studies, cited above, investigated community-based, non-profit education, healthcare and social services organizations. This research focuses on a large, global, for-profit technology company.

Summary

This chapter provided a literature review of the pertinent areas relative to building and leading a culture of collaboration in an employee on-line environment. Corporate and collaborative culture process models were explored to gauge their relevance to the application of on-line or virtual communities of knowledge workers. Corporate uses of intranet social networking sites were examined to determine their appropriateness in improving employee collaboration. The success factors identified in the validated survey instrument to be used in this study were discussed to gain a better understanding of the options available for Techco leaders.

The research indicates that there is no single success factor or condition responsible for creating successful employee collaborations. Corporate leaders need to align several factors to ensure effective collaboration, improved communication and increased knowledge sharing across functional and organizational boundaries.

Chapter Three: Research Design and Methods

Introduction

This research analyzed the impact of using intranet social networking tools in a large, global technology company on the process of building and leading a culture of collaboration. Since Techco introduced its social networking tool, inSite, the company leadership has focused on usage and activity metrics rather than outcome. This study concentrated on outcome measures to assess the extent to which employees who are members of inSite groups, experience the benefits or changes intended in the use of this social networking tool to achieve a collaborative culture in the company. This research focused on approximately 8,500 Techco employees listed as members of inSite groups (as of mid-2010) located across the enterprise and around the world.

This chapter describes the research design and methods that were used in this study. The problem statement and research hypotheses are reiterated, followed by a review of the research design and variables. The sample and the selection process will be defined along with the rationale for the data collection procedure. Finally, the survey instrument, included in Appendix A, will be described, including the validity and reliability of the instrument.

Problem Statement

What relationship, if any, exists between a specific company's use of intranet social networking tools and the collaborative culture of its employees?

Research Hypotheses

In order to answer the main question, an empirical educational inquiry was employed to determine the effectiveness of the usage of intranet social networking tools

to enable successful on-line collaborations. In focusing on a summative evaluation, the following four research hypotheses, with associated specific hypotheses, were developed:

Research Hypothesis 1. There is/is not a significant difference among employees of specific demographics with respect to participation in on-line collaborations using intranet social networking tools.

1.a. There is/is not a significant difference between management and non-management employees with respect to participation in on-line collaborations using intranet social networking tools.

- This specific hypothesis was tested using data from survey Section A, Question 3 to define the grouping factor management and non-management and the data from Section B, Question 1 to define the grouping factor Yes or No (is/is not a member of an on-line collaboration group). A 2x2 chi-square test was used with a level of significance of 0.05.

1.b. There is/is not a significant difference among employees' age grouping with respect to participation in on-line collaborations using intranet social networking tools.

- This specific hypothesis was tested using data from survey Section A, Question 2 to define the four groups for the variable age and the data from Section B, Question 1 to define the grouping factor Yes or No (is/is not a member of an on-line collaboration group). The data from Section A, Question 2 was put into one of four groups: Mature (b. 1933-1945), Boomer (b. 1946-1964), Gen X'er (b. 1965-1976) and Millennial (b. 1977-1998). A chi-square test was used with a level of significance of 0.05.

1.c. There is/is not a significant difference between male and female employees with respect to participation in on-line collaborations using intranet social networking tools.

- This specific hypothesis was tested using data from survey Section A, Question 1 to define the gender grouping factor and the data from Section B, Question 1 to define the grouping factor Yes or No (is/is not a member of an on-line collaboration group). A 2x2 chi-square test was used with a level of significance of 0.05.

1.d. There is/is not a significant difference among employees' tenure groupings with respect to participation in on-line collaborations using intranet social networking tools.

- This specific hypothesis was tested using data from survey Section A, Question 4 to define the three groups for the variable tenure and the data from Section B, Question 1 to define the grouping factor Yes or No (is/is not a member of an on-line collaboration group). The data from Section A, Question 4 was put into one of three groups based on the maturity and wide-spread use of intranet technologies at the time when the respondent began his/her employment at Techco: Pre-intranet technologies (more than 20 years), Web 1.0 technologies (11-20 years), and Web 2.0 technologies (10 years or less). A chi-square test was used with a level of significance of 0.05.

Research Hypothesis 2. There is/is not evidence of any or all of the 20 factors of a successful collaboration approach present in a specific company's intranet social networking communities.

Across all 20 factors, the researcher looked for areas that were shown to be particularly strong or weak relative to a mid-range score of 2 (neutral/no opinion).

2.a. There is/is not a significant level of agreement regarding the factor *History of Collaboration or Cooperation* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section C, Statements 1 and 2. A t-test was used with a level of significance of 0.05.

2.b. There is/is not a significant level of agreement regarding the factor *Collaborative Groups Seen as Legitimate Leaders* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section C, Statements 3 and 4. A t-test was used with a level of significance of 0.05.

2.c. There is/is not a significant level of agreement regarding the factor *Favorable Political and Social Climate* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section C, Statements 5 and 6. A t-test was used with a level of significance of 0.05.

2.d. There is/is not a significant level of agreement regarding the factor *Mutual Respect, Understanding and Trust* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section C, Statements 7 and 8. A t-test was used with a level of significance of 0.05.

2.e. There is/is not a significant level of agreement regarding the factor *Appropriate Cross Section of Members* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section C, Statements 9 and 10. A t-test was used with a level of significance of 0.05.

2.f. There is/is not a significant level of agreement regarding the factor *Members See Collaboration as in Their Self-Interest* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section C, Statement 11. A t-test was used with a level of significance of 0.05.

2.g. There is/is not a significant level of agreement regarding the factor *Ability to Compromise* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section C, Statement 12. A t-test was used with a level of significance of 0.05.

2.h. There is/is not a significant level of agreement regarding the factor *Members Share a Stake in Both Process and Outcome* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section C, Statements 13, 14 and 15. A t-test was used with a level of significance of 0.05.

2.i. There is/is not a significant level of agreement regarding the factor *Multiple Layers of Participation* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section C, Statements 16 and 17. A t-test was used with a level of significance of 0.05.

2.j. There is/is not a significant level of agreement regarding the factor *Flexibility* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section C, Statements 18 and 19. A t-test was used with a level of significance of 0.05.

2.k. There is/is not a significant level of agreement regarding the *Development of Clear Roles and Policy Guidelines* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section C, Statements 20 and 21. A t-test was used with a level of significance of 0.05.

2.l. There is/is not a significant level of agreement regarding the factor *Adaptability* within the respondents' virtual collaborative groups..

- This specific hypothesis was tested using data from survey Section C, Statements 22 and 23. A t-test was used with a level of significance of 0.05.

2.m. There is/is not a significant level of agreement regarding the factor *Appropriate Pace of Development* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section C, Statements 24 and 25. A t-test was used with a level of significance of 0.05.

2.n. There is/is not a significant level of agreement regarding the factor *Open and Frequent Communication* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section C, Statements 26, 27 and 28. A t-test was used with a level of significance of 0.05.

2.o. There is/is not a significant level of agreement regarding the factor *Established Informal Relationships and Communication Links* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section C, Statements 29 and 30. A t-test was used with a level of significance of 0.05.

2.p. There is/is not a significant level of agreement regarding the factor *Concrete, Attainable Goals and Objectives* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section C, Statements 31, 32 and 33. A t-test was used with a level of significance of 0.05.

2.q. There is/is not a significant level of agreement regarding the factor *Shared Vision* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section C, Statements 34 and 35. A t-test was used with a level of significance of 0.05.

2.r. There is/is not a significant level of agreement regarding the factor *Unique Purpose* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section C, Statements 36 and 37. A t-test was used with a level of significance of 0.05.

2.s. There is/is not a significant level of agreement regarding the factor *Sufficient Funds, Staff, Materials and Time* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section C, Statements 38 and 39. A t-test was used with a level of significance of 0.05.

2.t. There is/is not a significant level of agreement regarding the factor *Skilled Leadership* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section C, Statement 40. A t-test was used with a level of significance of 0.05.

Research Hypothesis 3. There is/is not a significance difference among the employee usage of an intranet collaboration tool other than inSite.

- This hypothesis was tested using data from Section B, Question 2 to define the variable, how many employees use other intranet collaboration tools from the 10 listed. A chi-square test was used with a level of significance of 0.05.

Research Hypothesis 4. There is/is not a significant difference between those employees who do or do not use the inSite tool with respect to evidence of any or all of the six Wilder CFI categories of a successful collaboration approach present in a specific company's intranet social networking communities. Across all six categories, the researcher looked for areas that are shown to be particularly strong or weak relative to a mid-range score of 2 (neutral/no opinion).

4.a. There is/is not a significant difference between those employees who use the inSite tool and those employees who do not with respect to the category *Environment* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section B, Question 2 and Section C, Statements 1 through 6. A t-test was used with a level of significance of 0.05.

4.b. There is/is not a significant difference between those employees who use the inSite tool and those employees who do not with respect to the category *Membership Characteristics* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section B, Question 2 and Section C, Statements 7 through 12. A t-test was used with a level of significance of 0.05.

4.c. There is/is not a significant difference between those employees who use the inSite tool and those employees who do not with respect to the category *Process and Structure* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section B, Question 2 and Section C, Statements 13 through 25. A t-test was used with a level of significance of 0.05.

4.d. There is/is not a significant difference between those employees who use the inSite tool and those employees who do not with respect to the category *Communication* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section B, Question 2 and Section C, Statements 26 through 30. A t-test was used with a level of significance of 0.05.

4.e. There is/is not a significant difference between those employees who use the inSite tool and those employees who do not with respect to the category *Purpose* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section B, Question 2 and Section C, Statements 31 through 37. A t-test was used with a level of significance of 0.05.

4.f. There is/is not a significant difference between those employees who use the inSite tool and those employees who do not with respect the category *Resources* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section B, Question 2 and Section C, Statements 38 through 40. A t-test was used with a level of significance of 0.05.

Research Design

Empirical, or statistical, research is used "to describe systematically the facts and characteristics of a given population or area of interest, factually and accurately" (Isaac & Michael, 1995, p. 32). A descriptive-inferential research design model was used in this study to understand and describe the influences of intranet social networking tools on employee collaboration. Descriptive statistics involve tabulating, depicting and describing data while inferential statistics predict characteristics of a population based on information gained from a sample drawn from that population. This approach, using the survey design, will provide "a quantitative description of trends, attitudes and opinions of a population by studying a sample of that population" (Creswell, 2003, p. 153). Statistical

inferences can then be calculated from that sample to make assumptions regarding the unknown characteristics of the population (Newton & Rudestam, 1999).

The advantages of using this research design are the ease and speed in which data can be collected from a relatively small sample, from which inferences can be drawn about the much larger population of inSite users. This approach is the Techco-approved method because it requires a minimal interruption of employees during work hours. The survey was cross-sectional and web-based, with data collected at one point in time, for the convenience of the participants.

Techco has knowledge of this research with the understanding that its anonymity will be protected with the usage of the aforementioned pseudonym.

Population

The population for this study included all current Techco employees who are members of a project team listed in the inSite social networking tool directory and are users of intranet social networking tools to communicate and collaborate. IT project groups were excluded because it is assumed that IT professionals are early adopters and enthusiastic users of web-based technologies. As well, Techco IT organizations were instrumental in developing and promoting the inSite tool. All inSite groups were reviewed and analyzed in mid-2010 with 171 non-IT groups, comprised of approximately 8,500 members, who were identified as eligible for this study.

In consultation with the Techco Knowledge Management and Collaboration Services organizations' executives, 40 inSite groups were selected, from the pool of 171 groups, to be surveyed. This selection was based on a preference for business unit and functional employee populations. These groups of people represent the engineering and

other professional specialties that drive Techco's innovations, profit margins and market share in a highly competitive industry, thus, those who would most benefit from increased collaborations. The Techco executives verbally agreed to endorse this researcher to survey enough employees in order to receive a desired sample (*n*) of 178 responses.

A systematic sample from the approximately 1100 members of these 40 inSite groups was surveyed for this study. No other demographic information, or stratification, was gathered about this population which spans across world-wide Techco sites and includes virtual/telecommuting employees, management and non-management employees, as well as employees of all genders, ages and lengths of service at Techco.

According to Gall, Gall, and Borg (2003), "the purpose of a survey is to use questionnaires to collect data from a sample that has been selected to represent a population to which the general findings of the data analysis can be generalized" (p. 222). The population represented in this study are the 8,500 members of Techco inSite groups.

Sample and Sampling Technique

The survey was sent to 650 Techco employees who are currently identified as members of inSite groups in the company "inSite Groups" directory. A single-stage sampling procedure was used, with the 650 names drawn from the referenced internal directory. A systematic sampling procedure was used to select the participants for this study in order to ensure that there was no bias in their selection beyond the constraints described above. Participants were selected from the alphabetically listed inSite user directory list at fixed intervals. The interval of 2 was selected, or every other name in the directory.

The number of participants to receive a request to complete the research survey was determined with the help of the Techco governing organization for academic surveys. Based on historical response rates for Techco surveys, the number of surveys was set at 650 in order to receive at least 178 surveys returned. The desired sample size of (*n*) 178 was obtained.

