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# Understanding the relationship between emotional intelligence and team effectiveness in global, high-technology engineering teams

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Dissertation

**UNDERSTANDING THE RELATIONSHIP BETWEEN EMOTIONAL  
INTELLIGENCE AND TEAM EFFECTIVENESS IN GLOBAL,  
HIGH-TECHNOLOGY ENGINEERING TEAMS**

by

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## **DEDICATION**

This work is dedicated to several members of my family who made this achievement possible. To my parents, Edward and Ethel Dugas, who instilled in me a deep value for education and a love for learning. To my sons, Greg and Adam Richer, who bring unconditional love and joy to my life every day. And finally, to my husband Matthew Richer, who provided both support and inspiration for setting an audacious goal and taking pride in its achievement.

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**ABSTRACT**

This research focused on engineers in the high technology industry as a distinct population that remains understudied in research on workplace emotional intelligence (EI). A mixed-method field study was used to examine the relationship between emotional intelligence and team effectiveness in engineering teams in a global high-tech organization.

The study population was 27 self-directed, global software development engineering teams whose work was structured using Agile / Scrum methodology. Team member EI was measured through use of the short form Trait Emotional Intelligence Questionnaire. Group emotional intelligence was measured through use of the Team EI Survey, which assesses team norms that support group-level emotional intelligence. Team effectiveness was measured via surveys completed by both team members and their managers.

Findings revealed the study population of engineers had significantly higher mean levels of individual trait EI and their teams had significantly higher group-level EI scores than the overall populations in the survey databases for

both instruments.

Individual trait EI and group-level EI were found to be significantly positively correlated with one another at the overall mean level and among many of their dimensions.

Team member ratings of team effectiveness were shown to have a significant positive correlation with group-level EI, while manager ratings of team effectiveness showed an inverse, negative (although not significant) relationship. Qualitative responses from both managers and team members stated a strong valuing of emotionally-intelligent behaviors and norms as enablers of successful team performance. Consistent with the data, comments also suggested a strong connection between the practices of the Agile / Scrum methodology and the development and reinforcement of individual trait EI and group-level EI norms.

Implications for practice include establishing a common definition of team effectiveness across managers and team members. Findings also support the development and use of group-level emotional intelligence norms for engineering teams. Further research is recommended to explore the relationship between use of the Agile/Scrum methodology and individual and group emotional intelligence.

This study contributes to the literature on emotional intelligence and team effectiveness, particularly for self-directed engineering teams using the Agile / Scrum methodology.

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## CHAPTER ONE: The Research Problem

### Section One: Introduction

Today's business organizations face increasingly complex requirements for success: the need to create or harness rapidly advancing technology innovations; the need to effectively manage workers dispersed across a variety of time zones and global regions; and the need to adjust to pressures to improve time to market, increase market share, and deliver enhanced profitability results to financial investors.

To meet these unrelenting demands, many organizations are relying more and more on highly-skilled individuals with differing areas of expertise to operate interdependently as teams, bringing together a wide variety of knowledge and experience in service of the business. These complex work teams are becoming an increasingly critical element for organizations in achieving their goals (Cohen & Bailey, 1997; Guzzo & Dickson, 1996; Janz, Colquitt, & Noe, 1997; Prati, Douglas, Ferris, Ammeter, & Buckley, 2003; Richter, Dawson, & West, 2011; Tannenbaum, Mathieu, Salas, & Cohen, 2012).

With this increased demand for effective teamwork comes the question of what skills and capabilities these teams need to operate effectively in their organizational environments. "In an era of teamwork, it's essential to figure out what makes teams work. Our research shows that, just like individuals, the most effective teams are emotionally intelligent ones – and that any team can attain emotional intelligence" (Druskat & Wolff, 2001). The term *emotional intelligence*

(EI) refers to our capacity for recognizing our own feelings and the feelings of others, and for managing emotions in ourselves and in our relationships (Cherniss & Adler, 2000; Goleman, 1998b; Mayer, Salovey & Caruso, 2004).

Research in the field of team-based emotional intelligence is creating an increasingly compelling business case for enhancing the EI-related skills of teams as a means for improving overall team productivity and cohesiveness (Foo, Elfenbein, Tan & Aik, 2005; Frye, Bennett, & Caldwell, 2006; Jordan, Ashkanasy, Hartel, & Hooper, 2002; Jordan & Troth, 2004; Offermann, Bailey, Vasilopoulos, Seal & Sass, 2004; Wolff, Druskat, Koman & Messer, 2006). But do all teams in all environments benefit from these competencies in the same way? While enhanced levels of emotional intelligence at both the individual and team level have been shown to correlate with enhanced team effectiveness in educational, military, and public service arenas (Elfenbein, 2006; Stubbs, 2005; Wolff et al., 2006), do these same capabilities lead to effectiveness for teams operating in the environment of today's high-technology (high-tech) businesses?

Though high-tech organizations are fitting environments to champion people as a critical source of innovation and success, the capabilities and performance valued are often one-dimensional, focusing on technical productivity. Intellectual skills are the primary qualifications for job positions...High-technology organizations generally have a unique workforce and culture that differentiate them from other types of work environments...Individuals in high-tech industries are often characterized

as eccentric, preferring to work alone, and lacking in social life or social consciousness, while at the same time revered as creative, prolific, hard workers. (Herriford, 2002, p. 4)

The worker profiles, the culture, and the demanding requirements of the high-tech environment contain some inherent conflicts. While high-tech organizations rely on teams working well together to design, develop, and deliver their key products, the culture of high-tech is characterized by intense personal stress, ferocious individualistic competition (Castells, 1998), high intellect, high ego (Rogers, 2001), and a premium value placed on "being right" (Mitchell, 1999). Is this an environment that, more than anywhere else, needs the capabilities that emotional intelligence can offer to its highly-paid, highly-intelligent workforce, or is this one environment where the benefits of enhanced EI will not actually pay off in increased productivity and cohesion for its teams?

### **Section Two: The Problem Statement**

Much of the research demonstrating a clear link between EI and team effectiveness has focused on traditional types of teams in traditional types of settings: teams with leaders in hierarchical environments or within humanistic or academic cultures. There has been far less research done in the area of emotional intelligence as it relates to self-managing or leaderless teams, particularly those operating within the uniquely complex environment of high-tech organizations. The goal of this research was to understand the relationship between emotional intelligence and team effectiveness in self-managing,

engineering-based product development teams operating within the global, high-tech environment.

### **Section Three: The Research Questions**

The primary focus for this study was to understand the relationship between emotional intelligence and team effectiveness in global, high-tech engineering teams. Four specific research questions were explored:

- How do the individual trait EI scores and the group-level emotional competency scores for the engineering team members at the high-tech organization studied compare to other types of workers in other industries?
- What is the relationship between the individual trait EI scores and the group-level emotional competency scores for the engineering teams being studied?
- What is the relationship between the individual EI / group-level emotional competency scores and the level of team effectiveness in the high-tech organization studied?
- How do the findings discovered through the analysis of the EI and performance data actually play out within the team's daily work experience?

### **Section Four: Overview of Plan of Inquiry**

Using a mixed-method field study design, this research focused on understanding the performance factors and results of the engineering teams

working within a specific high-tech setting. The teams made available for this study were 55 global engineering teams working on product development projects. Surveys were used to assess the individual levels of emotional intelligence for each team member, the group-level emotional intelligence for each team, and the overall effectiveness ratings for each team. These data were analyzed to understand the relationship between individual and group levels of emotional intelligence and team effectiveness for the study population. These findings were further explored in a purposeful sample of follow up interviews with team members and managers.

### **Section Five: Significance of the Study**

This study contributes to the scholarly literature in the areas of emotional intelligence and team effectiveness. The significance of this study is in four areas. First is an increased understanding of individual and group levels of EI in engineering populations. Second is to provide new insights regarding the relationship between the individual trait EI and the group-level EI constructs. Third is to provide enhanced understanding of the relationship between individual and group levels of EI and team effectiveness in high-tech engineering environments. Fourth is to use these findings to make recommendations for Human Resource practitioners, engineering team members, and managers in terms of team development, team effectiveness measures, and increased feedback and communication focused on alignment around key performance factors.

## **CHAPTER TWO: Literature Review**

### **Section One: Introduction**

Emotion has typically not been a welcome addition to the American workplace. For many years businesses operated from the belief that the world of work was a highly rational place, and that workers, therefore, should separate themselves from their emotions in order to be effective (Ashforth & Humphrey, 1995; Domagalski, 1999; Druskat, Sala, & Mount, 2006). Recent research, however, has revealed that separating ourselves from our emotions is not even a genuine option. Emotion has been found to be a key aspect of how our brains operate in managing many of our daily work behaviors, including decision making, prioritization, problem solving, learning, and memory (Bechara, Damasio, & Damasio, 2000; Damasio, 1994). All of these capabilities are vital to both individual and team success.

The ability to assess and utilize emotions effectively can be a critical success factor in the work place. For teams, this can involve a particularly challenging set of demands. Emotional intelligence at the group level and at the individual level has been shown to be an important contributor to team-level performance in a variety of different team-based situations (Elfenbein, 2006; Foo et al., 2005; Frye et al., 2006; Jordan et al., 2002; Jordan & Troth, 2004; Offermann et al., 2004; Wolff et al., 2006).

Continued research in this area could provide organizations with the data they need to actively pursue the implementation of emotionally competent

behaviors for all of their team members, leading to enhanced productivity at the individual, team, and organizational levels. To achieve these outcomes, companies must first understand the conditions under which emotional intelligence does, in fact, provide these benefits to organizations.

Several areas of literature have informed this research study: literature on emotional intelligence for individuals and for teams, research on the nature of high-tech employees in high-tech companies, as well as research on the definition of work teams and the elements of team effectiveness. Each of these areas and how they inform the structure of this study are discussed.

## **Section Two: Definition of Terms and Related Literature**

### *Subsection One: What is meant by “emotional intelligence”?*

The concept of emotional intelligence was initially put forth in the late 1930's by Robert Thorndike (Thorndike & Stein, 1937) and was raised again in the early 1940's by psychologist David Wechsler (1940). Both men focused on areas of success that went beyond the standard IQ measures and looked at the role and make up of social intelligence. This work was revisited beginning in 1983 through Howard Gardner's theory on multiple intelligences. Gardner (1983) proposed that “intrapersonal” and “interpersonal” intelligences were as important as the type of cognitive intelligence that is typically measured by IQ tests.

The term *emotional intelligence* (EI) is used across the literature in referring to a set of abilities, competencies or traits which typically include some form of the following: 1) a person's ability to be aware of his / her own emotions

and 2) through that awareness to consciously regulate them, as well as 3) the ability to be aware of others' emotions, to accurately read and interpret them, and 4) to respond in a productive manner (Cherniss & Adler, 2000; Goleman, 1998b; Mayer et al., 2004).

There are currently several different constructs that exist under the emotional intelligence banner, generating a lot of discussion in the EI literature regarding what exactly emotional intelligence is intended to represent and what the best ways are to assess it. One set of models focuses on EI as an alternative form of intelligence (Mayer & Salovey, 1997). Another set of models focuses on the behaviors or competencies that have their basis in emotional intelligence (Bar-On, 1997; Goleman, 1998b). Yet a third set of models focuses on the emotionally-based traits related to personality (Petrides, Pita & Kokkinaki, 2007).

*Subsection Two: What are emotionally-intelligent or  
emotionally-competent behaviors and norms?*

When emotional intelligence is used to guide behavior, the resulting actions are referred to as *emotionally-intelligent behaviors*. On an individual level such behaviors have also been referred to as *emotional competence* by Goleman (1998b). At a team level these behaviors contribute to groups establishing effective ways of working together, or what has been referred to as *emotionally competent group norms* by Druskat & Wolff (2001). Wolff et al. (2006) argue that to be "most useful in a group setting, behaviors consistent with emotional intelligence must be manifested at the group level" (p. 224), and take

the shape of norms or informal rules used by the teams to guide their interactions.

*Subsection Three: What models of emotional intelligence exist and how are they measured?*

Through the late 1990's a variety of models and approaches for thinking about emotional intelligence were explored. These different constructs have been studied and refined over the last twenty years. To help shed light on the variety of these approaches, four of today's commonly used models for emotional intelligence will be discussed.

In the first of these approaches, Mayer and Salovey (Mayer & Salovey, 1997) focus on a mental ability-based model that validates emotional intelligence as a true alternative construct for addressing the non-cognitive aspects of intelligence. They define emotional intelligence as:

...the capacity to reason about emotions, and of emotions to enhance thinking. It includes the abilities to accurately perceive emotions, to access and generate emotions so as to assist thought, to understand emotions and emotional knowledge, and to reflectively regulate emotions so as to promote emotional and intellectual growth. (Mayer et al., 2004, p. 197)

This model of emotional intelligence has had many assessment instruments created around it. The one developed by the authors of the model is the Mayer-Salovey-Caruso emotional intelligence test (MSCEIT). The MSCEIT intelligence /ability-based instrument presents the respondent with a variety of

tasks that require a response, similar to other types of intelligence tests. A set of expert evaluators rates the participant's responses as the means for establishing a level of emotional intelligence.

In the second of these approaches, Reuven Bar-On's model for emotional intelligence (1997) focuses on a variety of traits and abilities related to social and emotional well-being and adaptation. According to this model, "emotional-social intelligence is a cross-section of interrelated emotional and social competencies, skills and facilitators that determine how effectively we understand and express ourselves, understand others and relate with them, and cope with daily demands" (Bar-On, 2006, p. 14).

Bar-On describes his model as "being operationalized" by the instrument that was used to develop the model, the EQ-i. (Bar-On, 2006). The EQ-i includes items related to both ability aspects of emotional intelligence and to the broader competency and personality-based aspects.

The third approach to emotional intelligence, based on the work of Daniel Goleman (1998a) and Richard Boyatzis (Boyatzis and Sala, 2004), uses emotional intelligence as the basis for structuring emotionally competent behaviors that distinguish high-performers from average performers in the workplace. This model was inspired by the work done by Salovey & Mayer (1990) in terms of looking at alternate factors beyond pure intelligence, in the form of IQ, that contribute to successful performance. It was also "strongly

influenced by the work of McClelland (1973), Boyatzis (1982), and Spencer and Spencer (1993)" (Cherniss, 2010, p. 112).

The focus of this model is on the social and emotional competencies that are based in emotional intelligence abilities and that produce differentiated levels of performance success in the workplace. Because of this focus, several works by Goleman and his colleagues became very well known in the popular business press throughout the last twenty years, including two articles that appeared with a lot of notoriety in the Harvard Business Review: *What Makes a Leader?* (Goleman, 1998a), and *Primal Leadership: the Hidden Driver of Great Performance* (Goleman, Boyatzis, & McKee, 2001). Its inclusion in the business literature resulted in this model of emotional intelligence becoming the one with which most business leaders and employees are familiar. The basic framework addressed in the Goleman-Boyatzis model is shown in Figure 1.

In recent years this model has been updated to distinguish the factors of social awareness and relationship management more explicitly as "social competence" (Goleman, 2006). This revised model is measured by the Emotional and Social Competence Inventory (ESCI). This instrument is available only as a multi-rater instrument, using the participant's self-ratings as one comparative data point, but primarily relying on the behaviors observed and rated by others to formulate the overall level of emotional and social competence of the individual.

Figure 1: Emotional Intelligence Domains and Competencies

	Self (Personal Competence)	Other (Social Competence)
Recognition	<p><b>Self Awareness</b></p> <p>Emotional self-awareness Accurate self-assessment Self-confidence</p>	<p><b>Social Awareness</b></p> <p>Empathy Organizational awareness Service orientation</p>
Regulation	<p><b>Self-Management</b></p> <p>Emotional self-control Transparency Adaptability Achievement Initiative Optimism</p>	<p><b>Relationship Management</b></p> <p>Inspirational leadership Influence Developing others Change catalyst Conflict management Building bonds Teamwork and collaboration</p>

(Goleman, Boyatzis, & McKee, 2001)

The Goleman-Boyatzis model is often viewed in conjunction with the Bar-On model as being a "mixed model" (Ashkanasy & Daus, 2005) – one that incorporates aspects related to the intelligence construct of EI, but that also includes a variety of other emotion-related factors as part of its construct such as those relating to personality models and behavioral or competency-related preferences.

The fourth approach to emotional intelligence, which has evolved most recently, has been put forth by K. V. Petrides. This model, which is called a *trait emotional intelligence model*, "refers to a constellation of emotional self-perceptions located at the lower levels of personality hierarchies" (Petrides et al.,

2007). The elements of this construct fall "wholly outside the taxonomy of human cognitive ability (Carroll, 1993)," (Cooper & Petrides, 2010, p. 449), and focus on the affective aspects of personality.

The model and its assessment, the Trait Emotional Intelligence Questionnaire (TEIQue), are structured around the notion that emotional experiences are personal in nature, and can be fully understood only by the individual. As a result, this model of trait emotional intelligence is measured solely by self-report. This approach aligns well with the self-perceived abilities that it was created to measure.

In terms of its relationship to workplace performance, Petrides (2011) notes "trait EI theory maintains that certain emotion profiles will be advantageous in some contexts, but not in others...where individual's profiles have to be matched to specific job descriptions, with different job descriptions calling for different personality profiles (Pervin, 1968)", (p. 660).

Challenges related to the scientific validity across the general set of EI-related models and instruments exist (Ashkanasy & Daus, 2005; Conte, 2005; Landy, 2005; Locke, 2005).

There are multiple models and definitions related to the study of emotional intelligence, going beyond the primary ones included in this literature review. This is complicated further by the fact that, in many cases, multiple assessments exist related to the same construct. Changes in these constructs and instruments evolve as new studies shed new insights into the structures. While this certainly

makes sense on one level, it causes problems in terms of producing typical levels of data in support of the work. As noted by Landy (2005):

It would be lovely if the concepts and the measurement instruments would settle down for a bit. Meta-analyses and longitudinal designs are impossible when measures continually change. Similarly, coherent theory is unlikely to emerge when conceptual foundations are in flux. The MEIS has become the MSCEIT; there are versions of the EQ-i and ECI. Coupled with the problem of proprietary databases, there is often no way to track changes in instruments or supporting theoretical models...the construct and the operational definition of the construct (i.e., the actual measurement instruments) are moving targets. (p. 419)

In addition, the data reported as supporting many of the claims related to the validity and reliability of the EI assessments are often kept as confidential, proprietary information within commercial databases, making them unavailable for use in studies by other scientists and researchers (Ashkanasy & Daus, 2005; Conte, 2005; Locke, 2005).

While challenges exist with the still relatively new, evolving constructs and measures related to emotional intelligence, a number of studies do provide insights into how emotions and emotional intelligence have been shown to provide significant positive impacts in the workplace.

*Subsection Four: How does emotional intelligence relate to performance?*

Studies conducted over the last two decades have demonstrated the connection between emotional intelligence and performance. Yet concerns remain regarding such issues as the sample size of the populations studied, the rigor of the methods used to assess the findings, or the range of instruments and models utilized, making it hard to draw any consistent conclusions across the EI spectrum. The researchers of a 2011 meta-analysis (O'Boyle, Humphrey, Pollack, Hawver, & Story, 2011) set out to address many of these concerns.

