# THE RELATIONSHIP BETWEEN SELF EFFICACY, PROJECT LEADERSHIP OUTCOME AND FUTURE INTENTIONS TO ENAGE IN ORGANIZATIONAL BUSINESS PROCESS IMPROVEMENT OPPORTUNITIES

by

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#### Abstract

Most experienced managers know at the gut level that employees with higher confidence and a positive belief in their abilities will perform better than those without them. As Henry Ford put it, "If you think you can or think you can't, you are right. Six Sigma is but one in a long line of programs (e.g. quality circles, kaizen, TQM, etc) to support to development of a culture of continuous improvement. The reality is that arming individuals with increasingly more robust approaches to identify new opportunities, at a cost of billons annually (Bandura, 1997), has failed to eliminate the gap between knowing what needs to be done and making it happen. Investigation of employee behavior and motivation within the construct of social cognitive theory, more specifically the concept of self-efficacy, provides evidence for the importance of one's resilient self-belief as a predictor of success.

This researcher's position is that a mastery experience influences one's level of motivation to engage in organizational business process improvement. This is consistent with "mastery experience" as the most important source of self efficacy development. The central hypotheses of this study investigated the relationship between the outcome of one's most recent project leadership attempt and future intent to; a) use the methodology, b) lead a project, or c) participate on a project team. The first research question had three hypotheses that investigated the relationship between the outcome of a project leadership attempt and future intention to use BPI again. Future project leadership was the only hypothesis that conflicted with what was theorized; though directionally consistent, the results lacked statistical significance. The hypotheses for the second and third research questions, investigating the relationship of the BPI Skill Self Efficacy measure to project leadership outcome and future intentions, supported validity (discriminate and predictive) for researcher developed BPI Skill Appraisal. The hypotheses for the fourth and fifth research questions further support the importance of a mastery experience by demonstrating the importance of a mastery experience in the past.

## Dedication

This dissertation is dedicated to my parents, Edward and Carol Checket, who instilled in me

a passion for learning and a profound respect for education.

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#### CHAPTER 1. INTRODUCTION

#### Introduction to the Problem

Most experienced managers know at the gut level that employees with higher confidence and a positive belief in their abilities will perform better than those without them. As Henry Ford put it, "If you think you can or think you can't, you are right." Managers also know that the ability to drive continuous improvement and change in an organization is no longer an advantage, but rather a prerequisite for survival (Kotter, 1996a). The amount of popular literature dedicated to the topic of change and leading change is representative of the priority this issue has with contemporary organizational leaders. Organizational leaders want to know how to more effectively and efficiently seek out new opportunities and also what can be done to ensure success in taking advantage of them.

Six Sigma has continued to gain popularity as the approach of choice for leaders in today's business environment who recognize the vital importance of continuous improvement. This methodology has gained momentum primarily as a result of its recognition as a means of creating a corporate culture with a bias for action, change and improvement (Anonymous, 2006). This management system focuses on achieving lasting business leadership and top performance that will benefit not just the business, but all its stakeholders to include; customers, associates, and shareholders. Evidence has shown though, that this program and others like it are still prone to failure (Warnack, 2000).

To successfully implement change, there is the inevitable need for employees to enact new behaviors so that desired changes can be realized (Armenakis & Bedeian, 1999). Six Sigma is but one in a long line of programs (e.g. quality circles, kaizen, TQM, etc) introduced in support of an organizational goal to create a culture of continuous improvement. The reality is that arming individuals with increasingly more robust approaches to identify new opportunities, at a cost of billons annually (Bandura, 1997), there has been a failure to eliminate the gap between knowing what needs to be done and making the change a reality. Investigation of employee behavior and motivation within the construct of social cognitive theory, more specifically the concept of self-efficacy, provides evidence for the importance of one's resilient self-belief as a predictor of success.

#### Background of the Study

The basic premise of most approaches in the abundance popular change management literature is that a leader can navigate and even influence change (Rosenberg, 2003), but that managing it is nearly impossible. Most research on implementing change as a process has its roots in the early work of Lewin (1947), wherein he conceptualized change as progressing through three successive phases; unfreezing, moving, and freezing. This model has served as a basis for nearly every other change model introduced since. Models presented by people such as Judson (1991), Kotter (1995), Galpin (1996), and Armenakis, Harris, and Feild (1999) all described a multi-phase model for the implementation of change. A multi-phase approach to change is consistent with the contemporary view of organizations as complex systems; distinctly different from the cause and effect change model that fits traditional management philosophy founded in Fredrick Taylor's scientific management.

According to Peter Senge (1999), if today's business organizations want to meet the external challenges of globalization, changing workforces, evolving competition and new

technologies, it is not enough to change just strategies, structures and systems. Organizations, after all, are products of the ways that people think and interact.

"Sustaining any profound change process requires a fundamental shift in thinking and action. We need to think of sustaining change more biologically and less mechanistically. This requires patience as well as urgency. It requires a real sense of inquiry, a genuine curiosity about limiting forces. It requires thinking about how significant change invariably starts locally, and how it can grow over time. And it requires recognizing the diverse array of people who play key roles in sustaining change - people who are leaders."(Senge, 1999). "Most leaders instigating change are like gardeners standing over their plants, imploring them: 'Grow! Try harder! You can do it!' If leaders don't understand the forces that keep significant change from taking root and growing, all their entreaties, strategies, and change programs will produce more frustration than real results." (pg. 15)

To this, Senge (1999) asks the appropriate questions "What thinking and behaviors reinforce innovation - or impede it?" (pg. 16)

The challenges facing the modern manager include; continually assessing how things could be done better, getting employees to share their change goals, and working together with them to achieve those goals (Paglis, Laura L & Green, 2002). With a need for continuous improvement achieved through dramatic and rapid change, managers need to have a clear vision for the organization that takes into account the many factors that can influence success (Rosenberg, 2003). Leaders who are successful at driving continuous improvement in their organizations are also likely the ones who are successful at motivating and retaining high performing employees. This relationship supports an investment in investigations to understand what makes an employee motivated to step up and achieve the type of real and sustainable business results a corporation needs to remain competitive.

When a person's high self-expectations result in high performance, the Galatea effect is said to occur. One of the key conceptual formulations of self-expectations of performance is task specific self-efficacy (McNatt & Judge, 2004). According to self-fulfilling prophecy theory, one's behavior is consistent with his or her expectations, and those behaviors in turn will influence outcomes (Merton, 1948). Research in the area of psychology has suggested that individual personality type and efficacy may serve as predictors of leadership effectiveness especially in leading change efforts (Atkinson & Millar, 1999). Self-efficacy is a person's conviction about his or her abilities to mobilize the motivation, cognitive resources, and courses of action needed to successfully execute a specific task within a given context (Stajkovic, Alexander D & Fred Luthans, 1998). Not only does a person's beliefs about their abilities have an influence on the outcome of their actions, people tend to avoid activities and situations where they believe they are likely to fail, and will adjust their level of effort based on the outcome they expect. Bandura (1986) contends that one's behavior is better predicted from his or her beliefs than from the actual consequences of his or her actions. The importance of this theory is the implications it has on where a manager should target his or her energies in the hopes of developing employees who can and will succeed at the efforts needed to change an organization.

Self-efficacy is developed in four ways; mastery experience, social modeling, social persuasion, and affected state (Bandura, 2000; Goddard, Hoy, & Hoy, 2004). The mastery experience, considered to be the most powerful source of developing strong self-efficacy, is the focus of this research study. The perception that a performance had been successful tends to raise efficacy beliefs, contributing to the expectation that attempts to use a particular skill will be successful in the future with the opposite true in the case where perception is that the performance was a failure. Development of a resilient sense of efficacy requires experience

in overcoming obstacles through perseverant effort (Bandura, 2000). If the success can be attributed to something controllable by the individual than efficacy beliefs are enhanced (Goddard et al., 2004).

For over fifty years, leadership researchers have attempted to identify the aspects of leadership that improve organizational performance (Gordon & Yukl, 2004). Despite the countless studies that have been conducted during the fifty years with the intent of determining why some leaders are more effective than others, the answer has remained elusive. Reasons for this include the gap that exists between academics and practioners on what leadership is. Additionally, there is a continued overemphasis on finding universally relevant predictors of an effective leader without enough emphasis on situational factors and the context in which leadership occurs (Gordon & Yukl, 2004). Leaders continue to seek out advice for developing motivated employees willing to make the changes necessary for a company to succeed. An understanding of organizational change, the Six Sigma methodology for continuous improvement, and the social cognitive construct of self-efficacy provide the context for this study.

#### Statement of the Problem

Organizations face the dilemma of becoming more effective without increasing cost (Stajkovic, Alexander D & Fred Luthans, 1998). The failure of organizational change efforts is reported to be 70-80% (Higgs & Rowland, 2005). Considering that change is necessity for survival of the modern organization, improving the likelihood of success for attempted change efforts is an obvious organizational opportunity.

To successfully implement change, there is the inevitable need for employees to enact new behaviors so that desired changes can be realized (Armenakis & Bedeian, 1999). Six Sigma is but one in a long line of programs (e.g. quality circles, kaizen, TQM, etc) introduced in support of an organizational goal to create a culture of continuous improvement. The reality is that arming individuals with increasingly more robust approaches to identify new opportunities, at a cost of billons annually (Bandura, 1997), there has been a failure to eliminate the gap between knowing what needs to be done and making the change a reality.

Albert Bandura (2000) proposed that one's achievement is dependent on having the required skills and a resilient self-belief in ones ability to apply the skills, and made this concept the foundation of social cognitive theory. Organizations focused on creating a culture of continuous improvement are interested in engaging all employees in the use of the desired behavior not just once, but as a norm going forward. To do this, organizations must understand factors that impact whether or not employees have the motivation to step up to the challenge of leading change. The modern organization needs all employees to be actively engaged in continuous improvement efforts, in the target of this study, using Six Sigma methodology. As depicted in Figure 1, motivation is both an output of a leadership attempt and an input effecting whether an employee will step up to challenge when an opportunity exists. This unique relationship has potentially powerful consequences in an organization that has recognized the value of an engaged workforce that supports a culture of continuous improvement.



Six Sigma has demonstrated the ability to achieve phenomenal financial results in many notable companies. Limited engagement of individuals beyond a single project though, seems to predict that this will become yet another in the long string of fads. Where this approach and others in the past have surely had shortcomings, there seems reason to question whether the critical shortcoming is in the methodology or elsewhere. Should the focus be instead on the identification of factors that explain the lack of enduring employee engagement in an organizationally desired behavior?

This research study will focus on one high tech company that introduced Six Sigma six years ago. Despite impressive year over year growth in documented financial impact, the number of individuals engaged in Six Sigma type improvement efforts is a fraction of those that have been trained. Evidence would suggest that the methodology is not being adopted by the employees. In Lewin's terms, the leadership and management is failing at freezing this new behavior into the culture of the organization.

Research in the field of psychology suggests that individual personality type and efficacy may serve as predictors of leadership effectiveness especially in leading change efforts. Personality type research using the Meyers Briggs Type Indicator (MBTI) is most prevalent as a result of the undisputed robustness of the instrument. The MBTI is a personality trait that does not tend to evolve. People can be taught adaptive behaviors to better address a particular situation, but one's personality type is unlikely to change over time. In contrast, self-efficacy can be developed. Where the relationship between personality type and leadership has received attention by researchers and practitioners alike, self efficacy is a topic deserving more exploration. Managers can take deliberate action to improve employee motivation by addressing the known sources of self-efficacy development.

Research on the topic of self-efficacy has grown. Studies focused on student achievement and teacher performance (Goddard et al., 2004) are representative of the prolific work that has been conducted in the field of education. Bandura (1997) also noted numerous studies that investigated the significance of the relationship between self-efficacy and work-related performance like; job search, sales, learning and task related achievement, adaptability to advanced technology, career choice, naval performance at sea and more (Stajkovic, Alexander D & Fred Luthans, 1998). Though there has been some, research of self-efficacy in the field of organizational learning has been lagging (Goddard et al., 2004). A number of studies that investigated self-efficacy in organizations have highlighted the significance of this factor. In one study, Paglis (1999) investigated management self efficacy as a factor in the motivation of manager's to lead change. Luthans and Stajkovic (2002) have done a number of studies to include; an empirical investigation of manager efficacy as a factor in the level of employee engagement, and a meta-analysis (1998) to investigate self-efficacy and work related performance. These studies have demonstrated the validity of self-efficacy in the context of organizational learning.

As all real world research does, these studies had limitations. Paglis used data gathered via a survey of managers and direct reports to support the development of an instrument for measurement of leadership self efficacy (LSE) This study will also develop a survey instrument, but will augment the analysis with the additional project data from a leadership attempt. Paglis was focused on manager self-efficacy, proposing it as an antecedent to employee behavior. Expanding on the scope, this study will investigate selfefficacy of any employees regardless of their status as manager or individual contributor. As companies continue to recognize the benefit of having an empowered workforce, where every employee is expected to step forward, self-efficacy has organization wide implications. The Luthan and Stajkovic (2002, 1998) studies investigated self-efficacy as a factor in employee motivation to attempt and succeed at accomplishing simple tasks. In contrast, this study will focus on attempts of medium to high complexity where a person must address multiple tasks that included; influencing others, working across organizational boundaries, applying advanced project management and problem solving tools and techniques to take advantage of an opportunity for improvement.

There have been a number of studies that addresses personality type as a factor in leadership effectiveness (Culp, 1992), and development of a Six Sigma culture (Kaissi, 2004). Despite the research that has shown its effectiveness using personality type to predict leadership outcome, personality type is difficult to change. Self-efficacy can be developed in employees and therefore is of more interest in this research focused on understanding management opportunity address factors that will freeze into place a cultural change.

#### Purpose of the Study

The leaders of today's organizations need to be able to develop employees who are motivated to confront the inevitable organizational challenges and obstacles associated with continuous improvement efforts. Research and observation has shown that individual behavior changes precede measurable improvements in organization performance (Malone, 2001).

This researcher's position is that one's perception of success at an attempt to use a specified behavior will influence his or her level of motivation to attempt that behavior again in the future. This is consistent with "mastery experience" as the most important source of self efficacy development, and the factor that will impact the motivation of an employee's to engage in a specific type of organizational leadership activity again in the future. The central hypotheses of this study investigated the relationship between the outcome of one's most recent project leadership attempt and one's stated future intent to engage in the use BPI methodology again, lead a BPI effort, or participate on a BPI team.

Determinants of performance can be summarized in three themes: the effort applied by the employee, their level of knowledge and skill, and the performance strategies they use (Bandura, 2000). People approach and explore situations within their perceived capabilities, while avoiding situations they think exceed their ability (Bandura, 2000). Also, research has shown that the greater confidence individuals have in their capabilities, the more vigorous their effort and persistence (Bandura, 1986).

Social cognitive theory and self efficacy have proven a beneficial extension of traditional motivation and behavioral approaches. Both predictive and explanatory capability have made the construct of self-efficacy one of obvious benefit in an organizational setting where there are considerable implications for improving employee performance (Stajkovic, Alexander D & Fred Luthans, 1998).

Noted in a summary of the research done on change in the 90's, there was a call for additional research dealing with the behavioral and attitudinal reactions of organizational members to change in efforts to further define its human cost and how best to cope with its inevitable downside (Armenakis & Bedeian, 1999). This research will heed that call and investigate behavioral and attitudinal factor of skill self-efficacy.

#### **Research Questions and Hypotheses**

The research questions are primarily based on the work of Albert Bandura (2000) who theorized the mastery experience to be the most powerful source of self-efficacy. The first research question investigates the relationship between the outcome of a project leadership attempt and future intention to use BPI again. The second and third research question investigates relationship of a BPI Skill Self Efficacy measure to the two phenomenon, project leadership outcome and future intentions, addressed in the first research question, and provides validity for researcher developed BPI Skill Appraisal. The fourth and fifth research questions further explores the influence of a mastery experience by investigating beyond the most recent project leadership attempt to include the existence and outcome of any attempt at BPI project leadership in the past.

Research Question One: Is one's self-reported likelihood to attempt Business Process

Improvement in the future dependent on the outcome of his or her most recent BPI project

leadership attempt?

H1.A<sub>0</sub>: One's intention to lead a BPI project in the future is independent of the outcome of his or her most recently led BPI project. H1.A<sub>1</sub>: One's intention to lead a BPI project in the future is not independent of the outcome of his or her most recently led BPI project.

H1.B<sub>0</sub>: One's intention to participate in a BPI project in the future is independent of the outcome of his or her most recently led BPI project. H1.B<sub>1</sub>: One's intention to participate in a BPI project in the future is not independent of the outcome of his or her most recently led BPI project.

H1.C<sub>0</sub>: One's intention to use the BPI tools and techniques in the future is independent of the outcome of his or her most recently led BPI project. H1.C<sub>1</sub>: One's intention to use the BPI tools and techniques in the future is not independent of the outcome of his or her most recently led BPI project.

Research Question Two: Is one's level of BPI self efficacy (BPI SE) for the key tasks

that represent the obstacles to completing a BPI project dependent on and the outcome of his

or her most recent BPI project leadership attempt?

H2<sub>0</sub>: One's level of BPI Self Efficacy is independent of the outcome of his or her most recently led BPI project
H2<sub>1</sub>: One's level of BPI Self Efficacy is not independent of the outcome of his or her most recently led BPI project

Research Question Three: Is there a relationship between an employee's self-

reported likelihood to attempt Business Process Improvement in the future and his or her

level of self efficacy (BPI SE) for the key tasks that represent the obstacles to completing a

BPI project?

H3.A<sub>0</sub>: One's intention to lead a BPI project in the future is independent of his or her level of BPI SE.

H3.A<sub>1</sub>: One's intention to lead a BPI project in the future is not independent of his or her level of BPI SE.

H3.B<sub>0</sub>: One's intention to participate in a BPI project in the future is independent of his or her level of BPI SE. H3.B<sub>1</sub>: One's intention to participate in a BPI project in the future is not independent of his or her level of BPI SE.

H3.C<sub>0</sub>: One's intention to use the BPI tools and techniques in the future is independent of his or her level of BPI SE. H3.C<sub>1</sub>: One's intention to use the BPI tools and techniques in the future is not independent of his or her level of BPI SE.

Research Question Four: Does one's self-reported likelihood to attempt Business

Process Improvement in the future depend on his or her total project leadership experience?

H4.A<sub>0</sub>: One's intention to lead a BPI project in the future is independent of his or her total BPI project leadership experience.

H4.A<sub>1</sub>: One's intention to lead a BPI project in the future is not independent of the outcome of his or her total BPI project leadership experience.

H4.B<sub>0</sub>: One's intention to participate in a BPI project in the future is independent of the outcome of his or her total BPI project leadership experience. H4.B<sub>1</sub>: One's intention to participate in a BPI project in the future is not independent of the outcome of his or her total BPI project leadership experience.

H4.C<sub>0</sub>: One's intention to use the BPI tools and techniques in the future is independent of the outcome of his or her total BPI project leadership experience. H4.C<sub>1</sub>: One's intention to use the BPI tools and techniques in the future is not independent of the outcome of his or her total BPI project leadership experience. Research Question Five: Is one's level of BPI self efficacy (BPI SE) for the key tasks that represent the obstacles to completing a BPI project dependent on his or her total project leadership experience?

# H5<sub>0</sub>: One's level of BPI Self Efficacy is independent of his or her total BPI project leadership experience. H5<sub>1</sub>: One's level of BPI Self Efficacy is not independent of his or her total BPI project leadership experience.

#### Significance of the Study

Self-efficacy deals specifically with how a person's beliefs in their capability will influence both the level of motivation they have to attempt a task and their level of endurance to persevere along the path to produce a desired outcome. Unless a person believes they can gather up the necessary behavioral, cognitive, and motivational resources to succeed in a task, they will likely dwell on the daunting task ahead, and either put forth too little effort to succeed or never even attempt the task.