The Wilder CFI Survey Instrument

An extensive review of literature related to collaboration in large organizations led to the selection of the Wilder Collaboration Factor Inventory (CFI) for use in this research. The Wilder CFI was developed by Mattessich et al. (2001) in 1992 based on an in-depth review of 133 studies related to collaborations. They updated and expanded the CFI in 2001 after a review of 281 additional studies. Therefore, the CFI survey instrument is based on a meta-analysis of 414 collaboration studies to determine which factors impact successful collaborations in organizations. Their analyses identified 20 success factors grouped into six categories.

The intact survey instrument, the Wilder Collaboration Factors Inventory, was purchased by this researcher from Fieldstone Alliance (current copyright owner) for use in collecting the data for this study. This survey was used to gather data from 178 current employees of Techco who are members of project teams using the inSite collaboration tool. The final decision to use this research instrument was subject to the guidance of the Institutional Review Board (IRB), concurrence on the comprehensive literature review, and recommendations from the dissertation committee.

The Wilder Research Center, developer of the survey, suggests that organizations that are currently involved in collaborative efforts can use the CFI “to assess the strengths

and weaknesses of its collaboration activities, and then take steps to address the weaknesses" (Mattessich et al., 2001, p. 36). The CFI instrument contains 40 statements spread across 20 factors in six categories. Participants are asked to respond to the 40 statements on a Likert scale indicating degrees of agreement/disagreement with regard to their collaborative group. The Likert scale ranges from 1 (*strongly disagree*) to 5 (*strongly agree*). (Note: the Techco survey instrument uses a scale from 4 to 0 rather than 1 to 5. Thus, the analysis of the survey data was based on a 4 to 0 range, from 4 [*strongly disagree*] to 0 [*strongly agree*] and a mid-range point of 2).

This five-point scale is the typical response scale used in surveys. It is the most widely used scale in survey research and is highly regarded by researchers for its discrimination and reliability (Babbie, 2005). Researchers using the Likert scale assert that it prevents respondents from making more subjective decisions between the words for each scale point. By labeling each scale point, all respondents will give a common numerical value to each word choice which helps avoid misinterpretation of scale definitions (Babbie, 2005).

The inventory scoring was designed to be descriptive of successful collaborations, as well as prescriptive if scores indicate a weakness in a particular factor. Wilder Research Center researchers, as well as subsequent researchers that used the CFI instrument, consistently used the same approach to derive the scores for each factor (Derose et al., 2004; Mattessich et al., 2001, Townsend & Shelley, 2008).

Scores for each of the 20 factors were arrived at by combining the responses of two or more of the 40 statements. Statement responses were categorized to indicate strength, weakness or neutrality for each factor and, therefore, the likelihood of success

around that factor for the collaborative group. According to Mattessich et al. (2001), scores that indicate borderline performance for a particular factor should be discussed by the collaborative group to determine if further attention is needed. Scores at the low end of the spectrum, which indicate an area of concern, should certainly be addressed by the group to improve its effectiveness..

Mattessich et al. (2001) suggest that a preponderance of scores indicating agreement across most factors is usually associated with a group that has no major shortcomings. In contrast, a preponderance of scores indicating disagreement across most factors would reveal serious problems that could impede successful collaboration until addressed.

Though the CFI survey has been used many times in many different types of organizations (Czajkowski, 2006; Derose et al., 2004; Fogler, 2006; Greene, 2010; Mason, 2006; Mattessich et al., 2001; Perrault, 2008; Schmaltz, 2010; Townsend & Shelley, 2008), published research indicates that it has never been used to analyze on-line or virtual collaboration teams. In addition, the Wilder instrument has not been used (in published research) on project teams with members from multiple (more than two) organizations within one large, global for-profit company.

RAND Corporation researchers Derose et al. (2004) used the Wilder CFI survey for their study on members of a multi-agency consortium attempting to collaborate on addressing healthcare access issues in Miami. In their report, they stated that:

> We chose this inventory because it has a clear evidentiary base (i.e., its development was rooted in the research literature) yet it is still concise and simple to use. Furthermore, the survey instrument was designed to be a diagnostic tool

> for collaborative groups, to be used throughout a project's lifespan. We preferred the assessment approach of identifying strengths and weaknesses with respect to the factors that influence collaborative success, since this type of information is more useful as feedback than is an overall score of collaborative success or potential for success. (p. 52)

The RAND Corporation researchers' rationale for the appropriateness of the Wilder CFI instrument is also relevant for this study. The data to be provided to the Techco Knowledge Management and Collaboration Services organizations will be much more useful and informative on a factor-by-factor basis than would be an aggregate collaboration score. Factor scores will provide Techco executives with specific data concerning strengths and weaknesses of the collaborations as experienced by the surveyed inSite members. This data can then be used to determine the actions needed to remedy weaknesses and leverage successes across the enterprise.

Permission to use the CFI survey for this research, with proper citation, was granted to the researcher via email from Fieldstone Alliance, current owners of the copyright (see Appendix C).

The Modified Instrument Used for this Study

The survey for this study is divided into three sections and consists of 46 questions or statement responses total. Section A requested demographic information on age, gender, company tenure and management/non-management position. Research supports the inclusion of this information as relevant to this study (Alter, 2008; Cleveland, Stockdale, & Murphy, 2000; Freeman, Bourque, & Shelton, 2001; Johnson, 1997; Padavic & Reskin, 2002; Rosener, 1990 Tapscott & Williams, 2006).

Tapscott and Williams (2006) suggest that younger employees tend to be more comfortable working collaboratively and using new technologies because they have "grown up on-line" (p. 46). Alter (2008) agrees that employees under the age of 30 are reputed to be the fastest to adopt collaboration tools. He also states that employees between the ages of 30-50 are the most likely to use collaboration applications on projects and employees over 50 generally have the experience to best understand how collaboration technologies can be applied in the workplace.

Generalizations around leadership differences by gender are well documented (Cleveland et al., 2000; Freeman et al., 2001; Johnson, 1997; Padavic & Reskin, 2002; Rosener, 1990). Generally, men are thought to be more inclined toward a transactional leadership style (command-and-control) while women tend toward a more interactive leadership style (request-and-suggest), emphasizing cooperation and information-sharing (Rosener, 1990).

Information on company tenure and whether the employee has a management or non-management position was collected to better understand how these variables contribute to on-line collaboration activities. A Techco division president observed that many, if not most, employees who have been with the company for many years and have advanced to leadership positions carry with them a habitual command-and-control way of doing things. He noted that newer and/or younger employees could help Techco get out of that mindset, but expressed concern that these people are not in positions of power to enable them to make that change (Techco executive, personal communication, September 16, 2009)

Section B asked the participant to indicate whether or not he/she is a member of a virtual/on-line collaboration group that uses Techco intranet social networking tool(s). If the answer is *yes*, the participant was asked to indicate which social networking tools are used–including inSite and nine other social networking tool options–and then to proceed with the survey. If the answer is *no*, the participant was asked to stop and submit the survey as complete. This information was collected to provide the Techco executives with data on the preferred tools used by employees. Sections A and B are not a part of the Wilder CFI instrument, but were added by the researcher to gather additional information about the respondents and the tools they use.

Section C contains the slightly modified Wilder CFI survey. There are 40 statements to which agreement/disagreement was requested based on a five-point Likert-type scale. The scale responses range from *strongly agree* to *strongly disagree*, with the middle response of *neutral, no opinion*. The Techco approved company survey instrument automatically codes responses with a numerical score from 0 to 4 as follows:

0 = Strongly agree.

1 = Agree.

2 = No opinion.

3 = Disagree.

4 = Strongly disagree.

This response coding differs from the traditional 1-5 range used on the Wilder CFI scores. The only other modifications to the Wilder CFI instrument was limited to slight wording changes to make it clear that the statements refer to an virtual/on-line collaborative group and thus more understandable for the participants. These minor

wording adjustments to the survey statements were necessary to adapt them to an on-line collaboration rather than the more traditional collaborations that the instrument is normally used for. The precedent for this slight word change approach is based on several other studies (Derose et al., 2004; Greene, 2010; Perrault, 2008; Townsend & Shelley 2008;) that have done the same in order to clarify the intent of the statements for particular populations.

In every published study reviewed for this dissertation, permission was granted by Field Alliance to adapt the survey language as needed. Due to the fact that the survey was purchased and authorized for this academic use (Mattessich et al., 2001, with copyright owned by Field Alliance), as well as the historical precedent of Field Alliance accepting minor alterations to the wording of the survey statements, no further permissions were requested for this study.

The survey instrument (as shown in Appendix A) is a three-section questionnaire that was administered on-line through the Techco survey website. The on-line based survey was encrypted for the participants' protection and no personal or organizationally identifiable information was asked to ensure anonymity.

In Section A, the demographic information is comprised of the following four variables. All demographic information is indicated as *response optional*, a Techco survey organization requirement.

1. Gender– Female/Male.
2. Age–Participant's current age in years.
3. Position–Participant designated as Non-Management or Management.
4. Service Length–Participant's years of employment with the company.

Section B of the instrument is designed to identify whether or not employees are now, or were ever, a member of/participant in a virtual/on-line collaboration group that uses Techco intranet social networking tools. This section begins with one question that is answered either positively with *yes* or negatively with *no*. This question reads as follows:

1. I am now or have been a member of/participant in one or more virtual/on-line collaboration group(s) that use company intranet social networking tools.

If the response is *no*, survey participants are asked to not proceed any further with the survey. They are requested to submit the survey completed thus far and are thanked for their participation. If the response is *yes,* they are asked to proceed to the second question which is designed to provide information on the specific social networking tool(s) used.

In order to better understand the respondents who answered in the negative to this question–those who have not been involved in a collaboration using intranet social networking tools and yet are listed as members of inSite groups in the company directory–a descriptive breakout of the responses from the variables in Section B was conducted.

Section C of the instrument is designed to measure the self-purported opinions of the participant's collaborative experience in an on-line group that uses/used intranet social networking tools to interact. This section is comprised of 20 success factors and 40 statements requesting agreement or disagreement on a 5-point Likert-type scale, with a range from *strongly agree* (0) to *strongly disagree* (4), with *neutral, no opinion* (2) in the

middle of the scale. These statements provided data to test for significant agreement with the presence of the following 20 factors in the surveyed employees' inSite groups:

1. History of Collaboration or Cooperation in the Company.
2. Collaborative Groups Seen as Legitimate Leaders in the Company.
3. Favorable Political and Social Climate.
4. Mutual Respect, Understanding and Trust.
5. Appropriate Cross Section of Members.
6. Members See Collaboration as in Their Self-Interest.
7. Ability to Compromise.
8. Members Share a Stake in Both Process and Outcome.
9. Multiple Layers of Participation.
10. Flexibility.
11. Development of Clear Roles and Policy Guidelines.
12. Adaptability.
13. Appropriate Pace of Development.
14. Open and Frequent Communication.
15. Established Informal Relationships and Communication Links.
16. Concrete, Attainable Goals and Objectives.
17. Shared Vision.
18. Unique Purpose.
19. Sufficient Funds, Staff, Materials and Time.
20. Skilled Leadership.

It should be noted that while the Wilder CFI instrument divides the above 20 factors into six categories for the convenience of grouping like items together and deriving inferences from the groups by the researcher, these categories will not appear on the CFI instrument nor will they be known by the participants (see Table 9). This is so as to not emphasize or categorize the statements and potentially prompt inadvertent analysis by the respondents and influence their responses. The six categories (Mattessich et al., 2001) are defined as:

1. *Environmental* characteristics "consist of the geographic location [in this study, the location is virtual] and social context within which a collaborative group exists. The group may be able to influence or affect these elements in some way, but it does not have control over them" (p. 12).
2. *Membership* characteristics "consist of skills, attitudes, and opinions of the individuals in a collaborative group, as well as the culture and capacity of the organizations that form collaborative groups" (p. 14).
3. *Process and structure* refers to "the management, decision-making, and operational systems of a collaborative effort" (p. 18).
4. *Communication* refers to "the channels used by collaborative partners to send and receive information, keep one another informed, and convey opinions to influence the group's actions" (p. 23).
5. *Purpose* refers to "the reasons for development of a collaborative effort, the result or vision the collaborative group seeks, and the specific tasks or projects the collaborative group defines as necessary to accomplish. It is driven by a need, crisis or opportunity" (p. 25).

6. *Resources* includes "financial and human input necessary to develop and sustain a collaborative group" (p. 27).

These six categories provide data for the six variables associated with Research Hypothesis 4.

The data obtained from the three levels of the CFI survey instrument were used throughout this research. At the *category* level (Research Hypothesis 4), data was collected pertaining to inSite versus non-inSite users relative to their experiences with collaboration in the six Wilder groupings (categories). At the *factor* level (Research Hypothesis 2), data was collected from the users of any and all intranet social networking tools, including inSite, to understand their collaboration experiences in all 20 factors. Finally, the 40 Wilder CFI *statements* provide a common set of assertions with which respondents can agree or disagree in order to aggregate into measurable data at both the category and factor levels.

The CFI survey instrument categories, factors and statements are shown in Table 2 with statements unaltered. The actual survey instrument used (with slight wording changes to clarify the statements for virtual/on-line collaborations) is in Appendix A.

Table 2

Wilder CFI Categories and Factors with Associated Statements

Category: Environment
Factor: History of Collaboration or Cooperation in the Company
1. Organizations in our company have a history of working together.
2. Trying to solve problems through collaboration has been common in this company. It's been done a lot before.

