LEADERSHIP REQUIREMENTS FOR SUCCESSFUL LARGE-SCALE CULTURAL CHANGE USING CONTINUOUS PROCESS IMPROVEMENT METHODS: A MIXED METHODS RESEARCH STUDY.

A dissertation presented in partial fulfillment of

the requirements for the degree of Doctor of Management.

by

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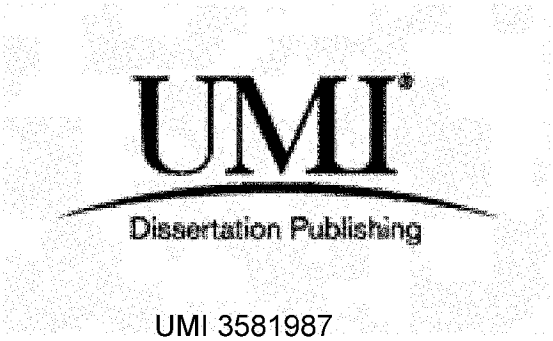

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Abstract

The once great American manufacturing and service organization is in jeopardy. Quality effective leadership is absent or declining across American organizations while the United States economy struggles to emerge from turmoil unlike anything we have seen since the great depression. In the wake of these leadership and economic calamities many organizational leaders have turned to continuous process improvement strategies and techniques to restore their financial and operational competitiveness. If not led effectively these large-scale organizational and cultural transformations may fail and organizational effectiveness along with them. Organizational leaders carry the burden of this responsibility, and yet, the leadership requirements necessary for facilitating these large-scale organizational and cultural transformations have not been clearly identified. This study proves the preceding claims through vigorous research and rigorous citation from the literature. The purpose of this study is to define the necessary leadership behaviors, skills, strategies, competencies, technologies, processes and protocols that have allowed some organizations to successfully navigate their own life-saving cultural transformations. Through triangulation of qualitative and quantitative data the study validated important cultural change strategies and leadership practices, then organized them into a best-practices cultural transformation model. Documenting the leadership requirements for successful cultural transformation may assist other organizations with their own successful cultural transformations.

Key Words: Cultural Change, Organizational Transformation, Organizational Development, Leadership Development, Continuous Process Improvement, Lean, Process Engineering

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Chapter One: Introduction

The purpose of this mixed methods research study is to identify and define the organizational leadership requirements necessary for successful cultural transformation utilizing Lean continuous process improvement methods. Process improvement has become a core component of organizational strategy and large-scale transformational change efforts by many companies (Hammer & Stanton, 1999; Kaplan, 2012; Mann, 2005; Spear, 2004; Womack & Jones, 2003). Some of these Lean practitioners have published important lessons for successful Lean implementation but the Lean leadership system necessary for implementing and sustaining a Lean culture has not been specifically identified or quantified (Emiliani, 2008; Kenney, 2011; Lareau, 2000; Liker & Convis, 2012). For purposes of this study, leadership requirements are defined as the collective competencies, behaviors, practices, processes, and technologies necessary for executing a large-scale Lean cultural transformation. While practitioners and scholars alike tend to agree that leaders play a critical component in implementing and sustaining Lean cultural transformation (Mann, 2005, Spear, 2004, Womack & Jones, 2003), there exists an opportunity to more fully identify and define the leadership requirements necessary for successful Lean cultural transformation. Therefore, this study seeks to identify, define, and organize this critical leadership system into a best-practices cultural change leadership competency model. This model can be utilized by other organizations to improve their own operational efficiencies through the deliberate transformation of organizational culture using Lean process improvement techniques and tools.

The study presents a social constructivism worldview that seeks to better understand the consequences associated with leadership in a real world practice and seeks multiple participant meanings to generate theories about the impact of leadership and cultural change in an

organizational setting (Creswell, 2009). Ontologically this study seeks to better understand the relationship between organizational leadership and its impact on an organization in attaining its cultural transformation goals (Hay, 2002). The epistemology of the study seeks to better understand what impact organizational leadership has on an organization during periods of significant cultural and operational change and how an organization's leadership system affects its ability to reach and sustain those transformational goals (Grix, 2002).

Results of the study may be utilized by other organizations considering the same endeavor to more effectively realize the gains sought by a Lean cultural transformation. By studying this leadership system, other organizations may better prepare for and optimize their own organizational leadership before, during, and after a similar significant cultural transformation. This optimization may produce quantifiable benefits in time savings, cost optimization, turnover over reduction, customer satisfaction ratings, and operational and sales process efficiencies.

Background

Companies have been faced with increasing pressure from customers and competitors in the past couple of decades (George, 2002). Organizational leadership and the United States socioeconomic system is in a state of turmoil unlike any in recorded history, thereby calling for adjustments of major importance for the meaningful development of organizations (Boatman & Wellins, 2011; Darling, 2009). Economic changes have forced manufacturing and service industry companies alike to seek new production and operations strategies in order to enhance their competitiveness in the global market place (Bonaccorsi, 2011; Darling, 2009; Jenkins, 2012; Ng, et al, 2010). In the wake of this turbulence many organizations are turning to continuous process improvement techniques like Toyota's Lean manufacturing production

system (TPS) to remain competitive in a post-recession economy that has been marred with slow growth and deep divisions in state and federal political leadership (Deming, 2013; Hammer & Stanton, 1999; Kaplan, 2012; Kenney, 2011; Martinez; 1995).

Although many companies are turning to this emerging strategy the vast majority of today's organizational change efforts fail to produce their intended business results which results in huge costs to budgets, time, people, customers, and faith in leadership (Anderson & Ackerman-Anderson, 2001). Despite the millions of hours and dollars spent on efforts to improve key business processes companies report significant dissatisfaction with a critical aspect of those change efforts; leadership (Martinez, 1995). Relying only on quality control and business processes to drive organizational change are no longer enough to ensure success or competitiveness in the market today (Svensson & Wood, 2006). Leadership is what sets companies apart today and that organizational leadership must be developed just like any other business process (2006). Competent change leadership has become a most coveted executive skill (Bersin & Associates, 2011; Boatman & Wellins, 2011; Heifetz, et al., 2009; Svensson & Wood, 2006).

Tragically, during this time when strong and effective leaders are needed most, organizational leadership in America is at an all-time low (Bersin & Associates, 2011; Boatman & Wellins, 2011; Darling, 2009; Heifetz, et al., 2009; Svensson & Wood, 2006). Failure of management to plan for the future and to foresee problems has brought about a waste of manpower, of materials, and of machine-time, all of which raises the manufacturer's cost and price that the purchaser must pay (Deming, 2013). The 2011 *Global Leadership Forecast* conducted by Developmental Dimension International reported that two out of every three of the over 14,000 leaders polled in their survey, stated that their companies do not have the leadership

talent necessary to compete in the future (Boatman & Wellins, 2011). In similar research, Bersin & Associates (2011) reported that more than half of organizations state that their business is being held back by a lack of leadership talent and that their top priority in the next year is to improve organizational leadership skills. One thing seems certain; when the economy recovers things won't return to normal, and a different mode of leadership will be required to drive change and organizational effectiveness (Heifetz, et al., 2009).

If organizational leadership requirements can be identified and defined by carefully studying the leadership behaviors and skills, competencies, protocols and actions at organizations that have successfully transformed their organizational culture into an efficient model of continuous process improvement, it may be possible to replicate that same system in other organizations and reverse this decline in organizational leadership while simultaneously increasing organizational effectiveness.

Sponsoring Organizations

Two Shingo Prize winning manufacturing companies volunteered to participate in this research study. These companies were located by contacting the Shingo Prize organization located at Utah State University in Logan, UT. These companies were selected because they have both successfully managed a large-scale cultural change using Lean methods.

US Synthetic

US Synthetic (USS) is a 30-year industry veteran and a leader in the development and production of polycrystalline diamond cutters (PDCs) for oil and gas exploration. They employ approximately 850 people and are located in Orem, Utah. US Synthetic has spent more than a decade perfecting its products to last longer—especially in tough conditions that test the limits of the most durable energy exploration and drilling equipment (PR, N., 2012).

As most companies did, US Synthetic had to cut staff to endure the recession but it kept a number more than the bottom line would have dictated, and those employees went to work creating leaner more efficient processes throughout the rough economy (Immel, 2012). They were so successful that when they began to pull out of the economic slump, they tripled revenue and were able to deliver more products, more quickly than the competition (2012). As an enterprise, US Synthetic has averaged 23 percent growth in annual revenues since beginning its Lean journey in 2006 (US, S., 2011). This growth would not have been possible without continuous improvement efforts to free up capacity and space for growth, and the ongoing support of its parent company, the Dover Corporation (2011). Employee head count over the same period has rose only 16 percent annually, and building space has only grown by 17 percent annually (2011).

Experimenting with management styles produced a successful system for US Synthetic to engage each and every worker, and enabled them to become vital components in the company's Lean transformation (Immel, 2012). For example, in US Synthetic's marketing department, Lean was applied to improve the trade show material shipping which reduced costs and required no additional workers, and on the production floor a simple cardboard funnel was constructed to catch debris falling from a press, which reduced the amount of time a press needs to be shut down for cleaning, resulting in time savings and allowing workers to deliver more value (2012).

Other examples of successful Lean cultural change at US Synthetic include:

- Expanding capacity by 75% on some existing equipment through waste elimination
- Reduced flow time for obtaining experimental results by 85% - from 21 to 3 days
- OSHA reportable injuries down 30% from 2008
- Reduced employee turnover rate to 4% average annually

- Improved number of implemented continuous process improvement suggestions from under 100 per year to over 14,000 per year

As a result of their organizational transformation, in 2011 US Synthetic received the world's top manufacturing award, The Shingo Prize, because of their unending commitment to continuous process and people improvement (US, S., 2011). US Synthetic has successfully transformed, and continues to transform their organizational effectiveness by the diligent implementation of Lean continuous process improvement techniques, resulting in a Lean organizational culture. US Synthetic prides itself on an uncompromising commitment to constant innovation, outstanding quality, and superior customer service, allowing their engineering teams to meet high performance standards and match the requirements of the world's most demanding oil exploration and development projects.

Metalworks

Metalworks is a privately owned company that designs and manufactures metal furniture. Through continued investment, the owners have grown Metalworks from a small job shop into a well-recognized leading supplier for the office furniture industry, employing over 300 people in and around Ludington , MI. (Shingo Prize, 2008). Employees have a long history of striving for continuous improvement, while maintaining customer satisfaction. Lean principles have been used to govern decisions made throughout the company for many years. In 2006 they introduced the continuous improvement matrix which has given them a visual measure of the progress of each functional area on their Lean journey. In 2008 Metalworks was awarded the manufacturing industries prestigious Shingo Prize for continuous process improvement. By successfully implementing Lean and creating a culture of continuous process improvement Metalworks has realized the following results and improvements.

- 75% reduction in customer complaints per million
- Cost savings totaling $6.2 million over five years
- 15% reduction of labor costs
- 88% reduction in OSHA reportable injuries since 2002
- 89% reduction in volatile organic compounds emitted since 2000

This study seeks to identify and define the leadership requirements that were necessary for US Synthetic and Metalworks to achieve such valuable award-winning cultural transformation.

Research Questions and Hypotheses

As a triangulated mixed methods study, this research project contains both qualitative and quantitative research questions and quantitative hypotheses that were researched and tested through multiple data collection techniques.

Quantitative questions inquire about the relationship between variables (Creswell, 2009). To deepen the understanding of the relationship between an organizational leadership system and its impact on Lean cultural transformation, the study introduces the following central quantitative question:

- Does the quality of an organization's leadership determine the outcome of Lean cultural transformations?

With this being the central quantitative question, testing the following directional hypotheses by collecting and analyzing online survey data may further validate or discount assumptions about organizational leadership and its impact on Lean implementation and cultural transformation. Those directional hypotheses are:

- Effective leadership is required for successful cultural transformation

- Effective leadership is necessary to sustain the gains realized from cultural transformation.
- Effective cultural change leadership can be determined and implemented within an organization.
- Most companies start-large scale cultural changes with the necessary leadership competency already in place.