By examining the relationship between the outcome of a leadership experience and stated intentions to use the behavior again in the future this study can give managers the information they need to motivate and support employees toward a culture of continuous improvement. While organizations struggle to maintain, if not reduce, the cost associated with enabling employees to be more productive, a behavioral approach is at the same time potentially more effective and less costly than pursuing the introduction of yet another program designed to achieve organizational goals.

*Black Belt* is a person who has generally first earned certification as a green belt. In addition to the 1 week green belt training, a black belt will attend 4 additional weeks of training focused on advance statistical tools and techniques. They might fill a full-time position, but in the specified high tech company, that is rare. They lead complex projects, or portfolios of projects, that have either the potential for a large financial impact or a cross-functional or global scope, where the advanced tools and techniques are helpful in analyzing the opportunity.

*Business Process Improvement (BPI)* the name of the Six Sigma based program in the high-tech company used for this study.

*Effectiveness* of a process is its ability to deliver the desired outcome, either product or service

*Efficiency* for a process is improved by minimizing waste (time, resources, cost, etc.).

*Green Belt* is a person who generally works on, applying the Six Sigma methodology to a specific process that he or she possesses a beneficial amount of subject matter expertise and has some level of responsibility for how well the process performs (George, 2002). This is viewed as an opportunity for an employee to excel in the organization by gaining training and experience using an industry recognized methodology (George, 2002). These individuals all receive 1 week of classroom training that covers the methodology and the basic level quality tools and techniques that are the foundation of Six Sigma. Training also includes a review of the applicable project management and team facilitation skills needed to lead an improvement project. *Master Black Belt* is an internal expert consultant (George, 2002b). These individuals are a resource that trains, mentors and coaches individuals and teams. During the early part of implementation of a Six Sigma program, there are rarely individuals with the skill and expertise to fill this role, so it is most often filled by external consultants. The target company for this research, having had their program in place for six years has certified only 4 people at this level.

*Mastery Experience* considered the most powerful of the four sources of self-efficacy in an individual. A behavior is considered a mastery experience when the person perceives the performance as successful.

*Project Tracking Tool (PTT)* is an intranet database application used by all BPI project leaders for documentation of key project information throughout the project lifecycle. This information is used by other project leader for best practice sharing and benchmarking of best practices, and used by program managers and organizational leader for project/program governance and reporting. This was the source used for identification of the research population and provided the project information used for analysis.

*Self Efficacy* refers to an individual's conviction (or confidence) about his or her abilities to mobilize the motivation, cognitive resources and courses of action needed to successfully execute a specific task with in a given context (Stajkovic, Alexander D & Fred Luthans, 1998).

*Six Sigma* is a management system focused on achieving lasting business leadership and top performance that benefits not just the business, but all its stakeholders to include; customers, associates, and shareholders. It provides employees with a methodology and guidance regarding the application of tools and techniques that will result in bottom line improvement to the profitability of the organization.

*Total Quality Management (TQM)* is a combination of quality and management tools and techniques focused on increasing profit and reducing loss due to ineffective and inefficient practices. The basic principles of the TQM philosophy are to satisfy both customers and suppliers and continuously improve the business processes

#### Assumptions and Limitations

Leadership research has proved a challenge to the traditional research approaches, challenges that can and are mitigated in light of a very real need for organizations to understand this dynamic. Cooper and Schindler (2003) state that good research generates dependable data derived from practices that are conducted professionally and that can be used reliably for managerial decision making. Reporting of the methodology should clearly address strengths and weaknesses; it should be complete and honest. Appropriate analytical techniques should be used with conclusions drawn limited to those clearly justified by the findings (Cooper & Schindler, 2003). Bottom line, good research is trustworthy.

The approach is a quantitative, non-experimental, descriptive correlation study that uses recorded information regarding a pre-exiting event, explores the potential correlations among two or more phenomenon, and uses a statistical approach to probe for reasons that underlie the relationship (Leedy & Ormrod, 2001). It did not use a control and experiment, or use randomly assigned participants, and will not determine cause of an effect (Creswell, 1994). As a fixed design, the demands of good research are to ensure trustworthiness through verification of validity and ability to generalize the findings.

The primary assumptions made regarding validity of this study include the validity of the survey instrumentation and minimization of respondent bias.

Assumptions supporting the minimization of respondent bias:

- Private collection of responses The use of email and assurance of anonymity in an email prior to the distribution of the survey support the minimization of response bias (Bandura, 2005)
- 2) Social influence –Prior research has demonstrated a lack of social influence on self-efficacy assessments (Bandura, 2005). People are likely to provide an unbiased personal assessment of this capabilities, and are unlikely to filter this assessment based on a perception they might have about what answer might be desired by either the organization or a researcher.
- Assessment Title the use of "appraisal inventory" as opposed to "self-efficacy" (Bandura, 2005).
- 4) Business Process Improvement attempts- an assumption of this study is that the projects in this database reflect the all BPI project work in the company.Limitations of the study:
- One high-tech company By far the greatest limitation to the generalization of the research finding is the use of on high tech company for the study. Leadership studies are challenged by the situational nature of the construct, but the size of the

sample (n=759) is large enough to provide directionally valid conclusions applicable to similar circumstances.

- 2) United States only The potential effect of cultural differences on the responses and interpretation of the questions on the questionnaire made limiting the study a necessity. There is the additional concern that sites outside of the US are also at different levels of maturity in implementing the BPI methodology.
- 3) Green Belt Projects documented in the PTT Six Sigma methodology is better known black belt projects. These projects are of increased impact and complexity, and tend to leverage an advanced level of skill of a small number of individuals in a company. The green belt level projects are far more indicative of a company wide culture of continuous improvement. These projects are consistent with a culture of employee are empowerment to make a difference and this is the behavior that companies know to be a competitive advantage.

These limitations and assumption will be addressed as applicable during the remaining chapters.

#### Nature of the Study

#### Research Design

In this study the relationship between an employee's likelihood of engaging in opportunities to improve the organizational performance through the application a methodology for continuous improvement and the outcome of their most recent leadership attempt using the methodology is investigated. The Project Tracking Tool (PTT), an intranet application used to document all BPI efforts, is the source for identification of the population of BPI projects that completed in the last two fiscal quarters of 2005. This secondary data source will provide additional data for the study to include; the project leader, project outcome, and project leader's previous leadership attempts. The identified project leaders will be sent a web based, two part questionnaire to gather self-reported information: 1) confidence in successfully completing the tasks associated with BPI projects, and 2) intention to use the BPI methodology and tools again in the future.

#### Sampling

A population of 759 green belt projects completed in any location in the United States during the last two quarters of 2005 was identified using the secondary data source, PTT. Green belt projects are the BPI projects that are most representative of a culture of continuous improvement where all employees are empowered to drive change. The selection of two quarters minimizes bias that could result from selecting a shorter time period. The survey will be distributed to project leaders for each of the identified projects. As company email addresses will the means of contact, any employee who has departed the company will not have an opportunity to complete the survey. The assumption is that individuals who have departed the company will not bias the sample. The potential of this issue as a limitation of the study will be addressed during data analysis.

#### Data Collection

Data from the secondary data source (PTT) has already been compiled. The questionnaire will be distributed 1 day after sending an email notifying the participants of the study and asking for their participation. The questionnaire consists of two parts; BPI Skill Appraisal, and future intentions. The BPI Skill Appraisal has 13 tasks with a 10 point scale

to assess one's confidence in completing the task. The second part, Future Intentions, has three questions; about leadership of, participation in and use of the methodology for improvement opportunities in the future. A number of steps were taken to minimize response bias to include; the use of a non-descript title of "BPI Appraisal Inventory" rather than self-efficacy, the use of a web based survey tool manage an email distribution of the survey to support the private recording of questionnaire feedback, and email prior to the survey that; 1) encourages frank answers, and 2) assures anonymity of the responses (Bandura, 2005). Additionally there is an assumption that employees will not bias their responses to what appears to be socially desirable; evidence shows that making efficacy judgments does not increase congruence between perceived efficacy and behavior regardless of either low or high social demands (Bandura, 2005).

#### Data Analysis

The analysis of the study will focus on the investigation of relationships between the identified variables in the study. Both parametric and non-parametric test will be used as appropriate.

#### Organization of the Remainder of the Study

The following chapter contains a review of the relevant literature. Topics covered include; organizational change, Six Sigma, and self-efficacy. Chapter 3, Methodology, describes the population, research design, research hypotheses, instrument, data collection, and data analysis. Chapter IV, Analysis and Presentation of Findings, presents the statistical analysis of the data and interpretation of the findings. Chapter V, Summary and Conclusion, includes a summary of the finding, conclusions, and recommendations for future research.

#### CHAPTER 2. LITERATURE REVIEW

The review of literature related to the proposed research includes the topics; (a) leadership research, (b) organizational change and leading change success factors, (c) Six Sigma, and (d) self–efficacy.

#### Leadership Research

Good research requires methodological consideration for the issues of validity and credibility. Research is considered valid and credible when there is freedom from bias that supports the generalization and transferability of the finding; in other words, it correctly addresses assumptions and limitations of the study. Organization change has proven a priority area for leadership research. Organizational change is a particularly complicated event, one that has increasingly challenged managers who seek to effectively and efficiently address opportunities to improve the profitability of their organization. Two characteristics of leadership research are two factors that complicate selection of an appropriate methodology; 1) the situational nature of leadership, and 2) the process focus.

Universal leadership theories attempt to identify leadership that is applicable in all situations (Gordon & Yukl, 2004). Contemporary approaches are based on contingency theories that describe leadership as situational, with behaviors and traits more beneficial in some circumstance but not others. This later approach appears more practical in light of organizational complexity, but provides for complications in research. Gordon and Yukl (2004) identified field experiments and qualitative ethnographic studies as the type of innovative research approaches that best accommodate this challenge.

Equally challenging to good leadership research is the past tradition of developing theories to predict leadership effectiveness (Gordon & Yukl, 2004). The true challenge to understanding leadership effectiveness is the underlying process and the implication of relationships. When leadership is viewed as a journey as opposed to an event or destination, traditional fixed designs are clearly inadequate. To capture the richness of the process, to provide explanation, Gordon and Yukl (2004) recommend longitudinal studies that leverage both qualitative and quantitative techniques.

Gordon and Yukl (2004), as an answer to the challenges of leadership research, suggest that further progress will require more innovative research methods. They suggest that researchers should venture beyond the traditionally used survey method, and seek to explore and explain the dynamic nature of leadership. This suggests that leadership research should include methods like field experiments, simulations, and qualitative methods. By using multiple methods when ever possible (Gordon & Yukl, 2004), the applicability of the findings are enhanced.

#### Six Sigma

#### Introduction

Today, nearly all companies are facing the harsh realities of a competitive environment. This is no time for evolutionary change. Instead, companies are instituting revolutionary changes meant to have impact within a very short time frame. Six Sigma can be a powerful tool for corporate leaders who recognize that the quality of their products is a critical factor of success. Segments such as computer technology and retail, where innovation and speed often take priority over quality, establishing a culture of Six Sigma can be challenging. Even in companies where quality is a major driver discontinue implementation of their Six Sigma program prior to seeing impact to the bottom-line. The long term investment of Six Sigma implementation, as it has been pointed out, "it's not for everyone" (Henderson & Evans, 2000). Considering what Six Sigma is capable of delivering, a better understanding of the reasons for failure to fully implement and sustain a Six Sigma program can provide insight into why other beneficial organizational changes fail to come to fruition.

The modern organization can no longer look to its ability to change as an advantage, it is now a prerequisite for survival. As the managers and leaders are the ones who are most responsible for the organizations survival, this is priority issue. People and companies will be leaders and have a competitive edge only if they maintain a consistent mental attitude and seek out more effective ways to produce quality products and services. The use of technologies, creative techniques and innovative programs will create a more efficient, less expensive and better environment for companies and their customers (Defeo, 1999). Six Sigma provides a holistic approach of enablement and empowerment toward the development the competitive edge every company desires.

Developed by Motorola in the mid-1980s, Six Sigma is a data-driven quality methodology that seeks to eliminate variation, and its associated costs, from a process. Six Sigma focuses on the needs of the customer to understand what needs to be improved, has gained popularity through the published successes of respected company like GE, Allied Signal, Kodak and many others. Its reliance on data, proponents say, differentiates Six Sigma from other methods (Scalise, 2001). The approach is based on rigorous Japanese
theories of quality for use in the manufacturing process, where defects are relatively easy to spot and count and thus well suited to the high-volume, high precision electronics industry that has highly complex processes (Henderson & Evans, 2000).

Six Sigma has drawn the interest of leaders mainly as a result of the fact that it clearly identifies the investment and resulting profit associated with improvements achieved as a result of its application (George, 2002, p.17). This is the language of corporate executives, a differentiator that bridges the ambiguity of concepts like the "hidden costs of quality" talk of past quality programs. Six Sigma is a management system focused on achieving lasting business leadership and top performance that benefits not just the business, but all its stakeholders to include; customers, associates, and shareholders. Six Sigma is occasionally presented as only a measure to define the capability of any process, but it is also a goal for improvement that reaches near-perfection, and the management system associated with achieving these goals. The system to achieve Six Sigma creates a culture characterized by (George, 2002a):

1. *Customer centricity*: Knowledge of what the customer's value most is the start of value stream analysis.

2. *Financial results*: No project or effort is undertaken unless there is evidence indicating how much shareholder value will be created.

 Management Engagement: The CEO, executives, and managers are engaged in Six Sigma. They have designated responsibilities for overseeing and guiding Six Sigma projects to make sure those projects stay focused on organizational priorities.
*Resource commitment*: Typically 1% to 3% of an organization is devoted to Six Sigma efforts full-time. Other employees participate regularly on projects.

5. *Execution infrastructure*: The hierarchy of specific roles (such as black belts and master black belts) provides ways to integrate Six Sigma projects into what the organization does and supports a culture of continuous improvements efforts.

Six Sigma is not just an improvement methodology; it is far more holistic than that. It is considered a system of management, a measure of capability, and a goal for improvement that reaches near perfection (George, 2002a). When understood in this context, Six Sigma as a natural evolution of the teaching of Deming and the philosophy of Total Quality Management. The Six Sigma Define-Measure-Analyze-Improve –Control (DMAIC) model for achieving change is a logical extension of the Deming Cycle, Plan-Do-Check-Act (PDCA).

# Define-Measure-Analyze-Improve-Control (DMAIC)

The financial impact of Six Sigma is the result of the integration of the tools, techniques and methodology into the DNA of an organization (George, 2002, p18). A fundamental element of the philosophy is a model that outlines the general methodology. This methodology serves as a step-by-step set of instructions for application of the tools and techniques that characterize Six Sigma. Though numerous methodological models are available, the one most prevalent is Define-Measure-Analyze-Improve-Control or simply DMAIC (see Figure 2).

Figure 2. DMAIC Model (Harry & Schroeder, 2000)



Control the new system. Institutionalize the improved system by modifying compensation and incentive systems, policies, procedures, MRP, budgets, operating instructions and other management systems. You may wish to utilize systems such as ISO 9000 to ensure that documentation is correct.

By definition Six Sigma is the achievement of eliminating defects of any process to a level of six standard deviations between the mean and the nearest specification limit. The Six Sigma statistic describes quantitatively how a process is performing. The sigma level represents the number of errors; a true Six Sigma process must not produce more than 3.4 defects per million opportunities. Errors are almost always due to variation of some type, leading to the mantra of Six Sigma "variation is evil". A high level of variation means that customers are not likely to get what they want, and this has far reaching impact on; retention, marketing, efficiency, and revenue growth. Six Sigma is though, much more than a problem solving methodology, and to view it as such is to significantly underestimate the potential it has to improve an organization's profitability and overall success.

#### Implementation

The reality is that customer's needs are always changing. Companies are challenged to quickly detect environmental changes, but they are equally challenged to adapt their organization to meet the new requirements. Company executives can not mechanically replace an old culture with the new, like changing a drive shaft in a car (Gilmore, Shea, & Useem, 1997). What they really need is a culture of innovation, a culture that has the built in flexibility to self-organize quickly and repeatedly. An organization must have; 1) the ability to clearly define and communicate a compelling, strategically appropriate vision and management's commitment, and 2) support development of "learning to learn" skills, to develop a culture capable of stabilizing an organization 3) have management that both empowers their employees and has the patience to allow employees to self-organize.

The survival of businesses, careers, and domestic or international competition depend increasingly on the kinds of competitive results produced by quality-driven strategies and processes (Defeo, 1999). Six Sigma can do just that. Successful Six Sigma leadership requires more than management dedication; there must also be deliberate attention paid to the alignment and balance of management support for employees and the organizational processes that provide the resources employees need.

As depicted in Figure 3, the Six Sigma cycle is dependent on the successful training of employees who then develop projects. The products, or outputs, of the Six Sigma cycle are the completed projects that deliver on the promise of improved profitability. The

successful projects become inputs to the Six Sigma cycle that fuel; 1) identification of additional projects, and 2) development of a critical mass of trained employees. Employees, once involved in Six Sigma, become its biggest boosters (Defeo, 1999). Until this point is reached, an organization will leverage consultants to train staff at all levels in project management, project selection, change management, and in the use appropriate tools and techniques. Of critical importance to the Six Sigma cycle is successful completion of improvement projects, without which this cycle will become just another training program that fails to deliver on promised results. With an estimated expense to train an employee at approximately \$8,000, including the time and resources devoted to overseeing Six Sigma efforts, (Scalise, 2001) it is easy to recognize why a company will chose to abandon implementation if the bottom line impact lags. Companies have recognized the challenges of making a organizational change of this magnitude, and have integrated human resource strategies to improve the likelihood of success.

Figure 3. The six sigma cycle (Scalise, 2001, p.43)



Truly changing behavior over the long term requires that the Six Sigma goals be internalized on an individual level. Six Sigma succeeds because it develops employee camaraderie and new levels of confidence, pride and professionalism. In hopes of achieving a Six Sigma culture, many companies have leveraged human resources-based actions to promote desired behavior and results. Six Sigma accomplishments as a key measure for management performance and compensation is a likely to encourage successful selection of Six Sigma projects (Henderson & Evans, 2000), but this does not always result in motivating the employees to lead Six Sigma efforts.

Jack Welch said the following about people and their capabilities: "What we call "stretch" simply means figuring our performance targets that are doable, reasonable, within our capabilities, and then raising our sights higher - much higher toward goals that at the outset seem to require superhuman effort to achieve. We have found that by reaching for what appears to be the impossible, we often actually make it. We wind up doing much better than we would have done. An exciting by-product of stretch behavior is an enormous surge of self confidence, as people achieve things they once suspected were beyond them (Henderson & Evans, 2000)."

Six Sigma provides a company with a more egalitarian and less hierarchical system of reporting and decision making, where employees are encouraged to see themselves as "owners" of the company and as "empowered" to do whatever it takes to meet customer's needs. Empowerment is an enabler of behavioral change, and arguably a factor in supporting the type of change that will make a company increasingly more profitable. It is the human

element, and attention to that element, that will determine the success or failure of Six Sigma implementation. The human element is taking advantage of an era of technological development to create a discipline based on the reality that higher levels of unbelievable quality at lower cost are urgently required to compete in a challenging and tough global economy. Six Sigma is a road map for survival (Defeo, 1999). Where Six Sigma is a process employees can use to achieve the challenging goals, it cannot motivate employees to take on the challenge of leading change efforts in an organization.