O'Boyle et al. set out to understand the relationship between emotional intelligence and job performance. Their goal was to see whether EI accounted for unique variance in predicting job performance, above and beyond the big five personality factors and cognitive ability. O'Boyle and his colleagues built their study upon a broad collection of earlier research, working to add increased rigor and an expanded data set to their study. In structuring their research, O'Boyle and his colleagues did the following:

- significantly expanded the number of studies and broadened the sample size of the populations being included in this research
- ensured that the most recent studies were included in the data
- assessed the findings of these various studies through a consistent framework to make comparison of the results possible. In this case the authors chose to work with Ashkanasy and Daus's (2005) categorization of the various EI models into three streams: 1) ability-based models that

use objective test items, 2) self-report or peer-report measures based on a four branch model of EI, and 3) mixed models which typically include aspects of intelligence, competency and personality

- performed tests for differences among streams of EI research and their relationships with personality and cognitive intelligence
- used the latest statistical procedures such as dominance analysis (an approach for comparing predictors in multiple regression), and
- tested for publication bias.

O'Boyle et al. were able to confirm that the overall relationship between EI and job performance is positive and significant ( $r = 0.28$ ,  $p < 0.001$ ). They also found that all three streams, to varying degrees, contributed to predicting job performance.

*Subsection Five: What is “team emotional intelligence”  
and how is it measured or observed?*

There are two distinct approaches in the literature for looking at and measuring a team's level of emotional intelligence:

a) *The collective EI of the individuals* who make up the team – this approach to assessing a team's EI looks at the combined set of individual EI resources from which the team can draw. Implications regarding team-level average EI, team-level minimum EI, team-level maximum EI, and team-level diversity of EI are elements of consideration when looking at team EI from this perspective.

b) *Group-level EI* – this approach for assessing group-level EI examines the set of group norms or behavior patterns that team members display in their interactions with one another. This perspective looks at team EI as more than just “the sum of the parts.” It focuses on the context that each unique team operates within and creates through the interaction of its members. Group-level EI is a team-level construct; it's a unique team property (Elfenbein, 2006, Wolff et al., 2006).

For the purposes of this study, the group-level definition and measures were utilized to capture the team's level of emotionally competent interactions, based on the researcher's desire to more deeply explore this model and its implications for engineering teams.

Before going into more detail regarding group-level emotional intelligence and its impact on team effectiveness, it is important to provide definitions and background related to the terms *team* and *team effectiveness* and how they were used for the purposes of this study

*Subsection 6: How is the term “team” being defined  
for the purposes of this study?*

There are numerous definitions for the term *team* or *work group* in the literature. Much of the team-based literature begins by providing one of several generic definitions of what is meant by the term *team*. Cohen and Bailey's (1997) definition of team provides a useful overall context for the workplace implications focused on in this study:

A team is a collection of individuals who are interdependent in their tasks, who share responsibility for outcomes, who see themselves and who are seen by others as an intact social entity embedded in one or more larger social systems (for example, business unit or the corporation), and who manage their relationships across organizational boundaries. (p. 2)

While in many studies the authors state that they will use the terms *team*, *group*, *work team*, *self-managing team*, etc. interchangeably, (Allen & Hecht, 2004; Cohen & Bailey, 1997; Guzzo & Dickson, 1996; Janz et al., 1997), these generic titles quickly become impractical as the studies move on to looking at the specific elements related to team effectiveness. Key findings in much of the team effectiveness research are in accordance with Cohen and Bailey's (1997) view that: "...the type of team matters for the determinants of effectiveness. By distinguishing among types of teams, [the research] clearly indicates that the variables that are studied and the findings that are captured vary for different types of teams" (p. 281).

While the literature review for this study includes research findings that relate to a broad range of teams and team-related topics, the issue of context and team type does play a role. In the case of this study, the type of team focused on was self-managing engineering teams and their operating context was that of a specific high-tech organization.

*Subsection Seven: What are self-managing teams,  
and how do they differ from other types of teams?*

The focus of this research study was a specific type of team known as a self-managing work team (SMWT), which in the case of this study was comprised of engineering-related workers operating within the context of a high-tech organization.

Hackman (1986) provides a simple definition of self-managing work units as one where "...members have responsibility not only for executing the task but also for monitoring and managing their own performance" (p. 92). In the case of this study, the term *self-managing team* is used synonymously with other terms found in the literature regarding these types of teams such as *self-directed*, *self-led*, and *self-regulating*.

*Subsection Eight: How do self-managing engineering teams operate within an  
Agile / Scrum product development environment?*

While engineers and high-tech companies may have stereotypical reputations for focusing primarily on intellect versus relationships or individual innovations rather than team-based enhancements to products, a relatively new approach to software development may be causing some significant changes in the product development culture and the organizational context within which these teams operate. Many of today's high-tech companies have their engineering teams utilizing a software development process called *Agile*. "Agile is an incremental, iterative approach to producing high-quality software with

frequent deliveries to ensure value throughout the process. It places a high value on individuals, collaboration, and the ability to respond to change" (Ambler & Holitza, 2012, p. 3).

A critical conceptual framework underlying the Agile approach is that the team developing the software is more important than any one specific process. At the heart of the methodology is the belief that successful software development comes from empowering and enabling a team to sign up for a specific increment of work (set its own goals within the context of the bigger project requirements), to iterate and collaborate on its development and testing, and to problem solve as it sees best throughout the process to produce a working aspect of a product within short, regular intervals. This approach allows for rapid reprioritization of product features or functionality as the customers and market place demand. It also allows for working software to be delivered continuously rather than at the end of a very long and complex development and testing cycle.

The Agile methodology is based on some very strong beliefs regarding software development teams and how they work best. The creators of this approach (Beck et al., 2001) have published an Agile Manifesto and a set of 12 Principles behind the Manifesto. These materials are made publically available and are shown in Figure 2 and Figure 3.

There are many ways to operationalize this set of Agile beliefs and methodologies. One of the more common approaches is by using a Scrum

framework.

Figure 2: Manifesto for Agile Software Development

***Manifesto for Agile Software Development***

*We are uncovering better ways of developing software by doing it and helping others do it.*

*Through this work we have come to value:*

**Individuals and interactions** over processes and tools

**Working software** over comprehensive documentation

**Customer collaboration** over contract negotiation

**Responding to change** over following a plan

*That is, while there is value in the items on the right, we value the items on the left more.*

Kent Beck

James Grenning

Robert C. Martin

Mike Beedle

Jim Highsmith

Steve Mellor

Arie van Bennekum

Andrew Hunt

Ken Schwaber

Alistair Cockburn

Ron Jeffries

Jeff Sutherland

Ward Cunningham

Jon Kern

Dave Thomas

Martin Fowler

Brian Marick

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(Beck et al., 2001)

Figure 3: Twelve Principles behind the Agile Manifesto

### **Principles behind the Agile Manifesto**

*We follow these principles:*

1. Our highest priority is to satisfy the customer through early and continuous delivery of valuable software.
2. Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage.
3. Deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale.
4. Business people and developers must work together daily throughout the project.
5. Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done.
6. The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.
7. Working software is the primary measure of progress.
8. Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely.
9. Continuous attention to technical excellence and good design enhances agility.
10. Simplicity—the art of maximizing the amount of work not done—is essential.
11. The best architectures, requirements, and designs emerge from self-organizing teams.
12. At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behavior accordingly.

(Beck et al., 2001)

The Scrum framework provides specific guidelines for implementing the Agile approach to software development. These guidelines include 1) establishing Scrum teams with specific roles and responsibilities, 2) applying "time-boxes" to help structure the timing and processes for the work being done by the team, 3) utilizing Scrum "artifacts" which are the "project plans" and

metrics used by the team to continuously track the progress of their work against their agreed upon goals, and 4) the "Rules" applied to defining when a piece of work is sufficiently "done", which means that the piece of software developed has included all of the necessary analysis, design, programming, testing, etc. needed to form a working and potentially shippable piece of the product (Schwaber & Sutherland, 2011).

The software development teams working within the Agile/ Scrum approach are typically made up of 5–10 individuals with different skill sets or areas of content expertise (e.g., writing code, architecture, QA, etc.). As a basic tenet of the Agile approach, the team is considered to be self-managing. There are, however, three key roles outside of this core team that interact very closely with the team members on a regular basis: the Scrum Master, the Product Owner, and the product Architect. The Scrum Master's role is to serve as a day-to-day coach to the project team. This Scrum Master does not have any hierarchical authority over the team members and is not viewed as the team's leader. His/her role is to provide support to the team in the forms of coaching or facilitation, better enabling the team members themselves to achieve the goals to which they committed. The *Product Owner* is typically a member of the Marketing or Product Management organization and represents both the voice of customer to the team and the established organization requirements based on the company's strategy and product roadmap. The *Architect* provides technical advice to the team and is typically the person who has laid out the larger product

design plan that the team is working to deliver.

Self-managing teams that operate within this set of Agile / Scrum approaches have a different set of guidelines placed on how they conduct themselves on a day-to-day basis than do many other types of self-managing teams. For example, these Agile / Scrum teams are physically co-located as often as possible, meet daily to review each team member's work and obstacles, and are expected to communicate frequently and directly with one another. Guidelines such as these affect the ways in which these team members work together. While this study is not specifically focused on the Agile / Scrum approach to teamwork, the teams operating within the high-tech company studied in this research were utilizing this set of approaches. Their team behaviors and their level of team effectiveness were looked at within this context.

*Subsection Nine: What is meant by "team effectiveness"?*

In defining *team effectiveness* it is important to consider exactly what results a company is looking to achieve through its use of teams. Results in the form of product or service deliverables is certainly one type of outcome that organizations are typically trying to achieve, but in many cases, other team-based outcomes are desired as well. While some of the literature questions whether teams are always the best approach in terms of tangible productivity gains (Allen & Hecht, 2004; Glassop, 2002; Green & Henderson, 2000), the vast majority of the literature acknowledges the social-emotional benefits and / or the competence-related benefits that come to both team members and to the

organization through working in teams (Allen & Hecht, 2004; Glassop, 2002). Working in teams is credited with providing team members with greater enjoyment of the work, reduced uncertainty, professional skill development, a sense of membership and belonging, reduced absenteeism, reduced employee turnover, increased industrial harmony, and many other benefits (Allen & Hecht, 2004; Cohen & Bailey, 1997; Cohen, Ledford & Spreitzer, 1996; Gibson, Zeller-Bruhn & Schwab, 2003; Glassop, 2002; Guzzo & Dickson, 1996). It is proposed that the impact of all of these team-based benefits, in the end, contributes to improved overall workplace performance (Glassop, 2002).

As a result, the definition of team effectiveness cannot merely focus on the quantitative delivery of products or services. It must also take into account the attitudes and the behaviors of team members as these relate to the overall performance benefits of the team for the organization. For the purposes of this research, the term *team effectiveness* was used to refer to outcomes produced by a team in the way of *performance*, as well as the behavioral and attitudinal outcomes that will be referred to as *cohesiveness* (Cohen & Bailey, 1997). Also of note for the purposes of this study is a similar definition of *self-managing work team effectiveness*. According to Cohen et al. (1996) "self-managing work team effectiveness is defined in terms of performance effectiveness (e.g., controlling costs, improving productivity, and quality), employee attitudes about their quality of work life (e.g., job satisfaction, organization commitment) and employee behavior" (p. 646).

*Subsection Ten: How does emotional intelligence relate to team effectiveness?*

A number of studies have demonstrated a positive link between emotional intelligence and team effectiveness (Elfenbein, 2006; Foo et al., 2005; Frye et al., 2006; Jordan et al., 2002; Jordan & Troth, 2004; Offermann et al., 2004; Wolff et al., 2006). According to Elfenbein (2006), a group's emotional-intelligence level is an important predictor of a range of team performance measures including performance ratings by senior staff members, retention of team members, and self-reported outcomes from team members such as enhanced performance, liking of colleagues, and team learning.

Elfenbein's (2006) study reveals that teams whose members had higher average scores on emotional intelligence-related tests reported they had lower levels of conflict, made decisions more collaboratively, experienced greater team learning over the course of their project, accomplished more in their work together, and had greater retention of their members. Thus, teams with higher average levels of individual emotional intelligence appeared consistently to outperform teams with lower average levels (Elfenbein, 2006).

Druskat and Wolff (2001) found that for teams to be most effective, they need to create emotionally competent group norms.

The most effective teams we have studied...have established norms that strengthen their ability to respond effectively to the kind of emotional challenges a group confronts on a daily basis. The norms they favor accomplish three main things: they create resources for working with

emotions, foster an affirmative environment, and encourage proactive problem-solving. (Druskat & Wolff, 2001, p. 85)

The effect of high or low levels of emotional competence within a team can be exacerbated through the phenomenon referred to as *emotional contagion*. This describes the way in which work groups generally converge to develop similar moods through their close association with one another (Barsade, 2002; Bartel & Saavedra, 2000). The contagion of positive emotion leads to greater team effectiveness in the form of greater cooperation and performance, as well as lower conflict – a form of emotionally intelligent behaviors that promotes greater team effectiveness (Ashforth & Humphrey, 1995; Barsade, 2002; Bartel & Saavedra, 2000; Elfenbein, 2006; Cherniss, 2000; Domagalski, 1999; Elfenbein, 2006; Goleman, Boyatzis & McKee, 2001, 2002; Prati et al., 2003).

EI skills may not actually add to a team's level of performance in every circumstance, however. According to Janz et al. (1997),

If the product or service market dictates that teams are under high degrees of time pressure, managers may not wish to encourage helping, sharing, and innovative behaviors because such behaviors have negligible effects in such circumstances...it may be that standardized task behaviors are more beneficial in such cases. (p. 901)

While there is clear evidence that individual and team performance can be predicted and enhanced by emotional intelligence and emotionally-competent behaviors, the role within which a person is working and the environmental

context in which that role operates may both have mitigating effects on the benefits of these behaviors. There do seem to be circumstances in which the emotionally-competent behaviors that usually enhance team effectiveness seem to, instead, slow the team down or get in the way of delivering what is required from the team. One of these contexts appears to be the rapid demands and short-term project requirements that often exist within high-technology work environments (Druskat & Kayes, 2000).

*Subsection Eleven: What is meant by “high-technology” and “high-tech culture”?*

The term *high-technology* (high-tech) is often used to include a variety of technology-based industries including telecommunications, bio-technology, internet, semiconductor, and computer hardware and software. One formal definition describes high-tech organizations as those that "...emphasize invention and innovation in their business strategy, deploy a significant percentage of their financial resources to Research and Development (R&D), employ a relatively high percent of scientists and engineers in their workforce, and compete in the worldwide, short-life-cycle product development markets" (Milkovich, G. T., Gerhart, B., & Hannon, J. M., 1990, p. 3).

*Culture*, in general, is defined by Schein (1990) as

... (a) a pattern of basic assumptions, (b) invented, discovered, or developed by a given group, (c) as it learns to cope with its problems of external adaptation and internal integration, (d) that has worked well enough to be considered valid and, therefore (e) is to be taught to new

members as the (f) correct way to perceive, think, and feel in relation to those problems. (p. 111)

In the case of *high-tech culture*, Schein's "given group" is the community of high-tech workers. In defining and maintaining high-tech culture, this occupational community seems to play a particularly strong role in forming the culture of the organization, rather than the inverse scenario of the organization's culture impacting the behaviors of the individual.

High-tech workers are noted for being more oriented to the culture of their profession, rather than the culture of the specific organization within which they operate. They tend to bring and recreate a similar professional high-tech environment wherever they go. "The high-tech worker identifies with a high-tech culture apart from the firm where he works" (Rogers, 2001, p. 41).

The high-tech culture, regardless of the organization, has a reputation for being fast-paced, high energy, entrepreneurial, and highly intense (Sprague & Ruud, 1988). It is often made up of diverse populations (in terms of race, nationality) and includes differing technical points of view. The need to problem solve is a core part of the culture, with the use of conflict and confrontation serving as a core means of communication (Delbecq & Weiss, 2000). The high-tech culture is also characterized by extreme individualism and intense personal stress (Castells, 1998). There is an ethos for hard work and hard play, with tremendous time and effort invested in innovation and competition, both among

high-tech workers themselves and among the organizations that make up the high-tech market place (Castells, 1998; Sprague & Ruud, 1988).

This constant, intense competition plays a role in forming the way high-tech workers operate and relate to their colleagues and their companies.

The high-tech worker wants to work on projects that enhance his own career, knowledge assets, and future earning power... Since high-tech workers manage their own careers to maximize their own personal knowledge value, they face a dilemma of sharing some of their knowledge with their colleagues in the course of their research and development projects. (Rogers, 2001, p. 41)

Many studies have focused on the characteristics of the high-tech worker that can operate, and even thrive, within this cultural environment. Many "...are described as 'loners' who live at their computer terminals and are oblivious to social issues and organizational politics (Carlston, 1985; Mahon, 1985:186)" (Sprague & Ruud, 1988, p. 175). This population is often described as having a high sense of integrity, coupled with an orientation for blunt honesty (Mitchell, 1999; Sprague & Ruud, 1988). The daily focus on problem solving can lead these high-tech workers to use criticism (or identifying a problem) as part of their world-view and communication style. While this approach may feel challenging to those who are the recipients, it is often intended as a means for improvement related to an issue or process about which the high-tech worker cares very deeply (Sprague & Ruud, 1988).

As noted by one high-tech engineer during an interview by Sprague and Ruud (1988) regarding the nature of dissent or "rocking the boat" in high-tech cultures:

Technical issues in high tech companies...those usually are not the problem. Because, see, engineers have a very clean way of fighting on technical issues...The problems come with the personalities and the company policies and that type of thing. I've been in a lot of companies and that's been my experience. (p. 184)

Yet, to truly be successful in their work, which requires both creativity and innovation, these high-tech individuals have to find ways to hear and learn from different perspectives, and to combine differing ideas in new ways rather than merely choosing one as right and another as wrong.

Thus, the predominant cultural attribute looked for in a manager or team leader is not someone who will be technically 'right' and control and direct subordinates, but rather someone who can excel in diagnostic questioning, bringing out the variety of perspectives that will lead to breakthrough solutions. (Delbecq & Weiss, 2000, p. 39)

In a high-tech environment where self-managing teams are the norm, individual team members become responsible for learning and using these same types of skills.

### **Section Three: Summary and Implications for This Study**

The focus of this study was to pull together all of these components found in the literature as foundational knowledge and to fill certain gaps in the current research. This study contributes to filling knowledge gaps in understanding the relationship between emotional intelligence and team effectiveness for the specific population being studied: self-managing, global engineering teams operating within a high-tech environment.

## **CHAPTER THREE: RESEARCH METHODOLOGY**

Using a mixed-method field study in a single organization, this research focused on understanding the relationship between emotional intelligence (EI) and team effectiveness in global, engineering teams operating within a high-tech organization. Specifically, this study looked at the relationship of both individual EI and group-level EI to engineering team effectiveness in a high-tech environment.

### **Section One: Conceptual Framework**

The design for this research was a mixed-method field study within a single high-technology organization, utilizing the results obtained through on-line survey instruments and follow up interviews with a purposeful sample of the research population.

An on-line survey was used to collect numeric team member ratings regarding 1) their own individual-level EI, 2) the group-level EI of their in-tact team, and 3) their perceived levels of team effectiveness. An abridged version of the on-line survey was used to collect perceived levels of team effectiveness from the management team ultimately responsible for the team members and their performance.

Qualitative data was also collected in both the team member and manager surveys through open-ended questions and written responses. Participants were asked to identify specific teams seen as demonstrating high, average, or low levels of team effectiveness, and then to provide open text comments regarding

the rationale for the teams they had named. In addition, team member surveys asked respondents to reflect on their own current teams and provide insights into what they saw the teams 1) doing well that should be continued, 2) doing currently that should be stopped, 3) not doing that they should start doing, and then any other comments worth noting regarding the effectiveness of their current teams.