The central qualitative question is a broad question that seeks exploration of the central phenomenon or concept of the study (Creswell, 2009). Creswell (2011) suggests developing one or two central questions with no more than five sub questions. The central qualitative question explores the relationship between organizational leadership and Lean cultural transformation. The qualitative sub-questions focus on learning more about the various aspects of a leadership system and their relationship to successful cultural transformation. The central qualitative question and sub-questions for this study are:

Central Qualitative Question:

- What are the organizational leadership requirements for successfully transforming organizational culture using Lean methods?

Qualitative Sub-Questions:

- What are the leadership challenges associated with Lean cultural transformation?
- What are the leadership practices required for successful cultural transformation?
- What are the leadership skills and knowledge necessary for successfully leading a Lean cultural transformation?
- What are the leadership strategies for completing a large-scale cultural transformation using Lean methods?

These qualitative and quantitative questions and the associated directional hypotheses are appropriate for capturing mixed data because they seek to explore and better understand the components of a successful leadership system, they inquire about the relationship among independent and dependent variables, and they make use of both open-ended and closed-ended questions (Creswell, 2009). Creswell (2011) describes these associations as comparing groups on an independent variable *(x = organizational leadership)* to assess its impact on a dependent variable *(y = Lean cultural transformation)* and relating one or more independent variables to one or more dependent variables.

Additional survey and interview questions are discussed throughout the methodology section of the study and are designed to define the leadership requirements for Lean cultural transformation. Some of those questions include:

- What did senior executives do to successfully implement Lean in your organization?
- What practices did middle managers engage in to support the implementation of Lean within the organization?
- What behaviors were consistent among line level managers and supervisors that led to successful Lean transformation?
- What systems or structures were utilized to ensure that Lean project timelines and deliverables were met during implementation?
- What effective leadership skills and knowledge were necessary for the implementation of Lean in your organization?

These questions help to identify the important behaviors, practices, and strategies needed across all levels of leadership in a Lean organization. These questions also assist in testing the hypotheses that 1.) All organizational leaders must possess or develop certain behaviors and

practices in order to successfully implement Lean, and that 2.) Effective leadership is a requirement for any organization that desires to transform its organizational culture.

Conceptual Framework

This research study utilizes a triangulation of data strategy. Methodological triangulation, or mixed-methods research, uses more than one kind of method to study a phenomenon (Casey & Murphy, 2009; Risjord et al., 2001). Methodological triangulation has been found to be beneficial in providing confirmation of findings, more comprehensive data, increased validity, and enhanced understanding of the studied phenomenon (Casey & Murphy 2009; Foss & Ellefsen 2002; Halcomb & Andrews 2005; Redfern & Norman 1994; Risjord et al., 2001). With triangulation, researchers can use two research methods to decrease the weaknesses of an individual method and strengthen the outcome of the study (Denzin 1978; Sharif & Armitage, 2004).

There are two types of methodological triangulation: 'across method' and 'within method'. Across-method studies combine quantitative and qualitative data-collection techniques (Boyd, 2001; Casey & Murphy, 2009). Qualitative methods are explanatory and textual, and include passive observation, participant observation, and open-ended interviews or analysis of company documents (Risjord et al., 2001). Quantitative methods include statistical analysis of outcomes or surveys collected by standardized scales or measures and are generally expressed numerically (Risjord et al., 2001). Within-method studies use two or more data collection procedures, quantitative or qualitative, but not both. For example, quantitative data may be collected using two procedures, such as survey questionnaires and a pre-existing database, while qualitative data may be collected by using participant observation and interviews (Casey & Murphy, 2009; Denzin, 1989; Kimchi et al., 1991; Thurmond, 2001).

This study applies an across-method strategy to gather, combine, and compare data from two Shingo Prize winning manufacturing organizations. The Shingo Prize is a not-for-profit organization located at Utah State University that teaches correct principles and new paradigms to accelerate the flow of value, alignment and empowerment of people, and transformation of organizational culture. The Shingo Prize has been dubbed the Nobel Prize of manufacturing and operational excellence by Business Week Magazine (Q, M., 2004). The sources of data were the result of conducting internal interviews with company leaders and staff members (qualitative strand), and developing and administering staff member surveys (quantitative strand). These data collection methods and the triangulation of data strategy used to collect and analyze data are discussed in detail in the methodology section of the study.

Assumptions/Biases

This study assumes that the members of the interview groups were forthright and forthcoming in their answers to the research questions about the role and impact of organizational leadership during the Lean organizational transformation. It is also assumed that recipients of the online survey also provided accurate and honest information about their observations and experience with the cultural transformation and the presence and effects of leadership during that transformational period at the organization.

It was important to avoid any conflict of interest or biases during this study. The APA (2002) Ethics Code addresses this concern in its "Conflict of Interest" standard (Standard 3.06), which says that researchers must abstain from engaging in professional activities that might diminish objectivity or competence, or lead to the exploitation of a client. There was no conflict of interest between the researcher and the sponsoring organization. The researcher was not employed by the sponsoring organization and has no other professional ties to the sponsoring

organizations. The researcher is only interested in documenting the leadership requirements that made it possible for the sponsoring organizations to successfully complete a cultural transformation utilizing Lean methods and tools.

To ensure an ethical research project it is important to disclose any researcher bias toward the topic and subjects (Creswell, 2009). While the researcher is passionate about leadership development and cultural change, it is also known that the researcher entered into this study from a purely discovery nature to determine what can be learned from the sponsoring organizations and their successful cultural transformation using Lean methods. The researcher maintained an unbiased approach to collecting and analyzing data from the sponsoring organizations as is expressed repeatedly throughout the study.

The APA (2002) Ethics Code principle of "Integrity" involves the "[promotion] of accuracy, honesty, and truthfulness. This principle refers to the importance of ensuring that a researcher's writing reflects a valid portrayal of the study. The researcher will maintain all rights to publishing any final report in a scholarly journal at the end of this research study but only with permission from the sponsoring organizations. Additional written consent may be required prior to attempting any efforts to publish the findings of the study as part of a business book or periodical. This additional permission did not pose any threat or concern to conducting the project ethically.

Significance

Through careful data collection, analysis, and triangulation of data it was revealed that organizations can improve their chances for successful organizational change by developing and implementing a rigorous leadership development strategy. This study successfully identified the leadership requirements for facilitating large-scale organizational culture transformation using

Lean continuous process improvement techniques. The data gathered from leaders and team members at successful organizations revealed a best-practices competency model for facilitating successful organizational cultural change. This model can be used by other organizations to develop their own cultural change strategies and to help them increase the return on investment from their own cultural transformations. The results of this study will help other organizations complete successful cultural transformations and these transformations have proven to produce measurable improvements in customer and employee satisfaction, product quality, productivity, and profitability.

Limitations

There were relatively few limitations to this study and those dynamics exerted a very limited influence in the data collection, analysis, and development of conclusions about organizational leadership and cultural change. Those limitations consisted primarily of the type of organizations participating in the study, the diverse geographic location of the researcher and the sponsoring organizations, and the comparative size of the two organizations.

To increase the validity of findings this study applied a triangulation of data strategy which cross-compared and analyzed the data collected at one organization with the findings at another organization. This strategy increases the validity of emerging themes (Creswell & Plano-Clark, 2011). Triangulation can be performed successfully with two or more organizations. This study was fortunate enough to identify and confirm two Shingo Prize winning manufacturing organizations for the study. Validity may have been increased by locating a service industry organization to participate in the study in order to triangulate the manufacturing organization data with a successful service organization like a bank, hotel, or hospital.

The researcher and sponsoring organizations were all located in different states. This geographic diversity helped to increase the validity of data but also limited the study design to using telephone interviews and an online survey tool. While these mixed data collection instruments proved effective in gathering the necessary data for the study, the researcher may have collected even more data if it were possible to actually visit each of the organizations and observe the culture at work.

Finally, while grateful for each of the sponsoring organizations voluntary participation in the study, the size of Metalworks when compared to US Synthetic resulted in data collection from just under 20 people, while data collection at US Synthetic consisted of combined responses from over 100 people. A larger interview and survey pool from the second sponsoring organization may have provided additional validity to the triangulation of data.

While these limitations may have had an impact on the outcome of the study, findings and conclusions were validated by member checking and triangulation of the data. This validity strategy has yielded a strong and valuable set of best-practices and a competency model that can be used by other organizations to improve their own organizational change efforts.

Definition of Terms

The following section presents terms that are used throughout the study and the definitions for those terms as they apply to the study of leadership and cultural transformation. The purpose of this section is to prepare the reader for better understanding the content of the study. Careful review of these terms and definitions will reduce any misunderstandings as the reader progresses through the document. Table 1 presents the key terms and definitions for the study.

Table 1

Key Terms and Definitions

Term	Definition
Behaviors and Actions	The visible behaviors and actions that leaders took to help transform the organization or to drive implementation of Lean practices and procedures.
Cultural Transformation	Dramatic change in an organization's operating culture. In this case cultural transformation refers to changing an existing organizational culture to a culture of continuous process improvement.
Epistemology	Sometimes referred to as the theory of knowledge, it seeks to understand the nature and scope of knowledge.
Goals and Objectives	The written and distributed performance expectations of an organization.
Hypotheses	Proposed explanations for a phenomenon.
Lean	A continuous process improvement management philosophy that is derived from the Toyota Production System.
Leadership Processes	Refers to the steps and actions taken by organizational leadership to successfully implement and sustain Lean process improvements and cultural change.
Mixed Methods	The use of both qualitative and quantitative data collection methods.
Organizational Leadership	Refers to senior leaders of the organization that is being discussed.
Organizational Performance	The combined results from all individuals who make up an organization.
Ontology	The nature of the social and political reality being investigated.
Process Improvement	A systematic approach to help optimize an organizations business processes in order to achieve more efficient results.
Qualitative Procedures	Data collection procedures that include conducting interviews, observing behavior, and examining documents.
Quantitative Procedures	Data collection procedures that include statistical analysis of outcomes or surveys collected by standardized scales or measures and are generally expressed numerically.

Sample	The group of people to whom a survey is sent.
Shingo Prize	A not-for-profit organization at Utah State University that teaches correct principles and new paradigms to accelerate the flow of value, alignment and empowerment of people, and transformation of organizational culture.
Skills and Knowledge	Refers to what effective leaders need to know and what they need to be able to do in order to successfully transform their organizations culture.
Survey	A data collection tool used to gather information from individuals.
Systems and Technologies	The protocols established by organizational leadership to support the implementation of Lean process improvement and cultural change.
Tools and Techniques	Refers to the implementation of various Lean practices and procedures within an organization.
Toyota Production System	A management philosophy renowned for its focus on the reduction of waste in operational processes to improve overall customer value.
Triangulation	The use of multiple research methods to decrease the weaknesses of an individual method and strengthen the outcome of a research study.
Variables	A logical set of attributes that can be tested to assess the effects one variable has on another.

Summary

The purpose of this introduction was to demonstrate the need for conducting a study to determine the organizational leadership requirements for successful Lean cultural transformation. The introduction has established the purpose of the study, the research strategy and design overview, and presented the study's mixed methods research questions and hypotheses. Important terms that will be utilized throughout the study were presented and defined for future reference. The introduction has explained important background information about the increasing importance of managing change in today's organizations. The opening to the study

demonstrated that many organizations are turning to continuous process improvement strategies and techniques like Lean manufacturing to implement and manage these changes in today's often turbulent and competitive organizational environments. The introduction discussed the important role organizational leadership plays in successful cultural transformation. Despite the important impact that leaders play in transforming organizations through positive change, it was revealed that there is a growing leadership deficit in the United States and within modern organizations. This study seeks to define the leadership requirements necessary for ensuring successful organizational transformations.

Organization of Dissertation

This dissertation in organized into five main chapters: the introduction, the literature review, the methodology chapter, the presentation of results, and the discussion of results.