#### Organizational Change

Only organizations that display the characteristics of being fast flexible, responsive and totally customer focused will survive to meet the economic challenges of the 21<sup>st</sup> century (Atkinson & Millar, 1999). It is of little surprise that virtually all companies want to build a culture that is vision driven, entrepreneurial, team based, and "boundary less "; a culture that favors nimble responsiveness to customers and market opportunities, all companies stress a more egalitarian, less hierarchical system of reports and decision making. Company's want a culture where employees are encourages to see themselves as "owners" of the company and as empowered to do whatever it takes to meet customer's needs. A review of the literature regarding organizational change that addresses the topics of complexity theory and models for leading change provides the necessary context for the introduction of self-efficacy as an important influence on the success of change in an organization.

### *Complexity Theory*

When organizations were studied and understood through the lens of scientific management, as introduced by Fredrick Taylor, there was an understanding that leveraged mechanistic laws and viewed people as automatons in a huge machine. From this mechanistic approach, all actions are seen as something that is accompanied by equal and opposite reactions; providing for a linear perspective of organizational dynamics and change. Life seems to contradict this classical view, and there is an increased realization by academics and practitioners alike that organizations are anything but simple. In contrast, modern organizations are instead seen as complex entities that operate as systems striving to establishing equilibrium (Burnes, 2004a).

Evolution theory provides a far more complex view of how change occurs. Nobelprize winner Ilya Prigogine, in the field of non-equilibrium thermodynamics and phase transitions, provides an explanation for the generation and development of order. Prigogine presents change, development and transformation as taking place in open systems operating in a far from equilibrium condition (MacIntosh & MacLean, 2001). A complex system is one where a large number of agents interact with each other (Aram & Noble, 1999). Complexity theory brings together research on complex systems from a range of scientific disciplines that include biology, chemistry and physics to name a few. These complex system, for survival purposes, operate at the edge of chaos yet have the ability respond continuously to changes in their environments through a process of spontaneous selforganizing (Stacey, R., 1996).

According to complexity theory, systems behave in a relatively stable manner until they reach a critical threshold. As this point is approached, the system becomes stressed, making it unstable. As the system moves from equilibrium to far-from-equilibrium conditions there exists the potential for change. A system in a far-from-equilibrium condition is open to the environment, importing energy and exporting entropy (which is a measure of disorder) (MacIntosh & MacLean, 2001). In this condition a system can make use of disorder to fuel the process of change. Different than the cause and effect model, a system uses feedback to escalate many tiny changes into globally different behavior patterns (Stacey, R. D., 1995). According to this theory, a system is result of every detail of its history, and what it will become can be known only if every detail of its future is identified (Stacey, R. D., 1995). Since this is impossible, the future of a system can really only be known when it happens, and thus that challenge of leading change in an organization.

There are three concepts at the heart of complexity theories; the adaptive nature of systems, self-organization, and the edge of chaos.

Systems are adaptive. They do not simply respond to events, systems evolve. Individuals are guided not only by their own rules of behavior, but also by the rules that they share with others in the group. Competition and conflict emerge and the evolution of the system is driven by individuals who are attempting to exploit each other, a game that can continue only if neither side succeeds completely or for extended periods of time (Aram & Noble, 1999). Because organizations have come to be known as complex systems (and not machines), they are adaptive too. They can be neither be controlled nor predicted, but will adapt in a manner in which order will emerge on its own.

Complex adaptive systems are spontaneously self-organizing. Increased levels of interconnectivity, shared identity, and collective capacity, all contribute to the self-organizing

capability of the organizational system (Gilmore et al., 1997). These characteristics of adaptation and self- organization create a distinctive dynamic within and between systems, one of tension and paradox; of competition and cooperation for supremacy and for survival; of dominance for the currently fittest; and retention of redundancy in the sustaining of recessive systems, a redundancy that sustains the potential for creativity (Wheatley, 1994).

The `edge of chaos' is a space where order and disorder co-exist (Tetenbaum, 1998). For complexity theorists, chaos describes a complex, unpredictable and orderly disorder in which patterns of behavior unfold in irregular but similar forms; snowflakes are all different but all have six sides (Tetenbaum, 1998). Chaos is often viewed as complete randomness, but complexity theory views it as just a different form of order. Chaos, which is both dynamic and non-linear, has a hidden order that only appears to be utter chaos (Tetenbaum, 1998).

Stacey (2003) identifies three types of chaos, which he refers to as order-disorder: stable equilibrium; explosive instability; and bounded instability. Only under the last of these, bounded instability, are complex systems seen as having the ability to transform themselves in order to survive. If systems become too stable, they ossify and die. If they become too unstable, as with cancer, they may get out of control and destroy themselves (Tetenbaum, 1998).The edge of chaos is where life has enough stability to sustain itself and enough creativity to deserve the name of life. It is the constantly shifting battle zone between stagnation and anarchy, the one place where a complex system can be spontaneous, adaptive, and alive (Aram & Noble, 1999). This propels the system away from its current state toward a new, ordered state in a way which is largely unpredictable. This switch in states is what is by definition an organizational transformation (MacIntosh & MacLean, 2001). There has been an ongoing search for techniques that support a "bounded instability" approach than enables management and leaders to optimize the edge of chaos type activities by their employees without the risk of unmanageable, explosive instability.

# Leading Change

Organizational change is often loosely categorized into two different models that highlight the link it has to complexity theory; 1) episodic, discontinuous, and intermittent, and 2) continuous, evolving, and incremental (Munduate & Bennebroek Gravenhorst, 2003). The distinctive quality of continuous change is that small continuous adjustments can accumulate to become a substantial change. Because it requires both breaking the current equilibrium and moving to a newly created equilibrium, it is most closely associated with planned intentional change promoted by change agents (Munduate & Bennebroek Gravenhorst, 2003). The continuous change intervention is characterized by the "logic of attraction" that induces constant adjustments and improvements. "people change to a new position because they are attracted to it, drawn to it, inspired by it" (Weick & Quinn, 1999). Innovation and change need to be understood from the point of view of the actors involved. From this perspective, the role played by managers who act as internal change agents affects the employee behavior and is directly related to the type of change that is taking place. In episodic change the manager's role is that of the prime mover who creates change, while in the continuous change model this role is characterized as a sense-maker who redirects change (Weick & Quinn, 1999). That is the difference implicit in Kotter's (1996, p. 24) question: "Is change something one manages or something one leads?" To manage change is to tell people what to do (a logic replacement) but to lead change is to show people how to be (logic

of attraction) (Weick & Quinn, 1999). In an attempt to support continuous improvement efforts, the role of a leader or manager is to bring about employee acceptance of change by inciting positive feelings with regard to the desired behaviors (Munduate & Bennebroek Gravenhorst, 2003).

The organizational change process is best understood in the context of Kurt Lewin's seminal work on the topic of planned changes, most importantly, his 3-step model. This model has served as a foundation for nearly every other model proposed since its introduction.

#### *Kurt Lewin and planned change*

Kurt Lewin was a humanitarian who believed that only by resolving social conflict, whether religious, racial, marital or industrial, could the human condition be improved (Burnes, 2004b). He believed that the integration of democratic values into all aspects of society was the key to preventing the worst extremes of social conflict that he had seen in his lifetime (Lewin, 1951). The model he proposed for supporting planned change involved all individuals as a means of assuring understanding and affording every individual the time and information needed to restructure his or her perception of the world around them (Burnes, 2004a, 2004b). Lewin's planned change approach is based on four concepts; Field Theory, Group Dynamics, Action Research, and the 3-step model.

Field theory is an approach to understanding group behavior by trying to completely map out the complex environment where behavior occurs. Environments are in a continuous state of adaptation, something he called 'quasi-stationary equilibrium' (Lewin, 1943a). As a

result, change and constancy are relative concepts, with change always happening, just in varying amounts (Lewin, 1951).

Group dynamics emphasize group behavior, as opposed to individual behavior, as the primary focus of change. Lewin's definition of a group still the most accepted " it is not the similarity or dissimilarity of the individuals that constitute the group, but the interdependence of their fate" (Burnes, 2004c). He was the first psychologist to write about group dynamics and the importance of the group in shaping the behavior of its members.

Action Research is a two pronged approach. First, for change to occur there is a requisite action that must be directed at achieving the change. Second, successful action is based on analyzing the situation correctly, identifying all the possible alternative solutions and choosing the one most appropriate to the situation at hand. Action research draws on both of the two previously discussed elements (field research to understand the current forces, and group dynamics to understand why the people are behaving as they are) to understand the resultant group behavior when encountering environmental forces (Burnes, 2004c).

The emphasis Lewin placed on people and their perceptions, the constancy of change, and the importance of the change itself highlights his reasons for stressing the characteristics of participation and collaboration as vital to change. Change that succeeds in a higher level of group performance often erodes to a point where performance returns to the previous level. The goal of change can not be the attainment of a desired level of performance. Instead, it is permanency at the new level or permanency for a desired period that should be the objective (Stacey, R., 1996). This led to the development of Lewin's 3-step change model; unfreezing, moving, and refreezing.

*3-Step Model.* Lewin believed a successful change to be characterized by three steps:

<u>Step 1: Unfreezing</u>. Lewin believed that the stability of human behavior is based on a quasi-stationary equilibrium supported by a complex field of driving and restraining forces. He argued that equilibrium needs to be disrupted (unfrozen) before old behavior can be discarded (unlearnt) and new behavior successfully adopted (Burnes, 2004a).

<u>Step 2: Moving</u>. Unfreezing is not an end in itself. Though it may create motivation to learn it does not necessarily control or predict the direction (Schein, 1988). It is necessary to take into account all the forces at work, and identify and evaluate, iteratively, the available options (Lewin, 1951). Lewin's view was that it was not possible to change the behavior of a group successfully, unless one understood the interactions (dynamics) between its members (Burnes, 2004a)

<u>Step 3: Refreezing</u>. This final step emphasizes stabilizing the group at a new quasi-stationary equilibrium in order to ensure that the new behaviors are set and will not return to the previous state. Lewin saw successful change as a group activity. Because group norms and routines are also transformed, changes to individual behavior will not be sustained. In organizational terms, refreezing often requires changes to organizational culture, norms, policies and practices (Schein, 1988)

Lewin's planned change model supports improving the operation and effectiveness of an organization by encouraging an approach that everyone. As the modern organization is faced with the reality that survival is contingent on an ability to transform rapidly and successfully (Kanter, 1989), Lewin's model has provided a seemingly simplistic foundation for understanding the interaction of factors influencing the success change. The seemingly simplistic model is helpful in understanding organizational change in the context of complexity theory.

Leaders desire a culture of innovation the flexibility to self-organize quickly and repeatedly. Vision has consistently been identified as a key responsibility of managers. The vision or goal must be tangible, measurable and realistic to the business and direct it toward the end state (Atkinson & Millar, 1999). There has been a dramatic shift in role of an effective leader or change agent from setting direction to developing strategic vision. The modern change agent must create an environment for self-organizing, where purposeful outcomes can be jointly created by diverse, interrelated, interdependent members of a complex system (Atkinson & Millar, 1999). This is often easier said than done, leading academics and practioners alike to search out models that accurately explain factors associated with leadership success.

# Models for Leading Change

John Kotter is probably one of the most well known names in popular business literature. His eight steps for leading change include; 1) establishing a sense of urgency, 2) creating a guiding coalition, 3) developing a vision and strategy, 4) communicating the change vision, 5) empowering a broad base of people to take action, 6) generating short-term wins, 7) consolidating gains and producing even more change, and 8) institutionalizing new approaches in the culture (Kotter, 1996b). He follows the unfreezing, changing, re-freezing organizational change model introduced by Lewin. Those who fail to understand this about his approach often make the mistake of taking actions out of sequence. His first four steps support unfreezing, the next three steps support the move, and the final step is about re-freezing. It is about having a compelling vision, and wanting to lead the efforts that support the entire organization getting there. He also highlights the importance communication plays in the successful change efforts.

Another approach is that of the "Heart, Heart, and Hands" (Gibson & Billings, 2004). Gibson (2004) reminds us that change creates uncertainty, and that uncertainty is accompanied by feelings like; a sense of loss of control, confusion, uncertainty, mistrust, "me" focus, fear of letting go of what led to success in the past, low stability, high energy (often misdirected), and an increased conflict. For change to happen, three areas must be addressed; the head, the heart, and the hand.

Management must provide people with an understanding of the reasons for change that are compelling and logical; in doing such, they have addressed the head. Managers must also acknowledge the fears and concerns of all the employees. By helping them to develop a sense of what the change will mean for them, managers are addressing the heart. Lastly, they must address the hands by empowering them to gain the new skills needed to be successful and aligning reward and recognition to reinforce the demonstration of desired behaviors.

In the context of Lewin's 3-step model for change (unfreeze, change, re-freeze) the challenge of successful change is more fully appreciated. Lewin's model is at the foundation of each of the discussed approaches.

Unfreezing is about overcoming inertia. The actions taken here need to be consistent with questioning the current status and seeing something logical and compelling enough to create a willingness to change. Kotter (1996) addresses this need with his steps that include creating a sense of urgency, creating a vision and communicating the vision. This is where leaders drive. These steps, this phase of change, are about action and about standing up front and being seen and walking the talk at every opportunity.

The second step, change, means a different approach, a different pattern, a different rhythm and different culture. Change creates uncertainty; jumping the curves is like letting go of one secure place to try to get to another. The feelings experienced by employees are the most challenging of any of the phases and include: sense of loss of control, confusion, uncertainty, mistrust, a self-preservation focus, trepidation associated with moving from something that worked in the past, instability, significant emotional stress, that in combination can manifest outward as misdirected high energy and increased conflict. A leader must anticipate these feelings without getting distracted, and focus on bring back a sense of control and confidence (Gibson & Billings, 2004). It is the management and the leaders of the organization that enable an organization to re-establish the control and confidence need to stabilize after a transformation.

Both change and re-freezing are the result of empowerment, recognition and patience on the part of management. Once there is a compelling reason for change, the actual shift will happen when it is right. Lichtenstein (1997) called the actual event grace, magic, or a miracle, each of those terms suggesting the unexplained nature of the event. Honoring the concept of equifinality, there is no one action that can be traced to the occurrence of change, though factors that can be seen as influential. Some of the more important enablers include learning, or learning to learn, as an organizational competency. The support for change and the support for stabilization are common in that they are about enabling. The leadership can not "do" either of these steps for the rest of the organization; only the organization will be able to figure out the right path and structure needed to support the new organization.

The managers and leaders that are at first challenged to identifying the behaviors needed to implement a new strategy, are equally challenged to find ways to teach, nurture, and reinforce the new behaviors needed to lead change. Managers and leaders can not stop until the change is cemented in the organization. They must also take steps to support the unlearning of older behaviors that are incompatible with the new. Feedback, both at a micro and macro level is mandatory. They must show evidence of objective progress in support of the vision. The modern manager and leader must never "let- up," the effort needed to enable change is equal to that required to ensure gains are sustained, and evolution for the next change can occur.

Gibson & Billings identify the 3<sup>rd</sup> step of change as "making it stick, maintaining the momentum" (Gibson & Billings, 2004). It is here that the changes are operationalized. Their head, heart and hand approach focuses the attention of managers on ensuring the clarity and understanding of the vision, continuously motivating people regarding the change, and verifying that everyone is continuing to use new behaviors and skills (Gibson & Billings, 2004).

Kotter's addresses "freezing" in the last step of his 8-step process of creating major change. He calls it "anchoring new approaches in the culture," (Kotter, 1995). It is here that

he states the reality that the standards and shared values of a change in the organization happen last, and these standards and shared values will happen as a result of demonstrated results, lots of talk, and potentially some turnover in personnel (Kotter, 1995).

The role of the leader and the actions of a manager are not necessary different at this time of "sticking the change", they are just more intense. Empowerment is a must, as the organization seeks out the best ways to accomplish goals. Support for learning to learn ensures that everyone will continually learn new skills to adapt the changing needs. Communication takes on a paramount role both in action and word as people need both constant re-affirmation of the need for change and evidence that real progress toward the vision that is being achieved. The vision must be reinforced again and again, successes need to be shared and the people who achieved them rewarded to reinforce expectations of the same from everyone else. As the market place continues demand change, organizational change is necessary for survival. This helps clarify the need for all managers to become adept at these leadership skills.

#### Leading Change Success Factors

Leadership research has exploded over the last half century as both academic and practioners race to understand the factors associated with effective leadership. In understanding the challenge of leadership during change, Nadler and Tushman (1989) present large scale organizational transformation as "frame bending". Key to selection of this term is an acknowledgement of change as an arduous undertaking. Organizations are complex systems with two major elements, strategy and organization (Nadler & Tushman, 1989). Strategy is what a company does; organization is how it does it. The organization is composed of work, people, formal processes and informal process all of which must be in congruence (Nadler & Tushman, 1989). The difficulty associated with change is the conflicting responsibilities placed upon those attempting to lead change.

Leaders enabling change have the conflicting requirements to both support congruence without making it an impediment to the creativity needed to take advantage of the improvement opportunity. This entire process places an immense amount of pressure on the employees of an organization. Much of the pressure created by organizational change could be alleviated if those leading change focus on people aspects in addition to strategy and other organizational elements (Woodward & Hendry, 2004). The impact of change on people provides insight into understanding the key features of leading and coping with change in an organization (Figure 4).



Figure 4. Leading and coping with change model (Woodward, 2004, p. 168)

First of all, people will always look first to how a change will impact them. As new directions and situations evolve, employees will assess them as either positive or negative and will adjust expectations accordingly. The perception is often most influenced by an assessment of the adequacy of resources and their capability to cope with the change. Employees need the support of credible and capable managers. They will continually assess the capability of management to deliver to them the resources they need. Employees appreciate the difficulties managers face in leading change, but will still punish managers who have been neglectful and who have created unnecessary pressures. This impact of judgment of managers and the effect it has on the success of change programs is often dismissed. Employees are continually evaluating what is going on during change, and will adopt various coping strategies to include denial, avoidance or stress, if they feel become overwhelmed.

An employee's ability to cope with change is most influenced by the development of skills to manage the new situations and the ability they then have to show responsibility for performance; this enhances their sense of autonomy and control. By providing support for employees to learn new competencies, through formal training or informal coaching, managers are providing the organizational support that employees require to develop the sense of autonomy and control they need to succeed.

Unfortunately, managers leading change tend to stress the things they control as the most important factors for success, as opposed to stressing the development of their employees' ability and perceptions about factors they must control for organizational

success. Successful managers recognize that the success employees experience in meeting the requirements of the new situation will reinforce feelings of control.

The mix of optimism and patience associated with managing and leading during a change highlight the situational nature of leadership, and also the need for ability in terms of the skills associated with establishing reasonable goals and boundaries to initiate change in an organization. There is though, another ingredient, arguably the most important, that represents a potentially illusive factor that can serve as a predictor of leadership success. Faced with the challenge of leadership, work rooted in Badura's social cognitive theory provides evidence for self-efficacy as a key factor in predicting success.

#### Self-Efficacy

The modern change agent must create an environment for self-organizing, where purposeful outcomes can be jointly created by diverse, interrelated, interdependent members of a complex system (Atkinson & Millar, 1999). This is often easier said than done, leading academics and practioners alike to search out other models that more accurately explain factors associated with leadership success. Most notably, research in the field of psychology suggests that individual personality type and efficacy may serve as predictors of leadership effectiveness especially in leading change efforts. The field of social cognitive theory (SCT) serves as a foundation for further discussion of this assertion.

## Self-fulfilling Prophecy

The "Pygmalion effect," occurs when a person's high level of expectations of another person results in high level of performance (McNatt & Judge, 2004). When a person's high self-expectations result in high performance, the Galatea effect is said to occur. One of the key conceptual formulations of self-expectations of performance is task specific self-efficacy (McNatt & Judge, 2004). According to self-fulfilling prophecy theory, one's behavior is consistent with his or her expectations, and those behaviors in turn will influence outcomes (Merton, 1948). A key direction of further self-fulfilling research, of obvious importance to organizations, is to learn how managers might enhance employee self-expectations. Gist and Mitchell (1992) identified the malleability of self-expectations, and self efficacy, as reason for organizational interest in further research.