(*table continues*)

Factor: Collaborative Groups Seen as Legitimate Leaders in the Company
3. Leaders in this company who are not a part of our collaborative group seem hopeful about what our group can accomplish
4. Others (in this company) who are not part of our collaborative group would generally agree that the organizations involved in this collaborative project are the "right" organizations to make it work.
Factor: Favorable Political and Social Climate
5. The political and social climate seems to be "right" for starting a collaborative project like this one.
6. The time is right for this collaborative project.
Category: Membership Characteristics
Factor: Mutual Respect, Understanding and Trust
7. People involved in our collaborative project always trust one another.
8. I have a lot of respect for the other people involved in this collaborative project.
Factor: Appropriate Cross Section of Members
9. The people involved in our collaborative project represent a cross section of those who have a stake in what we are trying to accomplish.
10. All the organizations that we need to be members in this collaborative group have become members of the group.
Factor: Members See Collaboration As In Their Self-Interest
11. My organization will benefit from being involved in this collaborative project.
Factor: Ability To Compromise
12. People involved in our collaborative project are willing to compromise on important aspects of our project.
Category: Process and Structure
Factor: Members Share a Stake in Both Process and Outcome
13. The organizations that belong to our collaborative group invest the right amount of time in collaborative efforts.
14. Everyone who is a member of our collaborative group wants this project to succeed.
15. The level of commitment among the collaboration participants is high.
Factor: Multiple Layers of Participation
16. When the collaborative group makes major decisions, there is always enough time for members to take information back to their organizations to confer with colleagues about what the decision should be.

(*table continues*)

Factor: Multiple Layers of Participation
17. Each of the people who participate in decisions in this collaborative group can speak for the entire organization they represent, not just a part.
Factor: Flexibility
18. There is a lot of flexibility when decisions are made; people are open to discussing different options.
19. People in this collaborative group are open to different approaches to how we can do our work. They are willing to consider different ways of working.
Factor: Development of Clear Roles and Policy Guidelines
20. People in this collaborative group have a clear sense of their roles and responsibilities.
21. There is a clear process for making decisions among the partners in this collaborative group.
Factor: Adaptability
22. This collaborative group is able to adapt to changing conditions, such as fewer funds than expected, changing political climate or change in leadership.
23. This collaborative group has the ability to survive even if it has to make major changes in its plans or add new members in order to reach their goals.
Factor: Appropriate Pace of Development
24. This collaborative group has tried to take on the right amount of work at the right time.
25. We are currently able to keep up with the work necessary to coordinate all the people, organizations, and activities related to this collaborative project.
Category: Communication
Factor: Open and Frequent Communication
26. People in this collaborative group communicate openly with one another.
27. I am informed as often as I should be about what goes on in the collaborative group.
28. The people who lead this collaborative group communicate well with the members.
Factor: Established Informal Relationships and Communication Links
29. Communication among the people in this collaborative group happens both at formal meetings and in informal ways.
30. I personally have informal conversations about the project with others involved in this collaborative group.

(*table continues*)

Category: Purpose
Factor: Concrete, Attainable Goals and Objectives
31. I have a clear understanding of what our collaborative group is trying to accomplish.
32. People in our collaborative group know and understand our goals.
33. People in our collaborative group have established reasonable goals.
Factor: Shared Vision
34. The people in this collaborative group are dedicated to the idea that we can make this project work.
35. My ideas about what we want to accomplish with this collaborative effort seem to be the same as the ideas of others.
Factor: Unique Purpose
36. What we are trying to accomplish with our collaborative project would be difficult for any single organization to accomplish by itself.
37. No other organization in the company is trying to do exactly what we are trying to do.
Category: Resources
Factor: Sufficient Funds, Staff, Materials, and Time
38. Our collaborative group has adequate funds to do what it wants to accomplish.
39. Our collaborative group has adequate "people power" to do what it wants to accomplish.
Factor: Skilled Leadership
40. The people in leadership positions for this collaborative project have good skills for working with other people and organizations.
Note. From *Collaboration: what makes it work* (2nd ed.) by P.W. Mattessich, M. Murray-Close, & B.R. Monsey, 2001, Fieldstone Alliance. All rights reserved, used with permission.

In order to optimize the response rate to the survey, several techniques were employed:

1. The survey was sent to participants electronically via email with a link to the survey instrument, a reminder email to complete the survey in the next two weeks.

2. Survey instructions emphasized time economy (10-15 minutes) and ease of completing the survey and a consent agreement was included (Appendix B).

3. A short message was included in each email which sent a positive message that the participants anonymous opinions are valued, and that a candid response was requested.

Validity and Reliability

Content validity and reliability are substantiated when the content of the survey instrument responses are recorded as intended. McMillan and Schumaker (2006) state that instrument validity is "the extent to which inferences and uses made on the basis of scores from an instrument are reasonable and appropriate" and reliability is "the consistency of measurement, or the extent to which the scores are similar over different forms of the same instrument or occasions of data collection" (p. 130). They recommend that a panel of experts be formed to review a survey instrument for content validity. Therefore, this researcher assembled a team of seven panel experts to conduct a pilot study. The pilot study consisted of an assessment of the data collection procedure, the instructions and the survey instrument in order to achieve a better, more precise research design.

Three Techco management and four non-management employees from a variety of backgrounds and expertise were selected based on their relevant experience, education, and overall qualifications in relation to this research. This panel, representative of the participants selected for the actual survey, was asked to review and make recommendations on the survey instrument regarding its ability to draw meaningful and useful data. In addition to their qualifications cited below, these panelists are all experienced virtual on-line collaboration team members. The panel included:

1. from the Mature age group (born between 1933 and 1945), a 22-year Techco senior manager.

2. from the Boomers age group (born between 1946 and 1964), three employees:

- a retired Army colonel and relatively new Techco employee (3 years).
- a 25-year Techno project manager.
- a 31-year Techco manager and Ed.D.

3. from the Generation X age group (born between 1965 and 1976), a 13-year Techco senior manager and Ed.D.

4. from the Millennials age group (born between 1977 and 1998), two employees with 6 years and 1 year with Techco.

The presentation of the survey instructions and instrument was conducted for the pilot study in the same manner as the actual research. The panel experts were sent an email describing the purpose of the research with a link to the on-line survey instructions. The email explained how to complete the questionnaire, followed by a link to the actual survey instrument (see Appendix A). This email included a request that the panel experts review and comment on the content validity of the instrument and whether the survey instructions were easy to understand and follow. The panel was also asked to time themselves on how long it took them to complete the survey in order to verify the estimated time commitment needed for the actual study respondents to complete the survey.

Feedback from the panel experts was requested within one week from the time the email was sent. The panel experts were asked to evaluate whether the questions were clear in sentence structure and applicable to the purpose of this research, as well as the

specific research questions they are intended to satisfy. In addition, they were asked to verify that the instructions were clear and that the web-based survey worked.

Upon receipt of the expert panel feedback, the survey instructions and instrument were slightly modified as suggested to ensure ease of use and minimal time needed for actual study respondents to complete the survey. Panel feedback and recommendations for the survey instrument and instructions included typographical errors identified, rewording of two questions, and revising the survey section titles from numeric to alpha for clarity.

Validity and reliability measures were also taken on the original Wilder CFI instrument upon which this research is based. Mattessich et al. (2001) maintain that the Wilder CFI survey instrument does not provide a single numerical score on the likelihood of a potential group's successful collaboration. Further, the researchers offer that the instrument "has not been developed as a measure with validity and reliability established through psychometric research" (p. 35). However, they do describe in detail the methodology used in their research that resulted in the survey instrument and subsequent analyses. The two major methodological rules adopted for identifying success factors from the 414 studies that they analyzed were:

- There must be a statement in the study that a particular factor was a significant influencer (factor) on the success of the collaborative group that was studied.
- An outside observer (in this case, a Wilder Research Center researcher) must be able to link that statement about the influencer (factor) directly to the evidence of its effect on that success, as stated in the study being reviewed.

The same stages (processes) were used both in the 1992 and the 2001 Wilder studies. The research stages are summarized here to emphasize the rigor with which the researchers conducted their meta-analyses.

1. Identification and assessment of research studies:
    (a) Formulation of a precise research question.
    (b) Collection of potentially relevant studies.
    (c) Development of acceptance criteria.
    (d) Initial screening of studies.
    (e) Critical assessment of studies.
2. Systematic codification of findings from each study:
    (a) Development of a methodology.
    (b) Identification of factors.
    (c) Validation of factors.
3. Synthesis of findings from individual studies:
    (a) Determining the list of factors.
    (b) Tallying the importance of factors.
    (c) Putting the factors into categories.

As Mattessich et al. (2001) noted in their book (under Stage 2.c., Validation of factors):

> In 1992, a second Wilder Research Center researcher independently reviewed each of the case studies and critically examined the evidence related to each factor identified by the first researcher to validate that it met the criteria [to be included in the study]. In 2000, the researchers jointly discussed each of the factors

> identified by the first researcher. The fact that the researchers, in 2000, built upon the initial meta-analysis conducted for the first edition of [the book] has both advantages and disadvantages. The advantages are that some effort is channeled directly into determining whether the initial 19 factors in the first edition withstand further scrutiny and that the new work deliberately uses the initial research base as a foundation for expansion. The major disadvantage is that the results of the first edition impose a frame of reference upon later researchers who might miss some new insights because their perspective is limited. Having factors from the first edition in place creates the potential for perceptual bias within the research for the 2nd edition. However, the research was pursued with careful attention to the rules established for the study, and [the book] provides a full explication of the study methods to enable others to conduct the same inquiry. *In this way, the research gains the greatest possible validity.* Both the findings and the methods for producing the findings are available for scrutiny by all who are interested. Others can refine the methods and improve upon these findings. (p. 66)

Townsend and Shelley (2008) conducted research with two goals: to validate the Wilder CFI and to determine the level of collaboration between college personnel and job center personnel. The results of their "factor analysis support the constructs proposed in the Wilder instrument as being key elements of successful collaboration" (p. 101). Townsend and Shelley cite previous studies, including the Derose et al. (2004) study, as providing additional support to the structure of the Wilder instrument. "Specifically, Derose et al. (2004) established reliability measures for 17 of the 20 factors. The remaining three factors consisted of a single item preventing a reliability analysis" (p.

103). Further, Townsend and Shelly stated that in assessing the suitability of the Wilder instrument for their research, they found that "while validity measures were not available for this instrument, the preponderance of evidence developed through its prolific use deemed the instrument appropriate for [this] study… [and]… provided this researcher with confidence regarding the use of the Wilder instrument" (p. 103).

To statistically validate the Wilder instrument, Townsend and Shelley (2008) conducted an exploratory factor analysis of the collaboration factors proposed by Mattessich et al. (2001). They described their factor analysis as follows: "Principle components analysis was employed utilizing a varimax rotation. Two criteria were used to determine the number of factors to rotate: the a priori hypothesis that the measure was unidimensional and interpretability of the factor solution" (p. 105). The researchers stated that the Wilder CFI instrument "revealed a statistically significant theoretical structure… thus helping validate the instrument" (p. 105).

Townsend and Shelley (2008), as well as this researcher, have found no other occurrence in published studies that support or expand on this validation.

Derose et al. (2004) were the first to establish reliability measures for the Wilder CFI instrument, which were repeated by Townsend and Shelley (2008). Both Derose et al. and Townsend and Shelley used Cronbach's alpha coefficient to measure the internal consistency of the questions to determine the extent to which respondents answered similar items consistently. According to DeRose et al., "Reliability coefficients ranged from a low of .52 to a high of .92 indicating that the questions were highly reliable and consistency of answers could be expected" (Derose et al., 2004, p. 58).

According to Townsend and Shelley (2008), based on the validity and reliability analyses conducted by themselves and Derose et al. (2004), other researchers can now confidently use the Wilder CFI instrument for quantitative research efforts. They assert that "as a result of this study, the Wilder instrument provides a broader landscape of opportunity for collaboration research through the use of statistical testing" (p. 111).

Data Collection

The data collection approach used in this research effort was to send the survey to a systematic sample of 650 participants. The researcher received permission from the required three Techco organizations to survey these employees. These organizations are: the Techco Employee Survey Team (TEST), Global Diversity and Employee Rights (GDER) and Human Subjects Review Board (HSRB). In accordance with Techco survey authorization, a sample size of (*n*) 178 was obtained.

The participants were sent a request via email to complete the survey, including a link to the survey instructions and instrument hosted on a Techco survey website. The survey instructions included the objective of the study, a description of the research population, and how the results would be used. Participants were asked to complete the survey within 2 weeks of receipt. A follow-up email was planned after one week to ensure receipt of the initial email request. However, to avoid further disruption to the surveyed employees during working hours, it was deemed unnecessary to send the second email once the target response of 178 was achieved.

Human Subjects Protection

Consideration for the protection of human subjects was addressed as per Pepperdine University guidelines which state that all research involving human subjects

must be conducted in accordance with accepted ethical, federal, and professional standards for research and be approved by the university's Institutional Review Board (IRB). The Pepperdine University IRB Manual (2009) assessed this research project in the following areas:

- Study design.
- Investigator qualifications.
- Selection of subjects.
- Risks and benefits.
- Informed consent process.
- Confidentiality and privacy. (pp. 21-23)

Consistent with IRB rules, survey participants were advised that their responses would in no way affect their performance, future opportunity, or career with the company. To provide assurance of the anonymity of the participant responses, a preface to the on-line survey screen (Survey Instructions/Consent Agreement shown in Appendix B) described the goal of the survey, anonymity guarantee, and the opportunity to request copies of the survey results if they desire.