The introduction established the purpose of the dissertation by discussing the problem and providing important background information on the design of the study and the sponsoring organizations. The introduction presents the research questions and hypotheses for the study and discusses the significance of the study findings. Assumptions, limitations, and a table with important definitions for key terms used in the study are included in this important chapter.

The literature review presents an unbiased and comprehensive accounting of what authors, practitioners, and scholars have experienced or studied, then written about the subject of leadership and its impact on large-scale organizational transformation. It is clear that change is accelerating in organizations today and successful companies possess the necessary organizational leadership to effectively manage and sustain change (Boatman & Wellins, 2011). It is revealed that organizations are turning to continuous process improvement techniques like Lean manufacturing to transform their business and operational cultures (Kaplan, 2011; Kenney,

2011). The chapter researches and describes Lean principles, tools, and techniques. This section reveals that there is an opportunity in the literature to more clearly define the leadership requirements for ensuring successful cultural transformations using Lean methods.

The methodology chapter defines the data collection strategy and methods used in the study. This important section clarifies that the study utilized triangulated mixed methods to collect and analyze research data. This data was used to identify and present the leadership requirements that were necessary for two successful organizations to transform their culture using Lean methods. This section contains a description of the online survey used for collecting quantitative data, details about the subjects interviewed, and a description of the data collection and analysis process used in the study. Important research study criteria like validity, assumptions, ethics, and limitations are also presented and discussed in detail in the methodology section.

Chapter four presents the results of the data collection and analysis. The purpose of this chapter is to present the data collected from administering 2 quantitative online surveys and conducting 15 qualitative interviews at two Shingo Prize winning manufacturing companies. This chapter is organized by first presenting the survey data and hypothesis test results from one company's survey followed by a presentation of the interview data and research question results from that same company. The survey and interview data from these companies are compared and contrasted to determine if there were convergences or differences in the data. The chapter concludes with a brief summary of findings and a more robust discussion of results follows in chapter five.

The purpose of chapter five is to present a detailed discussion of the results of this mixed methods research study on organizational leadership and cultural change. The chapter answers

the research questions posed in chapter one and reveals the insights learned from testing hypotheses regarding the importance of organizational leadership during times of cultural change. A model for realizing successful cultural change developed from careful consideration of the data gathered and analyzed is presented and discussed in this chapter. The chapter ends with a summary of the key findings and insights learned from the successful facilitation of this important and interesting mixed methods research study.

Chapter Two: Literature Review

This literature review explores the connection between organizational leadership and cultural transformation resulting from the implementation of Lean continuous process improvement strategies and tools. The chapter seeks to better understand the latent leadership system embedded in organizations that have successfully transformed their organizational culture using Lean methods in order to help others lead similar organizational culture transformations. The literature review addresses the following questions:

- Why are leading companies around the world aggressively implementing process improvement strategies and tools?
- What is 'Lean' and how does it work?
- Can the Toyota Production System (TPS) be utilized to transform organizations that are not traditional manufacturing companies?
- How do companies sustain the gains they realize with successful Lean implementation?
- What is the leadership support system (i.e. competencies, behaviors and structures) required to successfully transform an organization's existing culture into a Lean continuous process improvement culture?

The literature review demonstrates the importance of developing and implementing an effective process engineering strategy and presents an overview of the most common process improvement methodology utilized in organizations today. The literature review is divided into six main sections. Section one clearly reveals that there is a relationship between organizational leadership and organizational performance. Section two proves that organizations can and are transforming their approach to creating customer value by adopting process engineering and

continuous process improvement strategies and tools. Section three demonstrates how companies are using the Lean continuous process improvement methodology to eliminate waste in their business processes and to develop continuous process improvement cultures in their organizations. Section four proves that Lean methods can be used to improve customer value at both manufacturing and service organizations by presenting both manufacturing and service industry Lean case studies. Section five reveals the challenge of sustaining gains realized from Lean implementation and reviews strategies employed to maintain those gains. Section six proves that a requirement for successful Lean transformation is organizational leadership and explores an underdeveloped opportunity in the literature around the leadership behaviors, competencies, and structures necessary for successful Lean cultural transformation. The literature review concludes by presenting a summary and set of research questions and hypotheses that may be used to identify and better understand the leadership system necessary for successfully transforming any organization's culture into one of continuous process improvement.

Leadership and Organizational Performance

A review of some of the most contemporary writers and scholars tends to suggest that there is a firm connection between leadership effectiveness and organizational performance (Bass, et al., 1992; Bowers & Seashore, 1966; Boyne, et al., 2011; Erkutlu, 2008; Hannan, et al., 2011; Oreg & Berson, 2011; Stone, 1992). Researchers have conducted studies and gathered data demonstrating the positive effects of leadership on individuals, small teams, and large organizations from around the world (Parker, 1990; Howell, 2011; Maier & Sashkin, 1971; Sosik, et al., 1997). Among the most interesting data in the literature are the documented connections between, and importance of, leaders developing trust with individuals and teams in

order to be considered effective leaders (Gardner, et al., 2005; McAllister, 1995; Morris, et al., 2002; Norman, et al., 2010; -O'Hara-Devereaux & Johansen, 1994; Sharifi & Pawar, 2002). The literature review also tends to demonstrate that values congruency between leader, follower, and the larger organization is also a key behavioral trait of effective leaders (Bardi & Schwartz, 2003; Cheng, 2000; Cheng & Kuo, 1993; Hoffman, et al., 2011; Meglino & Ravin, 1998).

Bowers and Seashore (1996) studied 40 organizations in an attempt to determine the relationship between leadership and organization effectiveness. They conclude that there are four basic dimensions of leadership which have an impact on organizational effectiveness (1996). Those four dimensions are: leadership support, interaction facilitation, goal emphasis, and work facilitation (1996). Erkutlu (2008) identified a correlation between effective leadership and organizational performance. The study demonstrates that there is a tie between effective leadership and the reported levels of job satisfaction, turnover, and customer satisfaction at the hotels he studied (2008). Oreg and Berson (2011) conducted a study within the Israeli school system to see how people would respond to a large scale organizational change based on the influence of their leader's traits and style. It was substantiated that transformational leaders are better able to lead others through significant change initiatives. Hannah, Walumbwa, and Fry (2011) surveyed action teams in the military over periods of time to assess the level of authentic leadership (defined as relational transparency, balanced processing, and internalized moral perspective) present on the teams and its effects on each team's productivity. Results suggest that self-awareness, transparency, balanced processing, and moral perspective all significantly contribute to teamwork and team productivity. Furthermore, it was not just the authenticity of the formal leader, but the combined mean and strength of leadership on the team that drove outcomes. Stone (1992) has written research taking the principals of some elementary schools as

the targets and found that there is relative significance among transformational leadership, organizational effectiveness, and job satisfaction and job motivation of teachers. Bass, Daniel and Tucker (1992) also have written a research taking the principals of some universities as the targets, and found that transformational leadership has a positive impact on job satisfaction, performance, and the hardworking degree of teachers.

Regarding the issue of team leadership, Sosik, Avolio, and Kahai (1997) have made a research focusing on team variable. They found that transformational leadership has a positive impact on team effectiveness. Mackenzie, Podsakoff, and Rich (2000) have made a research on the issue of interaction among salesmen and it was found that transformational leadership has a positive impact on employee performance and engagement. Wang (2001) has made a research on the issue of R&D team interaction and it was also found that transformational leadership has a positive impact on team performance. Boyne, et al (2011) found that wherever an organization was performing well, loss of senior leadership negatively affected organizational performance and when organizational performance was low, senior leadership turnover positively affected organizational performance.

Cases demonstrating the positive effects of leadership on organizational performance have been documented throughout the literature. A case study performed by Maier and Sashkin (1971) on 425 plant workers attempted to pinpoint more effective leadership behaviors. In the scenarios each leader approaches a work problem from a slightly different perspective. The approaches are categorized into old solutions, new solutions, and integrated solutions. The results clearly show that leader behaviors which promote problem-solving interaction are more likely to produce outcomes that not only are more acceptable, but which can also be classified as both innovative and superior in quality. Martins, Gilson, and Maynard (2004) categorize team

functioning into Team Inputs (i.e. size, technology, diversity, leadership, etc.) Team Processes (i.e. goal setting, conflict, identity, monitoring and planning, etc.) and Team Outcomes, (i.e. satisfaction, decision and product quality, time, creativity, etc.). The authors take a position that these are the three elements necessary for effective teams, while other researchers argue that there are some influential factors for the improvement of team effectiveness, such as leadership (Kahai, et al., 1997), team formation (Early & Mosakowski, 2000), and team structure and team member's characteristics (Stewart & Barrick, 2000). Parker (1990) argues that the variable of leadership is the most important factor causing impact on team effectiveness. According to the argument (Parker, 1990), team leadership is the key factor to cause positive impact on team effectiveness. A good team leader should set clear goals and vision for the team. Meanwhile, team leaders should be able to stimulate team members to create the team spirit of labor division and cooperation. Shonk (1982) argues that for construction of a successful team, team leaders should set a clear vision and the right direction for team members to follow in conducting their work. According to the argument of Posey and Klein (1990), the main job of a team leader includes the assurance of resource efficiency, guidance for team development and maturity, training of team members, solution of team problems, and encouragement of team members to achieve organizational goals.

As Howell (2011) describes, a team's performance is related to how well the team members interact with each other and how well the leader helps keep them focused on their task to produce the expected deliverable. By seeking to more fully understand the components of effective teams and their relationship with one another, we can better diagnose and understand the role leadership plays in developing effective individuals, teams, and organizations. The theoretical focus of this study is to better understand how leadership affects the performance of

effective business teams. Results generally show that the difference between high and low performing account teams can be traced to the pattern and quality of the team's relationships with others inside and outside the team (Cross, et al, 2008).

In a study conducted by Kayworth and Leidner (2001), 13 virtual teams were created and asked to perform a task and solve a problem. The study of global virtual MBA teams participating in the research revealed that effective team leaders demonstrate the capability to deal with paradox and contradiction by performing multiple leadership roles simultaneously. Highly effective virtual team leaders act in a mentoring role and exhibit a high degree of understanding (empathy) toward other team members. Effective leaders are also able to assert their authority without being perceived as overbearing or inflexible. Effective leaders are found to be extremely effective at providing regular, detailed, and prompt communication with their peers and in articulating role relationships (responsibilities) among the virtual team members. Among the key variables that have been observed to influence the effectiveness of small-group decision making are leadership and structuring of the group process. Early behavioral approaches to leadership suggest that effective leaders are those who engage in two basic activities: initiating structure and consideration. Initiating structure refers to task-related activities, whereas consideration (human relations) relates to the extent of care and concern for team members. Under this theory, effective leaders are those able to maximize orientations for both task achievement and team member satisfaction (Kayworth & Leidner, 2001).

Researchers have spent significant amounts of time documenting the actions that leaders take to improve team work and organizational performance. Hill (2007) reported that many managers fail to recognize their group building responsibilities...conceive their people management role as building the most effective relationships with each individual subordinate,

erroneously equating the management of their group with managing the individuals on the group. Contingent rewards from leaders have also been found to yield positive impact on the performance of subordinates (Chen & Farh, 1999; Mackezie, et al., 2000; Podsakoff, et al., 1990). Chen and Farh (1999) focused their research on the leaders and employees of a Chinese enterprise. Their research results also show that contingent rewards have positive impact on the relationship among job satisfaction of subordinates, organizational commitment, organizational performance, and organizational citizenship behavior. Cheng (2000) and Shea (2000) found that the leader being strict and fair in meting out rewards and punishments has positive impact on leadership satisfaction, organizational commitment, team effectiveness, and individual and organizational performance. Conversely, if the leader is not strict and fair in meting out rewards and punishments, it will cause negative impact on the team's effectiveness. Sosik, Avolio, and Kahai (1997) also found in the research of team leadership that contingent rewards have positive impact on team effectiveness. Wang (2001) also found that the variable of contingent reward has positive impact on team effectiveness. Management by expectation implies that leaders manipulate the mechanism of punishment correctly towards subordinates who do not achieve the organizational mission, or has error behavior (Chia-Chen, 2004). Due to the weakness of human beings, subordinates do not like to be criticized or blamed. Therefore, management by exception results in stronger negative feeling to team members.