# Social Cognitive Theory (SCT)

Social cognitive theory (SCT) has been used as a conceptual framework for explaining a variety of human phenomenon including academic performance, achievement behavior, alcohol and drug abstinence, career choice, decision making, gender differences in performance, goal setting and motivation, healthy life-style choices, job performances, sport and motor performance, and different forms of political participation (Bandura, 1997). The framework of SCT explains a person's behavior as a relationship between three reciprocal dimensions (Figure 5) that include: 1) one's environment (e.g. consequences, good or bad, from the organization), 2) one's social cognitions and other personality factors, and 3) one's behavior (e.g. past successful of unsuccessful performance) (Malone, 2001; Mccormick & Martinko, 2004). Because of the reciprocal influence of the factors, employees are at the same time both products and producers of their personality, behavior and environment (Stajkovic, Alexander D & Fred Luthans, 1998).



Figure 5. Triadic relationship of Social Cognitive Theory

Research in the field of Social Cognitive Theory has progressed over the last few decades to include the addition of the factor of self-efficacy. Peterson's (2005) formula for human performance (Figure 6) takes the two internal variables of ability (employee) and motivation (behavior) and adds to it the variable of self-efficacy. Situational factors (environment) are viewed as a constant in the equation.

Figure 6. The Human Performance Model (Peterson & Arnn, 2005. p.8) Human Performance= *f*(self efficacy X motivation X Ability) + situational factors

Ability is the capacity or possession of knowledge that one has to perform a task of value to an organization (Mccormick & Martinko, 2004). It is the combination talent, learning, and experience that play a critical role in human performance. Motivation or the willingness to perform may be based on the belief in receiving some tangible reward. A person may believe in an outcome that will satisfy a need or emotional reward, such as praise

or recognition. While ability and motivation are obviously critical components of human performance, situational factors also impact performance. Research and theory development in the fields of psychology, education, organizational behavior, and other disciplines have clarified the roles played by ability, motivation, and situational factors in human performance (Locke, 1997). The fourth element, self-efficacy, serves as a factor in the human performance equation that adds insight to theory in the field of leadership and shown promise in answering the question "why some people step forward to attempt difficult tasks and others do not?"

# Self-efficacy

Self-efficacy stems from Bandura's (Bandura, 1997, 1999) Social Learning Theory and is "the belief in one's capabilities to organize and to execute the courses of action required to produce given attainments" . Self-efficacy is a person's own judgments of their competence to complete an action. Neither self-confidence nor self-esteem convey the richness of self-efficacy. Where self-confidence is a person's assurance of an outcome, good or bad; and, self-esteem is a person's estimate of his or her own worth; self efficacy is assuredness of a positive outcome. Neither of the two other terms come as close to the concept of self-efficacy and the potential impact of this factor on a persons' emotions, actions, thoughts, and motivation (Bandura, 1997).

Self-efficacy is a person's conviction about his or her abilities to mobilize the motivation, cognitive resources, and courses of action needed to successfully execute a specific task within a given context (Stajkovic, Alexander D. & Fred Luthans, 1998). A person's beliefs about their abilities have an influence on the outcome of their actions. People

tend to avoid activities and situations they believe they are likely to fail. They also tend to adjust level of effort expended based upon their expectations of the outcome. Bandura (1986) contends that person's behavior is better predicted from their beliefs than from the actual consequences of their actions.

A person with strong self-efficacy, when faced with task failure and frustrations, is more likely to recover quickly, to demonstrate persistence, and to employ creative problem solving when faced with challenges. This type of individual believes they will find a way if they work hard enough. When they are unsuccessful, it will not be attributed to their ability, motivation or the situation, but instead to a lack of effort on their part. People with high selfefficacy will persevere at tasks even when they are doomed to fail. They will persevere even when they really do not have the ability to perform a task; they will not "throw in the towel"; because they are spurred by obstacles to greater effort (Bandura, 1999).

Research within organizations (Bandura, 1999; Stajkovic, Alexander D. & Fred Luthans, 1998) has demonstrated that self-efficacy is strongly related to performance. Research has shown that self-efficacy affects peoples' thoughts, actions, levels of motivation and perseverance, and susceptibility to stress and depression. In light of what has been recognized about the challenges of transformation in an organization, the impact of a trait like self-efficacy seems intuitive. The implications to managers seeking means develop motivated employees, task specific self efficacy is increased through successful performance, but management could also structure successful repetitious and progressively more difficult mastery experiences for employees, so that they learn that they can "do it" (Eden & Yaakov Zuk, 1995; McNatt & Judge, 2004). *Sources of Efficacy*. There are four ways of developing a strong sense of efficacy; mastery experience, social modeling, social persuasion and , and affected state (Bandura, 2000; Goddard et al., 2004).

Social modeling provides a vicarious experience for people to see others like themselves persevere and succeed. This vicarious experience builds in individuals a belief that they too are capable of success. If the modeler performs well, it is likely that the efficacy of an observer will increase, with the opposite true if the performer does not do well.

Social persuasion is encouragement or specific performance feedback from a supervisor or colleague (Goddard et al., 2004). People are persuaded that they have what it takes, and as a result they will exert more effort than if they harbor self doubt. The potency of the persuasion depends on the credibility, trustworthiness, and expertise of the persuader Effective social persuaders do more than just convey faith in a person, they also take steps to ensure success and guard against situation likely to result in failure (Bandura, 2000). Though the power of social persuasion may be limited in terms of creating long term change, it can counter the occasional short term set-backs that do have the potential of creating just enough self doubt to interrupt persistence.

People also rely on their physical and emotional states to judge their capability (Bandura, 2000). The level of stimulation, either anxiety or excitement, adds to an individual's perception of self-capability or incompetence. Individuals with strong beliefs can tolerate pressure and crises and continue to function without debilitating consequences; they can learn to rise to the challenge when confronted with disruptive forces. Less efficacious individuals though, are likely to have a dysfunctional reaction, which in turn increases the likelihood of failure (Goddard et al., 2004).

The final source is the mastery experience. This source is considered the most powerful, and is the source of efficacy investigated in this research study. The perception that a performance has been successful tends to raise efficacy beliefs, contributing to the expectation that performance will be proficient in the future. The perception that one's performance has been a failure tends to lower efficacy beliefs, contributing to the expectation that future performances will also be inept. If people have only easy successes, then they are easily discouraged by failure. Development of a resilient sense of efficacy requires experience in overcoming obstacles through perseverant effort (Bandura, 2000). If the success can be attributed to something controllable by the individual (i.e. like use of Six Sigma tools and techniques) than efficacy beliefs are enhanced (Goddard et al., 2004). *Applicable Research* 

There has been a growing interest in the topic of self-efficacy, with research supporting the investigation of this factor in wide variety of settings. Education is one of the most prevalent areas with research targeting both students and teachers like the study by Goddard (2004) that focused on student achievement and teacher performance. There are also numerous studies that have investigated the significance of the relationship between self-efficacy and work-related performance like; job search, sales, learning and task related achievement, adaptability to advanced technology, career choice, naval performance at sea and more (Stajkovic, Alexander D & Fred Luthans, 1998).

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A scarcity of research of self-efficacy in the field of organizational learning though has been noted (Goddard et al., 2004). Though limited in number, studies that investigated self-efficacy in organizations have provided support for the significance of the factor. In one study, Paglis (1999) investigated management self efficacy as a factor in motivation of managers to lead change. This research project developed and tested a leadership model that focuses on the source of a manager's motivation for stepping forward and attempting to lead change. Paglis developed a new construct of leadership self-efficacy (LSE) with three proposed dimensions: direction-setting, gaining followers' commitment, and overcoming obstacles to change. Her work leverage Bandura's (1986) social cognitive theory, with the primary hypothesis that managers higher in LSE will be seen by others in the work environment as engaging in more attempts at leading change (Paglis, Laura L., 1999).

Luthans and Stajkovic have done a number of self-efficacy studies including an empirical investigation of manager efficacy as a factor in the level of employee engagement (2002), and a meta-analysis investigating self-efficacy and work related performance (1998). The studies support the validity of self-efficacy in the context of organizational learning. The meta-analysis examined whether combined reinforcement effects on task performance are additive, redundant, or synergistic (Stajkovic & Luthans, 2003). The study identified money, feedback, and social recognition as having a significant impact on task performance.

There have been a number of studies that have addressed personality type as a factor in organizational change. Personality type has been investigated as a predictor of leadership effectiveness (Culp, 1992), and as a factor in the development of a Six Sigma culture (Kaissi, 2004). Culp investigated the relationship of leadership styles of leaders to organizational commitment to Total Continuous Quality Improvement (TCQI). She used a comparative field study involving 58 organizations. Three basic findings emerged as results of this study; (1) leadership style is not a major factor in the commitment to TCQI; (2) leadership satisfaction is greater in those organizations committed to TCQI; and (3) organizations committed to TCQI have more organic organizational structures than organizations not committed to TCQI (Culp, 1992). Kaissi used a quantitative correlation study to: (a) to investigate if there was a preferred influence style used by a leader in a high-tech organization when implementing a Six Sigma change program, and (b) to determine if there was a relationship between a particular influence style and the success of Six Sigma implementation. The study, conducted in one company, concluded that the majority of Six Sigma Personnel (>80%) used rational persuasion as their preferred influence style; and that persons using rational persuasion achieved significantly higher hard savings as compared to peers who used other influence styles(Kaissi, 2004). In addition, the effect of influence styles was mediated by the effect of social culture (US vs. Far East vs. Europe). Kaissi (2004) concluded with an observation that "human factor harmony in leadership with the statistical tool is the key to the successful implementation of Six Sigma."

#### Summary

The topics reviewed in this chapter where chosen for two distinct purposes; first, to provide a foundation and context for the study, and second, to highlight the organizational opportunities that this study might benefit. Leadership research is arguably one of the most prevalent, but is challenged by both the situational nature of leadership and difficulty in agreeing on a definition for leadership. Organizational change has evolved from being a linear, cause and effect type event to a highly complex, system type phenomenon. Companies strive to evolve effectively and efficiently in light of external changes and internal opportunities. The systems approach to organizational change adds to the complexity of determining factors that leaders can and should address to achieve organizational goals. Social cognitive theory, more specifically the self-efficacy, provides an interesting factor that has been linked to employee motivation. Where human capital is increasingly viewed as an organizations most valuable resource, it is arguably its most variable. Self-efficacy is malleable, and as such provides managers with the opportunity to address specific opportunities to improve employee motivation.

## CHAPTER 3. METHODOLOGY

This chapter will describe the methodology used to investigate the relationship between the outcome of one's most recent project leadership attempt and one's intentions to use Business Process Improvement (BPI) methodology (Six Sigma) in support future continuous improvement efforts in the company. This chapter will address the research foundations, the purpose of the study, and the research design. The chapter will also cover the sampling design, research hypotheses, development of the survey instrument, and data collection and analysis.

#### **Research Foundations**

Self-efficacy deals specifically with how a person's beliefs in their capability will influence both the level of motivation they have to attempt a task and their level of endurance to persevere along the path to produce a desired outcome. Unless people believe they can gather up the necessary behavioral, cognitive, and motivational resources to succeed in a task, they will likely dwell on the difficult task ahead, and either exert too little effort to succeed or never even attempt the task.

Research on the topic of self-efficacy has grown in many areas. Studies focused on student achievement and teacher performance (Goddard et al., 2004) are representative of the prolific work that has been conducted in the field of education. There are also numerous studies that have investigated the significance of the relationship between self-efficacy and work-related performance like; job search, sales, learning and task related achievement, adaptability to advanced technology, career choice, naval performance at sea and more (Stajkovic, Alexander D & Fred Luthans, 1998). Research of self-efficacy in the field of organizational learning though, has been lagging (Goddard et al., 2004).

Despite being limited in number, the studies that investigated self-efficacy in organizations have provided support for the significance of this behavioral factor. In one study, Paglis (1999) investigated management self efficacy as a factor in motivation of managers to lead change. Luthans and Stajkovic have done a number of studies to include an empirical investigation of manager efficacy as a factor in the level of employee engagement (2002), and a meta-analysis to investigate self-efficacy and work related performance (1998). These studies have demonstrated the validity of self-efficacy in the context of organizational learning.

As all real world research does, these studies had limitations. Paglis used data gathered via a survey of managers and direct reports to support the development of an instrument for measurement of leadership self efficacy (LSE). This study will also develop a survey instrument, but will augment the analysis with the addition project data from a actual leadership attempt. Paglis was focused on manager self-efficacy, proposing it as an antecedent to employee behavior. Expanding on the scope, this study will investigate selfefficacy of any employee, regardless of their status as manager or individual contributor. As companies continue to recognize the benefit of having an empowered workforce, where every employee is expected to step forward, self-efficacy has organization wide applicability. The Luthan and Stajkovic (2002, 1998) studies investigated self-efficacy as a factor in employee motivation to attempt and succeed at accomplishing simple tasks. In contrast, this study will focus on projects of medium to high complexity where a person must address multiple tasks that included; influencing others, working across organizational boundaries, applying advanced project management and problem solving tools and techniques if they are to succeed at an attempted business process improvement.

There have been a number of studies that have addressed personality type as a factor in organizational change. Personality type has been investigated as a predictor of leadership effectiveness (Culp, 1992), and as a factor in the development of a Six Sigma culture (Kaissi, 2004). Despite this research and other like it that has demonstrated the effectiveness of using personality type to predicting leadership outcome; personality type is a trait that difficult to change. Self-efficacy though, can be developed, and therefore is of more interest in this research focused on identifying factors that management can proactively address to freeze into place a change in the culture of an organization.

This researcher asserts the investigation of self-efficacy as a factor in explaining the engagement of employees in an organizationally beneficial activity of driving continuous improvement has not previously been done and therefore; helping to fill the void of self-efficacy research in organizations, and is a benefit to the managers and leaders in the company that is the target of this study.

## Purpose of the Study

The purpose of this quantitative correlation research study is to investigate, in one large high tech company, the relationship between the outcome of one's most recent BPI project leadership attempt, his or her self reported motivation to attempt future use the BPI methodology, and his or her level of BPI Skill Self-Efficacy (BPI SE), as shown in Figure 7.



Figure 7. BPI Project Leadership Experience, Future Intensions, and BPI SE

# **Research Questions**

Research Question One: Is one's self-reported likelihood to attempt Business Process Improvement in the future dependent on the outcome of his or her most recent BPI project leadership attempt?

Research Question Two: Is one's level of BPI self efficacy (BPI SE) for the key tasks that represent the obstacles to completing a BPI project dependent on and the outcome of his or her most recent BPI project leadership attempt?

Research Question Three: Is there a relationship between an employee's selfreported likelihood to attempt Business Process Improvement in the future and his or her level of self efficacy (BPI SE) for the key tasks that represent the obstacles to completing a BPI project?

Research Question Four: Does one's self-reported likelihood to attempt Business Process Improvement in the future depend on his or her total project leadership experience?
Research Question Five: Is one's level of BPI self efficacy (BPI SE) for the key tasks that represent the obstacles to completing a BPI project dependent on his or her total project leadership experience?

The research questions, as depicted in Figure 8, are primarily based on the work of Albert Bandura (2000) who theorized the mastery experience to be the most powerful source of self-efficacy. The second and third research question investigates relationship of a BPI SE measure to the two phenomenon (project leadership outcome and future intentions) addressed in the first research question, and provides validity for researcher developed BPI Skill Appraisal. The fourth and fifth research questions further explores the influence of a mastery experience by investigating beyond the most recent project leadership attempt to include the existence and outcome of any attempt at BPI project leadership in the past.



Figure 8. The Research Questions

Research Hypotheses

Research Question One: Is one's self-reported likelihood to attempt Business Process Improvement in the future dependent on the outcome of his or her most recent BPI project leadership attempt?

A personal mastery experience is believed to be one of the most influential sources of self efficacy. A key proposition of this study is that a person's perception of their capabilities will be an important influence on whether or not they attempt leadership (Paglis, Laura L & Green, 2002). The first research question is focused on evaluating the relationship between the outcome of one's most recent BPI project leadership attempt and his or her future intentions regarding use of the BPI methodology (Figure 9).



A person's efficacy influences the activities that he or she chooses to engage in. People approach and explore situations within their perceived capabilities, while avoiding situations they think exceed their ability (Bandura, 2000). Research has also shown that the greater the confidence individuals have in their capabilities, the more vigorous their effort and persistence (Bandura, 1997). It is therefore theorized that, compared to low self-efficacy employees, the high self efficacy employee should be; less likely to avoid difficult challenge, can be expected to exert more effort, and will persist longer to overcome encountered obstacles. Relatively unburdened by the stress associated with self-doubters, the high self-efficacy employee may be expected to respond more aggressively to opportunities for leading change and continuous improvement (Paglis, Laura L & Green, 2002). With this in mind, the real world opportunity to investigate the impact of mastery experience has obvious situational importance. The hypotheses investigate the relationship between motivation and the mastery experience for future participation in BPI as a leader, project participant, and use of the BPI methodology in general.

H1.A<sub>0</sub>: One's intention to lead a BPI project in the future is independent of the outcome of his or her most recently led BPI project.H1.A<sub>1</sub>: One's intention to lead a BPI project in the future is not independent of the outcome of his or her most recently led BPI project.

H1.B<sub>0</sub>: One's intention to participate in a BPI project in the future is independent of the outcome of his or her most recently led BPI project. H1.B<sub>1</sub>: One's intention to participate in a BPI project in the future is not independent of the outcome of his or her most recently led BPI project.

H1.C<sub>0</sub>: One's intention to use the BPI tools and techniques in the future is independent of the outcome of his or her most recently led BPI project. H1.C<sub>1</sub>: One's intention to use the BPI tools and techniques in the future is not independent of the outcome of his or her most recently led BPI project.

Research questions two and three (see Figure 10) investigate the validity of the BPI Skill Self-Efficacy measure as both concurrent and predictive in nature. Concurrent validity of the BPI SE measure is how well it is able to distinguish between individuals that have been theorized to be different. In the case of this research, with it focus on the importance of a mastery experience, BPI SE level should be lower for a person with an outcome of "deactivated" than for a person with an outcome of "complete" for his or her most recent BPI leadership attempt. The hypotheses for research question #2 are focused on investigating the relationship between BPI SE and the most recent project leadership experience. Predictive validity is the demonstrated capability of the BPI SE measure to predict what has been theorized it should predict. In this study, it has been theorized that there is a relationship between one's level of BPI SE and his or her intentions to engage BPI activities in the future. The hypotheses for research question #3 are focused on the relationship between BPI SE and future intentions regarding use of the BPI methodology.



Research Question Two: Is one's level of BPI self efficacy (BPI SE) for the key tasks that represent the obstacles to completing a BPI project dependent on and the outcome of his or her most recent BPI project leadership attempt?

# H2<sub>0</sub>: One's level of BPI Self Efficacy is independent of the outcome of his or her most recently led BPI project

# H2<sub>1</sub>: One's level of BPI Self Efficacy is not independent of the outcome of his or her most recently led BPI project

Research Question Three: "Is there a relationship between an employee's selfreported likelihood to attempt Business Process Improvement in the future and his or her level of self efficacy (BPI SE) for the key tasks that represent the obstacles to completing a BPI project?"

H3.A<sub>0</sub>: One's intention to lead a BPI project in the future is independent of his or her level of BPI SE.

H3.A<sub>1</sub>: One's intention to lead a BPI project in the future is not independent of his or her level of BPI SE.

H3.B<sub>0</sub>: One's intention to participate in a BPI project in the future is independent of his or her level of BPI SE. H3.B<sub>1</sub>: One's intention to participate in a BPI project in the future is not independent of his or her level of BPI SE.