Initial approval to proceed with the study was received by Pepperdine IRB (see Appendix D). When the survey was modified to incorporate pilot study recommendations, the survey instrument was resubmitted to Pepperdine IRB and approval was granted for the updated survey (see Appendix E).

In addition, assessment from the Techco's Human Subjects Protection Program (HSPP) was sought to ensure that:

- Risks to human subjects' health and safety are minimized .

- Any residual risks are warranted by the anticipated benefits of the research.
- All subjects are fully informed of the risks.
- Consent to participate is voluntary.
- The privacy and confidentiality of subjects are protected.
- Subjects are selected in an equitable manner. (internal Techco documentation)

Techco's HSPP program manager worked in coordination with the Pepperdine IRB organization and all were provided the same materials (survey and survey instructions/consent letter) to minimize time and effort in making their determinations. In addition, authorization to distribute the survey to employees was granted from the Techco Employee Survey Team (TEST) and the Techno Global Diversity and Employee Rights (GDER) organizations.

The researcher provided assurances to the study respondents that their participation in this study was voluntary and would in no way affect their performance, future opportunities or careers with the company. Their anonymity is protected and under no circumstances will individual responses be provided to anyone, including their management or other employees participating in the study. The privacy of each participant will be maintained in all published and written data resulting from this study. Participants were asked to acknowledge that by completing the survey, they are consenting to participate in the study.

Data Process and Analysis

The main question guiding the research is: what relationship, if any, exists between a specific company's use of intranet social networking tools and the collaborative culture of its employees? In order to answer the main question, an

evaluation educational inquiry was employed to determine the effectiveness of the usage of intranet social networking tools to enable successful on-line collaborations.

The data was collected on-line through a Techco survey website. The survey instrument automatically downloaded the responses into Microsoft Excel which were then copied by the researcher into SPSS® Statistics (Statistical Package for the Social Sciences) software for analysis. Appropriate analytical methods were selected and applied to individual research questions and their source survey questions.

Guidelines Associated with the Survey

Within the survey design, the following guidelines are established:

- The survey participants will remain anonymous to all except this researcher.
- Although a Techco executive assisted with the selection of the initial 20 inSite groups from which participants were selected, no further participant identification will be provided to that executive or any other person.
- Responses to the survey will not be associated with any particular inSite group. All responses will be collated together in a single repository.
- Survey respondents will provide answers to the questions as honestly and accurately as possible.
- Survey respondents participated on a strictly voluntary basis.
- The informed consent process was incorporated into the on-line survey tool, eliminating the need for a hard copy consent form from each participant.
- The survey was accessible via an approved Techco website, with all of the necessary internal approvals received by the researcher and communicated to the participants in the instructional email.

Limitations of the Study

Limitations of this research are listed below:

- The survey participants were specifically selected from a directory of inSite members based on their affiliation with a desired group which decreases the transferability of the findings.
- The small sample limits the generalizability of the findings. The sample size for this survey was limited to 178 participants.
- Only current and active Techco employees were surveyed and this limited scope may not be consistent with other types of industries or companies.
- Use of the Wilder CFI tool constrained and directed participant responses to a set of predefined statements without providing an opportunity for additional open-ended comments.
- Instructions for scoring the Wilder CFI instrument require the development of means, even though one of the response choices is *neutral, no opinion*. Scoring for this research will conform to the Wilder CFI instructions.

Summary

This chapter presented the research design for the study, including the research and specific hypotheses, methodologies that were used for the research design and the sampling technique used. An intact survey instrument was identified for use in this study and its validity and reliability were described. Protection for human subjects was covered, as well as the data collection and data processing procedures that were followed. This research design is consistent with this study's objectives as stated in Chapter One and reinforced by a comprehensive literature review in Chapter Two. Results of the study

analysis will be discussed in Chapter Four. Conclusions from this research will be presented in Chapter Five.

Chapter Four: Results

Introduction

This chapter presents the findings from the validated survey used to collect data for the purpose of this study. The purpose of this study is to examine the influence of a specific company's intranet social networking tools on building and leading a culture of collaboration. An email invitation to participate in the on-line survey and a link to that survey was sent to a random sample of 650 participants. A response rate of 27% was attained through the receipt of 178 participant replies. Of these, some participants did not answer all the survey questions, which caused variation in sample size, as noted in certain item tables and graphs. Analyses were performed using statistical formulas provided in references by Frey, Botan, and Kreps (2000) and Hays (1963), as well as SPSS® statistical software with the level of significance set at .05. The following tables and graphs in this chapter utilize descriptive and inferential statistics to illustrate the results of the survey.

Demographic Characteristics

Demographic characteristics (gender, age, position in company, years of employment) were collected from those who participated in the Virtual/On-line Collaboration Survey. All of the survey participants were Techco employees who currently work at company locations around the world. The response rate was 27%, derived from 178 participants returning the survey out of the initial 650 surveys sent.

All 178 respondents answered the question on gender. Figure 1 illustrates the participant's gender, 75% male, compared to 25% female.

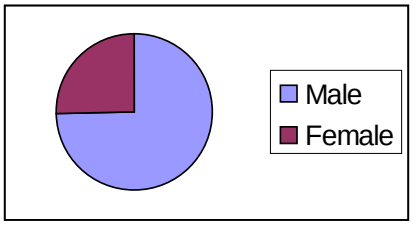

Figure 1. Frequency distribution of participants' gender.

A total of 153 respondents answered the question on age. Figure 2 depicts the distribution of the survey participants' age groups as defined by:

- Millennials (b. 1977-1998).
- Gen X'ers (b. 1965-1976).
- Boomers (b. 1946-1964).
- Matures (b. 1933-1945).
    - Note: no one responded who was born before 1933.

The Millennial group represented 20% of the employees that responded to the survey. Gen X'ers equated to 25% of the responses. The largest group of participants was the Boomers who provided 52% of the responses. The Matures represented the smallest group of respondents at 3%. Surveyed employees reported ages ranging from 22 to 74 years with a mean age of all participants of 37 years.

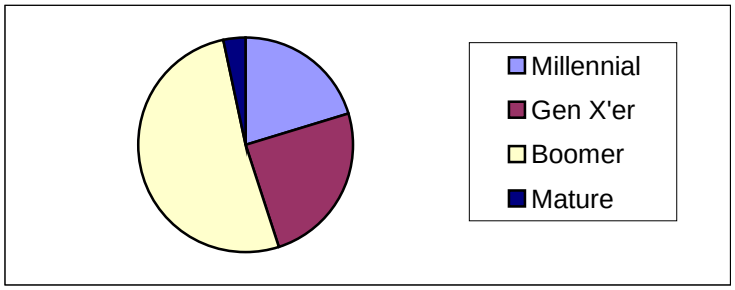

Figure 2. Frequency distribution of participants' age.

All 178 respondents answered the question on position at Techco. Figure 3 illustrates that the majority of survey participants, 84%, classified themselves as non-management. The remaining 16% were identified as management employees.

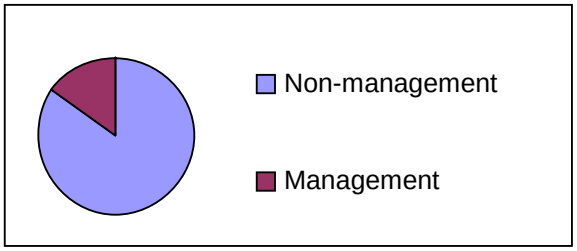

Figure 3. Frequency distribution of management and non-management participants.

The participants' years of experience with the company were put into one of three groups based on the maturity and wide-spread use of intranet technologies at the time when the respondent began his/her employment at Techco: Pre- intranet technologies (more than 20 years), Web 1.0 technologies (11-20 years), and Web 2.0 technologies (10 years or less). Figure 4 illustrates the frequency distribution of 163 survey participants; 15 employees chose to withhold their years of experience. Employees with between 0-10 years of experience equaled 34% of the participant responses. Employees with between 11-20 years of experience equaled 21%. Employees with more than 20 years of experience equaled 45%, the largest group represented. The years of experience ranged from 0.5 to 53 years, with a mean for all participating employees who provided the data of 17.3 years.

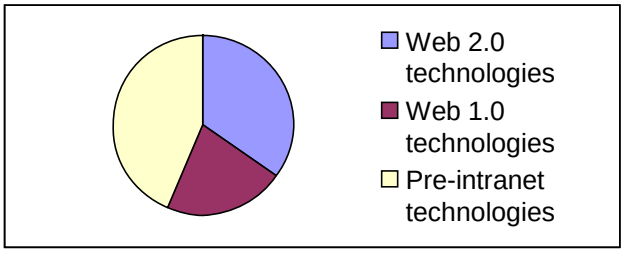

Figure 4. Frequency distribution of participants' years of experience, grouped into categories based on intranet use when employment at Techco began.

Problem Statement

What relationship, if any, exists between a specific company's use of intranet social networking tools and the collaborative culture of its employees?

Research Hypothesis 1

There is/is not a significant difference among employees of specific demographics with respect to participation in on-line collaborations using intranet social networking tools.

1.a. There is/is not a significant difference between management and non-management employees with respect to participation in on-line collaborations using intranet social networking tools.

- This specific hypothesis was tested using data from survey Section A, Question 3 to define the grouping factor management and non-management and the data from Section B, Question 1 to define the grouping factor Yes or No (is/is not a member of an on-line collaboration group). A 2x2 chi-square test was used with a level of significance of 0.05. The computed value of X^2, 2.504, was less than the table value of 3.841 resulting in the acceptance of the null hypothesis. There is not a significant difference between

management and non-management employees with respect to participation in on-line collaborations using intranet social networking tools. By conventional criteria, the difference is considered not statistically significant.

Results of the specific hypothesis testing of non-management versus management participation in collaborative groups are summarized in Table 3.

Table 3

Hypothesis Testing of Non-Management versus Management Participation in Collaborative Groups

Position	Member of an on-line collaboration group	*n*	X^2	Table value
Management	Yes	27		
	No	0		
			2.504	3.841
Non-management	Yes	138		
	No	13		

1.b. There is/is not a significant difference among employees' age grouping with respect to participation in on-line collaborations using intranet social networking tools.

- This specific hypothesis was tested using data from survey Section A, Question 2 to define the four groups for the variable age and the data from Section B, Question 1 to define the grouping factor Yes or No (is/is not a member of an on-line collaboration group). The data from Section A, Question 2 was put into one of four groups: Mature (b. 1933-1945), Boomer (b. 1946-1964), Gen X'er (b. 1965-1976) and Millennial (b. 1977-1998). A chi-square test was used with a level of significance of 0.05. The computed value of X^2, 21.39, was greater than the table value of 7.815 resulting in the

acceptance of the alternate hypothesis. There is a significant difference among employees' age grouping with respect to participation in on-line collaborations using intranet social networking tools. By conventional criteria, the difference is considered statistically significant.

Results of the hypothesis testing of age group participation in collaborative groups are summarized in Table 4.

Table 4

Hypothesis Testing of Age Group Participation in Collaborative Groups

Age Group	Member of an on-line collaboration group	*n*	X^2	Table value
Millennial	Yes	30		
	No	1		
Gen X'er	Yes	35		
	No	3		
			21.39	7.815
Boomer	Yes	75		
	No	4		
Mature	Yes	5		
	No	0		

1.c. There is/is not a significant difference between male and female employees with respect to participation in on-line collaborations using intranet social networking tools.

- This specific hypothesis was tested using data from survey Section A, Question 1 to define the gender grouping factor and the data from Section B, Question 1 to define the grouping factor Yes or No (is/is not a member of an on-line collaboration group). A 2x2 chi-square test was used with a level of significance of 0.05. The computed value of X^2, .053, was less than

the table value of 3.841 resulting in the acceptance of the null hypothesis. There is not a significant difference between male and female employees with respect to participation in on-line collaborations using intranet social networking tools. By conventional criteria, the difference is considered not statistically significant.

Results of the hypothesis testing of male and female participation in collaborative groups are summarized in Table 5.

Table 5

Hypothesis Testing of Male and Female Participation in Collaborative Groups

Gender	Member of an on-line collaboration group	*n*	X^2	Table value
Male	Yes	123		
	No	10		
			.053	3.841
Female	Yes	42		
	No	3		

1.d. There is/is not a significant difference among employees' tenure groupings with respect to participation in on-line collaborations using intranet social networking tools.

- This specific hypothesis was tested using data from survey Section A, Question 4 to define the three groups for the variable tenure and the data from Section B, Question 1 to define the grouping factor Yes or No (is/is not a member of an on-line collaboration group). The data from Section A, Question 4 was put into one of three groups based on the maturity and wide-spread use of intranet technologies at the time when the respondent began his/her employment at Techco: Pre-intranet technologies (more than

20 years), Web 1.0 technologies (11-20 years), and Web 2.0 technologies (10 years or less). A chi-square test was used with a level of significance of 0.05. The computed value of X^2, 20.15, was greater than the table value of 5.991 resulting in the acceptance of the alternate hypothesis. There is a significant difference among employees' tenure groupings with respect to participation in on-line collaborations using intranet social networking tools. By conventional criteria, the difference is considered statistically significant.

Results of the hypothesis testing of tenure group participation in collaborative groups are summarized in Table 6.