Among the highest documented recurrences within the leadership literature is the tie between a leader's ability to establish trust with individuals and teams as a means to improving organizational performance (Gardner, et al., 2005; McAllister, 1995; Morris, et al., 2002; Norman, et al., 2010; O'Hara-Devereaux & Johansen, 1994; Sharifi & Pawar, 2002). The development of trust has also been studied extensively within the literature on teams and

leadership and has been noted as a determining factor in the effectiveness of activities requiring coordinated action (McAllister, 1995). Trust has been described as the "glue of the global workspace" (O'Hara-Devereaux & Johansen, 1994). Trust has been shown to be positively associated with job satisfaction (Morris, et al., 2002), and improved working relationships (Sharifi & Pawar, 2002). It has also been suggested that a face-to-face meeting during the initial "courtship" period of a team's life cycle helps develop trust in the team (Coutu, 1998; Suchan & Hayzak, 2001). While high and low performing teams may start with the same levels of trust, the high performers appear to be better able to develop and maintain high levels of trust throughout their project (Kanawattanachai & Yoo, 2002). Leaders who display greater transparency evoke higher levels of trust (Norman, et al., 2010). Leaders who act according to their values build relationships and social networks that enable followers to become vulnerable to them by offering diverse viewpoints (Avolio & Luthans, 2006). Leaders are expected to be genuine in their intent to serve others and to empower followers through their leadership (George, 2003). Because such leaders are more transparent they evoke higher levels of follower trust through personal identification with their followers (Gardner, et al., 2005). Trust has been shown to have further "downstream" impacts on such variables as job satisfaction, employee retention, organizational commitment, organizational citizenship behavior, and performance (Connell, et al., 2003; Corbitt & Martz, 2003; Costa, 2003). Through a rigorous review of the literature and an analysis of the administration of an online survey, Hughes, Gardner, and Norman (2010) were able to draw ties between transparency (being open and honest) and levels of trust in followers. Higher levels of trust are reported with more effective leaders, job satisfaction, retention, organizational effectiveness, etc.

Another emerging anomaly in the literature is the importance of values congruency between the leader and follower, and the follower and the larger organization. Cheng (2000) adopts 884 employees of five companies as the targets to explore if the value judgment of employees is consistent. It was found that values consistency has positive significance and impact on organizational commitment and organizational citizenship behavior. Chia-Chen (2004) took 259 employees from six companies as the targets for their research and found that values consistency has positive relativity with job effectiveness. Values tend to influence an individual's interpretation of events and attitudes, as well as choices and behaviors (e.g., Bardi & Schwartz, 2003; Meglino & Ravlin, 1998). For example, individuals who value stability may interpret an organizational change as a threat and therefore resist it, whereas those who value stimulation and renewal may interpret it as an opportunity and will thus be more likely to support it. Hoffman, Bynum, Piccolo, and Sutton (2011) postulate that transformational leader's lead more innovative teams, and that values congruency provides an explanation as to why followers relate to leaders and pledge their loyalty and support. Other studies indicate that the congruency of individual team member's values with organizational values tends to cause teams to perform higher and remain more tenured over time (Hoffman, et al., 2011). Transformational leaders influence their followers by mobilizing meaning, articulating and defining what has previously remained implicit or unsaid, and by inventing images and meanings that provide a focus of attention (Hoffman, et. al, 2011). Finally, Burns (1978) declares that "The genius of leadership lies in the manner in which leaders see and act on their own, and their follower's, values."

The review of literature clearly demonstrates that there are strong ties between organizational leadership and organizational performance. The next section explores how

organizations are also making use of continuous process improvement strategies and techniques to drive organizational efficiency.

Process Engineering and Continuous Process Improvement

This section proves that organizations can and are transforming their approach to creating customer value by adopting process engineering and continuous process improvement strategies and tools.

Failure of management to plan for the future and to foresee problems has brought about a waste of manpower, of materials, and of machine-time, all of which raises the manufacturer's cost and price that the purchaser must pay (Deming, 2013). The consumer is not always willing to subsidize this waste and the inevitable result is loss of market, and loss of market begets unemployment (2013). Long recognized as the father of total quality management and continuous process improvement, Edward Deming's insights and continuous improvement methods helped Japanese automobile manufacturers change from a trailing player in the industry to the dominant leader in manufacturing quality automobiles in only a few decades. Yet, despite the millions of hours and dollars spent on efforts to improve key business processes, a new survey of 200 senior managers from Fortune 500 companies reveals significant dissatisfaction with a critical aspect of those change efforts (Martinez, 1995). On average, 40 percent of survey respondents were dissatisfied with the speed at which change efforts are progressing, according to Rath & Strong's Executive Panel Survey, Connecting Customers and Change (1995). Process engineering has changed the perspective of business leaders and enabled them with tactics for accelerating sustained change. No longer do executives see their organizations as sets of discrete units with well-defined boundaries. Instead, they see them as flexible groupings of entwined work and information flows that cut horizontally across the business, ending at points of contact

with customers (Hammer & Stanton, 1999). Process engineering has allowed executives to see through the structure of their organizations to the underlying purpose: the delivery of value to customers in a way that creates profits for shareholders (1999). The power in most companies still resides in vertical units which sometimes focus on regions, sometimes on products, sometimes on functions, and they guard their turf, their people, and their resources (1999). This combination of integrated processes and fragmented organizations has created a form of cognitive dissonance in many organizations. Horizontal business or customer focusing processes pull people in one direction, while traditional vertical management systems pull them in another. Confusion and conflict ensue, which undermines performance and ultimately degrades service and product quality to the customer (Hammer & Stanton, 1999).

Becoming a continuous process improvement enterprise is much more than a matter of establishing process manager positions. As lines of authority become less clear, the way managers interact with one another and with workers must also change (Hammer & Stanton, 1999). Process improvement and standardization offers many benefits to organizations. First, it lowers overhead costs since the process requires only one owner with one staff, only one set of documentation and training materials, and only one information system. Second, a standardized process presents one face to its customers, reducing transaction costs. Third, process standardization can increase organizational flexibility. When all business units are performing a process the same way, a company can easily reassign people from one unit to another to respond to shifts in demand (Hammer & Stanton, 1999). Process improvement has become a core component of organizational strategy and large scale transformational change efforts (Hammer & Stanton, 1999; Kaplan, 2012; Mann, 2005; Spear, 2004; Womack & Jones, 2003). Modern

organizations would do well to embrace these concepts in order to achieve and maintain superior quality product and services levels and industry competitiveness.

In order for process engineering to work not everything needs to be done all at once. Although a sense of urgency and impatience is appropriate to leading change another essential element is patience (Kenney, 2011). Urgency combined with patience along with faith that deep change will come with time strikes the right balance (2011). Process owners should be appointed as they will guide the entire effort. A process measurement system should be established at the outset to track the effort's progress. Focus on achieving some tangible benefits quickly. Without clear and early signs that the desired gains will materialize, people will grow anxious and disillusioned (Hammer & Stanton, 1999).

The most visible difference between continuous process improvement enterprises and traditional organizations is the existence of process owners. These are managers with end-to-end responsibility for individual processes. Process owners are the living embodiment of a company's commitment to its processes (Hammer & Stanton, 1999). Process owners must have real responsibility for and authority over designing the process, measuring its performance, and training the frontline workers who perform it (Hammer & Stanton, 1999).

When designing the new process one must ensure that adequate levels of human contact are ensured. Behavioral science indicates that customers dislike unexpected changes and are more satisfied when they can stick to their habits during service interactions (DeVine, et al., 2012). Process owners should carefully identify which channels are most effective in reaching their customers and avoid the assumption that different communication channels exert equivalent effects. Results of one study indicate that after the ideal level of communication is exceeded, customers can actually react negatively (Godfrey, et al., 2011). This negative response can be

exacerbated by the use of multiple channels but mitigated by aligning channels with customer preferences (2011). The findings suggest that the complex effects of multichannel communication can actually drive customers away from rather than closer to a company. With so much depending on the preferences and voice of the customer, organizations would do well to consider collecting some form of customer feedback as part of their process assessment and process improvement strategy. It is also important to point out that process owners can't simply order process workers to do their bidding (Hammer & Stanton, 1999). Take for example a process improvement specialist attempting to improve the check-in speed of guests at a hotel. The specialist must work through unit heads and vice presidents to effect changes to the check-in process and the behavior of the front desk staff. These unit heads must negotiate with the process specialist to ensure that the process designs are sound, the process goals are reasonable, and the resource allocations are fair. Process improvement professionals have become a key component of any department or organizational team. In many ways, when deployed with the proper support from the executive team, these experts can assume the equivalent organizational role as the modern day battlefield sniper, capable of tackling and taking out important high-value strategic process improvement and organizational change targets.

This section has demonstrated that many organizations (Deming, 2013; Hammer & Stanton, 1999; Kaplan, 2012; Kenney, 2011; Martinez; 1995) are seeking to improve customer value by implementing process engineering and continuous process improvement strategies and tools.

Lean Continuous Process Improvement

This section of the literature review proves that companies are using Lean continuous process improvement methodology to eliminate waste in their business processes and to develop continuous process improvement cultures within their organizations.

Lean process improvement is one of the most common and preferred change methodologies utilized in organizations today (Deming, 2013; Hammer & Stanton, 1999; Kaplan, 2012; Kenney, 2011; Martinez; 1995; Page, 2005). Large businesses such as Microsoft, Boeing, Dell, and General Motors have painstakingly followed the tenets of Lean continuous process improvement and reaped major savings (Page, 2005). At the heart of Lean is the philosophy of removing waste from business and organizational processes and systems. Lean is a long-term philosophy of growth by generating value for the customer, society, and the economy with the objectives of reducing costs, improving delivery times, and improving quality through the total elimination of waste within processes and the larger business system (Wilson, 2010). Of all of the management decisions a leader faces, the easiest to make and hardest to execute is a commitment to improve quality by eliminating waste (Kaplan, 2012).

Lean manufacturing was first implemented by the Toyota Corporation in response to the mass-production model. Taiichi Ohno is considered to be the father of the Toyota Production System (Kaplan, 2012). When engineers at Toyota researched mass-production systems, they discovered that their mass-production model, which eliminated change over time by using one machine for each part, was not optimally efficient (2012). They discovered that machines downstream were sitting idle until the specific part the machine made was required for production. These idle machines contributed to waste in the process. Therefore, the engineers from Toyota created a Lean manufacturing system. This system focused on the continuous

identification and elimination of waste (Imai, 1997). As a result, the Toyota Production System used fewer resources than mass production. Organizations have found that, by identifying and removing waste, as well as implementing Lean tools, they can continuously improve their productivity, increase quality, and become more cost effective (Imai, 1997). It has also been determined that these same manufacturing process improvement methods can be successfully utilized in service organizations to achieve similar results (Bonaccorsi, 2011; Jenkins, 2012; Ng, et al, 2010).

Companies have been faced with increasing amounts of pressure from customers and competitors in the past couple of decades (George, 2002). Customers have higher expectations from their purchases, and manufacturers can meet these expectations by increasing a product's quality, reducing delivery time, and minimizing product costs or a combination of the three (2002). This has forced the manufacturing industry to implement new production strategies to enhance their competitiveness in the global market place. Surprisingly, despite process automation and information technology and training interventions, the level of service quality is actually declining, with year-on-year service levels deteriorating by significant amounts (Acland, 2005, Dickson, et. al., 2005). The application of Lean thinking to the service context could be a possible solution to tackle both quality and cost concerns (Abdi, et al., 2006; Erlich, 2006; Maleyeff, 2006). It is important then to understand how this thinking and the application of these tools and methods can be utilized to solve quality and cost issues.