H3.C<sub>0</sub>: One's intention to use the BPI tools and techniques in the future is independent of his or her level of BPI SE.
H3.C<sub>1</sub>: One's intention to use the BPI tools and techniques in the future is not independent of his or her level of BPI SE.

The potential moderating factor of past project leadership experience provides additional opportunity to investigate the impact of a mastery experience on motivation to attempt use of a specific behavior again. Success in the past should result in a higher level of resilience to the impact a set-back on one's self-confidence. Past project leader experience is measure of both the existence and outcome of a previous BPI project leadership attempt. The total BPI experience is a combination of the existence and outcome of a previous attempt and the outcome of most the most recent BPI leadership attempt. As shown in Figure 11, the hypotheses for this research question will investigate the impact of previous BPI experience on both future intentions and the level of BPI Skill Self Efficacy. Figure 11. Research Question #4 & #5



Research Question Four: Does one's self-reported likelihood to attempt Business Process Improvement in the future depend on his or her total project leadership experience?

H4.A<sub>0</sub>: One's intention to lead a BPI project in the future is independent of his or her total BPI project leadership experience.

H4.A<sub>1</sub>: One's intention to lead a BPI project in the future is not independent of the outcome of his or her total BPI project leadership experience.

H4.B<sub>0</sub>: One's intention to participate in a BPI project in the future is independent of the outcome of his or her total BPI project leadership experience. H4.B<sub>1</sub>: One's intention to participate in a BPI project in the future is not independent of the outcome of his or her total BPI project leadership experience.

H4.C<sub>0</sub>: One's intention to use the BPI tools and techniques in the future is independent of the outcome of his or her total BPI project leadership experience. H4.C<sub>1</sub>: One's intention to use the BPI tools and techniques in the future is not independent of the outcome of his or her total BPI project leadership experience.

Research Question Five: Is one's level of BPI self efficacy (BPI SE) for the key tasks that represent the obstacles to completing a BPI project dependent on his or her total project leadership experience?

H5<sub>0</sub>: One's level of BPI Self Efficacy is independent of his or her total BPI project leadership experience.

# H5<sub>1</sub>: One's level of BPI Self Efficacy is not independent of his or her total BPI project leadership experience.

## Research Variables

The data for this study is derived from two sources, the Project Tracking Tool (PTT), and from a researcher designed survey.

*Project Leadership Outcome* is an independent variable in this research study. The data for this variable is derived from the PTT. The population of projects selected for the study all closed during the third and fourth fiscal quarters of 2005. The closure is one of two options; completion, or deactivation.

*Complete* is closure of projects that demonstrated a financially validated impact to the company's profitability.

*Deactivated* is closure of a project without achieving and impact to the company's profitability

*Past Project Leadership Experience* is investigated as a potential moderating factor in the relationship between most recent project leadership outcome and future intentions to use BPI. If personal mastery experiences are truly one of the most influential sources of efficacy information (Paglis, Laura L & Green, 2002), then a pre-existing pattern of success should strengthen an individual's belief in his or her capability. Since self-efficacy is especially impacted when success is achieved by overcoming obstacles through persistent effort (Bandura, 2000), a project leader that has already achieve success using BPI should be impacted by a subsequent failure less than a person who is attempting BPI for the first time.

This variable is also derived from the PTT database. There are three possible values; 1) none, 2) past complete, and 3) past deactivated.

*Total Project Leadership Experience* is combination of Past Project Leadership Experience and the outcome of the most recent BPI project leadership experience. There are six possible values; 1) none – complete, 2) none-deactivated, 3) past complete – complete, 4) past complete – deactivated, 5) past deactivated – complete, 6) past deactivated- deactivated.

*Future intention to lead a BPI project* is a measure of one's self reported likelihood to engage in leading a continuous improvement effort using the BPI methodology again in the future. Project leaders take on the responsibility to apply the BPI methodology in an effort to take advantage of an identified opportunity to improve the profitability of the company. The data for this measure, and the other two future intention measures, is collected from the responses of the selected project leaders to the questions on part 2 of the questionnaire The response to the question for this variable, and the two other future intention variables, will be gathered using a Likert-scale with five options ranging from "strongly agree" to "strongly disagree" and a mid- point of "neither agree nor disagree".

*Future intention to participate in a BPI project* is a measure of one's self reported likelihood to engage as active team member on a future BPI opportunity.

*Future Intention to use the BPI methodology tools and techniques* is a measure of one's self reported likelihood to apply the quality, statistical, and project management skills to more effectively and efficiently address continuous improvement opportunities as they arise in day to day business.

*BPI Skill Self Efficacy (BPI SE)* is a measure of one's self reported level of confidence in their ability to accomplish the tasks required to complete a BPI project. This measure will be derived from the BPI Skill Appraisal (Part 1 of the questionnaire). The data for this variable will be derived from part 2 of the questionnaire given to the selected population of project leaders. Each task will be an individual question, and responses to the question will be gathered using a scale with an associated score ranging from 0 "no confidence at all" to 10"completely confident". The BPI SE will be the average of the responses gathered.

#### Research Design

The design of this study is non-experimental. It did not use a control and experiment, or use randomly assigned participants, and will not determine cause of an effect (Creswell, 1994). The approach is a quantitative, non-experimental, descriptive correlation study that uses recorded information regarding a pre-existing event, explores the potential correlations among two or more phenomenon, and uses a statistical approach to probe for reasons that underlie the relationship (Leedy & Ormrod, 2001). As depicted in Figure 12, the research design addresses; design of the sample, development of a survey, delivery of the survey, and data collection. These activities will produce the data needed to evaluate each of the research questions.

#### Figure 12. Design of the research study



## Design of the Sample

The target of this study is a Fortune 100 high tech company. The leadership introduced the Six Sigma based methodology they called Business Process Improvement (BPI) six years ago as the chosen approach to understanding and improving business processes, product quality, and service. One of the company's three guiding initiatives is "Winning Culture", and BPI is a key component of this initiative. The company encourages the use of BPI to increase productivity, reduce cost, foster global sharing of key learning's and enhance individual and team development. BPI provides every team member the opportunity to develop new skills while helping the company become continuously more efficient and productive. It is a vehicle that enables every employee to excel. BPI is consistent with every part of "Winning Culture" to include the meritocracy approach to reward and recognition that gives the highest rewards to the employees who most contribute to the success of the company. This is a culture which encourages direct relationships and empowerment at every level, a culture where BPI is a vehicle to improve the effectiveness and efficiency of an empowered workforce.

The BPI Green Belt project leaders in the United States for all projects that completed in the third and fourth quarter of 2005 were selected as the population for this research study (n=759). The Project Tracking Tool (PTT) database provided the population of projects that met the limitation identified. PTT is an intranet application used by project leaders to document the BPI project life-cycle. The application is used for; governance, reporting and best practice sharing purposes. An assumption of this study is that the projects in this database reflect the all BPI project work in the company.

A number of criteria were used to ensure the population of projects selected supported the research without unintended bias. Green belt projects led by employees in the United States were selected for the survey. Assumptions support the decision for these limitations of the study. Green Belt level projects were selected for this study for three primary reasons; 1) green belt level projects represent 85% of the total BPI financial benefit realized in 2005, 2) 95% of the employee skill certifications are at a Green Belt level, and 3) the skills associated with certification are most clearly aligned with "Winning Culture" where every employee is empowered and encouraged to drive continuous improvement. The limiting of the study to United States only was to block the unknown impact of cultural differences and the differences in maturity of BPI integration (many global locations are new). Though interesting factors, neither of these are part of this research study. The assumption is that, despite the selection of only one company for this study, and the limitations placed on the population selected for the study within this company, the results of the study will still provide directionally valid information.

## Survey Development

A survey will be used to gather self reported responses from the population of selected project leaders. The gathered responses will be used as measures for the variables; BPI SE level, future intention to lead a BPI project, future intention to participate on a BPI project team, and future intention to use BPI methodology, tools and techniques.

*BPI Skill Appraisal Instrument – Part 1.* The variable BPI SE (BPI Skill Self-Efficacy) level is measured using Part 1 of the questionnaire. The development and validation the BPI Skill Appraisal used to collect responses for a measurement of BPI SE level, was primarily the result of the use of "Guide for constructing self-efficacy scale" created by Albert Bandura (2005).

The development of the BPI Skill appraisal instrument to assess one's level of BPI SE supports the empirical investigation of the relationship between the outcome of one's most recent BPI project attempt and his or her intentions to engage in BPI in the future. Given the potential strength of the factor of self- efficacy in explaining the level of engagement of employees in the company's culture of continuous improvement, a valid assessment instrument has benefit beyond this particular study. Further investigation can be done to; better understand the tasks that are considered the critical obstacles and challenges, and also to further investigate the relationship between individual tasks to an employee's future intentions to engage in BPI efforts. This BPI Skill self-efficacy instrument can be used to

identify the patterns of strengths and limitations in perceived capability that could support predictions about employee behavior in the future and also provides change agent with the information they need to make changes that will improve the speed of integration of BPI into the company culture.

A BPI self-efficacy scale must have both face and content validity and should measure what it purports to measure. For this research, it is the perceived capability to complete a business process improvement project. People who score high on perceived selfefficacy should differ in distinct ways from those who score low; verification of such provides support for the instrument's validity (Cooper & Schindler, 2003). Identification of the tasks, selection of a response scale and a test- retest of the survey all provided for the construct validity of the BPI SE instrument.

A comprehensive self-efficacy assessment will address the factors over which an individual has some level of self-control (Bandura, 2005). An initial list of tasks was developed with input from two primary sources; 1) a green belt project completion checklist, and 2) the green belt training material. This list was both indicative of BPI project completion and met the suggested guidelines for measurement of self-efficacy, thus having face validity. The face validity was further enhanced by an expert panel review. Cooper and Schindler (2003) identified the use of a panel of persons to judge how well the instrument meets the standard as a means of ensuring content validity. A review of the proposed list of tasks was reviewed by; a certified green belt mentor, a certified black belt, and a certified master black belt. Their feedback was reviewed and appropriate modifications were made to the list of tasks.

The tasks identified on the list were formed into statements to ensure consistency with the concept of perceived capability. The tasks were all written as "can do" rather than "will do"; can is a judgment of capability, will is a statement of intention (Bandura, 2005). The individuals surveyed will be asked to judge their BPI skill as of now, not at some time in the future. The response scale for recording of strength of efficacy beliefs is a single unit intervals ranging from 0 ("Cannot do"); through intermediate degrees of assurance, 5 ("Moderately certain can do"); to complete assurance, 10 ("Highly certain can do"). This scale is suggested by Bandura (2005) who's research demonstrated that use only a few steps is less sensitive and less reliable, and should be avoided.

*Future Intentions – Part 2.* The dependent variables; 1) future intention to lead a BPI project, 2) future intention to participate on a BPI project team, and 3) future intention to use BPI methodology, tools and techniques, future intentions, will be measured using the responses to each of the questions included on part 2 of the survey. The three questions (one for each variable) will be used to gather a self reported level likelihood of engagement in BPI opportunities in the future. The three questions are; 1) I will lead a business process improvement effort in the next 18 months, 2) I will participate in a business process improvement effort in the next 18 months, 3) I will use the tools and techniques associated with business process improvement in my day to day work. Responses to the questions will be gathered using a 5 point Likert scale.

*Validity of the Survey.* The criterion-related validity of the two part survey was addressed through both expert review and "test re-test". Dr. Jim Mirabella, professor of research methods and survey design reviewed the survey. His issues were addressed and

feedback incorporated resulting in the final product (Appendix). A measurement instrument must be capable of differentiating individuals that are distinctly different in terms of level of BPI SE. 5 Certified Black Belts and 5 individuals who have had no involvement or training in the use of BPI were asked to complete the questionnaire. The same individuals were given the questionnaire one week later. This "test re-test" of the survey provided results that established the stability and reliability of measures.

The researcher designed survey met required level of validity needed to progress with the research study. Criterion related validity in terms of the predictive and congruent nature of the BPI SE measure will be further addressed in the analysis of the hypotheses for research questions two and three. Research question two investigates the ability of the BPI SE measure to discriminate individuals theorized to be different. Research question three investigates the capability of the BPI SE measure to predict a person's response to question about his or her likelihood of engagement in future business process improvement opportunities.

#### Survey Delivery and Data Collection Procedures

The research data was derived from two sources. Project data was derived from a secondary data source, the Project Tracking Tool (PTT), an intranet application used by BPI project leader for documentation throughout the project life-cycle, providing information for governance and reporting. BPI Skill Efficacy and future intentions data will be gathered using a two part questionnaire. A copy of this questionnaire is included in Appendix A.

The each of the identified project leaders was sent an email that requests their participation in an upcoming survey (Appendix C). The email provided information about the

study, the importance of their participation, the estimated time commitment to complete the survey, and a thank you in advance for their participation. This email also provided the researcher initial validation of population of select project leaders for the study. Any unavailable email addresses indicated the departure of the employee from the company. An analysis of the sample of individuals that have departed was done to address the introduction of potential bias to the study. The questionnaire was made available the following business day, access was via an email delivered link to a web based survey. The selected individuals were sent 2 reminders (one at five and another at nine days) as reminders to complete the survey, responses were collected for ten business days.

The survey data was extracted from the web survey tool into an Excel file, where an employee identification number was used to match it to the associated project information (BPI project leadership outcome and total BPI project leadership experience).

#### Data Analysis

The data for this study was analyzed using SPSS 13.0 for Windows. All hypotheses will be tested using a chi-square test of independence.

#### Assumptions and Limitations

The primary assumptions made regarding validity of this study include the validity of the survey instrumentation and minimization of respondent bias.

Assumptions supporting the minimization of respondent bias:

- 5) Private collection of responses The use of email and assurance of anonymity in an email prior to the distribution of the survey support the minimization of response bias (Bandura, 2005)
- 6) Social influence –Prior research has demonstrated a lack of social influence on self-efficacy assessments (Bandura, 2005). People are likely to provide an unbiased personal assessment of this capabilities, and are unlikely to filter this assessment based on a perception they might have about what answer might be desired by either the organization or a researcher.
- Assessment Title the use of "appraisal inventory" as opposed to "self-efficacy" (Bandura, 2005).
- 8) Business Process Improvement attempts- an assumption of this study is that the projects in this database reflect the all BPI project work in the company.

Limitations of the study:

- 4) One high-tech company By far the greatest limitation to the generalization of the research finding is the use of on high tech company for the study. Leadership studies are challenged by the situational nature of the construct, but the size of the sample (n=759) is large enough to provide directionally valid conclusions applicable to similar circumstances.
- 5) United States only The potential effect of cultural differences on the responses and interpretation of the questions on the questionnaire made limiting the study a necessity. There is the additional concern that sites outside of the US are also at different levels of maturity in implementing the BPI methodology.

6) Green Belt Projects documented in the PTT – Six Sigma methodology is better known black belt projects. These projects are of increased impact and complexity, and tend to leverage an advanced level of skill of a small number of individuals in a company. The green belt level projects are far more indicative of a company wide culture of continuous improvement. These projects are consistent with a culture of employee are empowerment to make a difference and this is the behavior that companies know to be a competitive advantage.

#### Summary

This chapter contains the methodology for this study to investigate the relationship between a mastery experience and motivation to use a company desired behavior in the future. Additionally, the methodology for validating a BPI SE measure is also addressed. This chapter included the sampling design, the research hypotheses, the development and validation of the survey instrument, data collection and the proposed data analysis. Chapter 4 will present the results and analysis of the study.

## CHAPTER 4. DATA COLLECTION AND ANALYSIS

**Research Questions and Hypotheses** 

The research questions are primarily based on the work of Albert Bandura (2000) who theorized the mastery experience to be the most powerful source of self-efficacy. The first research question investigates the relationship between the outcome of a project leadership attempt and future intention to use BPI again. The second and third research question investigated the relationship of a BPI Skill Self Efficacy measure to the two phenomenon, project leadership outcome and future intentions, addressed in the first research question, and provided validity for researcher developed BPI Skill Appraisal. The fourth and fifth research questions further explored the importance of a mastery experience by investigating beyond the most recent project leadership attempt to include the existence and outcome of any attempt at BPI project leadership in the past.

Research Question One: Is there a relationship between an employee's self-reported likelihood to attempt Business Process Improvement in the future and the outcome of his or her most recent BPI project leadership attempt?

Likelihood to lead a project, participate in a project, and use BPI tools and techniques in the next 18 months were each measured with a 5 point Likert scale. For the chi-square analysis, the levels were combined to create two categories, high and low. Low included; (a) strongly disagree, (b) disagree, and (c) neither agree nor disagree. High included both (a) agree and (b) strongly agree.

H1.A<sub>0</sub>: One's intention to lead a BPI project in the future is independent of the outcome of his or her most recently led BPI project. H1.A<sub>1</sub>: One's intention to lead a BPI project in the future is not independent of the outcome of his or her most recently led BPI project.

30.51% of the respondents were neutral to negative to the idea of leading a project in the next 18 month (Figure 13). The bar chart (Figure 14) shows that the likelihood to lead is not the same for deactivated and complete recent project leadership attempts. A cross tabulation (Table 1) provides additional evidence for a difference in likelihood to lead a project based on outcome. A chi-square analysis was performed to determine if the relationship was significant.

Table 1. Cross Tabulation of Recent BPI Project Outcome and Likelihood of Future ProjectLeadership

			Outco	me	
			Deactivated	Complete	Total
Lead_HL	Low	Count	77	60	137
		Expected Count	70.5	66.5	137.0
	High	Count	154	158	312
		Expected Count	160.5	151.5	312.0
Total		Count	231	218	449
		Expected Count	231.0	218.0	449.0

Lead\_HL \* Outcome Crosstabulation

Figure 13. Pie Chart: Likelihood of Future Leadership High/Low



Figure 14. Bar Chart: Likelihood of Future Leadership High/Low by Outcome



The p-value for the Pearson Chi-Square (Table 2) is .181. The p-value is greater than .05, therefore the null hypothesis is not rejected, and there is insufficient evidence to conclude that one's intention to lead a future project depends on the outcome of his or her most recent BPI project.

Table 2. Chi-Square Analysis of Recent BPI Project Outcome and Likelihood of Future Project Leadership

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.786 <sup>b</sup>	1	.181		
Continuity Correctior	1.522	1	.217		
Likelihood Ratio	1.790	1	.181		
Fisher's Exact Test				.185	.109
Linear-by-Linear Association	1.782	1	.182		
N of Valid Cases	449				

a. Computed only for a 2x2 table

b. 0 cells (.0%) have expected count less than 5. The minimum expected count is 66.
 52.

# H1.B<sub>0</sub>: One's intention to participate in a BPI project in the future is independent of the outcome of his or her most recently led BPI project. H1.B<sub>1</sub>: One's intention to participate in a BPI project in the future is not independent of the outcome of his or her most recently led BPI project.

17% of the respondents were neutral to negative to the idea of participation in a

business process improvement effort during the next 18 months (Figure 15). The likelihood

to participate is not the same for deactivated and complete recent project leadership attempts

(Figure 16). A cross tabulation shows a difference between the actual and expected

likelihood to participate in a project based on outcome (Table 3). A chi-square analysis was

performed to determine if the relationship is statistically significant.

\$			Outco	me	
			Deactivated	Complete	Total
Participate_HL	Low	Count	55	21	76
		Expected Count	39.1	36.9	76.0
	High	Count	176	197	373
		Expected Count	191.9	181.1	373.0
Total		Count	231	218	449
		Expected Count	231.0	218.0	449.0

 Table 3. Cross Tabulation:
 Recent BPI Project Outcome and Likelihood of Future Project

 Participation
 Participation

Figure 15. Pie Chart: Likelihood of Future Participation High/Low







The p-value for the Pearson Chi-Square is .000 (Table 4). This is less than .05, the null hypothesis is rejected and there is sufficient evidence to conclude that one's intention to participate in a future project is depends on the outcome of his or her most recent BPI project. A higher likelihood for participation in a future project was more probable when the outcome of one's most recent BPI project was a success.