Table 6

Hypothesis Testing of Tenure Group Participation in Collaborative Groups

Tenure Group	Member of an on-line collaboration group	*n*	X^2	Table value
Web 2.0 technologies	Yes	54		
	No	2		
Web 1.0 technologies	Yes	33	20.15	5.991
	No	2		
Pre-intranet technologies	Yes	66		
	No	6		

Research Hypothesis 2

There is/is not evidence of any or all of the 20 factors of a successful collaboration approach present in a specific company's intranet social networking communities. Across all 20 factors, the researcher looked for areas that were shown to be particularly strong or weak relative to a mid-range score of 2 (neutral/no opinion).

Forty survey statements, with responses plotted on a 5-point Likert scale, ranging from *strongly agree* (0) to *strongly disagree* (4), were used to measure the presence of the 20 collaboration factors. The variable tested in each of the 20 specific hypotheses consisted of the responses to the two or three statements associated with each of the factors. The results of the 20 specific hypotheses testing the presence of each collaboration factor are shown below and summarized in Table 14.

Across all 20 factors, the researcher looked for areas that were shown to be particularly strong or weak relative to a mid-range score of 2 (neutral/no opinion).

2.a. There is/is not a significant level of agreement regarding the factor *History of Collaboration or Cooperation* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section C, Statements 1 and 2. A two-tailed t-test was used with a level of significance of 0.05. The calculated value of t, -.302, was less than the table value of 1.96 resulting in the acceptance of the null hypothesis. There is not a significant level of agreement regarding the factor *History of Collaboration or Cooperation* and it is considered not statistically significant.

2.b. There is/is not a significant level of agreement regarding the factor *Collaborative Groups Seen as Legitimate Leaders* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section C, Statements 3 and 4. A two-tailed t-test was used with a level of

significance of 0.05. The calculated value of t, -.37, was less than the table value of 1.96 resulting in the acceptance of the null hypothesis. There is not a significant level of agreement regarding the factor *Collaborative Groups Seen as Legitimate Leaders* and it is considered not statistically significant.

2.c. There is/is not a significant level of agreement regarding the factor *Favorable Political and Social Climate* within the respondents' virtual collaborative groups..

- This specific hypothesis was tested using data from survey Section C, Statements 5 and 6. A two-tailed t-test was used with a level of significance of 0.05. The calculated value of t, -2.07, was greater than the table value of 1.96, resulting in the acceptance of the alternate hypothesis. There is a significant level of agreement regarding the factor *Favorable Political and Social Climate* and it is considered statistically significant.

2.d. There is/is not a significant level of agreement regarding the factor *Mutual Respect, Understanding and Trust* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section C, Statements 7 and 8. A two-tailed t-test was used with a level of significance of 0.05. The calculated value of t, -1.012, was less than the table value of 1.96, resulting in the acceptance of the null hypothesis. There is not a significant level of agreement regarding the factor

Mutual Respect, Understanding and Trust and it is considered not statistically significant.

2.e. There is/is not a significant level of agreement regarding the factor *Appropriate Cross Section of Members* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section C, Statements 9 and 10. A two-tailed t-test was used with a level of significance of 0.05. The calculated value of t, -.209, was less than the table value of 1.96, resulting in the acceptance of the null hypothesis. There is not a significant level of agreement regarding the factor *Appropriate Cross Section of Members* and it is considered not statistically significant.

2.f. There is/is not a significant level of agreement regarding the factor *Members See Collaboration as in Their Self-Interest* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section C, Statement 11. A two-tailed t-test was used with a level of significance of 0.05. The calculated value of t, -1.36, was less than the table value of 1.96, resulting in the acceptance of the null hypothesis. There is not a significant level of agreement regarding the factor *Members See Collaboration as in Their Self-Interest* and it is considered not statistically significant.

2.g. There is/is not a significant level of agreement regarding the factor *Ability to Compromise* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section C, Statement 12. A two-tailed t-test was used with a level of significance of 0.05. The calculated value of t, -.527, was less than the table value of 1.96, resulting in the acceptance of the null hypothesis. There is not a significant level of agreement regarding the factor *Ability to Compromise* and it is considered not statistically significant.

2.h. There is/is not a significant level of agreement regarding the factor *Members Share a Stake in Both Process and Outcome* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section C, Statements 13, 14 and 15. A two-tailed t-test was used with a level of significance of 0.05. The calculated value of t, -.478, was less than the table value of 1.96, resulting in the acceptance of the null hypothesis. There is not a significant level of agreement regarding the factor *Members Share a Stake in Both Process and Outcome* and it is considered not statistically significant.

2.i. There is/is not a significant level of agreement regarding the factor *Multiple Layers of Participation* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section C, Statements 16 and 17. A two-tailed t-test was used with a level of

significance of 0.05. The calculated value of t, .045, was less than the table value of 1.96, resulting in the acceptance of the null hypothesis. There is not a significant level of agreement regarding the factor *Multiple Layers of Participation* and it is considered not statistically significant.

2.j. There is/is not a significant level of agreement regarding the factor *Flexibility* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section C, Statements 18 and 19. A two-tailed t-test was used with a level of significance of 0.05. The calculated value of t, -1, was less than the table value of 1.96, resulting in the acceptance of the null hypothesis. There is not a significant level of agreement regarding the factor *Flexibility* and it is considered not statistically significant.

2.k. There is/is not a significant level of agreement regarding the *Development of Clear Roles and Policy Guidelines* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section C, Statements 20 and 21. A two-tailed t-test was used with a level of significance of 0.05. The calculated value of t, -.096, was less than the table value of 1.96, resulting in the acceptance of the null hypothesis. There is not a significant level of agreement regarding the factor *Development of Clear Roles and Guidelines* and it is considered not statistically significant.

2.l. There is/is not a significant level of agreement regarding the factor *Adaptability* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section C, Statements 22 and 23. A two-tailed t-test was used with a level of significance of 0.05. The calculated value of t, -.749, was less than the table value of 1.96, resulting in the acceptance of the null hypothesis. There is not a significant level of agreement regarding the factor *Adaptability* and it is considered not statistically significant.

2.m. There is/is not a significant level of agreement regarding the factor *Appropriate Pace of Development* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section C, Statements 24 and 25. A two-tailed t-test was used with a level of significance of 0.05. The calculated value of t, -.338, was less than the table value of 1.96, resulting in the acceptance of the null hypothesis. There is not a significant level of agreement regarding the factor *Appropriate Pace of Development* and it is considered not statistically significant.

2.n. There is/is not a significant level of agreement regarding the factor *Open and Frequent Communication* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section C, Statements 26, 27 and 28. A two-tailed t-test was used with a level of

significance of 0.05. The calculated value of t, -.812, was less than the table value of 1.96, resulting in the acceptance of the null hypothesis. There is not a significant level of agreement regarding the factor *Open and Frequent Communication* and it is considered not statistically significant.

2.o. There is/is not a significant level of agreement regarding the factor *Established Informal Relationships and Communication Links* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section C, Statements 29 and 30. A two-tailed t-test was used with a level of significance of 0.05. The calculated value of t, -1.04, was less than the table value of 1.96, resulting in the acceptance of the null hypothesis. There is not a significant level of agreement regarding the factor *Established Informal Relationships and Communication Links* and it is considered not statistically significant.

2.p. There is/is not a significant level of agreement regarding the factor *Concrete, Attainable Goals and Objectives* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section C, Statements 31, 32 and 33. A two-tailed t-test was used with a level of significance of 0.05. The calculated value of t, -.578, was less than the table value of 1.96, resulting in the acceptance of the null hypothesis. There is not a significant level of agreement regarding the factor

Concrete, Attainable Goals and Objectives and it is considered not statistically significant.

2.q. There is/is not a significant level of agreement regarding the factor *Shared Vision* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section C, Statements 34 and 35. A two-tailed t-test was used with a level of significance of 0.05. The calculated value of t, -.934, was less than the table value of 1.96, resulting in the acceptance of the null hypothesis. There is not a significant level of agreement regarding the factor *Shared Vision* and it is considered not statistically significant.

2.r. There is/is not a significant level of agreement regarding the factor *Unique Purpose* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section C, Statements 36 and 37. A two-tailed t-test was used with a level of significance of 0.05. The calculated value of t, -.63, was less than the table value of 1.96, resulting in the acceptance of the null hypothesis. There is not a significant level of agreement regarding the factor *Unique Purpose* and it is considered not statistically significant.

2.s. There is/is not a significant level of agreement regarding the factor *Sufficient Funds, Staff, Materials and Time* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section C, Statements 38 and 39. A two-tailed t-test was used with a level of

significance of 0.05. The calculated value of t, .129, was less than the table value of 1.96, resulting in the acceptance of the null hypothesis. There is a not significant level of agreement regarding the factor *Sufficient Funds, Staff, Materials and Time* and it is considered not statistically significant.

2.t. There is/is not a significant level of agreement regarding the factor *Skilled Leadership* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section C, Statement 40. A two-tailed t-test was used with a level of significance of 0.05. The calculated value of t, -.776, was less than the table value of 1.96, resulting in the acceptance of the null hypothesis. There is not a significant level of agreement regarding the factor *Skilled Leadership* and it is considered not statistically significant.

The results of these 20 specific hypotheses are shown in Table 7.

Table 7

Hypothesis Testing of Collaboration Factors

Collaboration Factor	*n*	*mean*	*std dev*	*t*	table value
2.a. History of Collaboration or Cooperation in the Company	332	1.685	1.042	-.302	1.96
2.b. Collaborative Groups Seen as Legitimate Leaders in the Company	331	1.711	.783	-.37	1.96
2.c. Favorable Political and Social Climate	332	1.042	.464	-2.07	1.96

(*table continues*)

Collaboration Factor	*n*	*mean*	*std dev*	*t*	table value
2.d. Mutual Respect, Understanding and Trust	332	1.160	.830	-1.012	1.96
2.e. Appropriate Cross Section of Members	330	1.807	.958	-.209	1.96
2.f. Members See Collaboration as in Their Self Interest	166	.939	.780	-1.36	1.96
2.g. Ability to Compromise	166	1.639	.702	-.527	1.96
2.h. Members Share a Stake in Both Process and Outcome	496	1.602	.836	-.478	1.96
2.i. Multiple Layers of Participation	329	2.040	.883	.045	1.96
2.j. Flexibility	329	1.270	.730	-1	1.96
2.k. Development of Clear Roles and Policy Guidelines	329	1.910	.930	-.096	1.96
2.l. Adaptability	327	1.440	.748	-.749	1.96
2.m. Appropriate Pace of Development	327	1.730	.797	-.388	1.96
2.n. Open and Frequent Communication	485	1.350	.800	-.812	1.96
2.o. Established Informal Relationships and Communication Links	323	1.188	.781	-1.04	1.96
2.p. Concrete, Attainable Goals and Objectives	481	1.510	.848	-.578	1.96
2.q. Shared Vision	320	1.350	.696	-.934	1.96
2.r. Unique Purpose	324	1.420	.920	-.63	1.96
2.s. Sufficient Funds, Staff, Materials and Time	324	2.120	.930	.129	1.96
2.t. Skilled Leadership	162	1.370	.812	-.776	1.96

Research Hypothesis 3

There is/is not a significance difference among the employee usage of an intranet collaboration tool other than inSite. This hypothesis was tested using data from survey Section B, Question 2 to define the variable, how many employees use each of the intranet collaboration tools from the 10 listed. The usage of each tool is shown in Table 8.

Table 8

Hypothesis Testing of Employee Usage of Intranet Collaboration Tools

Tool	Usage	*n*
inSite	Yes	159
	No	6
Sharepoint	Yes	147
	No	18
AskBCA	Yes	2
	No	163
i2i (Ideas to Innovation)	Yes	7
	No	158
Blogs	Yes	51
	No	114
Wikis	Yes	85
	No	80
AskMe	Yes	16
	No	149
Really Simple Syndication (RSS)	Yes	22
	No	143
Video Blogging or Podcasting	Yes	11
	No	154
Web forums (message and discussion boards)	Yes	43
	No	122

The computed value of X^2, 3,605, was greater than the table value of 15.507, resulting in the acceptance of the alternate hypothesis. There is a significant difference among employee usage of the collaboration tools listed. The difference is considered statistically significant.

Research Hypothesis 4

There is/is not a significant difference between those employees who do or do not use the inSite tool with respect to evidence of any or all of the six Wilder CFI categories of a successful collaboration approach present in a specific company's intranet social networking communities. Across all six categories, the researcher looked for areas that are shown to be particularly strong or weak relative to a mid-range score of 2 (neutral/no opinion). The variable tested in each of the six specific hypotheses consisted of the survey responses regarding use of the inSite tool and the statements associated with the factors in each of the six categories. The results of the six specific hypotheses testing the presence of each collaboration category are shown below and summarized in Table 16.

4.a. There is/is not a significant difference between those employees who use the inSite tool and those employees who do not with respect to the category *Environment* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section B, Question 2 and Section C, Statements 1 through 6. A two-tailed t-test was used with a level of significance of 0.05. The calculated value of t, -.612, was less than the table value of 1.96, resulting in the acceptance of the null hypothesis. There is not a significant level of agreement

regarding the category *Environment* and it is considered not statistically significant.