Any task in a manufacturing facility can be classified into one of three categories: incidental work, value-added work, and muda (Monden, 1998). Incidental processes are processes such as inspections that do not add value to the product, but are required in the current production system. Value-added processes add value to the product, such as the final assembly of

a product. Finally, non-value added processes, or muda, are defined as any process that does not add value to the product and is not required by the current production system (Monden, 1998). "Mudas" can be classified into seven categories which are also known as the seven deadly wastes. These seven deadly wastes include over production, waiting, transportation, over processing, inventory, motion, and defects (Womack & Jones, 2003). Another way to look at muda is to say that it is any activity that the customer is not willing to pay for. Lean focuses on identifying and eliminating muda from the manufacturing or service process. In order to increase the amount of value-added work in a facility, some companies will simply choose to increase the working hours. However, rather than simply achieving the goal of increasing value-added work, the company also increases incidental work and muda. In such a case, the company's competitive position is not enhanced. Therefore, a better way to increase the amount of value-added work in the facility or organization is to cut down the amount of incidental work and eliminate muda (Kaplan, 2012). Kaizen was designed for this very purpose: to continually improve the process by identifying and reducing waste. By using kaizen, companies are able to reshape the composition of work, in order to decrease muda and incidental work. Since the goal of kaizen is to continuously identify and decrease the amount of muda in a system, it is important to identify and separate muda from incidental and value-added work. Shigeo Shingo, an important early participant in the development of Lean thinking at Toyota, noted that the best approach to identifying waste is to seek out problems where none are thought to exist, so as to identify opportunities for further improvement (Shingo, 1985).

After identifying muda, the next step is to determine how to reduce it. One common way to reduce muda is through kaizen. The goal of kaizen is to involve every employee in thinking up small improvement ideas on a regular basis. When small improvements are implemented they

can make work easier and more enjoyable (Bodek, 2002). It is important to realize that a series of small, strategic improvements can quickly add up to a significant increases in system and service efficiency.

To assist in the process improvement effort Dr. Noriaki Kano (1993) developed a model by which it is possible to identify the factors which customers look for when they make a purchasing decision. The basic factor is something the customer expects like clean sheets in a hotel guest room. If the basic factor is absent then the customer is dissatisfied or even offended. The performance factor is something that sets the product or service apart from others like an accelerated check-in at a hotel. If the performance factor is present the customer may be delighted, if it is not, they may be dissatisfied. Dr. Kano recommends that if the performance factor is causing dissatisfaction, that it is quickly identified and removed (Kano, 1993). A delighter factor is something the customer doesn't expect and causes an increase in delight of the product or service; like the presence of a turn down service with chocolates or a surprise note from the hotel manager or champagne package present in the guest room. Process engineering and continuous process improvement are often required to ensure faster and easier delivery of these factors (Wood, 2004).

When setting out to improve a product or service using kaizen activity there are several Lean tools available ranging from value-stream mapping to asking "the five whys" (Womack & Jones, 2003). Since every case is different, determining which tools to utilize becomes the job of the Lean practitioner. Some of the most commonly utilized Lean tools are presented below, along with a brief description of each tool.

Value-stream Mapping

Perhaps the most core and fundamental process improvement technique is process or value-stream mapping. A value stream consists of all the materials and information required in the manufacturing of a particular product and how they flow through the manufacturing system. Value-stream mapping is simply transferring information about the value stream to a visual diagram or map, which represents either the current or future state of the manufacturing system (Womack & Jones, 2003). As the name implies, a current-state value-stream map (VSM) shows how both materials and information flow through the processes in the current system. A future-state VSM represents the ideal state of the manufacturing system. Tapping, et al., (2002) indicate that the value stream map can define activities and measure times from receiving to finishing of parts; it can define activities that take place from time of order until cash is received; it can define activities and measure time from conceiving product to its launch; or it can be geared toward the specific scope of the project.

Process at a Glance

After a particular product or service has been identified for improvement, the next step is to determine what is involved in the manufacturing of that particular product, or what is involved in providing that service to customers. The process at a glance shows which processes are involved and the sequential order of operations. This information typically includes a description of the operation, cycle time, percentage of uptime, and the number of workers required for each operation. Information gathered by this Lean tool will be used in subsequent Lean activities (Womack & Jones, 2003).

The Five Whys

After identifying where muda was located throughout the process, it is important to identify the root cause of the muda and reduce or remove it. The Five Whys method is a process that begins with identifying the specific problem and writing it on a piece of paper (Womack & Jones, 2003). This is followed by asking why the problem happens and writing the answer below where the problem was written (2003). If the answer given does not identify the root cause of the problem, the engineers keep asking why until the root cause of the problem is identified (2003). Although the name implies asking why a total of five times, some situations might require fewer and some might require more than five questions.

The Five S's

Five Japanese terms beginning with 'S' are utilized to create a workplace suited for visual control and Lean production. 'Seiri' means to separate needed tools, parts, and instructions from unneeded materials and to remove the latter. 'Seiton' means to neatly arrange and identify parts and tools for ease of use. 'Seiso' means to conduct a cleanup campaign. 'Seiketsu' means to conduct Seiri, Seiton, and Seiso at frequent, ideally daily, intervals to maintain a workplace in perfect condition. 'Shitsuke' means to form the habit of always following the first four S's (Wood, 2004). English translation of the Five S's would look like this:

Sort. Remove from the workplace all items that are not needed for current operations and activities.

Set. Arrange items needed so they are easy to use, and label them so they are easy to find and store.

Shine. Keep the workplace tidy, sweep floors, clean equipment, and generally make sure everything stays clean.

Standardize. Adopt a method of working to ensure the first three pillars are maintained.

Sustain. Ensure and make it a habit that everyone adopts and carries out the correct procedures.

The Five S's are a way of organizing all supplies and equipment as efficiently as possible, and having them in an appropriate place (Beiter & Hatfield, 2009).

Kaizen Events

Once the root cause of a problem has been identified, there is a need to find a solution which allows a company to reduce or eliminate muda. Sometimes this is done with the use of kaizen events. During a kaizen event, personnel from across disciplines and the Lean project team work together in order to find solutions for a particular problem in order to make improvements to the current manufacturing system (Womack & Jones, 2003). Kaizen's success owes much to the introduction of U.S. statistical quality-control methods from Edward Deming who is regarded as the man most responsible for Japan's success in manufacturing (Armbruster, 2005). Kaizen events can not only bring about changes and improvements in business process but can also serve as a team building event as these individuals and process stakeholders collaborate in team meetings to develop and implement solutions. These events could and should be concluded with a celebration event when successful implementation is achieved.

Standard Operation Routine Sheets

Standard operation routine sheets are used to show the time relationship between the worker(s) and the manufacturing system (Womack & Jones, 2003). The information required to create the routine sheet are: the time it takes for a worker to walk between processes, machine processing times, and manual operation times (2003). Manual operations are tasks that need to be done by the worker between processing cycles, such as loading/unloading, de-burring, and

inspection. The information is then turned into a graphical representation that shows what the worker and machines are doing throughout a cycle. This visual provides leaders and decision makers with a tool to identify where there are inefficiencies and duplications of effort occurring in the process.

Design of Experiment

Design of experiment (DOE) is a systematic method for exploring the cause-and-effect relationship between process variables and output variables (Womack & Jones, 2003). There are two types of DOE that can be performed: full factorial design and fractional design (2003). A full factorial design is the more desirable of the two options, because it performs a more thorough analysis, but it also requires more trials, and thus, more resources. Fractional DOE experiments allow companies to perform DOE, but this more limited method does not uncover all the information that would have been gained with the use of a full factorial design. These experiments may take the form of piloting a new system or process or by conducting customer or end-user testing of new processes prior to full scale implementation. In this way the process improvement team or professional is able to gather feedback on the changes and make important adjustments or corrections prior to full scale implementation. If a Lean organizational design is accompanied by a Lean management mindset, you will come to view all of your current processes as an experiment (Mann, 2009).

Muda or Gemba Walks

We know that muda means waste in Japanese (Soward, 2011). Earlier in this paper it was reported that there are seven basics types of waste that Lean attacks. A muda walk consists of spending around an hour watching how work is done and what wastes and barriers occur on the gemba (Soward, 2011). Gemba means "the floor" in Japanese and refers to the time spent

walking through various areas of the business to observe work processes and employee behaviors that might be contributing to incidental work, value-added work, or muda. An example might be for a manager or process improvement specialist to walk through a banquet kitchen at a large hotel during the time that the kitchen staff is busy serving up plates for a large banquet. By conducting these walks managers and Lean practitioners are able identify waste in its many forms and plan for taking action to eliminate that waste from the gemba.

Hoshin Kanri

Hoshin Kanri is a strategic decision making tool for a firm's executive team that helps the team focus resources on the critical initiatives necessary to accomplish the business objectives of the firm (Wood, 2004).

Certainly, this section has proved that many companies (Abdi, et al., 2006; Bonaccorsi, 2011; Erlich, 2006; Imai, 1997; Jenkins, 2012; Maleyeff, 2006; Ng, et al, 2010; Page, 2005) are using Lean continuous process improvement methods to eliminate waste in their business processes and to develop continuous process improvement cultures in their organizations. In the next section, case study summaries are provided from both manufacturing and service organizations that have utilized Lean methods to achieve their performance and process improvement goals.

Manufacturing and Service Industry Lean Case Studies

This section proves that Lean methods can be utilized to improve customer value at both manufacturing and service organizations by presenting both manufacturing and service industry Lean case studies.

The first case study of Lean process improvement implementation is from a small manufacturer in the United States (Chen, et al., 2010). Starting with collecting process

information, a current value-stream map was created that reflected the current operation status. A future value stream map was then proposed to serve as a guide for future lean activities. Next, hurdles that kept the company from moving towards future state were identified. The Five Whys method was employed to reveal the root cause for each hurdle, followed by kaizen events proposed as solutions. In this case study, two kaizen events were proposed. For the first kaizen event, experiment design was used to find the optimal machining parameters that reduced variation in a plasma cutting process. It consequently eliminated rework time and improved productivity. In the second kaizen event, implementation of rabbit-chasing increased the system flexibility and consequently reduced inventory levels between work stations. The company reduced their processing times while at the same time improving the quality of their products after Lean implementation. Cross training of all employees allowed the company to implement a rabbit-chasing system which provided the facility with the flexibility to accommodate employee absence. This in turn led to a reduction in the inventory levels between each of the operations (Chen, et al., 2010).

The next case study was performed at an industry leading manufacturing facility of petroleum field diamond drill bits for the oilfield services industry (Green, et al., 2012). The facility was approximately 15,000 square feet and accommodated roughly 100 direct employees, support staff, and management. Top management prescribed that Lean manufacturing needed to be phased in to complement total quality management in defining the culture of the company. The Lean manufacturing assessment included the first stage of value stream mapping, creation of a current state map, as well as assessing the opportunities that exist in the current state map. The Lean manufacturing strategy was developed by reviewing business unit goals and comparing the potential opportunities to these goals. Several general solutions were developed that had the

potential for addressing the identified waste locations and to meet business goals. Based on the potential solutions and the description of the potential solutions, the following reprioritizations were made: (1) Improve shank handling and staging within the crown machine cell, (2) move location of shank inventory, and (3) incorporate new lifting and handling devices to attach the shank to the crown (Green, et al., 2012). It was clear that the solutions provided a method by which to eliminate a great deal of waste from the material handling system. The solution was carried on to other facilities with cells that performed the same or similar processes (Green, et al., 2012).

A service industry case study demonstrates that Lean process improvement methods can also be utilized to solve business problems in non-manufacturing environments. Bonaccorsi (2011) decided to apply value-stream mapping to improve the performance of the enrollment center of an Italian university. A comprehensive team reflecting the needs of the management, of the employees, and of the end customers was recruited: 1) office manager as team leader; 2) didactic manager as value stream champion, 3) office employee and two students as team members. After a three day seminar on Lean techniques organized in partnership with the University, the team was ready to analyze the enrollment process and to identify any form of waste. The team spotted the following problems. Notwithstanding the high number of people employed in the process, the average waiting time (*i.e.* 1 hour and 39 minutes) was definitely too high. The team proposed the following Lean solutions. To assure flow, the bottleneck should be eliminated by substituting both the acceptance and the registration steps with a web application. The payment of the yearly fee should be executed on line, too. To avoid peak hours and unpredictable queuing times, the flow of students needed to be leveled. To reduce time losses, booklets were kept in two separate locations. As was clearly demonstrated by the future state

map, all the targets for the improvement could be achieved by means of the above mentioned Lean solutions. Implementation of the Lean team solutions led to the following results: 1) the whole process could be managed by 5 employees, 2) the average queuing time was reduced to 17 minutes or 5 minutes if the payment was made on line, 3) the process cycle efficiency was equal to 4.7/21.7 = 21.6% or 3.2/8.2 = 39% if the payment was made on line (Bonaccorsi, 2011).