Following the analysis of the data collected from the survey instruments, interviews were conducted with a small sample of the study population to gain a deeper understanding of how these results showed themselves in the daily lives and performance outcomes of these teams.

### **Section Two: Setting**

The setting for this study was a mid-sized, high-technology company headquartered within one of the recognized technology belts in the US, with engineering resources working out of a number of global locations. This company was chosen because 1) it represented the high-tech organizational environment, 2) it had engineers working in teams on product development projects, and 3) its management agreed to provide access to the engineering team members working in this environment.

### **Section Three: Population**

The teams invited to take part in the study included the full range of engineering teams working on current product development projects that were made available to the researcher by the senior management of the organization.

This population included both engineers and engineering managers directly employed by the organization, as well as staff that formally worked for a third-party, offshore partner based in eastern Europe. The third-party staff were fully integrated into the company's engineering development teams, and the research site was made available based on the condition that the third-party team members and managers be included and be considered to be part of the organization's engineering team population.

A total of 55 teams were initially engaged in the study process. Each team was made up of between 2–11 team members representing a range of engineering-related content expertise (e.g., writing code, architecture, QA, etc.). Teams with fewer than 3 team members were excluded from the final analysis, as the nature of their interactions would be made up of one-to-one behaviors rather than those of a typical team. There were 5 teams excluded as a result of having fewer than 3 team members. The mean number of members per team was 6, with a mode of 5 members per team (9 teams of the original 55 had this number of members).

Teams varied in terms of their geographic makeup, involving 7 major locations around the world. Primary populations were located in the US, Canada, Western Europe and Eastern Europe. Ten teams had all of their team members co-located in one office, with these offices situated in different global locations.

Each team operated as a self-managing group, and had an individual Scrum Master assigned to work as part of the team on a daily basis, providing

coaching and support as needed. The same survey data were collected from the Scrum Master as were collected from the other core team members. Individuals serving in the role of Product Owner and Architect also worked with the teams as needed, but not on a daily basis and not in the direct performance of their team tasks. As a result, these specialized roles were not included when collecting survey data from the teams.

Managers responsible for the on-going performance of the teams were asked to complete a manager version of the survey, which focused just on the area of team effectiveness. Individual and team-level emotional intelligence data were not collected from these managers. In a small number of teams, the manager for the team also served as the team Scrum Master. In these cases, Scrum Masters were treated as managers and provided with only the manager version of the survey. The managers of the teams were also located in a variety of global sites, sometimes co-located with team members, other times in a location where none of their team members were located. Both senior managers responsible for multiple teams and first-level managers who worked directly with a particular team were included in the study population

Survey data had to be received from at least 50% of the team's members and from at least one manager for the team to be included in the final study population. A total of 27 teams out of the original 55 met this criterion. There were a total of 122 team members and 36 managers (9 senior managers, 27 first-level managers) included in the final study population.

Additional demographic data were self-reported through the team member survey. In the final study population, 46% of the teams had been working together for longer than 2 years (with smaller portions of the population having worked together for varying periods ranging from 0–2 years). The Agile / Scrum methodology was used by 89% of the teams, though to varying degrees of adherence, with 47% of the teams having used this methodology for a 1–2 year period. Daily meetings, conducted virtually, were reported by 69% of the teams, with an additional 22% of the teams reporting they met more than once a week or weekly. The populations' regions of origin were primarily North America, Western Europe, and Eastern Europe. This level of demographic data was collected through the team member version of the survey only and, therefore, is not available regarding the management population.

#### **Section Four: Research Methodology**

Prior to beginning any data collection or working directly with study participants, all study materials were submitted for review and approval by the Boston University Institutional Review Board (IRB). In accordance with the requirements for human subject research, all individual participants received information regarding the purpose, benefits, and potential risks of the study, and explicitly stating the voluntary nature of their participation. Informed consent was obtained from all study participants prior to any data collection.

##### *Subsection One: Engaging the Team*

The researcher provided a brief overview of the research study (see

Appendix A) initially to the senior managers of the company's engineering groups, and then directly to all members and managers of the engineering teams, describing the purpose and process of the research. The purpose was described as looking at a variety of factors that contribute to team development and team effectiveness within high-tech environments, but did not explicitly discuss the focus of EI in teams so as not to bias team responses. Team members and managers were told that participation was voluntary and that they could withdraw from the study at any time. They were also asked to provide informed consent to participate in the research study (see Appendixes B and C).

#### Subsection Two: Data Collection

Figure 4 provides a high-level summary of the approaches for data collection and analysis that were used in this study. Specific details are provided in the separate sections for data collection and data analysis that follow.

Figure 4: Summary of Data Collection and Analysis Approaches

Research Questions	Data Collection	Data Analysis
1. How do the individual trait EI scores and the group-level emotional competency scores for the engineering team members at the high-tech organization studied compare to other types of workers in other industries?	Individual TEIQue scores and group-level TEI Survey scores - this worker population and type of industry vs. others in the TEIQue / TEI Survey data base: <ul style="list-style-type: none"> <li>• Individual scores / means</li> <li>• Team scores / means</li> </ul>	T-tests
2. What is the relationship between the individual trait EI scores and the group-level emotional competency scores for the engineering teams being studied?	Individual TEIQue scores and group-level TEI Survey scores	Correlational analysis; stepwise regression
3. What is the relationship between the individual EI/group-level emotional competency scores and the level of team effectiveness in the high-tech organization studied?	Mean TEIQue scores of team members; team-level TEI Survey scores for teams Measures of team effectiveness: <ul style="list-style-type: none"> <li>• Team member ratings</li> <li>• Management ratings</li> </ul>	Correlational analysis; t-tests
4. How do the findings discovered through the analysis of the EI and team effectiveness data actually play out within the team's daily work experience?	Qualitative comments captured through open-response items in the surveys <ul style="list-style-type: none"> <li>• Team member and manager nominations of high, average, and low performing teams, along with rationale for nominations</li> <li>• Team member critique of current team's effectiveness including strengths and recommendations for improvement</li> </ul> Qualitative comments captured through interviews with targeted samples from the study population. <ul style="list-style-type: none"> <li>• Members of senior management responsible for multiple teams</li> <li>• First-level managers that work directly with the teams</li> <li>• Team members</li> </ul>	Thematic analysis

Team members were asked to complete an on-line survey with questions focused on 1) individual EI factors, 2) group-level EI norms, and 3) overall team effectiveness, along with a small number of demographic questions (see Appendix D). These survey data were supplemented with information gathered through individual interviews from a targeted sample population of study participants.

- *Individual team member score for emotional intelligence* - questions from the Trait Emotional Intelligence Questionnaire (TEIQue), developed by K. V. Petrides, were used to collect data regarding emotion-related self-perceptions of team members. The TEIQue assesses 15 facets using the specific subscales shown in Figure 5. In addition, it provides scores on four broader factors: "well-being," "self-control," "emotionality," and "sociability" (Petrides, 2009).

Participants were asked to complete the 30 questions that make up the TEIQue Short Form. The short form set of questions, which is based on the full form of the TEIQue (153 items), was utilized to keep participants' time commitment to a minimum, given they were completing questions from two other surveys, as well. Two items from each of the 15 facets of the TEIQue were included, based on their correlations with the corresponding facet scores (Cooper & Petrides, 2010; Petrides & Furnham, 2006). Figure 5 shows the relationship between the 15 facets and their 4 corresponding factors.

The TEIQue, which assesses individual trait emotional intelligence, was chosen because of its design as a stand-alone self-assessment tool (see

Appendix E for the list of questions included in the TEIQue Short Form).

- *Group-level score for team's use of emotionally competent norms -*

questions from a second survey instrument, the Team Emotional Intelligence (TEI) Survey, were used to assess team-level demonstration of emotionally-competent group norms. The model that forms the basis of this instrument is shown in Figure 6.

Figure 5: The Four Factors and 15 Facets of the TEIQue

Factor	Facet	High scorers view themselves as...
Well-being	Happiness	...cheerful and satisfied with their lives
	Optimism	...confident and likely to "look on the bright side" of life
	Self-esteem	...successful and self-confident
Self-control	Emotion regulation	...capable of controlling their emotions
	Impulse control	...reflective and less likely to give in to their urges
	Stress management	...capable of withstanding pressure and regulating stress
Emotionality	Empathy	...capable of taking someone else's perspective
	Emotion perception (self and others)	...clear about their own and other people's feelings
	Emotion expression	...capable of communicating their feelings to others
	Relationships	...capable of maintaining fulfilling personal relationships
Sociability	Emotion management (others)	...capable of influencing other people's feelings
	Assertiveness	...forthright, frank, willing to stand up for their rights
	Social awareness	...accomplished networkers with superior social skills
*Independent	Self-motivation	...driven and unlikely to give up in the face of adversity
	Adaptability	...flexible and willing to adapt to new conditions

\*The two facets of Self-motivation and Adaptability contribute directly to the global trait EI score without going through any of the four factors.

(Petrides, K. V. & Furnham, A., 2001)

Figure 6: Team EI Norms

<b>3 Levels</b>	<b>9 Behavioral Norms</b>
Individual	<ol style="list-style-type: none"> <li>1. Interpersonal Understanding</li> <li>2. Caring Behavior</li> <li>3. Addressing Counterproductive Behavior</li> </ol>
Team	<ol style="list-style-type: none"> <li>4. Team Self-Evaluation</li> <li>5. Creating Emotion Resources</li> <li>6. Creating an Affirmative Environment</li> <li>7. Proactive Problem Solving</li> </ol>
External	<ol style="list-style-type: none"> <li>8. Organizational Understanding</li> <li>9. Building External Relations</li> </ol>

(Wolff, 2006)

The TEI Survey focuses on a group's patterns of behavior, or norms, which develop as a team works together performing its necessary tasks. There are nine norms that make up the set of group emotional intelligence items that are assessed in this survey.

Group emotional intelligence is a group-level construct and is very different from the individual-level emotional intelligence of group members. Group Emotional Intelligence represents the ability of a group to generate a set of norms that guide the emotional experience in a group in an effective way. There are norms that guide the group's interactions with its members (individual-level), the group as a whole (group-level), and others outside the group (cross-boundary level). At each of these levels there are

norms that create awareness of emotion in the group and norms that regulate group behavior. (Wolff, 2006, p. 1)

The majority of the questions from the TEI Survey (68 out of 72) were used to assess the participants' view of how their team uses emotionally-competent group norms in their day-to-day interactions. The last 4 questions of this section of the survey were qualitative in nature, asking team members to provide open-text responses regarding what their teams should continue doing, stop doing, or start doing, as well as any other information they felt should be known about their teams.

The TEI Survey was chosen for this study due to its approach in assessing group-level EI (see Appendix F for TEI Survey items). Because of the similarity in the names of the two EI instruments being used in this study (TEI Questionnaire and TEI Survey), the group-level Team EI construct, assessment, and results may also be referred to as Group EI or GEI for purposes of simplicity and clarification.

- *Assessment of team effectiveness* - Team members, as well as the managers who were responsible for the overall performance of the teams, were asked a set of 12 questions regarding their perceptions of their team's overall effectiveness. The first 6 questions of the survey (adapted from Balduzzi et al., 2005) asked for ratings on 6 factors related to team effectiveness (see Appendixes G and H). The final 6 questions were qualitative in nature, asking for open-text responses. Team members and managers were asked to identify

a specific team they saw as performing at each of 3 levels of effectiveness (high, average, and low), and then provide their rationale for each nomination.

Objective performance data regarding team effectiveness levels was requested from the participating organization, but management responded that it did not provide this level of information to anyone outside of the company. Instead they provided a summary of the types of metrics used in assessing team and individual performance.

- *Supplemental data collected through participant interviews* - Interviews were conducted after analyzing the data collected through the on-line survey to help provide a deeper insight into the study findings and to help clarify questions arising from the data analysis. A total of 9 interviews were conducted with a purposeful sample population: 3 with members of senior management, 3 with first-level managers who work more directly with the teams, and 3 with team members. Interview participants were selected to provide a mix of position levels, roles, global locations, and levels of team effectiveness.

### *Subsection Three: Data Analysis*

To answer each of the 4 research questions, correlational analysis and t-tests were used to assess quantitative results and thematic analysis was used to assess qualitative results.

The following data analysis was completed to answer the first research question: "How do the individual trait EI scores and the group-level emotional competency scores for engineering team members at the high-tech

organization studied compare to other types of workers in other industries?"

- Individual scores for trait EI were calculated. The global individual trait EI score and the scores for each of the 4 factors that contribute to it were analyzed. Variance was assessed against the database for the TEIQue short form.
- Group-level emotional competence scores were calculated. Variance was assessed against the database for the TEI Survey.
- T-tests were run to compare the means between the sets of populations being studied.

The following data analysis was completed to answer the second research question: "What is the relationship between individual trait EI scores on a team and the group-level emotional competency scores for the engineering teams being studied?"

- Correlational analysis was run to assess the significance of the correlations found between the overall mean scores and the mean scores for each factor of both models.
- Stepwise regression was run to understand the relationship between the factors making up both models.

To answer the question regarding the relationship between individual and team-level EI scores and the level of team effectiveness within the high-tech organization being studied, the following data analysis was completed:

- Correlational analysis was run to assess the significance of the correlations found between individual EI and the level of team effectiveness, and team-level EI and the level of team effectiveness.
- T-tests were run to assess the differences between the individual EI mean scores and the team-level EI mean scores for high versus low performing teams.

To answer the question regarding how the findings from this research actually played out within the daily work of experience of the teams, the following data analysis was completed:

- Thematic analysis was done with the open-text responses from team members and managers providing rationale for nominating a team as high, average, or low performing. Codes were identified and frequency counts were established for codes as they related to high, average, and low performing teams.
- Thematic analysis was done with the open-text responses providing insights into how the teams viewed their current performance (start/stop/continue/other). Codes were identified and frequency counts were established for codes as they related to high, average, and low performing teams.
- Thematic analysis was performed on the data collected from 9 follow-up interviews. Responses were reviewed to provide further insights into the findings established through all other data analysis.

## CHAPTER FOUR: RESULTS

This research study set out to answer four questions regarding emotional intelligence and engineering teams operating within a high-tech environment. A summary of the research findings is discussed in this chapter.

For Sections Two and Three, it should be noted that participant survey scores were converted into z-scores for more accurate comparisons across global raters. An analysis of variance was run for the study participants comparing their primary work locations and their ratings for the individual trait EI means, team-level EI means, and team effectiveness means. Significant differences were found to exist across multiple geographic locations. As a result, the raw scores were standardized through the use of z-scores to enable a more accurate comparison of the data. Raw scores were used in Section One to enable the survey scores for this study population to be compared with the raw scores found in the databases for each of the survey instruments.

### **Section One: EI Scores for Engineering Population**

The first question explored was, "How do the individual EI scores and the group-level emotional competency scores for the engineering team members at the high tech organization studied compare with the scores for other types of workers in other industries?" The individual TEIQue scores and the group-level TEI Survey scores for this study population were compared with those of the general populations in the databases for each of these instruments.

The TEIQue short form questionnaire was used to assess the individual level of trait emotional intelligence for each participating team member ( $N=122$ ). These scores were analyzed against the database of other individuals who have taken the TEIQue short-form assessment ( $N=866$ ). The scores considered included an overall or "global" individual EI score for each team member, as well as scores for each of the 4 factors that make up the trait EI model. Ratings for this instrument were based on a 7-point scale with 7 representing the high end of the scale.

The results showed the engineering study population as having higher scores at the overall or global trait EI level, as well as higher scores for each of the four factors of the trait Emotional Intelligence model. The difference in scores was significant for the global trait EI score ( $p=0.01$ ), as well as for 2 of the 4 trait EI factors: Well-being ( $p=0.02$ ) and Self-control ( $p=0.00$ ) (see Table 1).

The Team Emotional Intelligence (TEI) Survey was used to assess the team-level demonstration of emotionally competent group norms for each of the participating engineering teams ( $N=27$ ). These scores were analyzed against the database of other teams who have taken the TEI Survey ( $N=131$ ). The results were assessed for an overall team EI (TEI) score, and for each of the 9 factors that make up the Team Emotional Intelligence model. Ratings are based on a 5-point scale with 5 representing the high end of the scale.

Table 1

## Individual Trait Emotional Intelligence Scores - TEIQue Database vs. Study Population

Measure	Global Trait EI	Well-being	Self-control	Emotionality	Sociability
<b>Mean</b>					
Database Population	4.99	5.41	4.57	5.05	4.82
Study Population	5.26	5.63	5.03	5.23	4.91
Difference	-0.27	-0.21	-0.45	-0.18	-0.09
Significance	0.01	0.02	0.00	0.13	0.45
<b>Maximum</b>					
Database Population	7.00	7.00	7.00	7.00	7.00
Study Population	6.53	6.75	6.00	6.75	6.25
Difference	0.48	0.25	1.00	0.25	0.75
<b>Minimum</b>					
Database Population	2.00	1.67	1.83	1.63	1.83
Study Population	3.48	4.61	3.34	3.24	2.89
Difference	-1.48	-2.94	-1.51	-1.61	-1.06
<b>Median</b>					
Database Population	5.00	5.50	4.50	5.13	4.83
Study Population	5.28	5.64	5.04	5.30	5.00
Difference	-0.28	-0.14	-0.54	-0.18	-0.17

*Note.* Database Population  $N = 867$ ; Study Population  $N = 122$ .

The results showed the engineering study population as having higher scores at the overall group emotional intelligence (GEI) level, as well as higher

scores for 8 out of the 9 factors. The difference in scores was significant for the overall GEI score ( $p=0.02$ ) as well as for 5 of the 9 factors ( $p=0.00-0.04$ ) (see Table 2).

Two additional sets of factors which make up the overall Team Emotional Intelligence model were assessed as part of the TEI Survey: a set of fundamental group processes that tend to be core for any successful team (e.g., goals and objectives, meeting procedures) and a set of social capital factors that emerge as a team establishes a productive environment for working together (e.g., creating a safe environment for risk taking, team identity).

The results showed the engineering study population as having significantly higher scores at the overall Group Fundamentals level ( $p=0.01$ ), as well as significantly higher scores for 2 out of the 3 factors that make up the Group Fundamentals score: Goals and Objectives ( $p=0.02$ ) and Roles and Responsibilities ( $p=0.02$ ) (see Table 3).

The results also showed the engineering study population as having significantly higher scores for overall Social Capital ( $p=0.00$ ), with significantly higher scores for 2 out of the 4 factors that make up the Social Capital score: Creating Debate ( $p=0.00$ ) and Safety and Risk Taking ( $p=0.00$ ) (see Table 3).

Table 2

## Team Emotional Intelligence Scores - TEI Survey Database vs. Study Population

Measure	GEI	IU	ACB	CB	TSE	CER	CAE	PPS	OU	BER
Mean										
Database Population	3.58	3.66	3.22	3.84	3.22	3.09	3.74	3.80	3.68	3.95
Study Population	3.75	4.04	3.34	4.15	3.45	3.35	3.85	3.96	3.61	4.03
Difference	-0.17	-0.38	-0.12	-0.31	-0.23	-0.27	-0.11	-0.16	0.07	-0.07
Significance	0.02	0.00	0.27	0.00	0.02	0.00	0.16	0.04	0.33	0.27
Maximum										
Database Population	4.24	4.46	4.38	5.00	4.33	4.17	4.42	4.52	4.31	4.66
Study Population	4.41	4.60	4.33	4.72	4.40	4.50	4.63	4.64	4.30	4.48
Difference	-0.17	-0.14	0.04	0.28	-0.07	-0.33	-0.21	-0.12	0.01	0.18
Minimum										
Database Population	2.63	2.60	1.75	2.36	2.11	2.02	2.68	2.65	2.67	3.20
Study Population	2.64	3.40	1.88	3.49	2.05	2.10	2.63	2.50	2.30	2.90
Difference	-0.01	-0.80	-0.13	-1.13	0.06	-0.08	0.06	0.15	0.37	0.30
Median										
Database Population	3.61	3.68	3.29	3.86	3.24	3.09	3.77	3.83	3.70	3.93
Study Population	3.80	4.08	3.45	4.15	3.55	3.40	3.92	4.03	3.67	4.13
Difference	-0.19	0.40	-0.16	-0.29	-0.31	-0.31	-0.14	-0.20	0.03	-0.20

*Note.* Database Population  $N = 131$  teams; Study Population  $N = 27$  teams.