4.b. There is/is not a significant difference between those employees who use the inSite tool and those employees who do not with respect to the category *Membership Characteristics* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section B, Question 2 and Section C, Statements 7 through 12. A two-tailed t-test was used with a level of significance of 0.05. The calculated value of t, -.721, was less than the table value of 1.96, resulting in the acceptance of the null hypothesis. There is not a significant level of agreement regarding the category *Membership Characteristics* and it is considered not statistically significant.

4.c. There is/is not a significant difference between those employees who use the inSite tool and those employees who do not with respect to the category *Process and Structure* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section B, Question 2 and Section C, Statements 13 through 25. A two-tailed t-test was used with a level of significance of 0.05. The calculated value of t, -.413, was less than the table value of 1.96, resulting in the acceptance of the null hypothesis. There is not a significant level of

agreement regarding the category *Process and Structure* and it is considered not statistically significant.

4.d. There is/is not a significant difference between those employees who use the inSite tool and those employees who do not with respect to the category *Communication* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section B, Question 2 and Section C, Statements 26 through 30. A two-tailed t-test was used with a level of significance of 0.05. The calculated value of t, -.917, was less than the table value of 1.96, resulting in the acceptance of the null hypothesis. There is not a significant level of agreement regarding the category *Communication* and it is considered not statistically significant.

4.e. There is/is not a significant difference between those employees who use the inSite tool and those employees who do not with respect to the category *Purpose* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section B, Question 2 and Section C, Statements 31 through 37. A two-tailed t-test was used with a level of significance of 0.05. The calculated value of t, -.674, was less than the table value of 1.96, resulting in the acceptance of the null hypothesis. There is not a significant level of agreement regarding the category *Purpose* and it is considered not statistically significant.

4.f. There is/is not a significant difference between those employees who use the inSite tool and those employees who do not with respect the category *Resources* within the respondents' virtual collaborative groups.

- This specific hypothesis was tested using data from survey Section B, Question 2 and Section C, Statements 38 through 40. A two-tailed t-test was used with a level of significance of 0.05. The calculated value of t, -.145, was less than the table value of 1.96, resulting in the acceptance of the null hypothesis. There is not a significant level of agreement regarding the category *Resources* and it is considered not statistically significant.

The results of the six specific hypotheses testing the presence of each collaboration category for employees who use the inSite tool are shown in Table 9.

Table 9

Hypothesis Testing of Collaboration Categories for Employees Who Use inSite

Collaboration Category	*n*	*mean*	*std dev*	*t*	Table value
4.a. Environment	990	1.47	.866	-.612	1.96
4.b. Membership Characteristics	990	1.42	.804	-.721	1.96
4.c. Process and Structure	2141	1.66	.823	-.413	. 1.96
4.d. Communication	820	1.28	.787	-.917	1.96
4.e. Purpose	1148	1.44	.830	-.674	1.96
4.f. Resources	488	1.87	.892	-.145	1.96

Participant Comments

Of the previous studies that were reviewed for this dissertation, most used the Wilder CFI instrument along with follow-up interviews (Czajkowski, 2006; Derose et al., 2004; Folger, 2006; Greene, 2010; Perrault, 2008; Schmaltz, 2010). In these studies, researchers worked with a smaller number of participants in physical environments, and therefore, could easily question the individuals about their survey responses.

For this study, the researcher did not know personally or interact in a physical environment with any of the globally-dispersed respondents. The Virtual/On-Line Collaboration Survey was sent to participants via email and did not invite them to provide any additional comments or suggestions. Nevertheless, 20 survey participants sent email responses to this researcher offering further observations beyond the scope of the survey. While these participant comments were not considered when performing the survey data analyses, they do provide additional insights.

These participants elected to forgo anonymity; however, their identities will still be protected in the same manner as the requested survey data.

Eleven respondents expressed support and enthusiasm for the study. Nine participants provided comments expressing skepticism about the use of inSite as a collaboration tool. These comments are summarized as follows:

- inSite is more generally not project-specific; rather, it is used to get help from experts on a particular subject, exchange information and advance common interests.

- Sharepoint is the more common collaboration tool used by teams working together on a particular collaborative project.
- Techco leaders are likely not aware of how or when inSite members use the tool to gather data or seek expert opinions from others across the company in the performance of their daily jobs. Therefore, accurate usage data may be impossible to collect.

Several employees commented negatively on inSite, stating that:

- inSite is used primarily to pursue pet interests and thus is a waste of time.
- inSite would be useful if people use it to gather information and only use it for a short amount of time.
- Collaborations using non-web-based tools are more effective (i.e., e-mail, telephone, shared servers)–collaboration is more effective with people one already knows.

It should be noted that it was never the intention of this research to focus on inSite, or any other particular tool, but rather on the overall collaboration conditions present at Techco, regardless of the tool. One wonders if the scores would have been stronger (or weaker) if the statements would have been focused specifically on the more popular collaboration tool, Sharepoint, which is frequently used among Techco team members who know each other. Nevertheless, the intention of this research was achieved as designed–with recognition that some of the responders likely struggled to answer the questions from the macro view as intended.

Summary

This chapter presented the results of a study that analyzed the impact of using intranet social networking tools in a large, global technology company on the process of building and leading a culture of collaboration in a virtual/on-line environment. Regarding the first research hypothesis, a significant difference was found in two out of four specific hypotheses: tenure and age groups. For the second research hypothesis, there was significant agreement for one of the 20 specific hypotheses: significant evidence of the *Favorable Political and Social Climate* collaboration factor in the participants' virtual collaboration groups. For the third research hypothesis a significant difference was found: predominant usage of the inSite and Sharepoint collaboration tools. Finally, with respect to the fourth research hypothesis, in all four specific hypotheses, no significant difference was found with regard to employee usage of inSite and the presence of the Wilder CFI categories. The following chapter will conclude this paper with the conclusions of this research.

Chapter Five: Discussion and Conclusions

Introduction

This research analyzed the impact of the use of intranet social networking tools in a large, global technology company on the process of building and leading a culture of collaboration. The study focused on assessing the extent to which employees, members of select on-line/virtual social networking groups, experience the benefits or changes that the company, Techco, intended in developing an intranet social networking tool to promote a collaborative culture within the company. The results of this study yielded several conclusions that will be of interest to Techco leaders who seek greater employee collaboration across the enterprise. It can be generalized from these results that significant differences exist among the ages and tenure of virtual group members, as well as the collaboration tools they prefer. In addition, significant evidence of one of the 20 collaboration factors, *Favorable Political and Social Climate,* was found.

Results and Findings of this Study

There were four significant findings uncovered in this research. They are interrelated and lead to a rather straightforward set of actions for the Techco executives who are intent on improving the collaborative culture.

The demographic characteristics that were collected from the virtual/on-line team members revealed a remarkably homogenous population. The great majority of survey respondents were male, non-management Boomers (age 47 to 55) with over 20 years' tenure at Techco. The generalization of the typical technology worker holds true here: the male, Boomer-age engineer who works at the same company for most of his career. This finding is consistent with my own personal observations as a career Techco employee

well familiar with the predominance of male-centric, engineering-focused, military-mindset coworkers.

In particular, the significant disproportion in participants' ages and tenures among virtual collaboration group members should be a concern to Techco leaders. There are at least two possible explanations for these findings–and either or both are disturbing. The first explanation could be that there actually are vastly more Boomer-age males with over 20 years experience dominating the virtual collaboration groups. The second reason may be that, of the 650 survey recipients, predominantly Boomer-age males with over 20 years experience were sufficiently motivated to complete and return the survey. Therefore, it may be concluded from this study that the experienced, Boomer-age, male group of Techco employees are the most concerned and proactive about knowledge-sharing and collaboration. This finding should alarm Techco leaders because these are the very employees who will soon be retiring and taking their vast knowledge and experience out the door with them.

Another significant finding was regarding the preferred collaboration tools used by survey respondents. Results revealed that two collaboration tools, inSite and Sharepoint, dominate employee usage at Techco. With 83-90% of respondents reporting that they use these tools, it is clear that these are the collaboration vehicles that Techco leaders should be focusing on.

The inSite tool works well in combination with the Sharepoint tool. Over time inSite has primarily developed into a repository for employees' profiles and resumes, attached to affiliations with a specific home organization or technical specialty. The website has become a resource for not only locating an expert, but learning more about a

specific employee one might be working with but doesn't know personally. inSite has become the primary way employees can learn more about each other by accessing profiles and resumes. In addition, employees are posting resumes and profiles on inSite to let others (peers as well as potential employers) know of their qualifications, credentials, experience and expertise.

Collaboration on specific projects, with members who know what they are expected to contribute to a group's activities, is far more likely on a Sharepoint website. Sharepoint sites are established at the inception of a particular group and employees are invited to join if they are members of a specific project. Once an individual Sharepoint site is set up, this becomes the virtual environment where members interact, store documents and trade information throughout the life of a project.

Using inSite to locate an expert and then inviting this expert to join a team that meets and shares information on Sharepoint is a very effective way to collaborate across the enterprise. This study showed that this application is most frequently used to collaborate at Techco.

In this study, there was significant evidence of the presence of only one of the 20 of the Wilder CFI collaboration factors: *Favorable Political and Social Climate*. This indicates a widespread acceptance and support of the collaboration mission at Techco. In addition, conclusions can be drawn from the responses to the other 19 factors and a path forward can be derived, as described in the next section.

Recommendations Based on Study Results

According to the findings of this study, the employees most actively participating in virtual collaborative groups are the Boomer-age males with over 20 years Techco

experience. Their preferred tools for collaboration are nearly evenly split between inSite and Sharepoint. These employees are also enthusiastic supporters of the company's collaboration efforts. Thus, it is imperative that Techco leaders capture the knowledge and experience of these employees before they retire from the company and this opportunity is missed.

As Child and Schumate (2007) found, connecting people to experts, rather than people to data repositories, increases the effectiveness of collaborations. Surowieki (2005) agreed that connecting people to other people is the most effective way to solve problems. The strong preference for inSite and Sharepoint in this study, in that they are tools that connect people in a virtual environment, supports this previous research.

Based on these findings, Techco leaders should take the following three actions as quickly as possible–before the most collaborative employees retire:

1. Model and mentor managers in collaborative behaviors across the enterprise through the use of inSite and Sharepoint themselves–and then publicly talk about their experiences, gains and lessons learned.
    - The mean score for the collaboration factor related to management participation (*Multiple Layers of Participation*) revealed one of the highest levels of dissatisfaction in this study. In addition, only 15% of survey respondents were managers. Most Techco managers follow closely in the footsteps of their executives. Therefore, executives can greatly influence the widespread adoption of collaborative behaviors throughout the workforce.

- As Alter (2008) noted, executives typically do not need to use collaborative tools such as inSite and Sharepoint nearly as often as members of project teams do, however corporate culture is heavily influenced by their behavior. When executives set the example, managers and employees will almost assuredly adopt those same behaviors.

2. Recognize and reward information sharing and collaborations yielding specific results.
    - The lowest score received on the Wilder CFI factors was for sufficient funds, staff, materials and time. Employees feel that they do not have the resources needed to accomplish all that they would like to do in their collaborative groups. Nevertheless, in this economy, we are all asked to do more with less. When a collaborative group achieves success on a project, Techco leaders should recognize this success publicly and reward the participants.
    - Survey results and my own personal knowledge of the Techco communities reveal a nearly universal employee pride in working for Techco and for its products. Recognition for the collaborative groups that further Techco's success as a company, as well as acknowledging the value (reward) of those contributions, would go a long way toward promoting a culture of collaboration. This would encourage all employees, not just the over-50 group, to participate more in collaborative projects.

3. Provide mandatory training on collaborative behaviors.
    - Several recent enterprise-wide initiatives have successfully moved the Techco culture in specific desired directions. For example, executive emphasis on integrating all company divisions under a "One Techco" public image and infusing a customer-centric focus in Techco communications were achieved through company-wide required training.
    - Collaboration training should be deployed to familiarize managers and employees with successful collaborative strategies, as well as techniques to overcome challenges and achieve team objectives (Alter, 2008; Child & Schumate, 2007; Gratton, 2007; McAfee, 2009). As researchers Alter (2008), Markus (1994) and McAfee (2009) observed, underuse of collaborative technologies is often due to not only technophobia, but entrenched practices and mindsets. Training in both collaborative behaviors and tools would equip the workforce with the direction needed to increase their participation in collaborative groups.

Recommendations for Future Actions

The study has resulted in an expanded characterization of what collaboration means today, given the Web 2.0 world that we now live and work in. Previous collaboration studies have been conducted on teams of people who work together in physical environments. As a result of new web-based technologies, it is just as likely that an employee would be teamed with a colleague across the country–or beyond–as they

would be with someone sitting in the next cubicle. To further our understanding of successful collaborations, additional research should be done on virtual/on-line teams.

The Wilder CFI instrument provides an excellent foundation from which to begin this effort because it is a comprehensive tool that has been proven effective in measuring success for traditional collaboration projects. Subsequent studies should be done using virtual/on-line, geographically-dispersed team members to understand their collaboration experiences relative to the data gathered, to date, from traditional groups in physical environments. Literature is abundant on traditional team collaborations–but little research has been done on successes and failures in virtual environments.

It remains to be seen whether the 20 Wilder CFI factors are all-inclusive for other web-based environments. There may be additional factors to be identified that would indicate a successful on-line collaboration, or there may be some factors that would no longer be relevant outside of traditional collaborations. A comparison between traditional and virtual collaborations, with respective risks and benefits, would be useful for organizations deciding which approach, physical or virtual spaces, would best meet the needs of a particular endeavor. It is easy to envision hundreds of valuable collaboration studies that should be conducted in this new virtual environment.