In 2005 all staff in the emergency department (ED) at Hôtel-Dieu Grace Hospital in Canada began a transformation, employing Toyota Lean manufacturing principles to improve ED wait times and quality of care (Ng, et al, 2010). A key principle of Lean continuous process improvement is to reduce waste and make work simpler. That's a big change for hospitals, where systems seem to be getting more complex (Page, 2005). Lean techniques such as value-stream mapping, just-in-time delivery techniques, workplace organization, reduction of systemic wastes, use of the worker as the source of quality improvement and ongoing refinement of process steps formed the basis for the process improvement project. The team participated in Lean training workshops to learn the process techniques and strategies before conducting their analysis and implementing solutions to the ED problems. The team was able to identify and treat 19 problem areas in their processes. The team reported that the key to implementing the Lean system was to involve the front-line workers in creating plans and projects to improve their work, to run the project as trials, and to gather feedback to refine the project. This is known in Lean as a "Plan, Do, Check, Act" cycle (Likert, 2004, Womack & Jones, 2003). The ED achieved major improvements in departmental flow without adding any additional ED or inpatient beds. The mean registration to physician time decreased from 111 minutes to 78 minutes. The number of patients who left without being seen decreased from 7.1% to 4.3%. The length of stay for discharged patients decreased from a mean of 3.6 to 2.8 hours, with the largest decrease seen in

patients triaged at levels 4 or 5 using the Canadian Emergency Department Triage and Acuity Scale. The hospital noted an improvement in ED patient satisfaction scores following the implementation of Lean principles.

Central Baptist Hospital is a medium-sized urban facility that is recognized nationally by the American Heart and American Stroke Associations. The hospital operates with an average daily census of 227 patients, employs approximately 2,400 people and is part of the Baptist Healthcare System based in Louisville, KY. The hospital had used the plan, do, check, act cycle as its primary team-centered improvement technique (Jenkins, 2012). While PDCA had proven effective for some issues, Lean promised the rapid improvements that patient flow required. Additionally, the house-wide implications of patient throughput demanded a broader method for capturing and visualizing the aspects of the process (2012). Contracted Lean educators were brought in for a week to train a multidisciplinary team that included administrative leaders and clinicians from admissions, nursing units, the emergency department, environmental services, case management, registration, decision support and one physician. Short term ad hoc team members also were brought in for expertise and input on specific departmental and systems issues. In addition to nursing, ad hoc members included pharmacy, radiology, information systems and transport. The team was large, comprising 19 members, with one executive serving as the process champion. In addition to collecting traditional types of data on admission and discharge patterns, the team collected observational data by engaging in gemba walks. Gemba is a Chinese word that means "the real place" (Jenkins, 2012). The gemba walk is all about walking in someone else's shoes. The team's goal for the process was to witness firsthand the roadblocks that could be encountered and to experience the system through the eyes of the patient (2012). The team developed value stream maps of the current process demonstrating current conditions,

along with value stream maps showing the future state, along with the improvements needed to achieve a smoother flow process. Viewing the current state versus the future state allowed the team to identify the changes needed to reach a higher level of performance (Jenkins, 2012). The team identified the corrective actions, or kaizens, needed to improve flow throughout the hospital. The value stream map showed significant gaps in communication and coordination. To improve the admissions process, the team identified the need for a capacity command center. One major goal of the center was to bring all critical decision makers to the table to gather and share data. Morning huddles were established at 8 a.m., with the option of meeting later in the afternoon when necessary.

Another way the team improved turnover time was through the realignment of staff (Jenkins, 2012). Prior to the project, lunches were not staggered, which sometimes left unit floors without staff at critical times. The team also found that dirty rooms accumulated during shift changes and that the night shift routinely was unable to meet the demand (2011). To better meet the discharge patterns of individual units, the team realigned staff to cover early morning cleaning needs and staggered staff schedules to cover lunch and shift change times (2011).

During the three years that the project has been under way, the number of patients on waiting lists for hospital entry has declined steadily (Jenkins, 2012). When the project began, patients in waiting ranged from five to as high as 15. Even on the busiest days, rarely are more than five individuals waiting for admission.

These case study examples from the literature prove that successful utilization of Lean process improvement methods can assist both manufacturing (Chen, et al., 2010; Green, et al., 2012) and service organizations (Bonaccorsi, 2011; Ng, et al, 2010; Jenkins, 2012) in achieving their business performance goals.

Sustaining Lean Improvements

This section of the literature review reveals the challenge of sustaining gains realized from Lean implementation and reviews strategies employed to maintain those gains.

The general conclusion that many practitioners of Lean have arrived at is that sustaining improvements requires a combination of top leadership commitment and a culture of continuous improvement (Deming, 1982; Jones, 2005; Kaplan, 2012; Liker & Convis, 2012; Stempfle, 2011; Wilson, 2010). The study of continuous improvement involves two unique stages. We have already learned the importance of a robust process improvement strategy and the methods for bringing about initial change. Making improvements in any area of your business by applying the tools of Lean is the easy part, but sustaining those gains and keeping those processes from slipping back to the previous level is another thing altogether (St. Andre, 2011). Lean and kaizen techniques and tools allow organizations to perform important self-diagnosis of their customer value and manufacturing processes. Once these changes are made and a more optimal production or service level has been achieved, leaders must then take steps to protect those gains. Successful implementation of Lean and transformation of the organizational culture is not complete without tending to this important aspect of cultural transformation. We must sustain the gains, we cannot make progress without sustaining the gains, and ultimately, we cannot survive without sustaining the gains (Deming, 1982). Many organizations have achieved impressive results in various aspects of their business through Lean transformation. Few firms, however, sustain those initial results, and many struggle to bring the results down to a bottom-line impact (Roth, 2006).

The two techniques used to sustain Lean gains include maintenance and standardization of improvements (Wilson, 2010). Maintenance is the ability to restore equipment to the original condition so the status quo can be restored (2010). Standardization, on the other hand, is the

ability to get all people, machines, and methods to continue to do what has once been shown to be effective, be it the status quo or a process improvement (2010). Standardizing the changes to process improvement is perhaps the most challenging aspect to sustainability since it relies on training and motivating people to both understand the changes and to accept and commit to utilizing them on a consistent basis. A Lean effort that does not include training for employees and creating reward and recognition systems to reinforce change behavior will not yield the desired results nor will it be able to sustain short term gains in the long term. Some member or group within the organization must be hired or designated to create and reinforce this culture (Wilson, 2010).

The process of bringing about and sustaining improvement is much more a journey than it is an event. It needs to be driven from the top of the company and encompass the entire organization (Stempfle, 2011). If the logic in the heads of management has not changed along with the physical operations then things will easily slide backwards (Jones, 2005). Organizations need to be aware that creating a continuous improvement culture is what will sustain short term gains for the long term, and will require an integrated approach and interventions on multiple levels. Organizations that have been successful at long-term organizational transformation, universally, have done it by fundamentally changing the culture of their organizations (Shingo Prize, 2013). Culture cannot be changed by merely implementing a "program" of continuous improvement, by immersing large numbers of people in training programs, simply by organizing many improvement events, nor by assigning the work to a charismatic personality. Culture can only be affected by changing the way people think. Operational excellence is only achieved when everyone, top to bottom and side to side, align their thinking and hence behaviors with correct principles of operational excellence (Shingo Prize, 2008).

Human beings tend to gravitate to the familiar, the comfortable and the routine (Stempfle, 2011). Fixation on established paradigms and practices can severely limit the capability of organizations to change, thereby jeopardizing the ability of organizations to keep up with changes in their environment and new technological developments (2011). Breaking down these fixations is a top priority for senior leadership if sustained change is ever to fully manifest within the organization. Organizations develop cultural paradigms, processes and routines in order to manage uncertainty and gain efficiency. Over time, they often become fixated on their way of doing things, and it becomes more and more difficult to change existing paradigms, processes and routines. This fixation is not only an individual tendency, but also a common phenomenon in organizations (Purcell & Gero, 1996). Overcoming people's fixation on past practices and methods are therefore a requirement for any organization that strives to achieve sustained cultural change (Stempfle, 2011).

There are several actions that can be taken to remove this resistance to positive change. Organizational fixation can be reduced if organizations take a proactive role in creating a continuous improvement culture. Leaders in organizations have a unique responsibility to create a culture that minimizes organizational fixation while empowering the organization to transform and change continuously (Stempfle, 2011). Leaders need to show behaviors that have been characterized as transformational leadership (Bass & Riggio, 2005). These include leading by example, communicating vision and inspiration, providing intellectual stimulation, challenging employees to deliver new and creative ideas, giving feedback, and recognizing individual contributions. People tend to repeat behavior that is rewarded (Skinner, 1965) and by applying these leadership practices, leaders can recruit and enlist champions of the change process and celebrate supporters of the new and emerging culture.

Organizational leadership plays a critical role in sustaining gains realized from Lean improvements. Shaping and communicating organizational vision, values and rules of engagements is by no means a simple task and requires a prolonged effort that needs to be driven from the top of the organization (Stempfle, 2011). Core leadership responsibilities include drafting and communicating vision, values and rules of engagement, translating these into appropriate strategies, goals, and processes and appointing leaders who will transform the organization accordingly (2011). As a crucial component in the process, leaders need to role model what they preach in their daily behavior (Stempfle, 2011).

Leading individuals who are characterized by some of the aforementioned traits can pose a challenge for managers. Many managers prefer to hire less "difficult" employees who seem easier to lead, but who also show little potential to innovate or create and drive change (Stempfle, 2011). Leaders interested in sustaining change need to resist the temptation to make their own lives easier through recruiting individuals who are more agreeable rather than creative (2011). They need to be prepared to work with employees who may be more difficult to lead, but also show significant creative potential and an ability to drive cultural and process change. Leaders should set high standards and challenge their employees to stretch and think beyond their first or second idea, not accepting mediocrity. At the same time, leaders need to show trust and patience with their employees even if success does not come in the short term. They need to reward learning and effort instead of results, knowing that failure is common whenever truly novel ideas are explored (Stempfle, 2011).

Another key to sustaining the tools learned through the process improvement events requires process owners to study every process from beginning to end at least five times (Wood Digest, 2009). As daunting as this may seem initially, this step becomes easier over time.

Typically, about half of the waste in a process is removed each time it is studied (2009). However, it is impossible to see all the waste in the process at any given point. By going through every process at least five times, several understandings begin to emerge (2009):

1. The company will need to be organized to support the change over time.

2. Fully integrating and sustaining change could take up to a decade.

3. Progress may be slow initially but it will accelerate with time.

The real reason behind this practice is to help realize as an organization that improvement never ends. Often times the term "improvement" is thought of as a one-time step. After five or so passes through every process a new culture will begin to emerge that believes in continuous improvement. Tapping and Shuker (2002) stress the importance of utilizing such measures as seizing on small opportunities to become leaner, encouraging a culture of continuous improvement, and making waste visible. The key to achieving and sustaining improvement is to develop systems that not only offer employees the opportunity to make improvements, but adding systems that require employees to participate in the improvement process and that demand better results (St. Andre, 2011). Rather than having one or two people leading your continuous improvement effort, the focus needs to be on developing a deep bench through robust and continuous training, coaching and mentoring. It has been proven that staff development can increase the system's capacity to improve while costing less (Kelly, 2012). Once people willingly commit to establishing this new culture, sustaining Lean improvements becomes second nature.