**GEI** = overall Group Emotional Intelligence score (mean score of 9 contributing factors); 9 factors making up the GEI score are as follows: IU = Interpersonal Understanding, ACB = Addressing Counterproductive Behaviors, CB = Caring Behaviors, TSE = Team Self-evaluation, CER = Creating Emotional Resources, CAE = Creating Affirmative Environment, PPS = Proactive Problem Solving, OU = Organizational Understanding, BE = Building External Relationships.

Table 3

## TEI Group Fundamentals and Social Capital Scores - TEI Survey Database vs. Study Population

Measure	<b>GF</b>	G&O	R&R	MP	<b>SC</b>	CD	S&R	I	TI
Mean									
Database Population	3.61	3.63	3.95	3.26	3.82	3.68	3.67	3.80	4.15
Study Population	3.73	3.87	4.19	3.14	4.07	4.21	4.13	3.93	4.00
Difference	-0.11	-0.24	-0.24	-0.13	-0.25	-0.53	-0.46	-0.13	0.15
Significance	0.01	0.02	0.02	0.29	0.00	0.00	0.00	0.13	0.07
Maximum									
Database Population	4.51	4.47	4.75	4.54	4.48	4.53	4.67	4.67	4.89
Study Population	4.40	4.63	4.89	3.93	4.66	4.67	4.93	4.83	5.00
Difference	0.11	-0.16	-0.14	0.61	-0.18	-0.13	-0.27	-0.17	-0.11
Minimum									
Database Population	2.34	2.07	2.30	1.94	2.74	2.20	2.44	2.50	2.67
Study Population	2.22	2.00	3.17	1.50	3.13	3.60	3.33	2.75	2.50
Difference	0.12	0.07	-0.86	0.44	-0.39	-1.40	-0.89	-0.25	0.17
Median									
Database Population	3.63	3.68	4.00	3.23	3.84	3.70	3.70	3.81	4.21
Study Population	3.87	3.88	4.27	3.22	4.08	4.29	4.22	4.00	4.00
Difference	-0.25	-0.20	-0.27	0.01	-0.24	-0.59	-0.52	-0.19	0.21

*Note.* Database Population  $N = 131$  teams; Study Population  $N = 27$  teams.

**GF** = overall Group Fundamentals score (mean score of 3 contributing factors); 3 factors making up the GF score are as follows: G&O = Goals & Objectives, R&R = Roles & Responsibilities, MP = Meeting Procedures; **SC** = overall Social Capital score (mean score of 4 contributing factors); 4 factors making up the SC are as follows:

CD = Creating Debate, S&R = Safety & Risk-taking, I = Innovation, TE = Team Identity.

In summary, when compared with the databases for each of the survey instruments used, the results showed the engineering study population had significantly higher scores for both individual trait EI and for group-level team EI.

### **Section Two: Relationship Between Individual Trait EI and Group-level EI**

The second question on which this research focused was, "What is the relationship between the individual trait EI scores and the group-level emotional competency scores for the engineering teams being studied?" To answer this question, correlations were run for the study population comparing the team means for the individual TEIQue scores with the group-level TEI Survey scores (see Table 4). To account for cultural differences in the global participant ratings, z-scores were created. These z-scores were used for this set of correlations and for the remaining correlations represented in this chapter.

The results showed a significant positive correlation ( $p=.040$ ) between the overall individual trait EI mean for the teams and their overall group-level EI mean. There were significant positive correlations identified when comparing individual factors of both models, as well. The strongest number of significant correlations appeared when comparing the 4 individual trait EI factors with the 9 GEI factors. Seven of the 9 GEI factors had significant correlations with the individual trait EI factors, with 2 of the GEI factors having no significant correlations with the trait EI model: Creating an Affirmative Environment and Building External Relationships.

Table 4

## Individual EI vs. Team EI Correlations

Measure	GEI	IU	ACB	CB	TSE	CER	CAE	PPS	OU	BER	GF	R&R	G&O	MP	SC	CD	S&R	I	TI
<b>Global EI</b>																			
Pearson Correlation	.398	.311	.555	.256	.378	.447	.226	.435	.357	.223	.122	.105	.231	-.080	.115	.032	-.057	-.077	.408
Significance (2-tailed)	.040	.115	.003	.197	.052	.019	.256	.023	.068	.263	.545	.604	.246	.691	.568	.874	.778	.701	.035
<b>Emotionality</b>																			
Pearson Correlation	.453	.398	.619	.292	.442	.524	.291	.417	.395	.270	.206	.160	.308	.047	.182	.049	.005	.013	.446
Significance (2-tailed)	.018	.040	.001	.140	.021	.005	.141	.030	.042	.174	.301	.426	.118	.816	.364	.809	.981	.947	.020
<b>Self-Control</b>																			
Pearson Correlation	.192	.090	.270	.165	.230	.218	.000	.314	.182	.118	-.050	-.003	.078	-.215	-.071	-.133	-.178	-.237	.298
Significance (2-tailed)	.336	.656	.173	.412	.249	.274	.998	.111	.364	.559	.805	.986	.698	.282	.724	.510	.373	.234	.131
<b>Well-being</b>																			
Pearson Correlation	.446	.411	.536	.393	.359	.391	.334	.494	.340	.331	.248	.248	.310	-.112	.279	.108	.112	.107	.493
Significance (2-tailed)	.020	.033	.004	.043	.066	.044	.089	.009	.082	.092	.213	.212	.115	.577	.159	.592	.577	.595	.009
<b>Sociability</b>																			
Pearson Correlation	.343	.241	.537	.130	.334	.441	.210	.350	.331	.111	.064	.032	.155	-.042	.062	.081	-.090	-.099	.254
Significance (2-tailed)	.080	.227	.004	.519	.089	.021	.292	.074	.092	.581	.749	.875	.439	.834	.760	.689	.656	.622	.201

*Note.*  $N = 27$  teams. Correlations were run using z-scores. **GEI** = overall GEI score (mean score of 9 contributing factors); 9 factors making up the GEI score are as follows: IU = Interpersonal Understanding, ACB = Addressing Counterproductive Behaviors, CB = Caring Behaviors, TSE = Team Self-evaluation, CER = Creating Emotional Resources, CAE = Creating Affirmative Environment, PPS = Proactive Problem Solving, OU = Organizational Understanding, BE = Building External Relationships. **GF** = overall Group Fundamentals score (mean score of 3 contributing factors); 3 factors making up the GF score are as follows: G&O = Goals & Objectives, R&R = Roles & Responsibilities, MP = Meeting Procedures; **SC** = overall Social Capital score (mean score of 4 contributing factors); 4 factors making up the SC are as follows: CD = Creating Debate, S&R = Safety & Risk-taking, I = Innovation, TE = Team Identity.

Correlations were at a far lower level when comparing the 4 individual trait EI factors with the team EI Group Fundamental and Social Capital factors. No significant correlations appeared among the Group Fundamental factors. The Social Capital factor of Team Identity showed a significant positive correlation with the overall TEIQue mean ( $p=.035$ ), as well as with 2 of the 4 TEIQue factors, Emotionality ( $p=.020$ ) and Well-being ( $p=.009$ ).

When looking at the correlations for the trait EI factors, 3 of the 4 factors showed significant correlations with the GEI factors. The fourth trait EI factor, Self-Control, showed no significant correlations with any of the GEI factors, but did show the trend of an inverse, negative relationship with the majority of Group Fundamental and Social Capital factors.

In summary, for the engineering population studied in this research, a significant positive correlation was shown to exist between their overall individual trait EI scores and their team EI scores. Significant positive correlations were also shown for a number of the individual factors making up the two models.

Finally, a set of stepwise regressions was run to identify the relationship among the 4 individual EI factors and the mean scores for GEI, Group Fundamentals, and Social Capital. The individual EI factor of Emotionality was the only dimension of trait EI to show a relationship with the GEI mean ( $r^2=.205$ ,  $p=.018$ , Standard Coefficient Beta=.453). There were no significant relationships between individual trait EI and Group Fundamentals or Social Capital (see Table 5).

Table 5

Summary of Stepwise Regression Analysis for Variables Predicting Individual EI Factors in Group EI

Variable	<i>B</i>	<i>SE B</i>	$\beta$
Step 1			
Emotionality	.355	.139	.453*

*Note.*  $r^2 = .205$ . Regression was run using z-scores.

\* $p = .018$

A second set of stepwise regressions was run using the individual EI mean as the dependent variable, and the 3 sets of GEI factors, Group Fundamentals factors and Social Capital factors as the independent variables. The GEI factor of Addressing Counterproductive behavior showed a significant relationship with individual EI (see Table 6.1), as did the Social Capital factors of Team Identity and Innovation (see Table 6.2). The interconnectedness of these two models provides new information regarding the relationship of individual trait EI and its contribution to or enhancement as a result of high levels of group emotional intelligence. There seems to be an opportunity for these sets of traits and behaviors to support and extend one another within the group setting.

### **Section Three: Relationship between EI and Team Effectiveness**

The next question on which this research focused was, "What is the relationship between the individual and group-level emotional competency scores and the levels of team effectiveness in the high-tech organization studied?" Team

effectiveness scores were collected from team members and managers through 6 of the survey questions (see Appendix F).

Table 6.1

Summary of Stepwise Regression Analysis for Variables Predicting GEI Factors in Individual Trait EI

Variable	<i>B</i>	<i>SE B</i>	$\beta$
Step 1			
Addressing Counterproductive Behaviors	.640	.192	.555*

*Note.*  $r^2 = .308$ . Regression was run using z-scores.

\* $p = .003$

Table 6.2

Summary of Stepwise Regression Analysis for Variables Predicting Social Capital Factors in Individual Trait EI

Variable	<i>B</i>	<i>SE B</i>	$\beta$
Step 1			
Team Identity	.473	.212	.408*
Step 2			
Team Identity	.784	.240	.676
Innovation	-.487	.216	-.466

*Note.*  $r^2 = .166$  for Step 1;  $\Delta r^2 = .311$  for Step 2 ( $ps < .05$ ). Regression was run using z-scores.

\* $p = .035$

The results gathered from the team member ratings showed significant positive correlations ( $p=0.000$ ) between the team effectiveness scores and the mean scores for GEI, Group Fundamentals and Social Capital. A positive relationship was also shown for the overall individual EI mean, although not at a significant level. A similar pattern occurred when assessing the factors for group-level and individual EI. Every one of the group EI factors, including all 9 primary factors, the 3 Group Fundamentals factors, and the 4 Social Capital factors, had significant positive correlations ( $p=.000$  to  $.039$ ) with team member effectiveness ratings. The results also showed a positive relationship between the team effectiveness scores and 3 of the 4 individual EI factors, although none of these were at a significant level (see Tables 7 and 8.1–8.3).

When looking at the managers' ratings for team effectiveness, a trend of inverse relationships with both individual and group EI was shown; however, none of these relationships were at a significant level. The managers' effectiveness ratings had an inverse relationship to the team members' effectiveness ratings. The managers' effectiveness ratings also showed a negative relationship with all 4 of the individual and group EI mean scores (individual trait EI, GEI, Group Fundamentals, and Social Capital).

At the factor level, 13 out of the 16 GEI factors showed a negative relationship to the managers' team effectiveness ratings. The 3 GEI factors showing a positive relationship were Creating Emotional Resources, Meeting Procedures (Group Fundamental), and Safety and Risk Taking (Social Capital).

Table 7

Correlations for Team Effectiveness Ratings versus Individual and Group-level EI Means

Measure	Manager Effectiveness Rating	Team Member Effectiveness Rating	Global Trait EI Mean	GEI Mean	Group Fundamentals Mean	Social Capital Mean
<b>Manager Effectiveness Rating</b>						
Pearson Correlation	1	-.127	-.045	-.123	-.145	-.097
Significance (2-tailed)		.529	.822	.542	.471	.629
<b>Team Member Effectiveness Rating</b>						
Pearson Correlation	-.127	1	.177	.812	.798	.759
Significance (2-tailed)	.529		.377	.000	.000	.000

Note.  $N = 27$  teams. Correlations were run using z-scores.

Table 8.1

## Correlations for Team Effectiveness Ratings versus Individual EI Factors

Measure	Global Trait EI Mean	Emotionality Mean	Self-Control Mean	Well-being Mean	Sociability Mean
<b>Manager Effectiveness Rating</b>					
Pearson Correlation	-.045	.092	-.263	-.184	.110
Significance (2-tailed)	.822	.649	.185	.358	.584
<b>Team Member Effectiveness Rating</b>					
Pearson Correlation	.177	.302	-.051	.286	.144
Significance (2-tailed)	.377	.126	.799	.148	.474

Note.  $N = 27$  teams. Correlations were run using z-scores.

Table 8.2

Correlations for Team Effectiveness Ratings versus GEI Factors

Measure	GEI	IU	ACB	CB	TSE	CER	CAE	PPS	OU	BER
<b>Manager Effectiveness Rating</b>										
Pearson Correlation	-.123	-.158	-.056	-.130	-.019	.055	-.054	-.256	-.112	-.345
Significance (2-tailed)	.542	.431	.783	.518	.925	.786	.791	.197	.579	.078
<b>Team Member Effectiveness Rating</b>										
Pearson Correlation	.812	.741	.746	.669	.679	.670	.776	.718	.617	.693
Significance (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.001	.000

*Note.*  $N = 27$  teams. Correlations were run using z-scores. **GEI** = overall Group Emotional Intelligence score (mean score of 9 contributing factors); 9 factors making up the GEI score are as follows: IU = Interpersonal Understanding, ACB = Addressing Counterproductive Behaviors, CB = Caring Behaviors, TSE = Team Self-evaluation, CER = Creating Emotional Resources, CAE = Creating Affirmative Environment, PPS = Proactive Problem Solving, OU = Organizational Understanding, BE = Building External Relationships.

Table 8.3

Correlations for Team Effectiveness Ratings versus Group Fundamental and Social Capital Factors

Measure	<b>GF</b>	R&R	G&O	MP	<b>SC</b>	CD	S&R	I	TI
<b>Manager Effectiveness Rating</b>									
Pearson Correlation	-.145	-.251	-.210	.021	-.097	-.030	.176	-.149	-.283
Significance (2-tailed)	.471	.207	.292	.917	.629	.882	.381	.457	.153
<b>Team Member Effectiveness Rating</b>									
Pearson Correlation	.798	.676	.807	.498	.759	.553	.399	.825	.640
Significance (2-tailed)	.000	.000	.000	.008	.000	.003	.039	.000	.000

*Note.*  $N = 27$  teams. Correlations were run using z-scores. **GF** = overall Group Fundamentals score (mean score of 3 contributing factors); 3 factors making up the GF score are as follows: G&O = Goals & Objectives, R&R = Roles & Responsibilities, MP = Meeting Procedures; **SC** = overall Social Capital score (mean score of 4 contributing factors); 4 factors making up the SC are as follows: CD = Creating Debate, S&R = Safety & Risk-taking, I = Innovation, TE = Team Identity.

There was also a negative relationship between the managers' team effectiveness ratings and 2 of the 4 individual EI factors. Two individual EI factors, Emotionality and Sociability, showed a positive relationship (see Tables 7 and 8.1–8.3).

In summary, there were significant positive correlations between all of the team EI factors and the team member ratings for effectiveness. There was also a positive relationship between 3 of the 4 individual EI factors and the team ratings of effectiveness, though not at a statistically significant level. In contrast, a trend of negative relationships was found between the managers' team effectiveness ratings and the individual and group EI ratings, though none of these relationships were at a significant level.

In looking at the relationship between EI and team effectiveness, further analysis was done to try to understand what variations might exist between high and low performing teams. The team effectiveness ratings collected through the 6 survey questions provided one view of team performance.

Qualitative information regarding team effectiveness was also captured through an additional set of survey questions, and provided a second lens for viewing team effectiveness. Both team members and managers were asked to identify a specific team they saw as demonstrating consistently high levels of effectiveness (high), one demonstrating solid and steady levels (average), and one that tended to be consistently challenged in performing at desired levels (low).

When trying to use either the team effectiveness ratings or the team nominations to identify teams that stood out as clearly high or low performing, both sets of data proved to be highly inconsistent. As previously discussed, managers and team members did not rate the effectiveness of the teams in the same way. Additionally, in looking at the nominations, some managers viewed a particular team as high performing while another manager identified that same team as an example of an average or low performing team. The same was true for the team member nominations. When the nominated teams were analyzed, significant inconsistencies were discovered across both manager and team member views of the 27 teams (see Table 9).

A request for objective performance data was made to the organization being studied to try to shed some light on "who was right" in terms of actual team effectiveness. The company declined the request based on the need for confidentiality. They were not comfortable sharing detailed organizational performance data outside of the company, even with the team identity and overall company identity kept anonymous. They were open to trying other ways to help address this question.

As a result, discussions occurred with several of the senior managers as to what overall metrics were tracked for each team, and how to best identify high and low performing teams across the organization. The senior managers did not believe, at the end of the day, that any specific metrics they could provide would actually tell the full story of team effectiveness.

Table 9

Views of High, Average and Low Performing Teams by Score and Nomination

Consistent View of Teams by <b>Nominations</b>	Consistent Nominations by Multiple Managers	Consistent Nominations by Multiple Team Members	Consistent Nominations by Multiple Managers & Team Members	Consistent View of Teams by <b>Effectiveness Scores</b> (z-scores)	Consistent <b>Range of Score</b> (z-scores) by Managers & Team Members
High Nominations	4 teams	1 team	0 teams	High Scores	1 team
Average Nominations	0 teams	1 team	0 teams	Average Scores	7 teams
Low Nominations	2 teams	0 teams	0 teams	Low Scores	3 teams
No nominations	5 teams	10 teams	3 teams	Opposing View of Teams by Effectiveness Scores	Same Team Scored at Opposite ends of Rating Scale (High / Low)
	Same Team Nominated as both High and Low by Managers	Same Team Nominated as both High and Low by Team Members	Same Team Nominated as both High and Low - Manager view vs. Team View	Manager High / Team Low	3 teams
Opposing View of Teams (both High and Low)	3 teams	6 teams	1 team: Manager view = Low Team view = High	Manager Low / Team High	2 teams

*Note.* N = 27 teams. "Consistent" is used to describe a common level of nomination or rating given by two or more managers or team members.

Within the Agile / Scrum environment, teams compete against themselves in terms of their month-over-month performance in 30-day work "sprints" to deliver usable parts of a software product. There is a strong feeling that it is not appropriate to compare teams with one another as many critical variables may differ across the teams (level of difficulty of tasks, existing quality issues to be addressed, availability of key tools, team member time allocated to the tasks that month, unanticipated interruptions to handle critical customer issues, etc.).