 Table 4. Chi-Square Analysis of Recent BPI Project Outcome and Likelihood of Future

 Project Participation

	cili-aquale lesis											
	Value	df	Asymp. Sig. (2⊲sided)	ExactSig. (2⊲sided)	ExactSig. (1⊲ided)							
Pearson Chi-Square	16.030 <sup>b</sup>	1	.000									
Continuity Correction	15.038	1	.000									
Likelihood Ratio	16.570	1	.000									
Fisher's Exact Test				.000	.000							
Linear-by-Linear Association	15.994	1	.000									
N of Valid Cases	449											

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a. Computed only for a 2x2 table

b.0 cells (.0%) have expected count less than 5. The minimum expected count is 38. 90.

# H1.C<sub>0</sub>: One's intention to use the BPI tools and techniques in the future is independent of the outcome of his or her most recently led BPI project. H1.C<sub>1</sub>: One's intention to use the BPI tools and techniques in the future is not independent of the outcome of his or her most recently led BPI project.

15% of the respondents were neutral to negative regarding intent to use BPI tool and techniques in the future (Figure 17). There was an observable difference in the response according to recent project outcome (Figure 18), with individuals who lead a deactivated project more negative than peers who completed his or her project. A cross tabulation provides additional evidence for a potential relationship between the factors (Table 5). A chi-square analysis was performed to determine if the relationship was statistically

significant.

Table 5. Cross Tabulation: Recent BPI Project Outcome and Likelihood of Future BPI Tools/Techniques Use

2			Outco	ome	3	
			Deactivated	Complete	Total	
Use_HL	Low	Count	47	22	69	
		Expected Count	35.5	33.5	69.0	
	High	Count	184	196	380	
		Expected Count	195.5	184.5	380.0	
Total		Count	231	218	449	
		Expected Count	231.0	218.0	449.0	

Figure 17. Pie Chart: Likelihood of Future BPI Tool/Technique Use High/Low



Figure 18. Bar Chart: Likelihood of Future BPI Tool/Techniques Use High/Low by Outcome



The p-value for the Pearson Chi-Square is .003 (Table 6). Since this is less than .05, the null hypothesis is rejected and there is sufficient evidence to conclude that one's intention to use BPI tool and techniques again in a future project depends on the outcome of his or her most recent BPI project. One's likelihood of using BPI tools and techniques again in the future is less probable if one's most recent BPI project was unsuccessful.

Table 6. Chi-Square Analysis of Recent BPI Project Outcome and Likelihood of Future Use of BPI Tools and Techniques

	Value	df	Asymp. Sig. (2-side d)	Exact Sig. (2-sided)	Exact Sig. (1-side d)
Pearson Chi-Square	<sup>d</sup> 880.9	1	.003		
Continuity Correction	8.297	1	.004		
Likelihood Ratio	9.270	1	.002		
Fisher's Exact Test				.003	.002
Linear-by-Linear Association	9.048	1	.003		
N of Valid Cases	449				

a. Computed only for a 2×2 table

b.0 cells (.0%) have expected count less than 5. The minimum expected count is 33. 50. Research Question Two: Is one's level of BPI self efficacy (BPI SE) for the key tasks that represent the obstacles to completing a BPI project dependent on and the outcome of his or her most recent BPI project leadership attempt?

H2<sub>0</sub>: There is no difference in the mean BPI Self Efficacy as a function of the result of one's most recently led BPI project H2<sub>1</sub>: There is a difference in the mean BPI Self Efficacy as a function of the result of one's most recently led BPI project

There was a difference in mean BPI Self Efficacy by outcome. The mean value was 8.69 for individuals who completed their recent BPI project; higher than the 7.91 for those whose projects were deactivated (Table 7 and Figure 19). A t-test for independent samples was used to evaluate the statistical significance of the difference.

Table 7. Descriptives-Group Means: BPI\_SE by Outcome

	Outcome	N	Mean	Std. Deviation	Std. Error Mean
BPI_SE	Deactivated	231	7.91294	1.598521	.105175
	Complete	218	8.69119	1.400981	.094886



Figure 19. Bar Chart-Group Means: BPI\_SE by Outcome

A t-test for independent samples (Table 8) was used to evaluate the significance of the difference. The Levene's test for equality of variances produced a p-value of .089, higher than .05 needed to support the assumption of equality of variance, so the assumption of equal variances will be used for the t-test. The p-value for the t-test was .000. Since the p-value is less than .05, the null hypothesis is rejected, and it can be concluded that the mean BPI SE level differs as a function of one's most recently led BPI project. Those who successfully led a BPI project have significantly higher BPI self-efficacy than those who were unsuccessful in their BPI project leadership attempt.

Table 8. t-Test of Mean BPI - SE Level by Project Outcome

2		Levene's Equality of	Test for Variances			t-test fo	r Equality of N	leans		
		0 78 28 2					Mean	Std. Error	95% Cor Interva Diffe	nfidence I of the rence
		F	Sig.	t	df	Sig. (2-tailed)	Difference	Difference	Lower	Upper
BPI_SE	Equal variances assumed	2.898	.089	-5.473	447	.000	778249	.142192	-1.057696	498802
	Equal variances not assumed			-5.494	444.596	.000	778249	.141652	-1.056639	499859

Research Question Three: Is there a relationship between an employee's selfreported likelihood to attempt Business Process Improvement in the future and his or her level of self efficacy (BPI SE) for the key tasks that represent the obstacles to completing a BPI project?

Research question three investigates the relationship between one's level of BPI SE and their stated likelihood to engage in BPI again in the near future. As with the testing of the hypotheses for research question one, the 5 point Likert scale was divide between 3 and 4 in order to create a "high" and "low" likelihood categorization.

# H3.A<sub>0</sub>: There is no difference in the mean BPI Self Efficacy as a function of the one's future intention to lead a BPI project. H3.A<sub>1</sub>: There is a difference in the mean BPI Self Efficacy as a function of one's future intention to lead a BPI project.

The mean BPI SE levels differ for individuals who responded with a high versus low

likelihood of leading a BPI project in the next 18 months (Figure 20). The mean BPI SE

level of 8.51 for those with a high likelihood of leading is greater than mean of 7.79 for those

who responded with a low likelihood of leading (Table 9). A t-test for independent samples

was used to evaluate the statistical significance of the difference in means.

Table 9. Mean BPI - SE by Likelihood of Future Project Leadership

Lead_HL	N	Mean	Std. Deviation	Std. Error Mean
BPI_SE Low	137	7.78769	1.582903	.135237
High	312	8.51176	1.490467	.084380

Figure 20. H3A Bar Chart: BPI\_ SE Group Means by Likelihood to Lead



A t-test (Table 10) was used to evaluate the significance of the difference. The Levene's test for equality of variances produced a p-value of .503, greater than the p-value of .05 needed to support the assumption of equality of variance, so the assumption of equal variances will be used for the t-test. The p-value for the t-test was .000. Since the p-value is less than .05, the null hypothesis is rejected, and it can be concluded that one's BPI SE level differs as a function of one's likelihood of leading a project in the future. Those who responded positively regarding future intention to lead a BPI project have significantly higher BPI self-efficacy than those whose responded either neutral or negatively.

Table 10. t-Test of Mean BPI - SE Level by Likelihood of Future Project Leadership

		Leven es Equality of	ven es Test for lity of Variances test for Equality of Means							
							Mean	Std. Error	95% Cor Interva Differ	rfidence Lof the rence
		F	Sig.	t	df	Sig. (2-tailed)	Difference	Difference	Louver	Upper
BPI_SE	Equal variances assumed	.448	.503	-4.851	447	.000	724172	.155702	-1.030171	418 172
	Equal variances not assumed			-4.543	246.199	.000	724172	.159402	-1.039137	410/206

H3.B<sub>0</sub>: There is no difference in the mean BPI Self Efficacy as a function of the one's future intention to participate in a BPI project.
H3.B<sub>1</sub>: There is a difference in the mean BPI Self Efficacy as a function of the one's future intention to participate in a BPI project.

The mean BPI SE levels differ for individuals who responded with a high versus low likelihood of participating in a BPI project in the next 18 months (Figure 21). The mean BPI SE level of 8.48 for those with a high likelihood of leading is greater than mean of 7.36 for those who responded with a low likelihood of leading (Table 11). A t-test for independent samples was used to evaluate the statistical significance the difference between the groups.

Group Statistics										
Participate_HL N Mean Std. Deviation Mean										
BPI_SE	Low	76	7.35961	1.703846	.195445					
	High	373	8.48054	1.452192	.075192					

Table 11. Mean BPI - SE by Likelihood of Future Project Participation

Figure 21. H3B Bar Chart: BPI\_ SE Group Means by Likelihood to Participate



A t-test, shown in Table 12, was used to evaluate the significance of the difference. The Levene's test for equality of variances produced a p-value of .124, higher than .05 needed to support the assumption of equality of variance, so the assumption of equal variances will be used for the t-test. The p-value for the t-test was .000. Since the p-value is less than .05, the null hypothesis is rejected, and it can be concluded that there is a difference in the mean BPI SE level as a function of one's likelihood of participating in a project in the future. Those who responded positively regarding future intention to participate in a BPI project have significantly higher BPI self-efficacy than those who responded either neutral or negatively.

		Leven e's Equality of	Test for Variances	t-test for Equality of Means							
							Mean	Std. Error	95% Cor Interva Differ	vfidence I of the ence	
		F	Sig.	1	df	Sig. (2-tailed)	Difference	Difference	Lower	Upper	
BPI_SE	Equal variances assumed	2.373	.124	-5.948	447	.000	1.120931	.188448	-1.491285	750 577	
	Equal variances not assumed			-5.353	98.410	.000	-1.120931	.209410	-1.530470	705 386	

Table 12. t-Test of Mean BPI - SE Level by Likelihood of Future Project Participation

H3.C<sub>0</sub>: There is no difference in the mean BPI Self Efficacy as a function of the one's future intention to use BPI tools and techniques. H3.C<sub>1</sub>: There is a difference in the mean BPI Self Efficacy as a function of the one's future intention to use BPI tools and techniques

The mean BPI SE level differs for individuals who responded with a high versus low likelihood of participating in a BPI project in the next 18 months (Figure 22). The mean BPI SE level of 8.48 for those with a high likelihood of using BPI tools and techniques is greater than mean of 7.27 for those who responded with a low likelihood (Table 13). A t-test for independent samples was used to evaluate the significance of the mean difference between the groups.

Table 13. Mean BPI - SE by Likelihood of Future BPI Tool and Technique Use

				Std. Error
Use_HL	N	Mean	Std. Deviation	Mean
BPI_SE Low	69	7.27478	1.806437	.2 17 4 69
High	380	8.47529	1.430443	.073390



Figure 22. H3C Bar Chart: BPI\_SE Group Means by Likelihood to Use BPI Tools/Techniques

A t-test, shown in Table 14, was used to evaluate the significance of the difference. The Levene's test for equality of variance produced a p-value of .003, lower than .05, so the assumption of equal variances will not be used for the t-test. The p-value for the t-test was .000. Since the p-value is less than .05, the null hypothesis is rejected, and it can be concluded that there is a difference in the mean BPI SE level differs as a function of one's likelihood of using BPI tools and techniques. Those who responded positively regarding future intention to use BPI tools and techniques have significantly higher BPI self-efficacy than those whose responded either neutral or negatively. Table 14. t-Test of Mean BPI - SE Level by Likelihood of Future BPI Tool and Technique Use

		Leven e's Equality of	Test for Variances	t test for Equality of Means							
							Mean	Std. Error	95% Cor Interva Differ	nfidence Fof the rence	
		F	Sig.	t	df	Sig. (2-tailed)	Difference	Difference	Lower	Upper	
BPI_SE	Equal variances assumed	9,003	.003	-0.142	447	.000	-1.200507	.195473	1.584007	810.347	
	Equal variances not assumed			-5.231	84170	.000	-1200507	.229516	-1.656911	744 103	

Independent Samples Test

Research Question Four: Does one's self-reported likelihood to attempt Business

Process Improvement in the future depend on his or her total project leadership experience?

# H4.A<sub>0</sub>: One's intention to lead a BPI project in the future is independent of his or her total BPI project leadership experience. H4.A<sub>1</sub>: One's intention to lead a BPI project in the future is not independent his or her total BPI project leadership experience.

A cross tabulation (Table 15) and bar chart (Figure 23) suggest a difference in

likelihood to lead a future project as a function of total project leadership experience. A chi-

square analysis was done to evaluate the relationship between one's future intention to lead a

BPI project and total BPI project leadership experience.

Table 15. Crosstabulation: Likelihood of Future Project Leadership by Total Project Leadership Experience

6×			Total_Exp						
		-	Past complete- Complete	None- Complete	Past Deactivated- Complete	Past Complete- Deactivated	None- Deactivated	Past Deactivated- Deactivated	Total
Lead_HL	Low	Count	10	39	11	15	43	19	137
		Expected Count	24.4	26.9	15.3	25.9	26.9	17.7	137.0
	% within Total_E×p		12.5%	44.3%	22.0%	17.6%	48.9%	32.8%	30.5%
	High	Count	70	49	39	70	45	39	312
		Expected Count	55.6	61.1	34.7	59.1	61.1	40.3	312.0
		% within Total_Exp	87.5%	55.7%	78.0%	82.4%	51.1%	67.2%	69.5%
Total		Count	80	88	50	85	88	58	449
		Expected Count	80.0	88.0	50.0	85.0	88.0	58.0	449.0
		% within Total_Exp	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Lead\_HL \* Total\_Exp Crosstabulation



Figure 23. Bar Chart: Likelihood of Future Project Leadership by Total Project Leadership Experience

The p-value for the Pearson Chi-Square is .000 (Table 16). The p-value is less than .05, the null hypothesis is rejected and there is sufficient evidence to conclude that one's intention to lead a BPI project again in the future is a function of his or her total BPI leadership experience. A post-hoc evaluation determined which categories are significantly different from each other.

Table 16. Chi Square Analysis of Likelihood to Lead a BPI by Total Project Leadership Experience

Chi-Square Tests							
	Value	df	Asymp.Sig. (2-sided)				
Pearson Chi-Square	42.613 <sup>a</sup>	5	.000				
Likelihood Ratio	44.035	5	.000				
Linear-by-Linear Association	12.023	1	.001				
N of Valid Cases	449						

a.0 cells (.0%) have expected count less than 5. The minimum expected count is 15.28.

The groups are not of equal size, therefore Tanhame (Table 17) was chosen for post hoc analysis. The results of the multiple comparisons substantiate the lack of statistical difference between the "None-deactivate" and "None-complete" categories, but shows that these two categories are significantly less likely to lead a future BPI project than "past complete- complete" and "past complete –deactivated". "None-deactivated" is also less likely to lead than "past deactivated- complete".
# Table 17. Post Hoc Multiple Comparison (Tanhame): Total Project Leadership Experience Category Differences in Likelihood to Lead a Future Project

#### Multiple Comparisons

Dependent Variable: Lead\_HL

Tamhane

		Mean				
		Difference			95% Confid	lence Interval
(I) Total_Exp	(J) Total_Exp	(I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
Past complete-Complete	None-Complete	.318*	.065	.000	.12	.51
	None-Deactivated	.364*	.065	.000	.17	.56
	Past Complete-Deactivated	.051	.056	.999	11	.22
	Past Deactivated-Complete	.095	.070	.947	12	.31
	Past Deactivated-Deactivated	.203	.072	.090	01	.42
None-Complete	None-Deactivated	.045	.076	1.000	18	.27
	Past complete-Complete	318*	.065	.000	51	12
	Past Complete-Deactivated	267*	.068	.002	47	07
	Past Deactivated-Complete	223	.080	.085	46	.01
	Past Deactivated-Deactivated	116	.082	.927	36	.13
Past	None-Complete	.267*	.068	.002	.07	.47
Complete-Deactivated	None-Deactivated	.312*	.068	.000	.11	.51
	Past complete-Complete	051	.056	.999	22	.11
	Past Deactivated-Complete	.044	.072	1.000	17	.26
	Past Deactivated-Deactivated	.151	.075	.506	07	.38
Past	None-Complete	.223	.080	.085	01	.46
Deactivated-Complete	None-Deactivated	.269*	.080	.015	.03	.51
	Past complete-Complete	095	.070	.947	31	.12
	Past Complete-Deactivated	044	.072	1.000	26	.17
	Past Deactivated-Deactivated	.108	.086	.972	15	.36
None-Deactivated	None-Complete	045	.076	1.000	27	.18
	Past complete-Complete	364*	.065	.000	56	17
	Past Complete-Deactivated	312*	.068	.000	51	11
	Past Deactivated-Complete	269*	.080	.015	51	03
	Past Deactivated-Deactivated	161	.082	.551	41	.08
Past	None-Complete	.116	.082	.927	13	.36
Deactivated-Deactivated	None-Deactivated	.161	.082	.551	08	.41
	Past complete-Complete	203	.072	.090	42	.01
	Past Complete-Deactivated	151	.075	.506	38	.07
	Past Deactivated-Complete	108	.086	.972	36	.15

\*. The mean difference is significant at the .05 level.

# H4.B<sub>0</sub>: One's intention to participate in a BPI project in the future is independent of his or her total BPI project leadership experience. H4.B<sub>1</sub>: One's intention to participate in a BPI project in the future is not independent of his or her total BPI project leadership experience.

A cross tabulation (Table 18) and bar chart (Figure 24) suggest a difference in

likelihood to participate in a future project as a function total project leadership experience.

A chi-square analysis was done to evaluate the relationship between one's future intention to

participate in a BPI project and total BPI project leadership experience.

Table 18. Crosstabulation: Likelihood of Future Project Participation by Total Project Leadership Experience

				Total_Exp							
			None- Complete	None- Deactivated	P <i>as</i> t complete- Complete	Past Complete- Deactivated	Past Deactivated- Complete	Past Deactivated- Deactivated	Total		
Participate_HL	Low	Count	12	34	4	8	5	13	76		
		Expected Count	14.9	14.9	13.5	14.4	8.5	9.8	76.0		
		% within Total_Exp	13.6%	38.6%	5.0%	9.4%	10.0%	22.4%	16.9%		
	High	Count	76	54	76	77	45	45	373		
		Expected Count	73.1	73.1	66.5	70.6	41.5	48.2	373.0		
		% within Total_Exp	86.4%	61.4%	95.0%	90.6%	90.0%	77.6%	83.1%		
Total		Count	88	88	80	85	50	58	449		
		Expected Count	88.0	88.0	80.0	85.0	50.0	58.0	449.0		
		% within Total_Exp	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%		

Figure 24. Bar Chart: Likelihood of Future Project Participation by Total Project Leadership Experience



The p-value for the Pearson Chi-Square (Table 19) is .000. The p-value was less than .05, the null hypothesis is rejected and there is sufficient evidence to conclude that one's intention to participate in a BPI project again in the future is a function of his or her total BPI leadership experience. A post-hoc evaluation determined which categories significantly differ.

Table 19. Chi Square Analysis of Likelihood to Participate in a BPI Project by Total Project Leadership Experience

Chi-Square Tests							
	Value	df	Asymp.Sig. (2⊲sided)				
Pearson Chi-Square	44.628 <sup>a</sup>	5	.000				
Likelihood Ratio	41.800	5	.000				
Linear-by-Linear Association	1.687	1	.194				
N of Valid Cases	449						

a.0 cells (.0%) have expected count less than 5. The minimum expected count is 8.46.