With the information gleaned from this research, Techco leadership has a clear set of actions needed to support the path they are moving in–toward a dominant culture of collaboration. As demonstrated in this study, Techco employees desire to collaborate and value the opportunities to do so. Techco leaders should encourage effective employee collaborations by joining teams and rewarding successes. These successful collaborations should be communicated across the enterprise to model the desired behavior. Training

should be provided to emphasize collaborative behaviors and provide the tools needed for employees to succeed on their teams.

In addition, Techco's Collaboration, Learning and Replication (CLR) organization should take the findings from this study and the Wilder CFI factors and develop company-wide actions that would support moving the needle on the 20 defined areas toward significant strengths. This study identified some areas of opportunity, such as additional resources needed and increased leadership presence in virtual collaborative groups, which would move the culture at Techco in the desired direction.

Finally, Techco's Collaboration, Learning and Replication (CLR) organization should rerun this study in approximately 2 years to assess the degree to which actions taken are achieving the desired results. This study has provided a baseline from which to gage improvements in the collaborative culture of virtual teams. The research should continue to measure progress.

Conclusion

This study examined the influence of a specific company's intranet social networking tools on building and leading a culture of collaboration. In recent years, corporations such as Techco have understood the limitations of person-to-person channel technologies, such as telephone and e-mail. Taking a cue from popular social networking sites such as Facebook, these companies have embraced web-based platform technologies that make digital content and subject matter experts globally visible, searchable and permanently available to employees.

Companies today recognize the value of network-based communication and collaboration tools that help employees reach across boundaries to share ideas, best

practices and fresh approaches. However, in order to be effective, these tools must be supported by people, processes and a culture that is committed to growing and sustaining collaborative initiatives.

The research behind this dissertation corroborates the findings of LaFasto and Larson (2001). They characterized the organizational environment as the psychological atmosphere that emerges from the way an organization conducts itself, shapes attitudes and guides behavior. This organizational environment has no physical location, rather it is pervasive–encompassing and saturating everything employees do: how they communicate, how they make decisions, how they interact with one another, what encourages them and what discourages them. LaFasto and Larson argue that "The environment is never neutral. It has compelling content. It shapes our ideas and perspectives. It can promote openness or silence. It can encourage risk taking or risk aversion. It can allow for differences or require sameness" (p. 158).

The results from this study provide valuable insights to leaders who desire to operate more effectively in a dynamic, virtual environment. The responses of the surveyed Techco employees show that they want their business executives to model collaborative behaviors across the enterprise, including coaching and mentoring, to develop leaders who demonstrate understanding that multiple perspectives lead to better decisions and products. Techco employees recognize the value of collaboration but need their leaders to support information sharing and team efforts by ensuring that the necessary resources and training are available.

A recent article in *Newsweek* magazine (Smith, 2010) substantiates the timeliness and importance of this research. John Chambers, CEO of Cisco Systems, spoke on the

future of leadership. He noted that there were two primary insights he gained as the leader of a company known for its role in building the infrastructure of the Internet:

- The obligation of a leader to drive and reinforce corporate culture.
- The shift from command-and-control leadership to collaboration and teamwork.

He remarked that it is not easy to make this cultural shift because executives from his generation were not trained that way in their MBA classes. He believes that 80-90% of a leader's job is to work together toward common goals, which requires an entirely different skill set. He explained that, at Cisco, they are moving heavily toward collaborative teams with cross-functional membership. "We are going to train a generalist group of leaders who know how to learn and operate in collaborative teamwork. I think that's the future of leadership" (Smith, 2010, p. 46).

Companies like Techco and Cisco Systems recognize that successful collaboration and communication across their global enterprises are keys to driving productivity, growth and achievement of business objectives. This study reinforced the need to understand the conditions conducive to creating and leading a culture of collaboration. Recommendations, based on this research, are provided to move Techco further toward their stated goals. As well, this research provides a tool for assessing those conditions in a virtual/on-line environment. With the findings from this research and the studies that came before and will follow, companies can leverage new social networking technologies more effectively and use them to build and lead corporate cultures that optimize the contribution of every one of their employees.

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Appendix A

Survey Instrument

Virtual/On-line Collaboration Survey

Virtual/On-line Collaboration Survey

Thank you for participating in this survey. The survey data and subsequent analyses will be provided to our Knowledge Management (KM) and Collaboration, Learning & Replication (CLR) organizations. KM and CLR are sponsoring this research in order to better understand how network-based communication and collaboration tools help employees reach across the enterprise and across silos to share ideas, best practices, and fresh approaches. This is an approved survey, authorized for distribution to employees by the following [redacted] organizations: Global Diversity & Employee Rights (GDER), Human Subjects Review Board (HSRB) and the [redacted] Employee Survey Team (BEST). Your time and interest in completing this survey is greatly appreciated.

Section A: Personal Information

1. Gender (response optional)

- ○ Male
- ○ Female

2. Age in years (response optional) _____

3. My position in the organization is: (response optional)

- ○ Non-management (defined by your HR job code)
- ○ Management (defined by your HR job code)

4. I have been employed with the company for this many years: (response optional) _____

Section B: Participation in a Virtual/On-line Collaborative Group

1. I am now or have been a member of/participant in one or more virtual/on-line collaboration group(s) that use company Intranet social networking tools.

- ○ Yes (If yes, please proceed with survey)
- ○ No (If no, please stop here. Survey is complete. Thank you for your participation.)

2. The company Intranet collaboration tool(s) used in my virtual/on-line collaboration group(s) are: (Check all that were used.)

- ☐ InSite
- ☐ Sharepoint
- ☐ AskBCA
- ☐ I2I (Ideas to Innovation portal)
- ☐ Blogs
- ☐ Wikis
- ☐ AskMe
- ☐ Really Simple Syndication (RSS)
- ☐ Video Blogging or Podcasting
- ☐ Web forums (i.e., message boards, discussion boards)

Section C: Measuring Collaboration Factors Present in the Virtual/On-line Collaborative Group

If you have been a member of a virtual/on-line collaborative group or groups, please answer the following questions based on your most recent experiences in that group. Indicate the extent to which you agree or disagree with the following statements.

Virtual/On-line Collaboration Survey

History of Collaboration or Cooperation in the Company

1. Organizations in our company have a history of working together.

- Strongly agree
- Agree
- Neutral, No opinion
- Disagree
- Strongly disagree

2. Trying to solve problems through collaboration has been common in our company. It's been done a lot before.

- Strongly agree
- Agree
- Neutral, No opinion
- Disagree
- Strongly disagree

Collaborative Groups Seen as Legitimate Leaders in the Company

3. Leaders in this company who are not part of our virtual/on-line collaborative group seem hopeful about what our group can accomplish.

- Strongly agree
- Agree
- Neutral, No opinion
- Disagree
- Strongly disagree

4. Others in our company who are not a part of our virtual/on-line collaborative group would generally agree that the organizations involved in our collaborative project(s) are the "right" organizations to make it work.

- Strongly agree
- Agree
- Neutral, No opinion
- Disagree
- Strongly disagree

Favorable Political and Social Climate

5. The political and social climate seems to be "right" for starting virtual/on-line collaborative projects like this one.

- Strongly agree
- Agree
- Neutral, No opinion
- Disagree
- Strongly disagree

6. The time is right for this virtual/on-line collaborative group and project(s).

- Strongly agree
- Agree
- Neutral, No opinion
- Disagree
- Strongly disagree

Virtual/On-line Collaboration Survey

Mutual Respect, Understanding and Trust

7. People involved in our virtual/on-line collaborative group trust one another.

- Strongly agree
- Agree
- Neutral, No opinion
- Disagree
- Strongly disagree

8. I have a lot of respect for the other people involved in our virtual/on-line collaborative group.

- Strongly agree
- Agree
- Neutral, No opinion
- Disagree
- Strongly disagree

Appropriate Cross Section of Members

9. The people involved in our virtual/on-line collaborative group represent a cross section of those who have a stake in what we are trying to accomplish.

- Strongly agree
- Agree
- Neutral, No opinion
- Disagree
- Strongly disagree

10. All the organizations that we need to be members of this virtual/on-line collaborative group have become members of the group.

- Strongly agree
- Agree
- Neutral, No opinion
- Disagree
- Strongly disagree

Members See Collaboration as in Their Self-Interest

11. My organization will benefit from being involved in this virtual/on-line collaborative group.

- Strongly agree
- Agree
- Neutral, No opinion
- Disagree
- Strongly disagree

Ability to Compromise

12. People involved in our virtual/on-line collaborative group are willing to compromise on important aspects of our project(s).

- Strongly agree
- Agree

- Neutral, No opinion
- Disagree
- Strongly disagree

Members Share a Stake in Both Process and Outcome

13. The organizations that belong to our virtual/on-line collaborative group invest the right amount of time in our collaborative efforts.

- Strongly agree
- Agree
- Neutral, No opinion
- Disagree
- Strongly disagree

14. Everyone who is a member of our virtual/on-line collaborative group wants our project(s) to succeed.

- Strongly agree
- Agree
- Neutral, No opinion
- Disagree
- Strongly disagree

15. The level of commitment among the virtual/on-line collaboration participants is high.

- Strongly agree
- Agree
- Neutral, No opinion
- Disagree
- Strongly disagree

Multiple Layers of Participation

16. When our virtual/on-line collaborative group makes major decisions, there is always enough time for members to take information back to their organizations to confer with colleagues about what the decision should be.

- Strongly agree
- Agree
- Neutral, No opinion
- Disagree
- Strongly disagree

17. Each of the people who participate in decisions in our virtual/on-line collaborative group can speak for the entire organization they represent, not just a part.

- Strongly agree
- Agree
- Neutral, No opinion
- Disagree
- Strongly disagree

Flexibility

18. There is a lot of flexibility when decisions are made; people are open to discussing different options.

- Strongly agree
- Agree
- Neutral, No opinion
- Disagree
- Strongly disagree

19. People in our virtual/on-line collaborative group are open to different approaches to how we do our work. They are willing to consider different ways of working.

- Strongly agree
- Agree
- Neutral, No opinion
- Disagree
- Strongly disagree

Development of Clear Roles and Responsibilities

20. People in our virtual/on-line collaborative group have a clear sense of their roles and responsibilities.

- Strongly agree
- Agree
- Neutral, No opinion
- Disagree
- Strongly disagree

21. There is a clear process for making decisions among the partners in our virtual/on-line collaborative group.

- Strongly agree
- Agree
- Neutral, No opinion
- Disagree
- Strongly disagree

Adaptability

22. Our virtual/on-line collaborative group is able to adapt to changing conditions, such as fewer funds than expected, changing political climate or change in leadership.

- Strongly agree
- Agree
- Neutral, No opinion
- Disagree
- Strongly disagree

23. Our virtual/on-line collaborative group has the ability to survive even if it has to make major changes in its plans or add new members in order to reach its goals.

- Strongly agree
- Agree
- Neutral, No opinion
- Disagree
- Strongly disagree

Appropriate Pace of Development

24. Our virtual/on-line collaboration group has tried to take on the right amount of work at the right time.

- Strongly agree
- Agree
- Neutral, No opinion
- Disagree
- Strongly disagree

25. We are currently able to keep up with the work necessary to coordinate all the people, organizations and activities related to our virtual/on-line collaborative project(s).

- Strongly agree
- Agree
- Neutral, No opinion
- Disagree
- Strongly disagree

Open and Frequent Communication

26. People in our virtual/on-line collaboration group communicate openly with one another.

- Strongly agree
- Agree
- Neutral, No opinion
- Disagree
- Strongly disagree

27. I am informed as often as I should be about what goes on in our virtual/on-line collaborative group.

- Strongly agree
- Agree
- Neutral, No opinion
- Disagree
- Strongly disagree

28. The people who lead our virtual/on-line collaborative group communicate well with the members.

- Strongly agree
- Agree
- Neutral, No opinion
- Disagree
- Strongly disagree

Established Informal Relationships and Communication Links

29. Communication among the people in our virtual/on-line collaborative group happens both at formal meetings and in informal ways.

- Strongly agree
- Agree
- Neutral, No opinion
- Disagree
- Strongly disagree

30. I personally have informal conversations about the project(s) with others involved in our virtual/on-line collaborative group.

- Strongly agree
- Agree
- Neutral, No opinion
- Disagree
- Strongly disagree

37. No other organization in the company is trying to do exactly what we are trying to do.

- Strongly agree
- Agree
- Neutral, No opinion
- Disagree
- Strongly disagree

Sufficient Funds, Staff, Materials and Time

38. Our virtual/on-line collaborative group has adequate funds to do what it wants to accomplish.

- Strongly agree
- Agree
- Neutral, No opinion
- Disagree
- Strongly disagree

39. Our virtual/on-line collaborative group has adequate "people power" to do what it wants to accomplish.

- Strongly agree
- Agree
- Neutral, No opinion
- Disagree
- Strongly disagree

Skilled Leadership

40. The people in leadership positions for our virtual/on-line collaborative project(s) have good skills for working with other people and organizations.

- Strongly agree
- Agree
- Neutral, No opinion
- Disagree
- Strongly disagree

This completes the survey. Thank you for your participation.