Rather, teams are assessed on their own ability to accurately estimate the amount and difficulty level of work they can take on and deliver in a 30 day period known as a "sprint" (some teams use 2 week sprints rather than 4 week sprints). The teams have varying team-member capacity month over month (actual amount of team-member time available to work on the agreed upon tasks that month) and are asked to take this capacity plan into account as they agree on the number of "story points" to sign up for in each sprint. "Story points" are used to estimate the level of effort it will take to deliver the work needed to satisfy their customer use case or "story". Story point accuracy and capacity planning accuracy are two of the typical key metrics tracked for many of the teams. Additional measures related to quality are often tracked, as well, including the team's ability to build automated testing into their core processes, and the time spent fixing new or previously existing bugs in the software.

While many of these metrics existed across most of the teams, managers did not capture and track them in the same ways across the organization. They

focused on the areas that they felt were most important for their teams. They also felt that the metrics that were captured did not tell the full story of the team, and as a result would not be an accurate representation, in and of themselves, for making judgments regarding which teams were truly high or low performing.

With objective metrics not available, efforts were made to work with the existing data captured through the surveys to understand the relationship between individual and group levels of EI and high versus low performing teams as judged by the effectiveness scores and team nominations.

An approach was taken to assign ranked point values of 3 (high), 2 (average) or 1 (low) to each set of nominations and ratings. These ranked points were then treated as a common type of score that could be added together or compared in a consistent way. This resulted in being able to establish 2 views of high and low performing teams for comparison: 1) a manager view: combination of manager scores and nominations and 2) a team view: combination of team member scores and nominations. High and low performing teams within each of these 2 views were then analyzed to try to understand the relationship between individual / group EI levels and team effectiveness levels (see Tables 10.1–10.5).

Table 10.1

## High versus Low Performing Teams: Team Effectiveness and EI Summary View

Measure	Manager Rating	Manager Nomins	Team Rating	Team Nomins	Global Trait EI Mean	GEI Mean	GF Mean	SC Mean
<b>Team Member View</b>								
High Performing Teams ( $n=10$ )	0.10	0.40	0.48	1.70	0.33	0.45	0.33	0.32
Low Performing Teams ( $n=7$ )	-0.02	0.71	-0.78	-0.29	0.04	-0.41	-0.50	-0.46
T-test Significance	0.79	0.73	0.00	0.00	0.20	0.00	0.01	0.00
<b>Manager View</b>								
High Performing Teams ( $n=8$ )	0.83	1.50	-0.11	0.75	0.02	-0.04	-0.05	0.00
Low Performing Teams ( $n=8$ )	-0.89	-0.88	0.07	0.50	0.06	0.18	0.16	0.15
T-test Significance	0.00	0.00	0.61	0.77	0.83	0.47	0.51	0.66

*Note.*  $N = 27$  teams in overall study population. Correlations were run using z-scores. Nomins = number of nominations received as a high or low performing team; GEI = Group Emotional Intelligence; GF = Group Fundamentals; SC = Social Capital.

Table 10.2

## High versus Low Performing Teams: Individual Trait EI

Measure	EI Mean	EI Variance	Emot. Mean	Self- Control Mean	Well- Being Mean	Sociabil. Mean	EI Max	EI Min	EI Median	EI SD
<b>Team Member View</b>										
High Performing Teams ( <i>n</i> =10)	0.33	1.88	0.38	0.12	0.30	0.31	1.17	-0.71	0.32	0.83
Low Performing Teams ( <i>n</i> =7)	0.04	1.36	-0.18	0.17	0.03	0.41	0.70	-0.66	-0.03	0.66
T-test Significance	0.20	0.14	0.06	0.79	0.20	0.21	0.03	0.87	0.07	0.15
<b>Manager View</b>										
High Performing Teams ( <i>n</i> =8)	0.02	1.94	0.06	-0.09	-0.06	0.14	0.92	-1.02	0.04	0.81
Low Performing Teams ( <i>n</i> =8)	0.06	1.88	-0.07	0.13	0.23	-0.09	0.88	-1.00	0.19	0.83
T-test Significance	0.83	0.91	0.58	0.25	0.06	0.41	0.85	0.97	0.38	0.91

*Note.* *N* = 27 teams in overall study population. Correlations were run using z-scores. Emot. = Emotionality; Sociabil. = Sociability; Max = Maximum; Min = Minimum; SD = Standard Deviation

Table 10.3

## High versus Low Performing Teams: Group EI Mean Scores

Measure	GEI	IU	ACB	CB	TSE	CER	CAE	PPS	OU	BER
<b>Team Member View</b>										
High Performing Teams ( <i>n</i> =10)	0.45	0.37	0.35	0.35	0.44	0.42	0.36	0.42	0.30	0.24
Low Performing Teams ( <i>n</i> =7)	-0.41	-0.28	-0.40	-0.33	-0.30	-0.36	-0.49	-0.32	-0.31	-0.30
T-test Significance	0.00	0.01	0.02	0.01	0.00	0.00	0.00	0.02	0.08	0.08
<b>Manager View</b>										
High Performing Teams ( <i>n</i> =8)	-0.04	0.00	0.04	0.00	0.04	0.00	-0.07	-0.10	-0.12	-0.16
Low Performing Teams ( <i>n</i> =8)	0.18	0.22	0.19	0.23	0.13	0.00	0.03	0.23	0.11	0.25
T-test Significance	0.47	0.39	0.60	0.39	0.69	0.99	0.73	0.31	0.49	0.14

*Note.* *N* = 27 teams in overall study population. Correlations were run using z-scores. GEI = overall Group Emotional Intelligence score (mean score of 9 contributing factors); 9 factors making up the GEI score are as follows: IU = Interpersonal Understanding, ACB = Addressing Counterproductive Behaviors, CB = Caring Behaviors, TSE = Team Self-evaluation, CER = Creating Emotional Resources, CAE = Creating Affirmative Environment, PPS = Proactive Problem Solving, OU = Organizational Understanding, BE = Building External Relationships.

Table 10.4

## High versus Low Performing Teams: Group Fundamentals and Social Capital Mean Scores

Measure	GF	R&R	G&O	MP	SC	CD	S&R	I	TI
<b>Team Member View</b>									
High Performing Teams ( <i>n</i> =10)	0.33	0.25	0.40	0.14	0.32	0.21	0.21	0.38	0.27
Low Performing Teams ( <i>n</i> =7)	-0.50	-0.32	-0.63	-0.31	-0.46	-0.11	-0.16	-0.72	-0.47
T-test Significance	0.01	0.08	0.00	0.16	0.00	0.18	0.14	0.00	0.02
<b>Manager View</b>									
High Performing Teams ( <i>n</i> =8)	-0.05	-0.07	-0.12	-0.05	0.00	0.14	0.24	-0.14	-0.25
Low Performing Teams ( <i>n</i> =8)	0.16	0.34	0.16	-0.12	0.15	0.16	0.03	0.09	0.22
T-test Significance	0.51	0.13	0.43	0.81	0.66	0.93	0.36	0.54	0.16

*Note.* *N* = 27 teams in overall study population. Correlations were run using z-scores. GF = overall Group Fundamentals score (mean score of 3 contributing factors); 3 factors making up the GF score are as follows: G&O = Goals & Objectives, R&R = Roles & Responsibilities, MP = Meeting Procedures; SC = overall Social Capital score (mean score of 4 contributing factors); 4 factors making up the SC are as follows: CD = Creating Debate, S&R = Safety & Risk-taking, I = Innovation, TE = Team Identity.

Table 10.5

High versus Low Performing Teams: Effectiveness Factors

Measure	Team Member Ratings							Manager Ratings						
	OE	E	Q	SD	SR	AG	PVO	OE	E	Q	SD	SR	AG	PVO
<b>Team Member View</b>														
High Performing Teams (n=10)	0.48	0.34	0.35	0.31	0.39	0.54	0.35	0.10	0.31	0.16	0.09	-0.26	-0.05	0.31
Low Performing Teams (n=7)	-0.78	-0.64	-0.61	-0.50	-0.52	-0.73	-0.92	-0.02	-0.13	0.26	-0.13	0.34	-0.23	-0.21
T-test Significance	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.79	0.44	0.86	0.60	0.21	0.72	0.33
<b>Manager View</b>														
High Performing Teams (n=8)	-0.11	-0.07	-0.42	0.04	-0.01	-0.10	-0.11	0.83	1.09	1.16	0.59	0.44	0.83	0.91
Low Performing Teams (n=8)	0.07	0.06	0.31	0.03	0.09	0.11	-0.21	-0.89	-0.97	-0.82	-0.98	-0.59	-0.93	-1.03
T-test Significance	0.61	0.68	0.11	0.95	0.71	0.58	0.81	0.00	0.00	0.00	0.00	0.04	0.00	0.00

*Note.* N = 27 teams in overall study population. Correlations were run using z-scores. **OE** = Overall Team Effectiveness rating (mean score of 6 contributing factors); 6 factors making up the OE score are as follows: E = Efficiency, Q = Quality, SD = Self-directed, SR = Sustain Relationship over time, AG = Achieve Goals, PVO = Performance Versus Other teams.

Studying these 2 views of high versus low performing teams revealed some interesting differences. In using t-tests to analyze the team member view of high and low performing teams, significant positive relationships were shown between the high-performing teams and their levels of both individual and team emotional intelligence. High performing teams scored higher in every one of the 16 group EI factors, in all of the team's ratings for the 6 effectiveness factors, and in 4 out of the 6 manager effectiveness factors. They also scored higher in 2 out of 4 of the individual EI factors. The differences in these scores for high vs. low performing teams were at significant levels for 7 out of the 9 group EI factors, for 1 of the 3 Group Fundamentals factors and for 2 of the 4 Social Capital factors ( $p=0.00$  to  $0.02$ ). The higher scores were also significant for the team member ratings for 5 of the 6 effectiveness factors ( $p=0.00$  for all).

An inverse relationship showed up quite consistently when reviewing the high versus low performing teams from the managers' view. The high performing teams had lower scores than the low performing teams for the majority of the EI factors being assessed. In looking at individual EI, the high performing teams had a lower overall mean score than the low performing teams. The high performing teams did have higher scores for 2 of the 4 individual EI factors: Emotionality and Sociability, and lower scores for the factors of Self-Control and Well-being. None of the individual EI relationships met the benchmark level of significance ( $p=0.05$ ).

In looking at the manager's view as it relates to the group level EI scores,

14 out of the 16 factors showed an inverse relationship between the EI rating and the team's level of performance, with 2 factors showing a positive relationship: the Fundamentals factor of Meeting Procedures and the Social Capital factor of Safety and Risk Taking. None of the group level EI relationships with the manager performance ratings were at a significant level ( $p=0.05$ ).

Continuing with the manager's view, the high-performing teams had significantly higher manager ratings for the 6 team effectiveness factors ( $p=0.00-0.04$ ). These same high-performing teams (manager view) had lower ratings from the team members for 4 of the 6 performance factors, although none of the differences were at a significant level ( $p=0.05$ ).

In summary, no objective performance data were available to assess correlations with individual and team EI scores. Instead a combination of performance ratings and team nominations collected through team member and manager survey responses were used to represent overall levels of team effectiveness. These scores were analyzed to try to understand any differences existing between teams that were viewed as having high and low levels of overall effectiveness. The team member assessments of effectiveness showed a primarily positive relationship with both individual and team-level EI, with the differences in mean scores at a significant level. Manager assessments of effectiveness showed a primarily negative relationship with both individual and team-level EI, though the differences in mean scores were not at a significant level ( $p=0.05$ ).

#### **Section Four: Team Experiences in the Agile Environment**

Finally, this study set out to understand how the findings discovered through the analysis of the quantitative survey data actually played out within the team's daily work. As previously mentioned, qualitative data were collected from both team members and managers in terms of nominations for high, average and low performing teams. They were asked not only to name a specific team that was an example of that performance level, but also to answer the question for each nomination, "What causes you to identify this team in this way?" These comments from both team members and managers were coded and analyzed for key themes, in hopes of gaining an increased level of understanding of what factors positively or negatively contributed to team effectiveness. A set of 20 codes emerged that were similar for both populations (see Appendix I for code definitions and examples).

Themes emerged representing both areas of team effectiveness being examined in this study: performance outcomes (9 themes) and cohesion (11 themes) (see Tables 11.1 and 11.2). The frequency was counted for the number of times comments were made related to a specific theme. Positive comments regarding the nominated team possessing that particular aspect of effectiveness were tallied, as well as comments related to that same aspect being missing or needed by the nominated team. These missing aspects were noted as negative comments and the count for these items was shown in parentheses. The frequency with which they were named was calculated as part of the overall

Table 11.1

Thematic Analysis of Qualitative Comments: Rationale for Team Nominations Made by Managers

<b>MANAGER RESPONSES - REASONS FOR NOMINATING A TEAM AS HIGH, AVERAGE, OR LOW PERFORMING</b>																					
	# of manager comments	1 Communication	2 Collab	3 Delivers/output	4 Efficiency/Speed	5 Expertise / challenge	6 Flexibility/Responsive	7 Clear Goals / Plan	8 Knowledge Sharing	9 Organiz / Extern Mgmt	10 Morale /Syn-ergy	11 Optimism/motiv	12 Others-aware/help	13 Own-ership	14 Predict/Consist	15 Pro-blem solving	16 Pro-cess	17 Qua-lity	18 Re-spect	19 Self-directed	20 Effort / Works hard
HIGH TMS.	30	8	7 (1)	14	5	14	6	7	2	11 (3)	2	6	5 (2)	3	13	5	7	11	1	6	1
AVG TMS.	27	1	4 (1)	13	4 (3)	16 (3)	3	10	0	15 (9)	1	1	1	0	9	5 (3)	4 (1)	5 (1)	0	1	1
LOW TMS.	26	2 (2)	2 (2)	12 (7)	2 (2)	12 (10)	1	12 (11)	1 (1)	29 (29)	1 (1)	2 (1)	2 (2)	0	6 (4)	0	0	4 (3)	0	4 (4)	0
POS.		9	9	32	6	29	10	18	2	14	3	8	4	3	24	7	10	16	1	7	2
NEG.		2	4	7	5	13	0	11	1	41	1	1	4	0	4	3	1	4	0	4	0
TOT. FREQ		11	13	39	11	42	10	29	3	55	4	9	8	3	28	10	11	20	1	11	2

*Note:* See Appendix I for full code labels, definitions and examples. Codes highlighted in gray are identified as being cohesion or relationship oriented; codes not highlighted are identified as being performance or outcome oriented. Negative comments related to a coded theme as missing or poorly done are noted in parentheses ( ).

Table 11.2  
Thematic Analysis of Qualitative Comments: Rationale for Team Nominations Made by Team Members

<b>TEAM MEMBER RESPONSES - REASONS FOR NOMINATING A TEAM AS HIGH, AVERAGE, OR LOW PERFORMING</b>																					
	# of team member comments	1 Commu- nication	2 Collab	3 Deli- vers/ out- put	4 Effici- ency/ Speed	5 Exper- tise/ chal- enge	6 Flexibi- lity/Re- spon- sive	7 Clear Goals / Plan	8 Know- ledge Shar- ing	9 Organiz / Extern Mgmnt	10 Morale /Syn- ergy	11 Opti- mism/ motiv	12 Others- aware/ help	13 Own- ership	14 Predict/ Consist	15 Pro- blem solving	16 Pro- cess	17 Qua- lity	18 Re- spect	19 Self- directed	20 Effort/ Works hard
HIGH TMS.	26	1	5	12	6	8	3	3	0	3	2	0	5	1	7	2	0	8	1	1	2
AVG. TMS.	22	0	1	11 (1)	4 (1)	5	3	2 (1)	1	5 (4)	1	0	3	0	8 (1)	1	1	4 (2)	1	2	3
LOW TMS.	17	2 (2)	3 (3)	6 (5)	1 (1)	4 (2)	1 (1)	2 (2)	3 (3)	5 (4)	1 (1)	1 (1)	7 (6)	2 (1)	2(2)	1 (1)	0	5 (5)	0	0	0
POS.		1	6	23	9	15	6	4	1	5	3	0	9	2	14	3	1	10	2	3	5
NEG.		2	3	6	2	2	1	3	3	8	1	1	6	1	3	1	0	7	0	0	0
TOT. FREQ		3	9	29	11	17	7	7	4	13	4	1	15	3	17	4	1	17	2	3	5

*Note:* See Appendix I for full code labels, definitions and examples. Codes highlighted in gray are identified as being cohesion or relationship oriented; codes not highlighted are identified as being performance or outcome oriented. Negative comments related to a coded theme as missing or poorly done are noted in parentheses ( ).

frequency count for each theme identified. The results of this qualitative analysis revealed that both team members and managers had very similar patterns of frequency in citing how they judged the effectiveness of the teams they nominated. For both managers and team members, 5 of the 6 most frequently mentioned themes were the same and all fell in the performance outcomes aspect of team effectiveness: delivering outcomes, team member expertise, organizational and management factors outside of the team's actions, predictability and consistency of outcomes, quality of work. For the managers, a sixth theme received a high frequency rating: clear goals and plans. For the team members, a sixth theme also received a high frequency rating: awareness of others' needs / willingness to help. This sixth theme identified by team members falls into the second aspect of team effectiveness – cohesion.

A second set of qualitative data was collected from just team members as part of their team survey. They were asked to respond to 4 open-ended questions reflecting on the effectiveness of their own current teams. These questions focused on 1) what the team was doing well that should be continued, 2) what the team was not doing now and should start doing, 3) what the team was doing now that it should stop doing, and finally 4) if there was anything else they would like to make known about their current team and how it functions. The results of these comments revealed a different orientation to team effectiveness than did the comments gathered from the nomination rationale. When team members were talking about their own experiences within their day-

to-day working teams, the frequency shifted to include a more substantial focus on the themes related to cohesion (see Table 12).

In analyzing the team member comments for core themes, the same set of 20 codes emerged as with the prior set of qualitative responses, with the addition of 2 new codes that emerged from this set of qualitative data: the work itself / working on good projects and innovation. This updated set of 22 codes was used for thematic analysis of the start/stop/continue comments. The comments for each of the 4 questions were analyzed separately, and then collectively summarized. In addition, note was made as to whether the team member making the comment was part of a high, average, or low performing team according to the team member view of performance (combined rank for team members' effectiveness scores and team nominations). Frequency for each of the themes was assessed, as well as the positive or negative nature of the comments. Frequency counts for negative comments were noted in parentheses.

The results of this analysis revealed a more balanced representation of the cohesion-related factors of team effectiveness with four of the top eight themes relating to how the group worked together: communication, collaboration, morale / group synergy, and awareness of others' needs / willingness to help.