The groups are not of equal size, so the Tanhame was chosen for post hoc analysis. Table 20 shows the results of the multiple comparisons. Unsuccessful first time project leaders (none-deactivated) were significantly less likely to participate in future BPI projects than any of their peers except those with both an unsuccessful recent and past project leadership attempt (deactivated-deactivated) Table 20. Multiple Comparison- Tanhame: Total Project Leadership Experience Category Differences in Likelihood to Participate in a Future Project

#### Multiple Comparisons

Dependent Variable: Participate\_HL

Tamhane

		Mean			05% 0	lawaa lataa al
(I) Total Exp	(I) Total Exp	Difference	Std Error	Sig	95% Confid	lence Interval
Past complete-Complete	(J) Total_Exp	(1-3)	044	556		22
	None-Deactivated	.000	058	000	05	.22
	Past	.000	.000		.10	.01
	Complete-Deactivated	.044	.040	.992	08	.16
	Past Deactivated-Complete	.050	.049	.997	10	.20
	Past Deactivated-Deactivated	.174	.060	.074	01	.36
None-Complete	None-Deactivated	.250*	.064	.002	.06	.44
	Past complete-Complete	086	.044	.556	22	.05
	Past Complete-Deactivated	042	.049	.999	19	.10
	Past Deactivated-Complete	036	.056	1.000	21	.13
	Past Deactivated-Deactivated	.088	.066	.957	11	.29
Past	None-Complete	.042	.049	.999	10	.19
Complete-Deactivated	None-Deactivated	.292*	.061	.000	.11	.47
	Past complete-Complete	044	.040	.992	16	.08
	Past Deactivated-Complete	.006	.053	1.000	15	.17
	Past Deactivated-Deactivated	.130	.064	.493	06	.32
Past	None-Complete	.036	.056	1.000	13	.21
Deactivated-Complete	None-Deactivated	.286*	.068	.001	.09	.49
	Past complete-Complete	050	.049	.997	20	.10
	Past Complete-Deactivated	006	.053	1.000	17	.15
	Past Deactivated-Deactivated	.124	.070	.708	09	.33
None-Deactivated	None-Complete	250*	.064	.002	44	06
	Past complete-Complete	336*	.058	.000	51	16
	Past Complete-Deactivated	292*	.061	.000	47	11
	Past Deactivated-Complete	286*	.068	.001	49	09
	Past Deactivated-Deactivated	162	.076	.410	39	.06
Past	None-Complete	088	.066	.957	29	.11
Deactivated-Deactivated	None-Deactivated	.162	.076	.410	06	.39
	Past complete-Complete	174	.060	.074	36	.01
	Past Complete-Deactivated	130	.064	.493	32	.06
	Past Deactivated-Complete	124	.070	.708	33	.09

\*. The mean difference is significant at the .05 level.

H4.C<sub>0</sub>: One's intention to use the BPI tools and techniques in the future is independent of the outcome of his or her total BPI project leadership experience. H4.C<sub>1</sub>: One's intention to use the BPI tools and techniques in the future is not independent of the outcome of his or her total BPI project leadership experience.

A cross tabulation (Table 21) and bar chart (Figure 25) suggest a difference in

likelihood to use BPI tools and techniques in the future as a function of total project

leadership experience. A chi-square analysis was done to evaluate the relationship between

one's future intention to use BPI tools and technique and total BPI project leadership

experience.

Table 21. Crosstabulation	: Likelihood of Future	Use of BPI Tool	ls/Techniques by	Total
Project Leadership Experi	ence			

					Total	_E×p			
			None- Complete	None- Deactivated	P <i>as</i> t complete- Complete	Past Complete- Deactivated	Past Deactivated- Complete	Past Deactivated- Deactivated	Total
Use_HL	Low	Count	10	26	8	2	4	19	69
		Expected Count	13.5	13.5	12.3	13.1	7.7	8.9	69.0
		% within Total_Exp	11.4%	29.5%	10.0%	2.4%	8.0%	32.8%	15.4%
	High	Count	78	62	72	83	46	39	380
		Expected Count	74.5	74.5	67.7	71.9	42.3	49.1	380.0
		% within Total_Exp	88.6%	70.5%	90.0%	97.6%	92.0%	67.2%	84.6%
Total		Count	88	88	80	85	50	58	449
		Expected Count	88.0	88.0	80.0	85.0	50.0	58.0	449.0
		% within Total_Exp	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Use\_HL \* Total\_Exp Crosstabulation



Figure 25. Bar Chart: Likelihood of Future Use of BPI Tools/Techniques by Total Project Leadership Experience

The p-value for the Pearson Chi-Square (Table 22) is .000. The p-value was less than .05, the null hypothesis is rejected and there is sufficient evidence to conclude that one's intention to participate in a BPI project again in the future is a function of his or her total BPI leadership experience. A post-hoc evaluation determined which categories significantly differed.

Table 22. Chi Square Analysis of Likelihood to Use BPI Tools and Techniques in the Future by Total Project Leadership Experience

Chi-Square Tests							
	Value	df	Asymp.Sig. (2-sided)				
Pearson Chi-Square	43.102 <sup>a</sup>	5	.000				
Likelihood Ratio	43.925	5	.000				
Linear-by-Linear Association	.256	1	.613				
N of Valid Cases	449						

a.0 cells (.0%) have expected count less than 5. The minimum expected count is 7.68.

The groups are not of equal size, so the Tanhame was chosen for post hoc analysis. Table 23 shows the results of the multiple comparisons. Respondents with no mastery experience (none-deactivated and past deactivated-deactivated) were statistically the same, but were significantly less likely to use BPI tools and techniques than any of the other four categories that covered respondents with a mastery experience.

# Table 23. Multiple Comparison- Tanhame: Total Project Leadership Experience Category Differences in Likelihood to Use BPI Tools and Techniques

#### Multiple Comparisons

Dependent Variable: Use\_HL Tamhane

		Moon				
		Difference			95% Confide	ence Interval
(I) Total_Exp	(J) Total_Exp	(I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
Past complete-Complete	None-Complete	.014	.048	1.000	13	.16
	None-Deactivated	.195*	.059	.019	.02	.37
	Past Complete-Deactivated	076	.038	.492	19	.04
	Past Deactivated-Complete	020	.051	1.000	17	.13
	Past Deactivated-Deactivated	.228*	.071	.027	.01	.44
None-Complete	None-Deactivated	.182*	.060	.039	.00	.36
	Past complete-Complete	014	.048	1.000	16	.13
	Past Complete-Deactivated	090	.038	.247	20	.02
	Past Deactivated-Complete	034	.052	1.000	19	.12
	Past Deactivated-Deactivated	.214*	.071	.048	.00	.43
Past	None-Complete	.090	.038	.247	02	.20
Complete-Deactivated	None-Deactivated	.272*	.052	.000	.12	.43
	Past complete-Complete	.076	.038	.492	04	.19
	Past Deactivated-Complete	.056	.042	.953	07	.18
	Past Deactivated-Deactivated	.304*	.064	.000	.11	.50
Past	None-Complete	.034	.052	1.000	12	.19
Deactivated-Complete	None-Deactivated	.215*	.062	.011	.03	.40
	Past complete-Complete	.020	.051	1.000	13	.17
	Past Complete-Deactivated	056	.042	.953	18	.07
	Past Deactivated-Deactivated	.248*	.073	.016	.03	.47
None-Deactivated	None-Complete	182*	.060	.039	36	.00
	Past complete-Complete	195*	.059	.019	37	02
	Past Complete-Deactivated	272*	.052	.000	43	12
	Past Deactivated-Complete	215*	.062	.011	40	03
	Past Deactivated-Deactivated	.032	.079	1.000	20	.27
Past	None-Complete	214*	.071	.048	43	.00
Deactivated-Deactivated	None-Deactivated	032	.079	1.000	27	.20
	Past complete-Complete	228*	.071	.027	44	01
	Past Complete-Deactivated	304*	.064	.000	50	11
	Past Deactivated-Complete	248*	.073	.016	47	03

\*. The mean difference is significant at the .05 level.

Research Question Five: Is one's level of BPI self efficacy (BPI SE) for the key tasks

that represent the obstacles to completing a BPI project dependent on his or her total project

*leadership experience?* 

# H5<sub>0</sub>: There is no difference in the mean BPI Self Efficacy as a function of one's total BPI project leadership experience.H5<sub>1</sub>: There is a difference in the mean BPI Self Efficacy as a function of one's total BPI project leadership experience.

The calculated means (Table 24) and bar chart show (Figure 26) both show a

difference in the mean BPI -SE levels for the six total project leadership experience

categories. An ANOVA was done to evaluate the significance of the difference in mean BPI

SE level for the six categories.

Total_Exp	Mean	N	Std. Deviation
Past complete-Complete	8.95088	80	1.488911
None-Complete	8.71420	88	1.266065
Past Complete-Deactivated	8.40353	85	1.291993
Past Deactivated-Complete	8.23520	50	1.396003
None-Deactivated	7.67761	88	1.745888
Past Deactivated-Deactivated	7.55103	58	1.618863
Total	8.29080	449	1.553767

Table 24. Descriptives: Mean BPI\_SE Level by Total Leadership Experience



Figure 26. Bar Chart: Mean BPI Self Efficacy Level by Total Project Leadership Experience

The p-value for the ANOVA (Table 25) is .000. The p-value this is less than .05, the null hypothesis is rejected and there is sufficient evidence to conclude that one's level of BPI SE is a function of total project leadership experience. A post-hoc evaluation determined which categories significantly differ.

Table 25. ANOVA BPI SE by Total Project	Leadership	Experience
ANOVA		

BPI\_SE

	Surn of Squares	df	Mean Square	F	Sig.
Between Groups	116.695	5	23.339	10.716	.000
Within Groups	964.863	443	2.178		
Total	1081.558	448			

The groups are not of equal size, so the Tanhame was chosen for post hoc analysis. Table 26 shows the results of the multiple comparisons. "None-deactivated" and "past deactivated-deactivated" do not differ from each other, but both of these categories have a mean BPI- Self Efficacy that is significantly less the mean for any of the other 4 categories. Individuals who do not have a mastery experience (project completion) have a lower BPI Self Efficacy than those who have a mastery experience

# Table 26. Multiple Comparison- Tanhame: Total Project Leadership Experience Category Differences in mean BPI SE level

#### Multiple Comparisons

Dependent Variable: BPI\_SE

Tamhane

		Mean			OE9/ Confid	lanaa Intanyal
(I) Tatal Eve		Difference	Otal Error	Ci.a	95% Conne	
(I) I Otal_Exp Past complete-Complete	(J) Total_Exp	(I-J)	Std. Error	Sig.	Lower Bound	Opper Bound
1 así complete-complete	None-Complete	.230070	.214303	.991	40034	.07300
	Post	1.273201	.249097	.000	.55140	2.01505
	Complete-Deactivated	.547346	.217598	.177	09961	1.19430
	Past Deactivated-Complete	.715675	.258239	.094	05730	1.48865
	Past Deactivated-Deactivated	1.399841*	.269992	.000	.59284	2.20684
None-Complete	None-Deactivated	1.036591*	.229897	.000	.35320	1.71998
	Past complete-Complete	236670	.214303	.991	87388	.40054
	Past Complete-Deactivated	.310675	.194559	.832	26705	.88841
	Past Deactivated-Complete	.479005	.239147	.522	23943	1.19744
	Past Deactivated-Deactivated	1.163170*	.251793	.000	.40819	1.91815
Past	None-Complete	479005	.239147	.522	-1.19744	.23943
Deactivated-Complete	None-Deactivated	.557586	.271320	.475	25279	1.36796
	Past complete-Complete	715675	.258239	.094	-1.48865	.05730
	Past Complete-Deactivated	168329	.242105	1.000	89515	.55849
	Past Deactivated-Deactivated	.684166	.290106	.264	18479	1.55312
None-Deactivated	None-Complete	-1.036591*	.229897	.000	-1.71998	35320
	Past complete-Complete	-1.273261*	.249697	.000	-2.01505	53148
	Past Complete-Deactivated	725916*	.232972	.032	-1.41834	03349
	Past Deactivated-Complete	557586	.271320	.475	-1.36796	.25279
	Past Deactivated-Deactivated	.126579	.282529	1.000	71629	.96945
Past	None-Complete	310675	.194559	.832	88841	.26705
Complete-Deactivated	None-Deactivated	.725916*	.232972	.032	.03349	1.41834
	Past complete-Complete	547346	.217598	.177	-1.19430	.09961
	Past Deactivated-Complete	.168329	.242105	1.000	55849	.89515
	Past Deactivated-Deactivated	.852495*	.254604	.017	.08954	1.61545
Past	None-Complete	-1.163170*	.251793	.000	-1.91815	40819
Deactivated-Deactivated	None-Deactivated	126579	.282529	1.000	96945	.71629
	Past complete-Complete	-1.399841*	.269992	.000	-2.20684	59284
	Past Complete-Deactivated	852495*	.254604	.017	-1.61545	08954
	Past Deactivated-Complete	684166	.290106	.264	-1.55312	.18479

\*. The mean difference is significant at the .05 level.

#### Summary

The statistical analysis provided in the results section demonstrated support for nearly all of the hypotheses. The first research question had three hypotheses that investigated the relationship between the outcome of a project leadership attempt and future intention to use BPI again. Future project leadership was the only hypothesis that conflicted with what was theorized. The hypotheses for the second and third research questions, investigating the relationship of the BPI Skill Self Efficacy measure to project leadership outcome and future intentions, supported validity (discriminate and predict) for researcher developed BPI Skill Appraisal. The hypotheses for the fourth and fifth research questions further support the importance of a mastery experience.

The next section discusses conclusions that can be drawn from this analysis as well as suggestions for future research.

#### CHAPTER 5. SUMMARY AND CONCLUSION

This chapter reviews the purpose of the study, research design, summarizes the findings, discusses implications of the results and limitations of the study, and suggests opportunities for future research.

#### Background

The purpose of this quantitative correlation research study was to investigate, in one large high tech company, the relationship between the outcome of one's most recent BPI project leadership attempt, his or her self reported motivation to attempt future use the BPI methodology, and his or her level of BPI Skill Self-Efficacy (BPI SE).

#### Research Design

In this study the relationship between an employee's likelihood of engaging in opportunities to improve the organizational performance through the application a Six Sigma methodology for continuous improvement and the outcome of their most recent leadership attempt using the methodology is investigated. The Project Tracking Tool (PTT), an intranet application used to document all BPI efforts, was the source used to identify the population of BPI projects completed in the last two fiscal quarters of 2005. This secondary data source provided data that included; the project leader, project outcome, and the existence and outcome any previous leadership attempts. The identified project leaders were sent a web based, two part questionnaire to gather self-reported information: (a) confidence in successfully completing the tasks associated with BPI projects, and (b) intention to use the BPI methodology and tools again in the future. 759 green belt projects, all United States projects that ended in the last two quarters of 2005, were identified using a secondary data source, Project Tracking Tool (PTT). Green belt projects are the BPI projects most representative of a culture of continuous improvement where all employees are empowered to drive change. The survey was distributed to the project leaders for each of the identified projects. The questionnaire consists of two parts; BPI Skill Appraisal, and future intentions. The BPI Skill Appraisal had 13 tasks with a 10 point scale to assess one's confidence in completing the task. The second part, Future Intentions, had three questions about; leadership of, participation in and use of the methodology for improvement opportunities in the future. The company email address was used to distribute the survey. Of the 759 surveys sent, 449 responses (59.2%) were received.

#### Summary of the Results

This study investigated the effect of the outcome of an attempt to lead a Business Process Improvement on an employee's level of BPI self-efficacy and his or her likelihood to engage in BPI efforts in the future. The five research questions investigated in this study are primarily based on the work of Albert Bandura (2000) who theorized the mastery experience to be the most powerful source of self-efficacy.

Research Question One: Is one's self-reported likelihood to attempt Business Process Improvement in the future dependent on the outcome of his or her most recent BPI project leadership attempt?

Research Question Two: Is one's level of BPI self efficacy (BPI SE) for the key tasks that represent the obstacles to completing a BPI project dependent on and the outcome of his or her most recent BPI project leadership attempt?

Research Question Three: Is there a relationship between an employee's selfreported likelihood to attempt Business Process Improvement in the future and his or her level of self efficacy (BPI SE) for the key tasks that represent the obstacles to completing a BPI project? Research Question Four: Does one's self-reported likelihood to attempt Business Process Improvement in the future depend on his or her total project leadership experience?

Research Question Five: Is one's level of BPI self efficacy (BPI SE) for the key tasks that represent the obstacles to completing a BPI project dependent on his or her total project leadership experience?

The first research question investigated the relationship between the outcome of a project leadership attempt and future intention to use BPI. The second and third research question investigated the relationship of a BPI Skill Self Efficacy measure to the two phenomenon, project leadership outcome and future intentions, addressed in the first research question, and provided validity for researcher developed BPI Skill Appraisal. The forth and fifth research questions further explored the significance of the mastery experience by investigating beyond the scope of a recent project leadership attempt to include the existence and outcome of any past BPI project leadership.

### Research Question One

A personal mastery experience is believed to be one of the most influential sources of self efficacy. A key proposition of this study was that a person's experience when attempting to apply BPI methodology would both influence the perception they have in their capabilities and is an important influence whether or not they attempt a Business Process Improvement effort again in the future. The first research question focused on evaluating the relationship between the outcome of one's most recent BPI project leadership attempt and his or her future intentions regarding use of the BPI methodology.

The alternative hypothesis was supported for two of the three hypotheses. Consistent with the work of Bandura (1997) and others (Eden & Yaakov Zuk, 1995; Gist, 1987;

Maddux, Norton, & Stoltenberg, 1986; Merton, 1948; Paglis, Laura L., 1999; Peterson & Arnn, 2005; Stajkovic, Alexander D & Fred Luthans, 1998), an individual's self reported motivation to attempt a challenging activity in the future is dependent on a successful outcome of a past effort. There was a positive relationship between both future intentions to participate and future intention to use BPI tools and techniques and the most recent project outcome. Though directionally consistent, there was no statistically significant relationship between future intention to lead a BPI project and the most recent project outcome. This is inconsistent with other research that suggests the primacy of the mastery experience. In additional to discussing these findings further in the implications sections of this chapter, this is a noted opportunity for future research.

#### Research Questions Two and Three

Research questions two and three investigated the validity (discriminating and predictive) of the BPI Skill Self-Efficacy measure. The ability to discriminate is how well the measure is able to distinguish between individuals theorized to be different (Leedy & Ormrod, 2001). The relationship between one's BPI SE measure and his or her response to questions about BPI future intent supported an evaluation of the predictive validity.

The hypothesis for research question two evaluated the significance of the difference in one's mean BPI Self efficacy as a function of the outcome of his or her most recent project leadership attempt. The null hypothesis was rejected, it was concluded that the BPI Self Efficacy level of a person who successfully completed his or her most recent BPI project is higher than that of a person who was unsuccessful. The BPI SE measure discriminated between individuals according to the outcome of their most recent leadership attempt. The hypotheses for research question three focused on the relationship between one's BPI Self Efficacy and his or her future intent to engage in BPI. The null was rejected for all three hypotheses (leadership, participation and tool/technique use). It was concluded that one's future BPI intent is a function of one's mean BPI Self Efficacy. These hypotheses support the predictive validity of the BPI-SE measure. Individual's with higher BPI-SE level responded more positively to questions regarding their future likelihood of BPI project leadership, participation and tool/technique use than did their peers with a lower measure of BPI SE.