Section four has revealed the challenge of sustaining gains realized from Lean implementation and reviewed the strategies employed in many organizations today to maintain those gains. It has been demonstrated that leadership skill, commitment and support are critical

keys to sustaining a culture of continuous improvement (Bass & Riggio, 2005; Jones, 2005; St. Andre, 2011; Stempfle, 2011).

Continuous Process Improvement and Organizational Leadership

This section of the literature review proves that a requirement for successful Lean cultural transformation is organizational leadership and explores the existing literature around the leadership behaviors, competencies, and structures necessary for successful Lean cultural transformation.

Leaders are the root drivers of Toyota's successful engagement of team members throughout the company in embracing and adopting Lean practices and mindset (Liker & Convis, 2012). Successful Lean implementation is the result of this engagement, not the cause (2012). Lean leaders strive for continuous improvement in every aspect of the business and achieving that improvement requires everyone to work together. Lean leaders provide ample opportunities for their followers to satisfy their needs as thinking, emotionally charged, creative people who want to excel and gain recognition for their actions (Lareau, 2000). This requires consistent and tenacious leadership in every department or division and at every managerial position up and down the leadership ladder. Companies that practice some sort of Lean management do so in ways that are either high or low fidelity representations of Toyota's management system (Emiliani, 2008). In most cases Lean management as it has been understood and practiced by companies other than Toyota, tends to end up being a low or ultra-low fidelity version of the Toyota system (2008). Not surprisingly, the results they achieve are very poor compared to Toyota (2008). Lean leadership is never provided by a few stars with extraordinary ability or from a single chief officer with stunning charisma (Liker & Convis, 2012). Lean organizations tend to take leadership development very seriously and work from the bottom up providing

leaders with training, coaching, and development opportunities to improve their leadership skills and to improve the company's ability to work together across functions.

Implementing tools represents at most 20 percent of the effort in Lean transformations (Mann, 2009). The other 80 percent of the effort is expended on changing leaders' practices and behaviors, and ultimately their mindset (2009). Senior management has an essential role in establishing conditions that enable that 80 percent of the effort to succeed (2009). But just what that essential role looks like and what the leadership practices and behaviors are for successfully establishing those conditions are not very well documented and tend to be a collection of ideas, opinions, observations, and conclusions offered from experienced Lean managers and their direct involvement with Lean initiatives and projects (Mann, 2005; Roth, 2006; Spear, 2004). These authors state that organizational leaders cannot delegate their Lean involvement because their engagement is what enables them to examine and change the logic in their heads (Roth, 2006). That change or transformation in the leaders' logic is essential to the transformation of the entire enterprise (2006). The challenge it seems for leaders in Lean transformation involves underestimating the magnitude, wholeness, and depth of changes needed (2006), and the failure of most Lean initiatives can be pinned on a failure of leaders to change their leadership practices (Mann 2005).

But change leadership practices and behaviors to what? Some experienced Lean manager's ideas and opinions about effective Lean leadership include establishing governance arrangements that cross divisional boundaries, supporting a thorough, long-term vision of the organization's value-producing processes, and holding everyone accountable for meeting Lean commitments (Mann, 2009). Others hold that executive leadership, which includes the organization's top managers and their staff, must work strategically to improve access to

resources and markets (Roth, 2006). And that line leadership's improvement methods, which includes senior and middle managers responsible for divisions, plants, offices and programs, include efforts that result in greater coordination and collaboration at their level (2006). Some of these master Lean practitioners have captured important lessons to successful Lean implementation but have not identified or quantified the Lean leadership behaviors, competencies, skills and knowledge, or structures necessary for implementing and sustaining a Lean culture (Emiliani, 2008; Lareau, 2000; Liker, & Convis, 2012). For example, Spear (2004) espoused that there is no substitute for direct observation, proposed changes should always be structured as experiments, workers and managers should experiment as frequently as possible, and managers should coach, not fix. Even Edgar Schein (1996) discovered that organizations had trouble learning and improving because of consistent failures among leaders to communicate across the subcultures of their occupational communities. But none of these master practitioners have identified or measured the necessary set of leadership practices, behaviors, skills, knowledge, experience, and structures necessary for implementing and supporting Lean cultural transformation. It seems we still do not have an empirically tested and documented Lean leadership system stemming from a well-documented successful Lean organization that could be used as a Lean leadership model for others to replicate.

One thing that is known is that when people in the organization hold the assumption that only executives can cause significant change, they have disempowered themselves (Senge et al., 1999). Executives need to hold realistic views of the limits of their powers, realizing that people in large organizations have become cynical about "flavor of the month" management fads (1999). Local line leaders, the managers accountable for results with authority to undertake changes, need to be involved in any change that is to be meaningful and sustained (2009).

Without top management buy-in, organizations cannot sustain change efforts. Conversely, top management buy-in is a poor substitute for genuine commitment spread throughout the organization (Roth, 2006).

This section has proven that managers and leaders must adopt a new set of leadership practices in order to successfully implement and sustain Lean cultural transformation (Mann, 2005; Mann, 2009, Roth, 2006; Schein, 1996, Spear, 2004). While ideas and suggestions for improving Lean leadership exist (Emiliani, 2008; Lareau, 2000; Liker, & Convis, 2012), a study quantifying a Lean leadership support system could not be identified in the literature.

Summary

This literature review concludes by presenting a summary of findings and a set of research questions and hypotheses that were used to identify and better understand the leadership requirements necessary for successfully transforming any organization's culture into a continuous process improvement culture.

The literature review demonstrated that process engineering and process improvement is a critical strategy and skill set for any organization seeking to optimize efficiency and improve customer value by eliminating waste in it processes and systems (Bonaccorsi, 2011; Chen, et al., 2010; Green, Lee & Kozman, 2012; Jenkins, 2012; Kaplan, 2012; Ng, et al, 2010). Forward thinking organizations are adopting methods like Lean process improvement made popular by Toyota to develop their internal capacity for process analysis and the elimination of waste in their production and service processes (Abdi, et al., 2006; Erlich, 2006; Imai, 1997; Maleyeff, 2006; Page, 2005). The literature review reveals that continuous process improvement strategies and techniques can and are being utilized in both manufacturing and service organization environments to improve performance and to assist those companies in achieving their

organizational goals ((Bonaccorsi, 2011; Chen, et al., 2010; Green, et al., 2012; Jenkins, 2012; Kaplan, 2012; Ng, et al, 2010).

Although Lean manufacturing has been widely recognized for its effectiveness in continuously improving productivity, product quality, and on-time delivery to customers, the cost for hiring a full-time Lean manufacturing engineer has kept many small businesses from implementing Lean in their facilities (Chen, et al., 2010). Womack and Jones (2003) recommend that managers and executives embarking on Lean transformations think about three fundamental business issues that should guide the transformation of the entire organization:

1. Purpose: What customer problems will the enterprise solve to achieve its own purpose of prospering?

2. Process: How will the organization assess each major value stream to make sure each step is valuable, capable, available, adequate, flexible, and that all the steps are linked by flow, pull, and leveling?

3. People: How can the organization insure that every important process has someone responsible for continually evaluating that value stream in terms of business purpose and Lean process, and how can everyone touching the value stream be actively engaged in operating it correctly and continually improving it?

At the heart of Lean is its philosophy of long-term growth generating value for the customer, society, and the economy with the objectives of reducing costs, improving delivery times, and improving quality, all through the total elimination of waste (Kaplan, 2012; Wilson, 2010). The key foundational strategies that support this philosophy are the investment in people and the stability of the processes that then yield a system that will produce a high-quality product or service. This foundation of high quality has two strategies. First is the training and

development of the workforce (Wilson, 2010). Second is the effort to make all processes stable and capable of meeting customer needs (2010). It is a strategy designed to achieve high levels of delivered quality. Organizations make use of Lean continuous process improvement techniques like value stream mapping, the Five Why's for root cause analysis, the Five S's, design of experiments, and Muda or Gemba walks (Beiter & Hatfield, 2009; Mann, 2009; Soward, 2011; Tapping et al., 2002; Womack & Jones, 2003; Wood, 2004). By applying these methods organizations can do more than simply improve the operating processes throughout their organization. This literature review has demonstrated that tenacious implementation of a continuous process improvement strategy will also develop a sustainable organizational culture that values efficiency and perfection in everything they do (Bass & Riggio, 2005; Jones, 2005; St. Andre, 2011; Stempfle, 2011; Tapping & Shuker, 2002; Wood Digest, 2009).

The review also revealed what appears to be an opportunity in the continual process improvement literature. This missing link is a well-defined set of leadership practices, behaviors and structures and processes that make up a successful organizational leadership system; one that can effectively facilitate this large-scale cultural transformation. While practitioners and scholars tend to agree that leaders play a critical component in implementing and sustaining Lean cultural transformation (Mann, 2005, Spear, 2004, Womack & Jones, 2003), not many, if any, empirical studies have been conducted to establish what the essential leadership practices and behaviors are that will ensure successful Lean cultural transformation. Rather, authors in the literature can be found espousing what they think leader's should do, or have seen leader's do personally (Emiliani, 2008; Lareau, 2000; Liker, & Convis, 2012 Mann, 2009, Spear, 2004), but none could be found that have actually conducted a study at a successful Lean organization to establish what the critical leadership practices and behaviors are on the part of executives, middle managers,

and line level leaders that made that transformation possible. Additional interview questions and hypotheses designed for this study to define these leadership requirements included:

- What did senior executives do to successfully implement Lean in your organization?
- What practices did middle managers engage in to support the implementation of Lean within the organization?
- What behaviors were consistent among line level managers and supervisors that led to successful Lean transformation?
- What systems or structures were utilized to ensure that Lean project timelines and deliverables were met during implementation?
- Was effective leadership necessary for the implementation of Lean in your organization?

These questions help to identify the important behaviors, practices, systems, and structures needed across all levels of leadership in a Lean organization. These questions also assist in testing the hypotheses that 1.) All organizational leaders need to possess or develop certain behaviors and practices in order to successfully transform their organizational culture, and that 2.) Effective organizational leadership is indeed a requirement for any organization that desires to transform itself into a Lean organization. These questions and more are explored in greater detail in the following chapter on methodology. The methodology chapter presents and explains the data collection strategy and instruments used during this mixed methods research study.

Chapter Three: Methodology

This section presents a comprehensive review of the methodology used for this study. The intent of this section is to clearly define all of the studies data collection and analysis methods. The methods section contains the research questions and hypotheses, study design and instrumentation, methods of analysis, and sample populations for the qualitative interviews and the quantitative survey. The methodology chapter describes the detailed plan used for successfully facilitating the data collection and analysis of the research study.

The United States socioeconomic system is in a state of turmoil unlike any in recorded history (Darling, 2009), this dilemma calls for adjustments of major importance for the meaningful development of organizations (2009). Economic changes have forced manufacturing and service companies alike to seek new solutions to enhance their competitiveness in the global market place. Process improvement has become a core component of organizational strategy and large scale transformational change efforts by many companies (Hammer & Stanton, 1999; Kaplan, 2012; Mann, 2005; Spear, 2004; Womack & Jones, 2003). Yet, while continuous process improvement practitioners have published important lessons for successful continuous process improvement implementation (Emiliani, 2008; Kenney, 2011; Lareau, 2000; Liker & Convis, 2012), and practitioners and scholars tend to agree that leadership plays a critical component in implementing and sustaining Lean cultural transformation (Mann, 2005, Spear, 2004, Womack & Jones, 2003), no empirical studies can be found specifically identifying the comprehensive leadership requirements necessary for ensuring successful Lean organizational cultural transformation. Mapping of these leadership requirements could assist other organizational leaders in successfully enhancing the effectiveness of their own organizations through cultural transformation.