These 4 cohesion-related themes were complemented by the remaining 4 performance-related themes: team member expertise, clear goals and plans, organizational and management factors outside of the team's actions, and

Table 12

Thematic Analysis of Qualitative Comments: Responses to Start / Stop / Continue Questions

Team Member Question	1 Communicate	2 Collab	3 Delivers/output	4 Efficiency/Speed	5 Expertise/challenge	6 Flexibility/Responsive	7 Clear Goals / Plan	8 Knowledge Sharing	9 Organiz /Extern Mgmt	10 Morale /Synergy	11 Optimism/motiv	12 Others-aware/help	13 Ownership	14 Predict/Consist	15 Problem solving	16 Proccess	17 Quality	18 Re-spect	19 Self-directed	20 Effort/Works hard	21 Work itself / good projects	22 Innovation
Doing well now - should continue																						
(N=26) High	5	7	4	2 (1)	7	1	3	2	1 (1)	7	0	7	1	0	4	3	2	3	0	1	3	4
(N=32) Avg	9	8	7	4	10	1	4	1	0	6	0	4	2	1	4	5	1	1	2	3	0	0
(N=7) Low	0	0	0	0	0	0	5	0	0	0	0	0	0	1	0	5	0	0	1	0	0	0
Total	14	15	11	6 (1)	17	2	12	3	1 (1)	13	0	11	3	2	8	13	3	4	3	4	3	4
Not doing - should start																						
(N=14) High	0	2 (2)	0	0	2 (2)	0	5 (5)	0	5 (5)	2 (2)	0	1 (1)	0	1 (1)	0	7 (7)	2 (2)	0	0	0	0	0
(N=24) Avg	7 (7)	2 (2)	0	1	2 (2)	0	7 (7)	1 (1)	8 (8)	1 (1)	1 (1)	1 (1)	3 (3)	0	0	4 (4)	1 (1)	0	1 (1)	0	0	0
(N=5) Low	1 (1)	0	0	0	0	0	2 (2)	1 (1)	1 (1)	0	1 (1)	0	0	0	0	1 (1)	1 (1)	0	0	0	0	0
Total	8 (8)	4 (4)	0	1	4 (4)	0	14 (14)	2 (2)	14 (14)	3 (3)	2 (2)	2 (2)	3 (3)	1 (1)	0	12 (12)	4 (4)	0	1 (1)	0	0	0
Doing now - should stop																						
(N=10) High	2 (1)	2 (2)	0	0	2 (1)	0	3 (3)	0	5 (5)	0	0	1 (1)	1 (1)	0	0	2 (2)	3 (3)	0	1 (1)	0	0	1 (1)
(N=15) Avg	3 (3)	2 (2)	1 (1)	1 (1)	1 (1)	0	5 (5)	1 (1)	7 (7)	0	0	1 (1)	1 (1)	0	0	1 (1)	1 (1)	4 (4)	0	0	0	0
(N=2) Low	0	1 (1)	0	0	1 (1)	0	0	1 (1)	1 (1)	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	5 (4)	5 (5)	1 (1)	1 (1)	4 (3)	0	8 (8)	2 (2)	13 (13)	0	0	2 (2)	2 (2)	0	0	3 (3)	4 (4)	4 (4)	1 (1)	0	0	1 (1)

Other info we should know																						
(N=11) High	4 (1)	2	1	0	3 (2)	0	0	0	4 (4)	6	0	6 (2)	0	0	0	0	0	1 (1)	1 (1)	1	1	0
(N=13) Avg	1 (1)	3 (1)	1	0	2 (1)	3	4 (4)	0	5 (5)	3 (2)	2 (1)	3 (2)	1 (1)	0	0	1	0	2 (1)	1	0	0	0
(N=6) Low	1	3 (1)	0	0	2 (1)	0	0	1 (1)	1	1	0	0	0	0	0	0	0	0	2 (1)	0	0	0
Total	6 (2)	8 (2)	2	0	7 (4)	3	4 (4)	1 (1)	10 (9)	10 (2)	2 (1)	9 (4)	1 (1)	0	0	1	0	3 (2)	4 (2)	1	1	0
Overall Frequency																						
POS.	19	21	13	6	21	5	12	3	1	21	1	16	3	2	8	14	3	5	5	5	4	4
NEG.	14	11	1	2	11	0	26	5	37	5	3	8	6	1	0	15	8	6	4	0	0	1
TOTAL FREQ.	33	32	14	8	32	5	38	8	38	26	4	24	9	3	8	29	11	11	9	5	4	5
(N=70 / 122 team members provided comments)																						

*Note:* See Appendix I for full code labels, definitions and examples. Codes highlighted in gray are identified as being cohesion or relationship oriented; codes not highlighted are identified as being performance or outcome oriented. Negative comments related to a coded theme as missing or poorly done are noted in parentheses ( ).

process. In reading through each of the specific comments, a clear sense emerged around how much team members valued the relationships they had (or were missing) with their team members, and also how much the Agile / Scrum process was valued as a method that contributed to their outcomes and performance.

Results from analyzing the survey data reveal that, from the team's point of view, both performance outcomes and cohesion made up important aspects of team effectiveness, as demonstrated through both their qualitative comments and their strong correlations between individual and group-level emotional intelligence and effectiveness ratings. The Manager view of team effectiveness was not as clear. While there was a negative trend present in the relationships between the manager effectiveness scores and both the individual and group EI ratings, none of the findings reached a significant level.

A final set of qualitative data was collected through a series of informal, follow-up interviews conducted with a combination of managers and team members. The purpose of these interviews was to 1) try to understand how team effectiveness was viewed by various individuals and roles within the organization, 2) to see if the participants could provide any insight into the different perspectives represented by managers and team members in the survey data, and finally 3) to see if participants experienced the Agile / Scrum process having an impact, either positive or negative, on the performance or cohesion aspects of team effectiveness. The ultimate goal of the interviews, as with the overall

research study, was to try to understand if the emotional intelligence and the cohesion aspects of team effectiveness were positively valued as performance enhancers or viewed negatively as distractions and time wasters.

A total of 9 interviews were conducted: 3 with senior managers responsible for multiple managers and teams, 3 with first-level managers responsible for the final performance outcomes of a team and typically the people manager for some of the team members, and 3 with team members. Participants were selected to represent a mix of geographic locations, views of the team's day-to-day actions, levels of organizational accountability, and levels of team performance. Interviews lasted for 30 minutes and were conducted by phone or video conference. The questions asked included warm up questions and items focused on the individual's view of team effectiveness. The final questions were more directly focused on gaining insight into the findings from the survey data: the discrepancies between the managers' view and the team members' view of team effectiveness, as well as the role that Agile / Scrum practices may play in either positively or negatively impacting team performance and cohesion (see Appendixes J and K for Interview Questions).

The outcomes of these interviews provided a relatively consistent set of responses. While performance outcomes were where the organizational metrics were focused and were the ultimate goal of the work the teams did, cohesion factors were viewed as being critical enablers for team success.

When asked what they thought of when they heard the term "team

effectiveness", all 6 of the managers and 1 of the team members began their responses with performance outcomes. Responses included such specifics as delivering on committed work goals, predictability, bug count, and the number of problems experienced once the software was deployed in the field. The remaining 2 team members had initial responses that differed: their responses began with communication, integration, understanding each team member's role, and collaborating. All 3 of the first-level managers and the remaining 1 team member did independently follow up on their initial statements to include such areas as working well together, solving problems, having team members be able to provide back up for one another, and understanding how to jump in and help one another.

As a follow up question to the team effectiveness items, participants were asked if they thought the area of cohesion mattered to team effectiveness. All 6 of the managers and 2 of the team members responded quite strongly that cohesion was an important part of team effectiveness. They provided specific examples of problems that occurred when teams had conflicts that weren't resolved effectively, and of the power of being able to bring strong, disparate views together for real dialogue, with outcomes that were enhanced through this diversity and convergence of thinking. Other specific areas identified included the ability to communicate effectively, gain alignment and build buy-in, feel respected and heard, being able to read what was going on with other team members and respond appropriately. One first-level manager noted, "People who work well

together are going to deliver something awesome. If they don't get along, there are going to be problems." And another first-level manager noted, "The only way to be successful is for teams to establish norms and a culture for themselves."

In addition, two of the senior managers commented on how much this mattered as teams came under pressure to solve a problem or deliver an outcome for a deadline. One of these senior managers noted, "It's kind of like being in the trenches in a war - you have to be able to count on the person to the right of you and to the left of you. You have to be able to trust them." Several managers mentioned having to change team assignments, and even having one team member leave due to poor cohesion.

One team member did specifically say that he did not think that cohesion factors were important to team effectiveness, but then went on to talk about how it was important to be able to talk with poor performers on the team, to understand what was going on for them, and to see how other team members could jump in and provide help.

Interview participants were then provided with the study findings that team member ratings showed a significant positive correlation with team effectiveness, while manager ratings showed a negative relationship with team effectiveness. All 9 of the participants were surprised by this finding, and none was able to provide any level of clear and immediate cause for why this would be the case. When asked to think further about the situation, and provide any possible insights that might apply, a number of different circumstances were brought to light.

The most common reply was that managers don't live inside the world of the team's daily life; that teams experience discussions and interactions of which the manager has no awareness or experience. Additional comments included 2 of the managers and 1 of the team members explicitly saying, "The teams are right." Support provided for this statement included comments regarding the fact that they were the closest to the work and knew best what was going on.

A few additional proposals were offered as possible reasons or contributing factors for the discrepancy between manager and team member views. Many centered on the challenges of alignment - between teams and managers, among team members, and among the various managers responsible for the teams. One team member stated, "If the managers' view is not the same as the teams', maybe the path to effectiveness is not clearly communicated." One senior manager noted the challenges of managing multiple self-directed teams, along with carrying out other organizational responsibilities. This manager noted, "Sometimes there's a lack of alignment between the managers and the teams. Scrum Masters are not always clear on what the priorities are. Sometimes things that seem obvious to us as senior managers are just not seen by first-level managers or Scrum Masters. We need to be more attuned and aligned."

An additional set of observations was offered by another senior manager. Regarding both the manager and the team member views, he observed, "We are engineers. Sometimes we lock onto something small and view the overall situation based on that." He went on to provide another example that applied

specifically to the management team. He mentioned that it was time for the company's annual performance review cycle, and that managers were asked to work within the guidelines of a normal distribution curve in providing ratings for their staff. To meet this expectation, the management team met to discuss staff ratings and to calibrate their views regarding team member performance. The manager observed that the discussions often began by revealing quite disparate management views of the same individual. "We all have our own limited views, we bring our own values, and see just one slice." He then described what turned out to be a very effective set of feedback sharing and calibration discussions across the management team.

Team members contributed a few other thoughts regarding possible reasons for the discrepancy between team member and manager views. One posed the idea that perhaps the teams liked to operate from a place of motivation and optimism, and that this view possibly caused them to see their effectiveness more positively than was the reality. This same team member commented that team effectiveness, particularly within software development teams "...is a balance of craft and science." He went on to describe the discrepancies regarding many of the metrics that could be used to judge team effectiveness including the definition of what makes "good software" and the definition of "done" for work that Scrum teams produce within an Agile environment. He commented that it was an on-going challenge to really determine "...which measures were most meaningful."

A second team member shared some additional possibilities to explain the discrepancies: maybe it was survival instincts on the part of the team members, or maybe it was that the stereotypes regarding engineers were true, and they lacked the self-awareness to be able to accurately assess these areas because they weren't naturally attuned to doing so.

Finally, the 9 interview participants were asked to comment on the role they thought the Agile / Scrum process played in team effectiveness, if any. Eight of the nine participants noted primarily positive impacts of Agile / Scrum on both the performance and the cohesion aspects of team effectiveness. One team member commented on the challenge he saw the methodology providing: "You can get caught up in the steps and the process of Agile without doing the deeper thinking about what really matters...Scrum tends to fragment thought and design...Good execution requires understanding."

The comments of the others were not all purely positive, but were strongly biased toward seeing the improvements gained through implementing Agile / Scrum practices. Positive comments related to performance outcomes and deliverables were focused on the improved overall effectiveness in the planning process and the ability to change requirements and priorities every thirty days in response to customer or market needs. Positive comments related to the cohesion aspects centered heavily on the communication practices established by Agile / Scrum: "How we communicate has really changed." Many of the managers and team members mentioned the practice of daily Scrum meetings

as being key ways for everyone to learn about what was going on. One manager noted, "It has changed the culture - made it open, set the expectation that you talk about issues." Additional comments talked about identifying performance problems and dependencies much sooner as a result of daily check-ins.

Participants also spoke about the challenges of Agile / Scrum. Many talked about the fact that implementing the methodology in its purest form was very difficult, and that most teams used some modified form of Scrum / Agile, trying to get the benefits while still providing some committed dates for product roadmaps and leveraging available resources to make up global teams. Several participants talked about the fact that Agile / Scrum is not an engineering process, it's a way for the overall organization to operate. Changes need to be made in terms of management roles and responsibilities, Product Marketing, and even the way the organization manages its customer relationships to truly provide an aligned implementation of the Agile / Scrum practices. Specific changes were noted for both managers and team members. One manager noted that it was still hard for engineers to provide each other with negative feedback when it was needed. "They don't call each other out as they are supposed to. They feel like 'it's not my role - I'm not a manager.'" One team member noted that successful Scrum / Agile practices required change on the part of managers: "Engineering managers like to direct work. Now they have to facilitate and get out of the way."

In summary, the interviews with 3 senior managers, 3 first-level managers,

and 3 team members provided useful additional insights as to how team effectiveness was viewed and what was important in enhancing team effectiveness. While delivering required and committed product outcomes was seen as the primary purpose of the teams, cohesion was viewed as a critical enabler and performance differentiator in most cases. The discrepancy between team member and manager views was seen primarily as an issue of alignment, with most interview participants feeling that team members knew best what was actually going on within teams and impacting their effectiveness. Finally, Agile / Scrum practices were viewed by the majority of participants as contributing positively to both performance outcomes and aspects of cohesion for the teams, though challenges exist in fully implementing and gaining the benefits from these practices. The findings from these interviews provided additional clarity and reinforced the data collected through the manager and team member surveys.

## CHAPTER FIVE: DISCUSSION

### Section One: Summary of Findings

The results of this study provide some interesting new information to consider in trying to understand the relationship between emotional intelligence and team effectiveness of self-directed engineering teams working in high-tech environments.

When comparing the individual and team emotional intelligence scores of the engineering study population to the databases for both surveys, the engineering population scored significantly higher. While the 122 team members, making up 27 working teams, are certainly a small sample population, these findings do call into question the stereotype of the "computer nerd" who is brilliant at solving technology issues, but inept at working with his colleagues. In a discussion that Daniel Goleman cites with MIT faculty member Stephen Rosen (Goleman, 1998b, p. 44), Rosen argues that "at the extreme high end of the IQ scale, there is often a lack of social skills...the smarter they are, very often the less competent they are emotionally and in handling people. It's as though the IQ muscle strengthened itself at the expense of muscles for personal and social competence."

Engineering populations fall at the high end of the IQ scale (Bausch, 2012; Statistics Brain, 2014). Research continues to explore the connection between IQ and EQ, with a 2014 study by Barbey, Colom, & Grafman finding that IQ and conscientiousness significantly predict emotional intelligence, and identifying the

shared areas of the brain that contribute to this interdependence.

Included in the definition of intelligence is the "...general ability to learn and adapt to the environment (Mayer, Salovey & Caruso, 2004, p 198). For the engineering population studied, the ability to operate effectively within a daily Scrum team environment is a core requirement. The Agile / Scrum methodology within which these teams carry out their work sets in place core operating processes and principles regarding effective team interactions (e.g., daily team meetings, monthly retrospectives, valuing individuals and interactions over processes and tools). These organizational requirements, imposed on these highly intelligent individuals, present an immediate and compelling need for them to "exercise their EQ muscle". As Goleman points out, "No matter how insensitive, shy, hot-tempered, awkward, or tuned-out people may be, with motivation and the right effort they can cultivate emotional competence." (1998b, p. 240–241). Explicitly identifying cohesion-related behaviors and norms as core requirements for engineering teams, to both team members and managers, could have a very constructive impact. If these team members do, in fact, need these behaviors and norms, providing a common set of expectations, tools, language, training, and reinforcement could add significantly to the effectiveness of the teams.

In assessing both the individual EI traits of the team members and the group-level EI norms of the working teams, the correlations between these two models provided new information for consideration. These two models have not

been previously studied together in any of the published literature. Individual trait EI and group-level EI were found to be significantly positively correlated with one another at the overall mean level and among many of their dimensions. There seems to be an opportunity for these sets of traits and norms to support and extend one another within the group setting. The Agile / Scrum context builds a culture oriented toward team EI, which through repeated demonstration and expectation, may in turn help to build the skills and perceptions of individual EI in the team members. Individuals with strong EI can, in turn, impact the overall group levels of EI in a reciprocal building of shared positive experiences for the team and its members.

In a 2005 study conducted by Elizabeth Stubbs, individual team leader emotional intelligence (as measured by the ECI-2 survey) was shown to be significantly related to the presence of emotionally competent group norms on the teams they led, and that emotionally competent group norms were related to team performance. It could certainly logically follow that in a self-directed team where there is no formally assigned individual leader, team members must step up and play this role within the team. Informal leadership emerges as team members with different skills or task-related expertise come to the forefront of the team's interactions to help ensure the team is addressing critical issues that impact performance. These informal leaders may be one strong individual within the team, or may vary among different members at different times. Thus, individuals with strong EI can play a role in helping to ensure a positive emotional

experience for their teams, and that context, in turn, may help to develop and reinforce group-level EI.

Further research is needed to understand the role the Agile / Scrum context plays in the reciprocal demonstration and development of individual trait EI and group-level EI, and their relationship with team effectiveness.

In trying to assess the relationship between individual and team levels of EI and team performance, significant positive correlations were found between team member ratings of team effectiveness and the group-level EI means and factors. Positive relationships were also found between the team member ratings of team effectiveness and the individual trait EI mean and factors, though none were at a significant level. These positive correlations and relationships make sense when considering the complexity of the required interactions within Agile software development teams. According to Cockburn and Highsmith (2001), "...people working together with good communication and interaction can operate at noticeably higher levels than when they use their individual talents...therefore, agile project teams focus on increasing both individual competencies and collaboration levels" (p. 132). They go on to describe the unique nature of Agile software development processes as "designed to capitalize on each individual and each team's unique strengths: One-size fits one - every process must be selected, tailored, and adapted to the individuals on a particular project team" (p. 132). Clearly team members and groups operating with higher levels of emotional intelligence and emotionally competent group norms would have an advantage in

managing this complex communication, collaboration, and alignment of their work to their individual and group needs and assets.

While the team member ratings of effectiveness were strongly correlated with group-level EI and showed a positive relationship with individual EI, there was a consistent trend of negative relationships between these EI variables and the managers' ratings for team effectiveness. Yet, unlike the team member ratings, none of the relationships between the manager effectiveness ratings and the group-level or individual EI ratings were found to be at a significant level. These findings raised a puzzling set of questions. Why would the manager and team member ratings show such different patterns? Why were none of the relationships between the manager effectiveness ratings and the teams' individual or group EI ratings at a significant level? Whose view was actually right?

The qualitative data collected through both the surveys and through follow-up interviews did provide a more cohesive view across managers and team members. Relationship-based norms and behaviors were explicitly discussed by both managers and team members as not only beneficial, but as critically important to the effectiveness of the teams.

The differing views revealed in the quantitative analysis of this study did, however, raise a set of interesting questions; and these questions may be viewed as a set of findings in and of themselves.

Some of the questions raised from the differences in manager and team

member ratings seemed to have their basis in the issue of alignment - of experiences, of priorities, of focus - for these two groups. While the teams share an important set of collective experiences that are outside of the managers' awareness, managers, too, have a set of organizational challenges and customer or market demands that are often not fully revealed to the teams. Challenges with alignment are not uncommon for managers and self-directed teams. Druskat and Wheeler (2004) describe the challenge of "managing in no-man's land." They describe the situation of "... leading a team that needs to manage itself as inherently tricky" and the role as "... highly ambiguous by nature (and, on the face of it, oxymoronic)" (p. 66). The situation has complexity added to it by the fact that "the typical external leader is in charge of several self-managing teams at one time" (p. 67). These external managers must play the complex role of working closely enough with the teams to understand and support what is going on without unduly controlling or directing the team's actions, while also working with the broader organization to understand the company's needs, expectations, available resources, and customer requirements. Manager behaviors found to be important for success in this complex role include relating, scouting, persuading, and empowering (Druskat and Wheeler, 2004). So even for these external managers of self-directed teams, the dependence on relationship skills and need for individual and group-level EQ is present.