#### **Research Questions Four and Five**

The potential moderating factor of past project leadership experience provides additional opportunity to investigate the importance of a mastery experience on motivation to attempt business process improvement again. Success in the past should result in a higher level of resilience to the impact a set-back has on one's self-confidence (Fernández-Ballesteros, Díez-Nicolás, Caprara, Barbaranelli, & Bandura, 2002). Past project leadership experience is a measure of both the existence and outcome of a previous BPI project leadership attempt. One's total BPI experience is a combination of the existence and outcome of a previous attempt and the outcome of the most recent BPI leadership attempt. BPI Self Efficacy level and future BPI intent were theorized to differentiate according to total leadership categories. Those that include a mastery experience (none-complete, completecomplete, complete –deactivated, deactivated-complete) should differ from those without a mastery experience (none-deactivated, deactivated-deactivated). All three null hypotheses for research question four were rejected; one's likelihood to lead, participate, and use BPI tools and techniques is a function of his or her total BPI leadership experience. The post hoc evaluation to determine the differentiation between categories produced mixed results. The theorized differentiation (the four categories that included a mastery experience versus the two categories with no mastery experience) was accurate for *Future intention to use BPI tools and techniques*. In regard to *Future intention to use BPI tools and techniques*. In regard to *Future intention to participate in a BPI project*, only the category "none-deactivated" was significantly different than all categories with a mastery experience. *Future intention to lead a BPI project* provided the most conflicting results, with both novice categories (none-deactivated and none-complete) differing significantly from the other four categories. This was not expected, and will be further discussed in the implications section. The lack of statistical differentiation of deactivated-deactivated (twice unsuccessful at BPI project leadership) from the other categories for the participation and leadership questions contradicts theory about the importance of the mastery experience above all other sources of self-efficacy.

Research question five evaluated BPI Self Efficacy as a function of one's total project leadership experience. The null hypothesis for research question five was rejected; one's BPI Self Efficacy is a function of his or her total BPI project leadership experience. The post-hoc analysis to assess the differentiation between total project leader categories was consistent with researcher expectations; project leaders that were in the two categories lacking a mastery experience had a mean BPI Self Efficacy lower than those with a mastery experience. The results of this study supported the importance of mastery experience as a significant factor influencing both one's confidences in his or her BPI competency and his or her future intent to engage in BPI. Additionally the results were supportive of the researcher developed BPI-SE appraisal which successfully demonstrated both the ability to discriminate and predict. The inconclusive results for the relationship between a mastery experience and future intent to lead a BPI project was not consistent with theory or previous research.

Implications of the Results and Suggestions for Future research

The goal of this study was to determine if one's achievement of a mastery experience using BPI methodology will influence; a) future intentions for engagement in continuous improvement effort, and b) his or her level of self efficacy. The results of the study were generally supportive of Social Cognitive Theory (SCT) and past self-efficacy research. Implication of these finding, both theoretical and practical will be discussed along with identification of future research opportunities. These areas will be discussed for each of three main areas; the mastery experience, future BPI intent, and the BPI Skill Appraisal. Mastery Experience

People approach and explore situations within their perceived capabilities, while avoiding situations they think exceed their ability (Bandura, 2000). Important theoretical implications of the findings of this study are based on the research that has also shown that the greater the confidence individuals have in their capabilities, the more vigorous their effort and persistence (Bandura, 1997). It is theorized that, compared to low self-efficacy employees, the high self efficacy employee are more likely to take on difficult challenges, will likely exert more effort, and will persist longer when faced with inevitable obstacles. Relatively unburdened by the stress associated with self-doubters, the high self-efficacy employee may be expected to respond more aggressively to opportunities to engage in change and continuous improvement (Paglis, Laura L & Green, 2002). The study provides valuable support for the applicability of SCT and the concept of self-efficacy to a business organization.

Support for the practical applicability of BPI mastery experience findings are based on the malleability of self-efficacy. The manager has organizational responsibility to both process and people. Because self-efficacy has been described as a malleable quality, any management attempt to proactively intervene in an effort to raise an employee's self-efficacy seems intuitively obvious. With the potentially viable activity of providing individuals with additional information and experience to consider in their ever-continuous self-evaluation (Gundlach, Martinko, & Douglas, 2003), managers should eagerly support any person in their organization who takes on the challenge of BPI project leadership. Because a BPI project is the type of significant and important event that supports development of selfefficacy, it has the "double edge" capacity of creating a negative workplace experiences in the event of failure. If a manger is supportive of an employee engagement in his or her first BPI opportunity, that manager's ongoing engagement and monitoring to assist in making the endeavor a successful one, will potentially make that employee more self-motivated toward BPI efforts in the future.

While many organizations start out with motivated employees and focused initiatives, their ability to maintain the initiatives often wanes over time (Bullington, Easley, Greenwood, & Bullington, 2002) The question of whether managers should pay attention to people or process is futile at best. The truth is they need to pay attention to both. Despite all of the evidence for primacy of the process there is even more evidence for concern for people. Evidence shows that the likelihood of failure of improvement efforts in an organization to be roughly two-thirds of those initiated. This study provided support for the assertions (Sanders) that the failure to assess human perceptions and behaviors has some value in explaining the frequent failures.

Future research opportunities include an investigation of importance of a mastery experience for the team members. Though the role of team members on a project is inconsistent from project to project and from organization to organization, the idea of group efficacy in this setting is a future research opportunity. Understanding how group efficacy influences the success of a project is valuable to building a culture of continuous improvement where competent individuals are available where and when needed. As a culture is developing, the hope is that a "critical mass" is created, one that ensures support for any opportunity.

#### Future intention to lead a BPI project

The results for the investigation of future intent to lead BPI projects were either inconclusive, or conflicted with research and general theory about the importance of a mastery experience. Research done by McNatt and Judge (2004), focused on the similar concept of self-fulfilling prophecy, identified extrinsic conceptualization as a factor in motivation. An employee's level of desire for potential rewards and outcomes is also a compelling motivator. Self-Efficacy theory highlights four sources for individual development; results of this study indicate that the mastery experience was supplanted by another, possibly social persuasion, where specific feedback from management is deemed desirable.

In the case of BPI in the organization in the study, certification is rewarded and recognized as valuable both inside the company and as marketable outside the company. This might explain why novices, regardless of project leadership outcome, are all unlikely to respond favorably to intent to lead a future project. A person who fails at their initial project leadership attempt is expected to avoid future opportunity, but that should not have been the case with those who were successful. It is possible that the reward and recognition strategy may be counter productive to developing a culture of continuous improvement. Valuing the reward, a person who has achieve certified status may see no value in embarking on the challenge again.

Future research opportunities exist for understanding when and why the mastery experience is supportive of building self-efficacy yet is supplanted by other factors when it comes to future motivation. A longitudinal study would provide an opportunity to investigate if the novice project leader with a successful outcome changes future intent over time. Can a task be so formidable that despite a positive outcome, a person can hardly fathom doing it again when asked shortly after the event? The potential conflicting relationship between reward and recognition strategy and the development of self-efficacy is also a topic warranting further investigation.

#### **BPI Skill Appraisal**

From a theoretical perspective, this study demonstrated the ability to create a valid self-efficacy instrument for complex tasks in a business organization. Such instruments have

the ability to provide valuable insight to leaders and program managers who can influence the policies and procedures at an organizational level to improve the success of a corporate initiative. It can aid mentors who have the opportunity to take action at an individual level to improve success of an employee driving a specific improvement effort.

The BPI Skill Appraisal is made up of 13 questions that vary in focus. The tasks include; project management, BPI tools and techniques, business acumen, influencing others and communicating results. The appraisal can be used at an individual level to determine how a manager or mentor can best support a BPI project leader. It can be used at a program level to influence the direction of future training, provide general guidance to management regarding the importance of their project sponsorship, and influence functional relationships as needed to improve the likelihood of project leader success in addressing a business improvement opportunity.

## Summary

Organizations focused on creating a culture of continuous improvement are interested in engaging all employees in the use of the desired behavior not just once, but as a norm going forward. To do this, managers must understand factors that influence employee motivation to step up to the challenge of leading change. The target organization of this study adopted a six sigma based methodology called Business Process Improvement (BPI) to guide its continuous improvement efforts. Motivation is both an output of a leadership attempt and an input effecting whether an employee will step up to challenge when an opportunity exists. This unique relationship has potentially powerful consequences in an organization that has recognized the value of an engaged workforce that supports a culture of continuous improvement.

# Limitations

Leadership research has proved a challenge to the traditional research approaches, challenges that can and are mitigated in light of a very real need for organizations to understand this dynamic. Cooper and Schindler (2003) state that good research generates dependable data derived from practices that are conducted professionally and that can be used reliably for managerial decision making. To meet this end, a study must clearly address limitations and use appropriate analytical techniques so that the conclusions drawn are limited to those clearly justified by the findings (Cooper & Schindler, 2003).

This research was a quantitative, non-experimental, descriptive correlation study that uses recorded information regarding a pre-exiting event to explore the potential relationships and dependencies among two or more phenomenon. A statistical approach was used to probe for reasons that underlie the relationships (Leedy & Ormrod, 2001). It did not use a control and experiment, or use randomly assigned participants, and will not determine cause of an effect (Creswell, 1994). As a fixed design, the demands of good research are to ensure trustworthiness through verification of validity and ability to generalize the findings. The primary assumptions made regarding validity of this study include; minimization of respondent bias, limitations to generalization of the finding, and validity of the survey instrumentation.

The use of a web based application for distribution of the questionnaire and collection of responses ensured both privacy and anonymity. Social influence, as theorized by Bandura

(2005), was to a factor in completion of the BPI skills appraisal (used to calculate the BPI-SE level). The failure of this study to support past research and theory for hypotheses focused on future intention to lead BPI projects does highlight a need for future research to understand what factor or factors do explain one's likelihood of BPI project leadership. As suggested earlier, reward and recognition is a source of motivation. Because the other questions were consistent with past research and theory, it is not likely that individual's answered just this one question with a social influence bias. The survey did include information to reach the researcher. One person did respond with information that their project was entered into the database to perform some type of IT maintenance and should not be considered in the study. If there are projects in database that should not be there it is reasonable to question if there are undocumented BPI projects. If employees were bias to entering projects into the project tracking tool based on project outcome or even one's level of BPI SE, there would be a limitation to the conclusions of the study to only documented projects as opposed to the BPI program in the company. Future research not solely dependent on a secondary data source, but rather a random survey of company employees might provide insight to this issue

The study was conducted with one type of project leader, Business Process Improvement at a Green Belt level, in one high tech company. The study was further scoped only to the project leaders in the United States. Caution should be taken in attempting to generalize these findings beyond this organizational setting. The sample population included 759 project leaders. 7.2% of the project leaders in the sample population were no longer employees at the company. Of the 7.2% of project leaders that departed the company, 1.8% percent were project leaders of projects that completed, 5.4% were project leaders of projects that were deactivated. A chi-square analysis resulted in a p-value of .007, is can be concluded that departure is a function of and project leadership outcome. This result is contradicts an assumption of the study, understanding the reasons for the difference in departure rate is an opportunity for future research. Though motivation is a key to company success, so is retention.

## Conclusion

The purpose of this study was to investigate the significance of a mastery experience in influencing an employee's motivation toward future engage in business process improvement. The study makes contributions within two general categories. First, as a quantitative leadership study targeting development of a quality culture, this research heeds both a request for more leadership research and provides practical implications regarding quality in a business organization. Specifically, this study investigated the mastery experience as the primary source of self-efficacy and factor in explaining employee future engagement in deliberate efforts to drive continuous improvement in a business organization. Secondly, the study provides needed testing of the social cognitive theory construct of self efficacy in a business organization. The study adds breadth to existing social cognitive theory and self-efficacy research that has flourished in academic, medical and some employee related issues like job searching, but has lagged in areas such as organizational learning (Goddard et al., 2004). This study was conducted in a business organization, specifically focused on a company's efforts to successfully implement and build a culture of continuous improvement and change.

To successfully implement change, there is the inevitable need for employees to enact new behaviors so that desired changes can be realized (Armenakis & Bedeian, 1999). Six Sigma is but one in a long line of programs (e.g. quality circles, kaizen, TQM, etc) introduced in support of an organizational goal to create a culture of continuous improvement. The reality is that arming individuals with increasingly more robust approaches to identify new opportunities, at a cost of billons annually (Bandura, 1997), there has been a failure to eliminate the gap between knowing what needs to be done and making the change a reality. This study investigated the behavior factor of self-efficacy that has shown promise in settings other than a business organization.

This study demonstrated the significance of the mastery experience as an influence on one's personal belief in their abilities and subsequently on their future intent to engage in business process improvement efforts. It failed to demonstrate support for the importance of the mastery experience for future intent to lead BPI. The findings are important to the organization and its leaders. Ensuring that individuals who take on the challenge of driving a continuous improvement effort in the company are provided with every bit of support possible to ensure success on their initial engagement will build the self-efficacy to make them increasingly motivated and more resilient to obstacles, challenges, and the inevitable failures that the future will hold.

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## Appendix A. BPI Project Leadership Questionnaire - Parts 1 and 2

Introduction Exit this survey >>										
Last year, you participated in a BPI effort documented in the Project Tracking Tool (PTT). In the survey that follows, you will be asked to respond to a few questions about this experience. Your responses to this survey will be used to investigate factors that influence the integration of BPI into the culture of Dell.										
Kindly complete the survey as soon as you receive it. Your responses will be consolidated an output will an excel spreadsheet with no personally identifying information; be assured that your responses will be completely confidential.										
If you have any difficulty opening the link or completing any of the questions, or wish to receive information about the outcome of										
Sincerely- Beth Chase Beth_Chase@dell.com 728-4626										
					Next >>					
Business Impro	ovement	Process (	BPI) Skill	Appraisa	al Inventory				Exi	<u>t this survey &gt;&gt;</u>
DIRECTIONS: Rate how confident you are in your ability to successfully accomplish each of the following tasks. Each task is related to successfully completing a Business Process Improvement (BPI) project. Indicate your degree of confidence, from 0 (no confidence at all) to 10 (completely confident). Thank you.										
all"					confidence"					confident"
0	0	0	0	0	0	0	0	0	0	0
2. INITIATION: Gain management sponsorship/support 0 "no 5 "Moderate 10 confidence at 1 2 3 4 amount of 6 7 8 9 "completely endednees"										
0	0	0	0	0	0	0	0	0	0	Connacine
9	0	<u> </u>	<u> </u>	<u> </u>	9	9	<u> </u>	<u> </u>	0	
3. INITIATION: Form a committed team of the right individuals (i.e. customer, supplier, process owners and subject matter experts) 0 "no 5 "Moderate 10 confidence at 1 2 3 4 amount of 6 7 8 9 "completely all"										
0	0	0	0	0	0	0	0	0	0	0
<< Prev Next >>										

Business Improvement Process (BPI) Skill Appraisal Inventory Exit this survey >>										
DIRECTIONS: Rate how confident you are in your ability to successfully accomplish each of the following tasks. Each task is related to successfully completing a Business Process Improvement (BPI) project. Indicate your degree of confidence, from 0 (no confidence at all) to 10 (completely confident). Thank you.										
1. DEFINE: Com	municate	e (verbal and	written) c	lear and con	npelling definiti	on of a bu	siness need,	/opportunit	y/problem	i i i i i i i i i i i i i i i i i i i
0 "no confidence at all"	1	2	з	4	5 "Moderate amount of confidence"	6	7	8	9	10 "completely confident"
0	0	0	0	0	0	0	0	0	0	0
2. MEASURE: Select the appropriate metric/measure to graphically illustrate a clear and compelling business need/opportunity/problem										
0 "no confidence at all"	1	2	з	4	5 "Moderate amount of confidence"	6	7	8	9	10 "completely confident"
0	0	0	0	0	0	0	0	0	0	0
3. MEASURE: Co	llect an a	ndequate amo	unt of me	tric/measur	e data to estab	lish a bası	eline and tai	get improvo	ement goa	1
0 "no					5 "Moderate					10
confidence at all"	1	2	3	4	amount of confidence"	6	7	8	9	"completely confident"
0	0	0	0	0	0	0	0	0	0	0
4. MEASURE: Cr	eate a co	st benefit and	lysis and	gain financi	al approval of ti	ne estimat	ted project s	avings		
0 "no confidence at	1	2	з	4	5 "Moderate amount of	6	7	8	9	10 "completely confident"
all"	0	0	0	0	Confidence"	0	0	0	0	Confident"
				< < Dra						
				<u></u>						
Business Impro	vemen	t Process (I	BPI) Skil	Anoraisa	Inventory				Exit	this survey >>
DIRECTIONS: Rate how confident you are in your ability to successfully accomplish each of the following tasks. Each task is related to successfully completing a Business Process Improvement (BPI) project. Indicate your										
degree of cor	indence		connider	ice de dity	to to (comple	cery com	noency. m	arik you.		
1. ANALYZE: Se	lect an aj	ppropriate qua	ality tools	and/or tech	iniques to analy	rze the cu	rrent proces	5		
0 *no confidence at	1	2	3	4	5 "Moderate amount of	6	7	8	9	10 "completely
J.	0	0	J	0	J	0	J	Э	0	J
2. IMPROVE: Ge resourcing (mo	ney, equi	ipment, peopl	e, etc)	stance as ne	reded to overco	me difficu	iit organizat	ional barrier	rs and or g	et necessary
confidence at all*	1	2	3	4	amount of confidence*	6	7	8	9	"completely confident"
0	Э	C	J	0	2	J	0	0	0	0
3. IMPROVE: Implement a plan to achieve targeted change/improvement										
0 *no					S *Moderate					10
confidence at all*	1	2	3	4	amount of confidence*	6	7	8	9	"completely confident"
0	0	J	0	J	0	0	0	J	U.	0
4. IMPROVE: Graphically illustrate measure/metric improvement using basic quality tools/techniques (e.g. trend chart, pareto, pie chart, etc.)										
0 *no confidence at	1	2	3	4	5 "Moderate amount of	6	7	8	9	10 *completely
) )	0	0	0	0	J	0	0	0	0	Connident
	<< Prev Next>>									

Business Improvement Process (BPI) Skill Appraisal Inventory Exit this survey									<u>t this survey &gt;&gt;</u>	
DIRECTIONS: Each task is i degree of cor	: Rate h related nfidence	ow confider to successf , from 0 (ne	nt you are ully compl o confider	in your a leting a B ice at all)	ability to succe susiness Proces to 10 (comple	ssfully a ss Improv etely cont	ccomplish vement (Bf fident). Th	each of the PI) project ank you.	e followir . Indicate	ng tasks. e your
1. Improve: Fin	ancially v	verify finalize	d Cost Ben	efit Analys	is (CBA).					
0 "no confidence at all"	1	2	з	4	5 "Moderate amount of confidence"	6	7	8	9	10 "completely confident"
0	0	0	0	0	0	0	0	0	0	0
2. CONTROL: Im 0 "no confidence at all"	plement 1	robust contr 2 O	ols to susta 3 O	in achieve 4	d improvement 5 "Moderate amount of confidence"	into the fu 6	nture 7	8	9	10 "completely confident"
3. REPORT: Com	nmunicati	e (verbal and	l written) tl	ne busines:	s process improv	vement to	manageme	nt and othe	r stakehol	ders.
0 "no confidence at all"	1	2	з	4	5 "Moderate amount of confidence"	6	7	8	9	10 "completely confident"
0	0	0	0	0	0	0	0	0	0	0
<< Prev Next >>										
Part 2: Future I	Engage	ment							<u>Exi</u>	<u>t this survey &gt;&gt;</u>
DIRECTIONS	. Rate h	ow likely vr	nu are to r	to the act	tivities listed ł	relow				

## 1. I will lead a business process improvement effort in the next 18 months

1. I will lead a business process improvement effort in the next 18 months									
Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree					
0	0	0	0	0					
2. I will partici	oate in a bus	iness process in	nprovemen	t effort in the n	ext 18 months				
Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree					
0	0	0	0	0					
3. I will use the Strongly Disagree	e tools and t Disagree	echniques assoc Neither Agree nor Disagree	iated with I Agree O	Strongly Agree	s improvement in my day to day work. Done >>				