[Send] [Clear All] Survey Author: 134681 | Survey Owner: 134681

Appendix B

Survey Instructions/Consent Agreement

Dear Survey Participant:

My name is Sheri Nugent. I am a Doctoral student in Organizational Leadership at Pepperdine University, Graduate School of Education and Psychology. I am currently in the process of recruiting individuals for my study entitled, “Building and Leading a Culture of Collaboration: An Analysis of the Influence of a Company’s Social Networking Tools on Employee Collaboration.” The professor supervising my work is Dr. Tom Penderghast. This research is being conducted in partial fulfillment of the requirements for a dissertation.

The objective of the study is to determine:

What relationship, if any, exists between a specific company’s use of intranet social networking tools and the collaborative culture of its employees?

I am inviting individuals from organizations across the company (both management and non-management personnel) to participate in my study. Please understand that your participation in my study is strictly voluntary. The following is a description of what your study participation entails, the terms for participating in the study, and a discussion of your rights as a study participant. Please read this information carefully before deciding whether or not you wish to participate.

If you should decide to participate in the study, you will be asked to respond to a survey with answers that are “to the best of your knowledge." Your responses should reflect your opinion, not answers you may think others would want stated. It should take

approximately 10-15 minutes to complete the survey. Please complete the survey alone in a single setting.

The Boeing web-based survey used is encrypted for your protection and no personally or organizationally identifiable information is asked for in the survey. Data will not be available on any on-line system except through the password protected service offered by the company-authorized on-line survey tool or on the researcher's personal computer. All data will be expunged after CD backups are created. CDs will be stored in two separate places. Only this researcher will have access to the data.

The only foreseeable risk associated with participation in this study is the imposition on the participant's time. Participation in this survey is voluntary and job status will not be affected by refusal to participate or to withdraw from the study.

If you should decide to participate and find you are not interested in completing the survey in its entirety, you have the right to discontinue at any point without being questioned about your decision. You also do not have to answer any of the questions on the survey that you prefer not to answer–just leave such items blank.

After two weeks, a reminder note will be sent to you to complete the survey. Since this note will go out to everyone, I apologize ahead of time for sending you a reminder if you have complied with the deadline.

If the findings of the study are presented to professional audiences or published, no information that identifies you personally will be released.

If you have any questions regarding the information that I have provided above, please do not hesitate to contact me at the address and phone number provided below. If you have questions about your rights as a research participant, contact:

Jean Kang
Manager, GPS IRB and Dissertation Support
Pepperdine University
Graduate School of Education & Psychology
6100 Center Drive 5th Floor
Los Angeles, CA 90045
[redacted]

By selecting “agree” on this electronic survey instrument, you are consenting to participate in the study.

Thank you for taking the time to read this information. I hope you decide to complete the survey. You will be able to receive a brief summary of the study findings in about one year. If you decide you are interested in receiving the summary, please e-mail your request to sherinugent@charter.net. If you would like documentation linking your participation in the research (i.e. would like to sign an informed consent form), please contact the researcher.

Sincerely,

Sheri Nugent
Doctoral Candidate
Pepperdine University
[redacted]

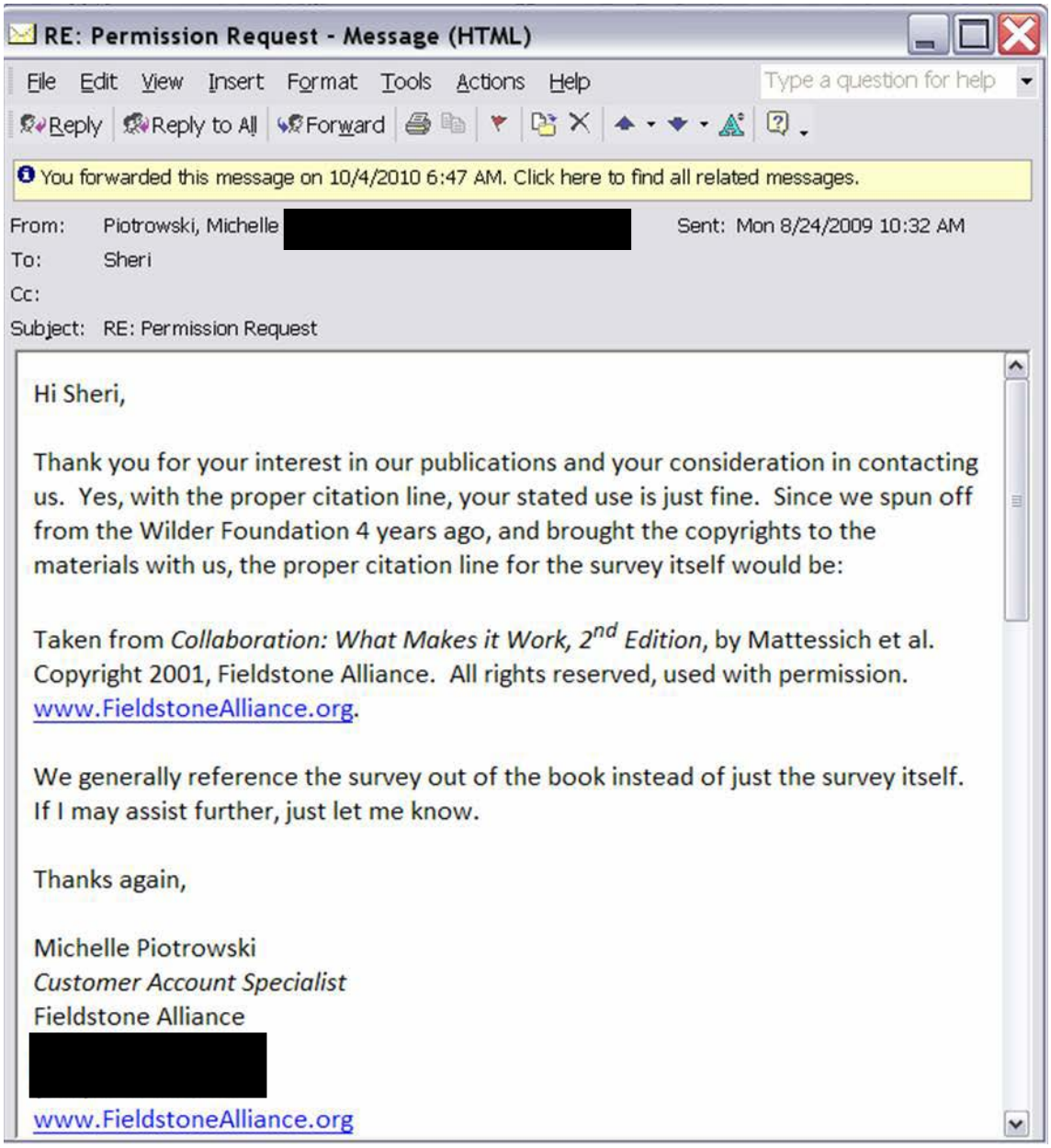
Dr. Thomas Penderghast
Faculty Supervisor
Pepperdine University
[redacted]

I have read and understand the consent agreement. By participating in the survey, I give my consent to participate in the survey.

☐ Agree ☐ Disagree

Appendix C

Permission to Use Wilder CFI Instrument



RE: Permission Request - Message (HTML)

File Edit View Insert Format Tools Actions Help Type a question for help

Reply Reply to All Forward

You forwarded this message on 10/4/2010 6:47 AM. Click here to find all related messages.

From: Piotrowski, Michelle [redacted] Sent: Mon 8/24/2009 10:32 AM
To: Sheri
Cc:
Subject: RE: Permission Request

Hi Sheri,

Thank you for your interest in our publications and your consideration in contacting us. Yes, with the proper citation line, your stated use is just fine. Since we spun off from the Wilder Foundation 4 years ago, and brought the copyrights to the materials with us, the proper citation line for the survey itself would be:

Taken from *Collaboration: What Makes it Work, 2nd Edition*, by Mattessich et al. Copyright 2001, Fieldstone Alliance. All rights reserved, used with permission. www.FieldstoneAlliance.org.

We generally reference the survey out of the book instead of just the survey itself. If I may assist further, just let me know.

Thanks again,

Michelle Piotrowski
Customer Account Specialist
Fieldstone Alliance
[redacted]
www.FieldstoneAlliance.org

Appendix D

Pepperdine IRB Approval

PEPPERDINE UNIVERSITY

Graduate & Professional Schools Institutional Review Board

February 22, 2011

Sheri Nugent
[redacted]

Protocol #: E0211D09
Project Title: ***Building and Leading a Culture of Collaboration: An Analysis of the Influence of a Company's Social Networking Tools on Employee Collaboration***

Dear Ms. Nugent:

Thank you for submitting your application, *Building and Leading a Culture of Collaboration: An Analysis of the Influence of a Company's Social Networking Tools on Employee Collaboration,* for exempt review to Pepperdine University's Graduate and Professional Schools Institutional Review Board (GPS IRB). The IRB appreciates the work you and your faculty advisor, Dr. Tom Penderghast, have done on the proposal. The IRB has reviewed your submitted IRB application and all ancillary materials. Upon review, the IRB has determined that the above entitled project meets the requirements for exemption under the federal regulations (45 CFR 46 - http://www.nihtraining.com/ohsrsite/guidelines/45cfr46.html) that govern the protections of human subjects. Specifically, section 45 CFR 46.101(b)(2) states:

> (b) Unless otherwise required by Department or Agency heads, research activities in which the only involvement of human subjects will be in one or more of the following categories are exempt from this policy:
>
> **Category (2) of 45 CFR 46.101**, research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: a) Information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and b) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

In addition, your application to waive documentation of consent, as indicated in your **Application for Waiver or Alteration of Informed Consent Procedures** form has been **approved**.

Your research must be conducted according to the proposal that was submitted to the IRB. If changes to the approved protocol occur, a revised protocol must be reviewed and approved by the IRB before implementation. For any proposed changes in your research protocol, please submit a **Request for Modification Form** to the GPS IRB. Because your study falls under exemption, there is no requirement for continuing IRB review of your project. Please be aware that changes to your protocol may prevent the research from qualifying for exemption from 45 CFR 46.101 and require submission of a new IRB application or other materials to the GPS IRB.

A goal of the IRB is to prevent negative occurrences during any research study. However, despite our best intent, unforeseen circumstances or events may arise during the research. If an unexpected situation or adverse event happens during your investigation, please notify the GPS IRB as soon as possible. We will ask for a complete explanation of the event and your response. Other actions also may be required depending on the nature of the event. Details regarding the timeframe in which adverse events must be reported to the GPS IRB and the appropriate form to be used to report this information can be found in the

Pepperdine University Protection of Human Participants in Research: Policies and Procedures Manual (see link to "policy material" at http://www.pepperdine.edu/irb/graduate/).

Please refer to the protocol number denoted above in all further communication or correspondence related to this approval. Should you have additional questions, please contact me. On behalf of the GPS IRB, I wish you success in this scholarly pursuit.

Sincerely,

Jean Kang
Manager, GPS IRB & Dissertation Support
Pepperdine University
Graduate School of Education & Psychology
6100 Center Dr. 5th Floor
Los Angeles, CA 90045
[redacted]

cc: Dr. Lee Kats, Associate Provost for Research & Assistant Dean of Research, Seaver College
Ms. Alexandra Roosa, Director Research and Sponsored Programs
Dr. Yuying Tsong, Interim Chair, Graduate and Professional Schools IRB
Ms. Jean Kang, Manager, Graduate and Professional Schools IRB
Dr. Tom Penderghast
Ms. Christie Dailo

Appendix E

Pepperdine IRB Modification Approval

PEPPERDINE UNIVERSITY

Graduate & Professional Schools Institutional Review Board

March 15, 2011

Sheri Nugent
[redacted]

Protocol #: E0211D09
Project Title: ***Building and Leading a Culture of Collaboration: An Analysis of the Influence of a Company's Social Networking Tools on Employee Collaboration***

Dear Ms. Nugent:

The GPS IRB has received your Request for Modification Form requesting permission modify your survey/questionnaire and consent form for your study, *Building and Leading a Culture of Collaboration: An Analysis of the Influence of a Company's Social Networking Tools on Employee Collaboration,* Your Request for Modification to your study has been approved and you may proceed with your study.

Your research must be conducted according to the proposal that was submitted to the IRB. If any further changes to the approved protocol occur, a revised protocol must be reviewed and approved by the IRB before implementation. For any proposed changes in your research protocol, please submit a **Request for Modification Form** to the GPS IRB. Because your study falls under exemption, there is no requirement for continuing IRB review of your project. Please be aware that changes to your protocol may prevent the research from qualifying for exemption from 45 CFR 46.101 and require submission of a new IRB application or other materials to the GPS IRB.

A goal of the IRB is to prevent negative occurrences during any research study. However, despite our best intent, unforeseen circumstances or events may arise during the research. If an unexpected situation or adverse event happens during your investigation, please notify the GPS IRB as soon as possible. If notified, we will ask for a complete explanation of the event and your response. Other actions also may be required depending on the nature of the event.

Please refer to the protocol number denoted above in all further communication or correspondence related to this approval. Should you have additional questions, please contact me. Thank you for submitting such complete and thorough application. On behalf of the GPS IRB, I wish you success in this scholarly pursuit.

Sincerely,

Jean Kang
Manager, GPS IRB & Dissertation Support
Pepperdine University
Graduate School of Education & Psychology
6100 Center Dr. 5th Floor
Los Angeles, CA 90045
[redacted]