The challenges of managing these self-directed teams is compounded by the shift in metrics used by Agile teams versus standard organizational measures.

Hartman and Dymond (2006) cite several critical shifts involved in creating and working with appropriate Agile measurements. Among a list of recommendations they call out is the need to "measure outcome not output" (p.1) where "...maximizing the amount of work not done" is promoted with the goal of "reducing planned output while maximizing delivered value" (p. 2). They go on to state that a good Agile metric "reveals rather than conceals its context and significant variables" (p. 2), and they highlight the fact that "it should be visibly accompanied by notes of significant influencing factors" (p.2).

They say that Agile metrics should "provide fuel for meaningful conversation. Face-to-face conversation is a very useful tool for process improvement. A measurement isolated from its context loses its meaning" (p. 2). They argue that a good Agile metric should "encourage 'good-enough' quality. The definition of what's good enough in a given context must come from that context's business customer or their proxy, not the developers" (p.2). Hartmann and Dymond also encourage that, in addition to creating effective organization-level metrics, local teams should also establish their own diagnostic metrics to be able to review and improve their own performance in an ongoing way.

In summary, the overall findings from this research study do make the business case that individual trait EI and emotionally-competent group norms add positively and significantly to the effectiveness of the engineering teams working in the Agile high-tech environment studied. Of particular note is the important role

that context seems play in supporting the use and development of both individual and group-level emotional intelligence.

### **Section Two: Implications for Practice and Recommendations**

Several recommendations for practice emerge from the findings of this study. First, establishing a clear picture of what team effectiveness looks like, that is agreed upon by management and team members, is an important area of focus. Whatever definition is applied to the term *team effectiveness*, the team members and managers need to be working from one aligned point of view to successfully achieve it.

Second, explicitly identifying cohesion-related behaviors and norms as core requirements for engineering teams, to both team members and managers, could have a very constructive impact. Doing this provides the team with a common language for establishing and monitoring its norms and behaviors. It also provides the organization with an opportunity to help develop and reinforce them.

This leads to the third recommendation, which is that organizations provide formal training to team members, Scrum Masters, and managers regarding the existence and use of emotionally-competent group norms. Teams need to have an understanding of what successful norms look like, and to receive support in selecting and developing the ones that are most important for their own working groups. They may find it beneficial to take the TEI Survey as an intact team, and to get support in reviewing a team feedback report and taking actions on the specific recommendations made for them.

Final recommendations include having the organization look at ways to explicitly reward and recognize effective use of individual and team level EI as they contribute to team effectiveness. Desired individual and team behaviors need to be reinforced at the organizational level. Currently the organization being studied does include behavioral competencies at the individual level in its annual performance review form, and as a consideration in its salary increase recommendations. As the organization continues its transformation to an Agile way of operating, finding ways to reward and recognize effective team-level use of emotionally competent norms could be an important addition in driving desired team effectiveness.

### **Section Three: Limitations of the Study**

This study involved a limited size sample population found within one high-tech organization. Therefore the findings have very limited generalizability. However, management / leadership systems in software engineering and similar types of high-tech organizations may find the primary findings of this study germane for consideration.

This study also has limitations related to the use of self-reported data. While both survey instruments were created for the purpose of self-reporting, this methodology may still have inherent limitations of validity of the data.

Qualitative thematic codes were identified solely by the primary investigator, without the benefit of multiple coders and confirmation through inter-rater reliability.

No objective performance data was made available to the researcher by the organization being studied. In using interviews to try to provide insights into the differing patterns of team member and manager ratings, retrospective sense-making may have biased participant responses.

Common method bias could be a consideration in the strong team member correlations between group EI scores and team effectiveness scores. This does not seem to have been the case, however, as differentiation in the ratings did occur across the various dimensions of both the group emotional intelligence and team effectiveness models. The order of items in the survey may have helped to interrupt any potential bias - individual and group EI questions in the survey were followed by a section of open-ended response questions, then by the team effectiveness scales.

#### **Section Four: Recommendations for Future Research**

Further study is recommended regarding the relationship between the individual trait EI model of emotional intelligence and of team-level emotionally competent norms of the TEI model. Gaining a deeper understanding regarding the interdependence identified between the various factors of these models may reveal additive opportunities to leverage and develop both areas of EI to improve team effectiveness.

Further research regarding the role that individual trait EI and emotionally competent group norms play in engineering teams is needed. These teams need to be studied in their organizational settings. Continued study is particularly

needed for Agile / Scrum teams in the workplace. It may be that the Agile / Scrum principals and methodology are contributing to raising the EI levels for both individuals and teams. Better understanding of this relationship between the Agile / Scrum context and individual and group EI could help provide even stronger recommendations for practice.

Finally, further research is needed to understand the role that both formal and informal leaders play within the Agile / Scrum environment in influencing both individual trait EI and team-level use of emotionally competent group norms, and therefore, team performance.

### **Section Five: Summary**

The findings in this study support the business case for focusing on individual trait EI and emotionally competent group norms for engineering product development teams operating within a high-tech environment. The insights gained from this study enable useful recommendations regarding team operational practices, management and team alignment, and training and development agendas for teams and their managers. Enacting these recommendations would enable organizations to purposely and proactively enhance the effectiveness of individual team members, of intact product development teams, and of the overall organization.

## **Appendix A**

### **Team Briefing Content**

(This content was communicated through video and audio conference calls, and via email to team members and their corresponding managers.)

My name is Lynne Richer. I am a doctoral student at Boston University. I am conducting a research study for my dissertation, focusing on the factors that impact the effectiveness of engineering teams operating within high-tech environments. I am asking that you and your team members agree to be voluntary participants in this study. If you agree to take part in this study, you will be asked to review and sign a voluntary informed consent form.

Participating team members will be asked to complete an on-line survey, taking a total of approximately 30 minutes. The items in this survey focus on individual and team-level actions that may contribute to team performance, and also on the overall effectiveness of the teams. Managers responsible for the performance of these teams will also be asked to complete a brief assessment regarding the teams' effectiveness, taking approximately 5 – 10 minutes for each participating team under their management. To supplement this survey data, a targeted sample population of individual team members will be asked to take part in a 30-minute follow up interview discussing their own experiences with their teams.

Where possible, objective measures captured by the organization regarding team performance will be reviewed and utilized as additional input in

assessing team levels of effectiveness.

Upon completion of the study, a high-level summary of this study's findings will be made available to participants and management upon request. Your responses will be kept strictly confidential. The identity of all participating individuals and teams will be kept anonymous. The identity of the company will also be anonymous in the final dissertation.

Participation in this study is completely voluntary. You can decline to participate, withdraw from participation at any time, or choose not to answer any individual question without penalty. Refusal to participate in the research will not impact your work conditions or status in any way.

I will be sending you an email notice regarding your participation. Included in that message will be the following:

1. Language providing *Informed Consent* information, and asking for your agreement to take part in the study. Please take a look at this Informed Consent information now so that you have the opportunity to ask any questions and ensure your understanding of it.
2. A live link to the survey questions to be completed for this study.

Thank you, in advance, for your consideration regarding participation in this study. I will be following up with you in the next week by email to invite you to take part.

## Appendix B

### Informed Consent - Individual Participant

Dear (Team name) Team Member,

This email message is to follow up on the briefing that you received recently regarding the request for you and your team members to participate in a research study.

**Introduction:** Please read this information carefully. The purpose of this message to provide you with important information regarding participation in a research study being conducted as part of a doctoral dissertation at Boston University. If any of the statements or terms in this form are unclear, please let us know. We would be happy to answer any questions.

**Research Study Purpose:** The purpose of the study is to examine and gain further insights into the factors that impact team effectiveness within a high-tech environment.

**Your Participation:** We are seeking the participation of the product development team members in your organization because they represent a key set of teams operating within a high-tech environment. We are asking you to take part in this study because you are a member of one of these product development teams.

**Procedures:** Participation in this study will involve completing a brief, on-line survey taking approximately 30 minutes. The first section of this survey focuses on traits of individual team members, the second section of the survey focuses

on group-level behaviors that develop within working teams, and the third section of the survey asks your opinions regarding the overall effectiveness of your team. The final section of the survey includes a few demographic questions regarding your team.

In addition to taking these surveys, there will be a small, targeted sample population of individual team members who will be asked to take part in a 30-minute follow up interview discussing their own experiences with their teams. The purpose of these interviews is to allow for a different level of understanding and insights about how the teams operate than may be gained through the on-line surveys alone.

**Risks and Benefits:** As a participant, the only anticipated risk that you may incur is experiencing a potential, slight discomfort regarding sharing your personal responses to the questions you will be asked. You do not have to answer any questions that make you feel uncomfortable.

There are several potential benefits to be gained through your participation.

- Upon completion of the study, you will have the option to receive a high-level summary of the study's findings, and to discover more about the specific set of ideas being tested.
- You will learn how research on team effectiveness is conducted within organizations.

- Also, you will have enabled the results of this research to add to the body of knowledge in Organizational Behavior and Social Psychology regarding the factors that contribute to team effectiveness within high-tech environments.

**Confidentiality and Anonymity:** Your responses will be kept confidential. All study results will be reported in aggregated form. No one individual's or team's results will be presented in isolation. When identification of any kind is necessary during the course of this study, codes or pseudonyms will be assigned. Information linking participants to their codes or pseudonyms be kept in a password protected computer / locked file, and will not be shared with anyone outside of the research team. This information will be retained for the required BU retention period of 7 years, and then will be destroyed or erased in a way that ensures personal information cannot practicably be read or reconstructed.

**Voluntary Participation:** Participation in this study is voluntary. You can decline to participate, end participation at any time, or choose not to answer any individual question without penalty. Refusal to participate in the research will not impact your work conditions or status in any way.

**Questions:** The person who is the primary researcher in charge of this study is Lynne Richer. Lynne may be reached at 617-283-0071 or lricher@bu.edu. The Faculty Advisor at Boston University who is working with Lynne is Dr. Alan Gaynor. Dr. Gaynor may be reached at 617-721-5581 or at agaynor@bu.edu. Any questions about your rights as a research participant and / or questions

about the university Institutional Review Board (IRB) may be sent to the IRB inbox at [irb@bu.edu](mailto:irb@bu.edu) or may be addressed by calling the IRB office at 617-358-6115. For more information, you may also directly access the Boston University IRB website at [www.bu.edu/IRB](http://www.bu.edu/IRB)

**Agreement to Participate:** By clicking on the link below to begin your survey, you acknowledge that you have read the above information, have had the opportunity to ask questions about the study, and agree to participate in this study.

**Please click on the link below to begin your survey. Thank you for your participation.** (Included customized link for each team's survey responses.)

## Appendix C

### Informed Consent - Manager of Team(s)

Dear Manager for (Team name),

This email message is to follow up on the briefing that you received recently regarding the request for you and the members of the team for which you are responsible to participate in a research study.

**Introduction:** Please read this information carefully. The purpose of this message is to provide you with important information regarding participation in a research study being conducted as part of a doctoral dissertation at Boston University. If any of the statements or terms in this form are unclear, please let us know. We would be happy to answer any questions.

**Research Study Purpose:** The purpose of the study is to examine and gain further insights into the factors that impact team effectiveness within a high-tech environment.

**Your Participation:** We are seeking the participation of the product development team members in your organization because they represent a key set of teams operating within a high-tech environment. We are asking you to take part in this study because you are a manager working with one or more of these product development teams.

**Procedures:** Participation in this study will involve taking approximately 15–30 minutes to complete a brief on-line survey. The survey asks your opinions regarding the factors that contribute to the success of your team(s), as well as

their overall level of effectiveness.

In addition to taking this survey, you may be asked to provide or help interpret some of the standard performance data that you already collect for your team(s). The purpose of reviewing this team performance data is to help understand the connection between the way the teams operate and the outcomes they produce. This data review will not involve the creation of any new material, and should take less than 30 minutes of your time. This data will be kept anonymous and confidential.

**Risks and Benefits:** As a participant, the only anticipated risk that you may incur is experiencing a potential, slight discomfort regarding sharing your personal responses to the questions you will be asked or sharing the team performance data already collected by your organization. You do not have to answer any question or share any information that makes you feel uncomfortable.

There are several potential benefits to be gained through your participation.

- Upon completion of the study, you will have the option to receive a high-level summary of the study's findings, and to discover more about the specific set of ideas being tested.
- You will learn how research on team effectiveness is conducted within organizations.
- Also, you will have enabled the results of this research to add to the body of knowledge in Organizational Behavior and Social Psychology

regarding the factors that contribute to team effectiveness within high-tech environments.

**Confidentiality and Anonymity:** Your responses and any other data that you may provide will be kept confidential. All study results will be reported in aggregated form. No one individual's or team's results will be presented in isolation. When identification of any kind is necessary during the course of this study, codes or pseudonyms will be assigned. Information linking participants to their codes or pseudonyms be kept in a password protected computer / locked file, and will not be shared with anyone outside of the research team. This information will be retained for the required BU retention period of 7 years, and then will be destroyed or erased in a way that ensures personal information cannot practicably be read or reconstructed.

**Voluntary Participation:** Participation in this study is voluntary. You can decline to participate, end participation at any time, or choose not to answer any individual question without penalty. Refusal to participate in the research will not impact your work conditions or status in any way.

**Questions:** The person who is the primary researcher in charge of this study is Lynne Richer. Lynne may be reached at 617-283-0071 or lricher@bu.edu. The Faculty Advisor at Boston University who is working with Lynne is Dr. Alan Gaynor. Dr. Gaynor may be reached at 617-721-5581 or at agaynor@bu.edu. Any questions about your rights as a research participant and / or questions about the university Institutional Review Board (IRB) may be sent to the IRB inbox at

[irb@bu.edu](mailto:irb@bu.edu) or may be addressed by calling the IRB office at 617-358-6115. For more information, you may also directly access the Boston University IRB website at [www.bu.edu/IRB](http://www.bu.edu/IRB)

**Agreement to Participate:** By clicking on the link below to begin your survey, you acknowledge that you have read the above information, have had the opportunity to ask questions about the study, and agree to participate in this study.

**Please click on the link below to begin your survey. Thank you for your participation.** (Included customized link for the teams related to this manger.)

## Appendix D

### Team Member Demographic Questions

**Instructions:** Please complete the following participant background information.

1. How long have you been a member of this team?
  - Less than 3 months
  - 3 to 6 months
  - 6 months to a year
  - 1 – 2 years
  - Greater than 2 years
  
2. Is this team currently using Agile / Scrum practices?  Yes  No
  
3. If so, how long has this team been utilizing Agile / Scrum practices?
  - 0 – 1 year
  - 1 – 2 years
  - 3 – 4 years
  - 5 years or more
  
4. Which represents most closely how often your entire team meets face-to-face?
  - More than once a week
  - Weekly
  - At least monthly
  - Quarterly
  - More than once a week
  - Weekly
  - Twice a year
  - Yearly
  - Never
  
5. Which represents most closely how often your entire team meets via conference call or through the use of some other virtual technology?
  - More than once a week
  - Weekly
  - At least monthly
  - Quarterly
  - Twice a year
  - Yearly

6. What is your region of origin?

- North America
- South America
- Central America
- Western Europe
- Eastern Europe
- Middle East
- Africa
- Central Asia
- East Asia
- Pacific

7. What is your primary work location?

## Appendix E

### Survey Section 1: Questions from the TEIQue-Short Form

You will be asked to complete four sections of this survey. Each section addresses a different area of focus related to you and your team. (Note: These 2 sentences were overall introductory comments given to participants when starting the survey - they are not directly related to the TEIQue instructions.)

Instructions: *Please answer each statement below by selecting the number that best reflects your degree of agreement or disagreement with that statement. Do not think too long about the exact meaning of the statements. Work quickly and try to answer as accurately as possible. There are no right or wrong answers. There are seven possible responses to each statement ranging from 'Completely Disagree' (number 1) to 'Completely Agree' (number 7).*

1. Expressing my emotions with words is not a problem for me.	1	2	3	4	5	6	7
2. I often find it difficult to see things from another person's viewpoint.	1	2	3	4	5	6	7
3. On the whole, I'm a highly motivated person.	1	2	3	4	5	6	7
4. I usually find it difficult to regulate my emotions.	1	2	3	4	5	6	7
5. I generally don't find life enjoyable.	1	2	3	4	5	6	7
6. I can deal effectively with people.	1	2	3	4	5	6	7
7. I tend to change my mind frequently.	1	2	3	4	5	6	7
8. Many times, I can't figure out what emotion I'm feeling.	1	2	3	4	5	6	7
9. I feel that I have a number of good qualities.	1	2	3	4	5	6	7
10. I often find it difficult to stand up for my rights.	1	2	3	4	5	6	7
11. I'm usually able to influence the way other people feel.	1	2	3	4	5	6	7
12. On the whole, I have a gloomy perspective on most things.	1	2	3	4	5	6	7
13. Those close to me often complain that I don't treat them right.	1	2	3	4	5	6	7
14. I often find it difficult to adjust my life according to the circumstances.	1	2	3	4	5	6	7
15. On the whole, I'm able to deal with stress.	1	2	3	4	5	6	7
16. I often find it difficult to show my affection to those close to me.	1	2	3	4	5	6	7
17. I'm normally able to "get into someone's shoes" and experience their emotions.	1	2	3	4	5	6	7
18. I normally find it difficult to keep myself motivated.	1	2	3	4	5	6	7
19. I'm usually able to find ways to control my emotions when I want to.	1	2	3	4	5	6	7
20. On the whole, I'm pleased with my life.	1	2	3	4	5	6	7
21. I would describe myself as a good negotiator.	1	2	3	4	5	6	7

22. I tend to get involved in things I later wish I could get out of.	1	2	3	4	5	6	7
23. I often pause and think about my feelings.	1	2	3	4	5	6	7
24. I believe I'm full of personal strengths.	1	2	3	4	5	6	7
25. I tend to "back down" even if I know I'm right.	1	2	3	4	5	6	7
26. I don't seem to have any power at all over other people's feelings.	1	2	3	4	5	6	7
27. I generally believe that things will work out fine in my life.	1	2	3	4	5	6	7
28. I find it difficult to bond well even with those close to me.	1	2	3	4	5	6	7
29. Generally, I'm able to adapt to new environments.	1	2	3	4	5	6	7
30. Others admire me for being relaxed.	1	2	3	4	5	6	7

(Petrides & Furnham, 2006)

All TEIQue forms, versions, and translations are available free of charge for academic research purposes only. Without written permission, any use of any TEIQue instrument for any reason other than academic research by members of recognized universities (including currently supervised undergraduate and postgraduate students) is unauthorized and illegal.

## Appendix F

### Survey Section 2: Selected questions from the Team Emotional Intelligence (TEI) Survey

**Directions:**

The questions in this section of the survey are about your experience with your team. The following pages contain a number of statements that describe teams in general. Thinking specifically about your team, please read each of the following statements and then indicate how much you believe they are true for your team by selecting an answer ranging from strongly disagree (1) to strongly agree (5).

There are no right or wrong answers to these questions. The survey is merely a measure of the way you believe your team does things, and is aimed at understanding behaviors and needs that are characteristic of your team.

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	We make an effort to understand each other's perspectives.	1	2	3	4	5
2	If a member behaves in a way that feels unfair to the rest of us, we let him or her know.	1	2	3	4	5
3	Members of this team act in ways that show they care about each other.	1	2	3	4	5
4	This team takes time to discuss what is going well and what is not going well.	1	2	3	4	5
5	We take time to talk about frustrations and other feelings in the team.	1	2	3	4	5
6	When something goes wrong, we see it as a challenge rather than an obstacle.	1	2	3	4	5
7	When we see a problem emerging we act on it right away.	1	2	3	4	5
8	We figure out why decisions that affect our team get made.	1	2	3	4	5
9	Every member understands their role in this team.	1	2	3	4	5
10	We have a clear and specific action plan for achieving team goals.	1	2	3	4	5
11	We encourage members to speak up when they disagree with one another.	1	2	3	4	5
12	We build relationships with those who can make a difference to our performance.	1	2	3	4	5
13	We circulate agendas prior to meetings.	1	2	3	4	5
14	On this team, mistakes are not held against you.	1	2	3	4	5
15	We find new ways to do things better.	1	2	3	4	5
16	We are more effective working together than apart.	1	2	3	4	5

TEI Survey - Open-ended Questions:

Instructions: Please provide your comments below. Your responses will be used to provide additional insights into how your team operates.

What is your team doing well that should be continued?

What is your team not doing now that it should start doing?

What is your team doing now that it should stop doing?

Is there anything else that you would like us to know about your team and how it functions?

## Appendix G

### Survey Section 3: Team Effectiveness Questionnaire - Team Members

Instructions: Please complete the following items for the team of which you are a member. Consider how effectively your team performs in each of the areas listed below and select the number on the scale that best represents your team's performance ( "1" = poor performance, "7" = outstanding performance).

- |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| 1. Efficiency in getting things done  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. Quality of the team's work   | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. Ability to be self-directed  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. Ability to sustain motivation, and work together on a long-term basis                                | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5. Achievement of your team's goals and objectives  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 6. Your team's performance vs. that of other teams with whom you are familiar that perform similar work | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

7. Please identify one team within this organization that tends to perform at a *consistently high, effective level*.

Team Name:                      What causes you to rate this team in this way?

8. Please identify one team that tends to consistently perform at a *solid, steady level*.

Team name:                      What causes you to rate this team in this way?

9. Please identify one team that tends to be *challenged in performing at the level it would like*.

Team name:                      What causes you to rate this team in this way?

(Adapted from Balduzzi et al., 2005)

## Appendix H

### Team Effectiveness Questionnaire - Management Version

Please complete the following items for the teams that fall under your management responsibilities.

*Please identify the set of teams for which you are responsible:*

Team Name #1 \_\_\_\_\_

Team Name #2 \_\_\_\_\_

Team Name #3 \_\_\_\_\_

Team Name #4 \_\_\_\_\_

Team Name #5 \_\_\_\_\_

Please rate each team on the items listed below using a seven point scale ranging from 1 (poor) to 7 (outstanding). Please indicate "Not Observed" (N/O) when applicable.

Questions	Team 1	Team 2	Team 3	Team 4	Team 5
1. Efficiency in getting things done					
2. Quality of the team's work					
3. Ability to be self-directed					
4. Ability to sustain motivation, and work together on a long-term basis					
5. Achievement of your team's goals and objectives					
6. Performance vs. other teams that perform similar work					

7. Please identify one team within the organization (one of your teams or otherwise) that tends to perform at a *consistently high, effective level*.

Team Name: \_\_\_\_\_ What causes you to rate this team in this way?

8. Please identify one team (yours or otherwise) that tends to consistently perform at a *solid, steady level*.

Team name:                      What causes you to rate this team in this way?

9. Please identify one team (yours or otherwise) that tends to be *challenged in performing at the level it would like*.

Team name:                      What causes you to rate this team in this way?

(Adapted from Balduzzi et al., 2005)

## Appendix I

### Codebook for Qualitative Themes

Code	Definition	Example from Comments
1. Communication	Speaking and listening well with one another	We communicate well with each other
2. Collaboration	Working effectively together	Team works well as a unit
3. Deliverables / Output	Getting things done; delivering results	High velocity of stories completed per sprint
4. Efficiency / Speed	Working efficiently, quickly	Quashes high priority customer issues with expedience
5. Expertise / Challenge	Deep knowledge, ability to apply it to meet challenges	High-performing engineers who deal with difficult area of the code
6. Flexibility / Responsiveness	Ability to adapt to change, be responsive to new requests	They have the ability to flex/change priorities
7. Clear Goals / Plan	Established plans, clear sense of what is to be done	The team charter is clear; able to make difficult decisions about what not to do
8. Knowledge Sharing	Key information is exchanged proactively or as requested	They are good at providing us with information and answering questions
9. Organization / Management Outside of Team	Organization's actions / decisions outside of the team that impact the team	The management is engaged; we have not been given sufficient requirements or direction from the organization because the change in direction the company is taking will take time to flesh out.
10. Morale / Synergy	Sense of connectedness among team members	Good synergy
11. Optimism / Motivation	Positive outlook	Members have a can-do attitude
12. Others – awareness of / willingness to help	Awareness of what others need, willingness to help, awareness of impact on others	Always helpful when their assistance is required.
13. Ownership	Team's collective sense of accountability / responsibility for something	Willing to take ownership of difficult projects
14. Predictability / Consistency	Predictability of outcomes over a period of time	Consistency in their predictions
15. Problem Solving	Ability to work through and solve problems	The team is constantly being asked about solving interactions with other team's components; ability to get over hurdles

16. Process	Ability to establish and follow effective work methods	Very good development and QA processes
17. Quality	Degree of excellence in work process and outcomes	Low number of customer bugs
18. Respect	Valuing of others / demonstration of that valuing	Team includes several senior leaders who are the brain trust of their area with offshore team members that respect and respond to this leadership
19. Self-Directed	Ability to make decisions and take action within the team	They self manage very well
20. Effort / Works Hard	Amount of time and effort put into the team's work	They always work hard
21. Work Itself / Good Projects	Valuing of interesting, challenging engineering work	We work on good projects
22. Innovation	Bringing new ideas to a situation	Coming up with innovative solutions

## Appendix J

### Interview Guidelines - Selected Managers

**Introduction to the Interview** (2 mins): This interview is part of the doctoral dissertation research study in which your group has been participating, focused on factors impacting team effectiveness in high-tech environments. The surveys that many managers and team members completed a few months ago were part of this same study.

I am conducting interviews like this one with a small sample population of managers and team members from across the group. The information gained from these interviews will provide a greater set of insights into the day-to-day workings of the teams than I could gain from survey responses alone.

Everything you say in this interview will be kept strictly confidential. Your data will be compiled and analyzed by me or other independent researchers that I involve in this project. It will be analyzed and interpreted in conjunction with interview data from several other managers or team members being interviewed as part of this study.

#### **Guidelines for Interview Questions:**

*Warm up questions (3 minutes):*

1. Tell me about your position at (company), and in particular, tell me about your roles and responsibilities related to the Scrum teams you manage.  
(looking for how involved are you, how closely do you see / work with the team day-to-day)

2. Which teams are you currently responsible for?
3. How long have the teams you manage been together? And how long have you been involved with these teams as their manager?

*Now I'd like you to tell me a little bit about how your teams operate and what your role as manager of these teams involves (10 minutes):*

4. As I mentioned a few minutes ago, this study is focused on trying to understand what factors impact team effectiveness in high-tech organizations. When I mention the term "team effectiveness" to you, what kind of things do you think about as a manager?
5. What aspects of team effectiveness are managers at (company) responsible for? (being aware of / managing?)
6. How do you go about assessing the effectiveness of the teams you are responsible for? (What formal or informal mechanisms, metrics, etc. do you use?)
7. What could the teams at (company) do to improve their overall levels of effectiveness?

*Thanks. That overview of your teams and your perspective about them was helpful. Now I'd like the chance to go just a bit deeper with you in a couple of areas. I've had a chance to review the data from the surveys that many managers and team members completed. I'd like to share with you one or two of the themes that I found interesting and ask you to provide some additional details*

*about how these themes tend to show up in the team's day-to-day work. (10 mins)*

8. When the survey results from the overall group were analyzed, we noticed that managers and team members had noticeably different views of team effectiveness. (Describe correlations for individual EI and group EI with team member effectiveness ratings vs. with manager effectiveness ratings.)
  - What are your thoughts regarding this?
  - What might account for these widely different views?
  - Does seeing this gap in survey ratings surprise you or does it resonate with you? How does this show itself in your day-to-day your experience of how managers and team members view team effectiveness?
9. One last area I'd like to discuss with you is the role that you think Agile plays in team effectiveness.
  - Does following an Agile / Scrum process have any positive or negative impact on the cohesiveness of the team? (explain)
  - Does following an Agile / Scrum process have any positive or negative impact on the performance outcomes of the team? (explain)
  - Can you provide examples / stories of how this works in the day-to-day operations of your teams?
  - Does managing the Agile/Scrum process affect how managers think about team effectiveness and cohesion?

10. Is there anything else that you think would be helpful for us to discuss?

*Thank you very much for your time. Your personal insights have been very helpful.*

## **Appendix K**

### **Interview Guidelines - Selected Team Members**

**Introduction to the Interview** (2 mins): This interview is part of the doctoral dissertation research study in which your group has been participating, focused on factors impacting team effectiveness in high-tech environments. The surveys that many managers and team members completed a few months ago were part of this same study.

I am conducting interviews like this one with a small sample population of managers and team members from across the group. The information gained from these interviews will provide a greater set of insights into the day-to-day workings of the teams than I could gain from survey responses alone.

Everything you say in this interview will be kept strictly confidential. Your data will be compiled and analyzed by me or other independent researchers that I involve in this project. It will be analyzed and interpreted in conjunction with interview data from several other managers or team members being interviewed as part of this study.

#### **Guidelines for Interview Questions:**

*Warm up questions (3 minutes):*

1. Tell me about your position at (company), and in particular, tell me about your roles and responsibilities as a member of a Scrum team. (looking for how involved are you, how closely do you see / work with the team day-to-day)

2. How long have the members of your team been together?

3. And how long have you been a member of this team?

*Now I'd like you to tell me a little bit about how your team operates and what your role as a member of this team involves (10 minutes):*

4. As I mentioned a few minutes ago, this study is focused on trying to understand what factors impact team effectiveness in high-tech organizations. When I mention the term "team effectiveness" to you, what kind of things do you think about as a team member?

5. What aspects of team effectiveness are team members at (company) responsible for? (being aware of / managing?)

6. How do you go about assessing the effectiveness of the team you are on? (What formal or informal mechanisms, metrics, etc. do you use?)

7. What could the teams at (company) do to improve their overall levels of effectiveness?

*Thanks. That overview of your team and your perspective about it was helpful.*

*Now I'd like the chance to go just a bit deeper with you in a couple of areas. I've had a chance to review the data from the surveys that many managers and team members completed. I'd like to share with you one or two of the themes that I found interesting and ask you to provide some additional details about how these themes tend to show up in the team's day-to-day work. (10 mins)*

8. When the survey results from the overall group were analyzed, we noticed that managers and team members had noticeably different views of team

effectiveness. (Describe correlations for individual EI and group EI with team member effectiveness ratings vs. with manager effectiveness ratings.)

- What are your thoughts regarding this?
- What might account for these widely different views?
- Does seeing this gap in survey ratings surprise you or does it resonate with you? How does this show itself in your day-to-day your experience of how managers and team members view team effectiveness?

9. One last area I'd like to discuss with you is the role that you think Agile plays in team effectiveness.

- Does following an Agile / Scrum process have any positive or negative impact on the cohesiveness of the team? (explain)
- Does following an Agile / Scrum process have any positive or negative impact on the performance outcomes of the team? (explain)
- Can you provide examples / stories of how this works in the day-to-day operations of your team?

10. Is there anything else that you think would be helpful for us to discuss?

*Thank you very much for your time. Your personal insights have been very helpful.*

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## CURRICULUM VITAE

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**LYNNE D. RICHER - Ed.D., GPHR**

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### Human Resources Profile

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Learning and Organization Development professional with proven track record of successful performance in progressively senior, strategic roles. Strong business leader, as well as thought leader for key HR practices. Expertise in diagnosing, structuring, and leading complex projects across functional units and global regions to deliver enhanced business results. Strong ability to think critically and systemically. Able to translate business strategy into practical tools and processes.

- **Organization Development:** Strategic advisor and partner to HR and business leaders at all levels of the company. Served as subject matter expert and "hands on" practitioner. Lead, consulted on, and / or facilitated various initiatives such as leadership transitions, team development, employee engagement, process improvement, organizational analyses and design, post-merger cultural integrations, change management, and strategy planning.
- **Executive / Leadership Development:** Managed corporate succession planning, high-potential development, and talent review processes. Partnered with senior executives and their staff to facilitate key discussions, and create / support individual development plans. Delivered executive development programs and direct coaching.
- **Talent Management / Architecture:** Sourced and selected global talent management tools; designed and implemented full suite of talent management modules within integrated system including 360 feedback, succession, and career planning. Created global processes to assist in the on-going assessment and development of talent. Proven ability to build consensus across diverse groups, including country-based Workers' Councils.
- **Corporate Strategy & Programs:** Established education strategy and programs based on company's strategic goals, work-force plan, and required organizational capabilities. Managed global team of internal staff and external vendors to ensure cost-effective, high quality outcomes.

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### Professional Experience

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MATHWORKS, Natick, MA 2012–2015  
 Privately held, multi-national corporation specializing in mathematical computing and modeling software. Global employee population of 3400 located across North America, EMEA and APAC.

#### **Senior Manager, Learning and Organization Development**

Responsible for the management of a global Learning and OD function within Human Resources. Managed a small team of OD and Learning professionals; provided a full range of professional, leadership, and management development programs and

resources. Served in a consultative role with HR Business partners, staff members, and business area leaders to diagnose needs and provide solutions to increase organizational and team effectiveness.

- Served as core team member for numerous organization initiatives bringing critical change to the business. Provided coaching, tools, and thought leadership for multiple projects including redesign of core business unit structures and roles, significant corporate infrastructure transformation, and alignment of team goals and strategies across functions and global regions.
- Evolved the OD function's model to define the role and the rules of engagement with HR Business Partners and business area leaders.
- Served as Human Resources representative on company-level Lean Integration team, supporting the transformation of MathWorks processes and culture into that of a Lean-based organization.
- Drew on internal and external resources to ensure the design and delivery of high quality programs, materials, and other learning and development resources and activities.

CONSULTANT / PART-TIME DOCTORAL STUDENT

2011–2012

### **Independent Consultant**

Worked across multiple industries providing executive coaching and organization / talent development consulting. Projects included HR strategic planning, organization design, leadership development strategy and competencies, and high-potential mentoring programs. Industries included high-tech, retail / consumer, and non-profit. Continued work on doctoral dissertation process at Boston University, focused on the relationship between emotional intelligence and team effectiveness in high-tech engineering teams.

AVID TECHNOLOGY, Burlington, MA

2004–2011

Global producer of award-winning digital audio and video solutions for the media and entertainment industries. Avid's 3000 professionals operate out of more than 20 countries across North America, EMEA, and APAC.

### **Director, Global Learning & Development**

2004–2011

Responsible for full range of company's learning and development tools and services. Worked directly with executive team as key clients. Managed global staff. Reported to VP of Human Resources as senior practice leader.

- Designed and lead corporate succession planning process, providing analytics and recommendations to CEO and Board.
- Developed company-wide leadership and management development programs. Received recognition award from executive team for impact to the business.
- Provided business planning and process coaching, leading to redesign of key organizational roles, functional groups and structures, and core operating processes. Resulted in improved business efficiencies, aligned cross-functional goals, and enhanced employee engagement.
- Provided coaching to leaders in assessing and developing skills needed for success in current and potential positions. Focus included on-boarding, transition into new or expanded roles, challenges with global / cross-functional teams, and other targeted areas for improved effectiveness.

- Selected and implemented fully integrated, on-line talent management tool.
- Negotiated with internal stakeholders and Workers' Councils for global practices with local country modifications. Resulted in scalable tools for aligning, assessing, developing, and rewarding performance of global talent.

**Strategic Human Resource Business Partner** 2010–2011

Concurrent with Learning & Development role, served as strategic HRBP to eight senior executives. Responsibilities included organizational diagnostics, on-going coaching, talent management, talent acquisition, on-boarding, and change management.

- Provided tools and led business discussions for organization and talent review process, resulting in identification of high-performing, high-potential employees for differentiated rewards and development.
- Managed workforce planning processes, leading to assessment of skills gaps and creation of hiring plans.
- Coached leaders in assessing organizational designs and business process to best deliver on their goals.

**Acting Vice President, Human Resources** 2007–2008

Concurrent with Learning & Development role, served as member of executive team during period of significant transition. Worked closely with Board of Directors, taking lead role with Compensation Committee. Worked with Acting CEO in assessing and restructuring leadership team. Worked with strategy consultants in reformulating company's business plan and organizational structure.

- Initiated restructure of HR organization to account management model with global shared services.
- Drove consolidation of benefits plans, vendors, and brokers leading to \$2.3M in cost avoidance.

TERRA LYCOS, Waltham, MA / Madrid, Spain 2000–2004  
Global subsidiary of Telefonica, a multi-national telecommunications company operating in more than 25 countries with 250,000 employees, 57 billion Euros in revenue. Terra Lycos owned and operated some of the most widely visited websites in the world, and was the largest Internet Service Provider across Spain and Latin America.

**Senior Director, Global People Development – Terra Lycos** 2001–2004

Promoted to head of function for newly merged organization. Responsible for all areas of organization development, corporate education, and leadership / employee development. Reported to Global EVP of HR. Directly supported executive team. Developed global staff of 6 direct reports / matrixed professionals.

- Partnered with executive team to assess organizational capabilities vs. business requirements. Outcomes resulted in new organization designs, business plans, and specific team interventions.
- Created Terra Lycos EDU (Employee Development University). Developed and implemented core content globally in multiple languages.
- Drove creation of corporate values for new Terra Lycos organization. Incorporated these values into full range of talent management tools and processes.

**Director, Employee and Leadership Development - Lycos** 2000–2001

Established new function within fast-paced US internet business. In first six months, rolled out tuition reimbursement, e-learning strategy and system, and core management development programs.

- Worked with HR colleagues and external consultants to produce “Mergers and Acquisition Playbook” enabling organization to rapidly assess and integrate new acquisitions.
- Developed talent review and retention process enabling business to identify high-impact talent, as well as key individuals with high risk of attrition. Tools enabled managers to create retention and development plans.

DATA GENERAL CORPORATION / EMC, Westborough / Hopkinton, MA 1997–2000  
Designer and manufacturer of computer systems and storage devices. Locations across US, Europe, and Asia. 5,000 employees worldwide. Acquired by EMC in late 1999.

**Director, Worldwide Leadership & Organization Development** 1998–2000

Promoted to head of global function. Responsible for full range of leadership and organization development services. Achieved financial results required to support internal P&L. Continued to support Data General as a division of EMC post-acquisition.

**Organization Development Consultant** 1997–1998

Responsible for organization development for engineering / R&D teams across the company. Focused on new product development processes, program management practices, cross-functional team effectiveness, and 3rd-party management.

BLUE CROSS BLUE SHIELD, Boston, MA 1994–1996

**Training & Development Manager / Organization Development Consultant**

BAYBANKS, INC., Springfield / Burlington, MA 1986–1993

**Training & Development Manager / Regional Head of Human Resources****Education**

Ed.D., Human Resource Development, Boston University, Boston, MA

M.A., Human Resource Development, American International College, Springfield, MA – graduated with distinction

B.A., Education, University of Massachusetts, Amherst, MA – graduated *cum laude*

**Professional Certifications and Associations**

Global Professional in Human Resources Certification, HR Certification Institute

Human Resources Leadership Forum, Organization Development Network, Chief Learning Officer Forums, American Society for Training and Development