Research Traditions

The purpose of this study is to identify the leadership requirements required for successful organizational culture transformation using Lean methods. Data collection consisted of conducting multiple qualitative interviews, and creating and administering online quantitative surveys. Collecting information using a variety of sources and methods is one aspect of what is referred to as triangulation (Fielding & Fielding, 1986). This strategy reduces the risk that conclusions will reflect only the systematic biases or limitations of a specific source (Maxwell, 2005). Qualitative and quantitative data were collected from two successful manufacturing organizations in order to compare and contrast the data and further validate emerging leadership themes. All interview data was transcribed and coded, then analyzed using frequency analysis (Daley & Onwuegbuzie, 2010). Survey data was analyzed using analysis of variance or ANOVA. Analysis of variance is a statistical technique used to test hypotheses by examining the variability of the sample data (Norusis, 2012).

Successful facilitation of the study has generated important leadership insights and a cultural change model that may further advance the literature on how organizations can more effectively conduct their own internal cultural transformations by establishing a successful organizational leadership system.

Research Questions and Hypotheses

As a triangulated mixed methods study, this research project contains both qualitative and quantitative research questions and quantitative hypotheses that will be researched and tested through multiple data collection techniques.

Quantitative questions inquire about the relationship between variables (Creswell, 2009). To deepen the understanding of the relationship between an organizational leadership system and

its impact on Lean cultural transformation, the study introduces the following central quantitative question:

- Does the quality of an organization's leadership determine the outcome of Lean cultural transformations?

With this being the central quantitative question, testing the following directional hypotheses by collecting and analyzing online survey data may further validate or discount assumptions about organizational leadership and its impact on Lean implementation and cultural transformation. Those directional hypotheses are:

- Effective leadership is required for successful Lean implementation and cultural transformation
- Effective leadership is necessary to sustain the gains realized from Lean process improvement implementation.
- Effective Lean leadership can be determined and implemented within an organization.
- Most companies start large scale cultural changes with the necessary leadership competency already in place.

The central qualitative question is a broad question that seeks exploration of the central phenomenon or concept of the study (Creswell, 2009). Creswell (2011) suggests developing one or two central questions with no more than five sub questions. The central qualitative question will explore the relationship between organizational leadership and Lean cultural transformation. The qualitative sub-questions will focus on learning more about the various aspects of a leadership system and their relationship to successful cultural transformation. The central qualitative question and sub-questions for this study are:

Central Qualitative Question:

- What are the organizational leadership requirements for successfully transforming organizational culture using Lean methods?

Qualitative Sub-Questions:

- What were the leadership challenges associated with Lean cultural transformation?
- What common leadership practices contributed to successful Lean implementation and cultural transformation?
- What are the leadership skills and knowledge necessary for successfully leading a Lean cultural transformation?
- What are the leadership strategies for completing a large-scale cultural transformation using Lean methods?

These qualitative and quantitative questions and the associated directional hypotheses are appropriate for capturing mixed data because they seek to explore and better understand the components of a successful leadership system, they inquire about the relationship among independent and dependent variables, and they make use of both open-ended and closed-ended questions (Creswell, 2009). Creswell (2011) describes these associations as comparing groups on an independent variable *(x = organizational leadership)* to assess its impact on a dependent variable *(y = Lean cultural transformation)* and relating one or more independent variables to one or more dependent variables.

Additional survey and interview questions are discussed throughout the methodology section of the study and are designed to define the leadership requirements for Lean cultural transformation. Some of those questions include:

- What did senior executives do to successfully implement Lean in your organization?

- What practices did middle managers engage in to support the implementation of Lean within the organization?
- What behaviors were consistent among line level managers and supervisors that led to successful Lean transformation?
- What systems or structures were utilized to ensure that Lean project timelines and deliverables were met during implementation?
- What effective leadership skills and knowledge were necessary for the implementation of Lean in your organization?

These questions helped to identify the important behaviors, practices, and strategies needed across all levels of leadership in a Lean organization. These questions also assisted in testing the hypotheses that 1.) All organizational leaders must possess or develop certain behaviors and practices in order to successfully implement Lean, and that 2.) Effective leadership is a requirement for any organization that desires to transform its organizational culture.

Research Design

This is a mixed methods research study that utilized a triangulation of data strategy. Methodological triangulation, or mixed-methods research, uses more than one kind of method to study a phenomenon (Casey & Murphy, 2009; Risjord et al., 2001). Methodological triangulation has been found to be beneficial in providing confirmation of findings, more comprehensive data, increased validity and enhanced understanding of the studied phenomenon (Casey & Murphy 2009; Foss & Ellefsen 2002; Halcomb & Andrews 2005; Redfern & Norman 1994; Risjord et al., 2001). With triangulation, researchers can use two research methods to decrease the weaknesses of an individual method and strengthen the outcome of the study (Denzin 1978; Sharif &

Armitage, 2004). This study applied both qualitative and quantitative research methods to collect leadership data from two Shingo Prize award winning manufacturing organizations. The main objective of qualitative research is to create a methodology for approaching, understanding, analyzing, and explaining management phenomena at a social or company level (Delattre, et. al, 2009). Quantitative research tends to focus on the collection of research data that can be measured and presented numerically (Cresswell, 2009). Together these techniques were used in this study to produce methodological triangulation of the data collected by the researcher.

There are two types of methodological triangulation: 'across method' and 'within method'. Across-method studies combine quantitative and qualitative data-collection techniques (Boyd, 2001; Casey & Murphy, 2009). Qualitative methods are explanatory and textual, and include passive observation, participant observation, and open-ended interviews or analysis of company documents (Risjord et al., 2001). Quantitative methods include statistical analysis of outcomes or surveys collected by standardized scales or measures and are generally expressed numerically (Risjord et al., 2001). Within-method studies use two or more data collection procedures, quantitative or qualitative, but not both. For example, quantitative data may be collected using two procedures, such as survey questionnaires and a pre-existing database, while qualitative data may be collected by using participant observation and interviews (Casey & Murphy, 2009; Denzin, 1989; Kimchi et al., 1991; Thurmond, 2001). This study utilized an across-method strategy to gather, combine and compare data from multiple sources. The main substantive activity of the researcher was logging data (Lofland, et al., 2006). The sources of data resulted from conducting 15 internal interviews with company leaders and staff members (qualitative strand), and developing and administering 2 online surveys to over 100 staff members (quantitative strand). That data was then analyzed using frequency analysis and analysis of

variance to identify critical leadership behaviors, actions, and protocols that were necessary for the successful implementation and sustainment of organizational culture change at the sponsoring organizations. By comparing and contrasting data across multiple organizations, leadership and cultural transformation themes were identified and validated against one another.

Population and Sample

This section discusses the subjects who participated in the research study and how informed consent and privacy protection was used to manage relationships with subjects and the primary clients from each organization. The subjects can be broken down into two respective categories; those subjects who participated in the online survey, and those subjects who participated in qualitative interviews with the researcher.

A review of the literature reveals that the three most common means of writing about clients and client organizations are obtaining informed consent, disguising client identity, and creating case composites (Sperry &Pies, 2010). This study utilized informed consent from the sponsoring organizations. The informed consent form includes an introduction and explanation of the research study, data collection procedures, risks and benefits, confidentiality, compensation, voluntary participation, and questions and contact information for Colorado Technical University representatives.

Schein (1999) defines the contact client as the individual who was contacted first within the sponsoring organization. The contact client for this project at US Synthetic was Hema Heimuli and the contact client at Metalworks was Scott Lakari. Working with the contact clients, the researcher established which members of the organization would be assigned to each of the two subject categories. Safeguarding privacy, respecting confidentiality, and protecting against disclosure of information are essential to fostering the establishment of a trusting relationship

with the primary clients and the research subjects. Privacy refers to the ability of the individual to maintain control over the time, place, manner, and extent to which information about one's self, beliefs, or person, is shared (ACHA Guidelines, 2010). All data obtained from interview participants, survey respondents, or internal organizational documents have been kept confidential and are only reported in an aggregate format (by reporting only combined results and never reporting individual ones).

Survey Population

Survey research and self-completion questionnaires are an important way of gathering population-level information (Angus, et al., 2003; Cartwright, 1983). They rely on a high response rate to yield a representative sample without the loss of statistical power and introduction of response bias (Iverson, et al., 2006). Response rate is therefore often regarded as the best single measure of the quality of survey data (Biener, et al., 2004). Survey recruitment procedures should aim to reduce response bias and increase response rate (Iverson, et al., 2006) at the same time as respecting participants' rights (Hewison & Haines, 2006). In an effort to increase response rate while respecting respondent rights this research survey made use of an informed consent waiver at the beginning of the survey. The informed consent waiver clarifies the intent of the survey and explains to all respondents in each category that participation is voluntary and that respondents can 'opt in' or 'opt out' at their choosing. The survey was sent to 150 people at US Synthetic and 25 people at Metalworks who were described by the contact clients as individuals who had participated in the successful cultural transformation at their respective organizations. A total of over 100 people responded to the survey. Survey results are discussed in more detail in chapter four; the presentation of data.

Interview Population

Researchers may use many different techniques, but at the heart of qualitative research is the desire to expose the human part of a story. Because there is a natural storytelling urge and ability in all human beings, even just a little nurturing of this impulse can bring about astonishing and delightful results (Mellon, 1998). Skilled interviewers can gain insight into lived experiences, learn the perspectives of individuals participating in a study, and discover the nuances in stories (Jacob & Fergusson, 2012). The interview subjects participated in qualitative interviews with the researcher to gather their personal experience through the cultural transformation and the associated aspects of organizational leadership that made the transformation a success.

By working with the contact clients at each organization a total of 15 subjects were identified to participate in the qualitative interviews. These subjects were identified as individuals from each company who were present for the cultural change at each of their respective companies.

10 interviews were conducted at US Synthetic. All participants were males in their 30's, 40's and 50's. The average age was mid 40's. Average tenure of the group was 15.1 years with the company. All participants held leadership roles during the beginning of the Lean cultural transformation. Table 2 provides a detailed description of the interview participants from US Synthetic.

Table 2

US Synthetic Interview Participant Demographics

Name	Current Position	Role During Change	Tenure (Years)	Age Group	Gender
Adam Earl	Customer Engineer	Factory Manager	8	30's	M
Brett Jensen	Production Manager	Production Manager	16	40's	M
David Brady	HR Director	Training	21	40's	M
Eric Pope	Operations VP	Production Manager	25	30's	M
Jeremy McLelland	Production Manager	Supervisor	10	40's	M
Jon Knight	Production Manager	Supervisor	18	30's	M
Mike Holman	Production Manager	Supervisor	11	50's	M
Nick Sloan	Production Manager	Supervisor	8	30's	M
Rob Galloway	CEO	Production Manager	17	40's	M
William Wooten	Production Manager	Production Lead	17	40's	M

5 interviews were conducted at Metalworks. 60% were female and 40% male. The average age was early 50's. Average tenure of the group was 22 years with the company. All participants held leadership roles during the beginning of the Lean cultural transformation. Table 3 provides a detailed description of the interview participants from Metalworks.

Table 3

Metalworks Interview Participant Demographics

Name	Current Position	Role During Change	Tenure (Years)	Age Group	Gender
Gloria Hilden	Supervisor	Supervisor	24	50's	F
Kandy Alverson	Buyer	Supervisor	27	50's	F
Scott Lakari	VP Operations	Director of Manufacturing	19	50's	M
Sue Caudill	Value Stream Manager	Value Stream Manager	26	50's	F
Tim Tibbits	Sales Operations Manager	Value Stream Manager	14	40's	M

Validity and Reliability

Validity is one of the strengths of mixed methods research and is based on determining whether the findings are accurate from the standpoint of the researcher, the participants, or the readers of the account (Creswell, 2009). Essentially, validity means that the researcher checks for accuracy in the researchers findings. This study used two validity strategies to ensure that the findings were accurate; triangulation of data and member checking.

The first validity strategy is triangulation of the data. Triangulation examines data from multiple sources (Denzin 1978; Sharif & Armitage, 2004). In this case the data was examined from the participants in the qualitative interviews, and data entered into the online quantitative surveys. This helped to identify important leadership requirement and cultural change themes. Triangulation of the interview data was used to surface themes about the impact of leadership on cultural transformation.

The second validity strategy was member checking. Member checking consists of taking the final report and descriptions or themes back to the sponsoring organization to determine whether they feel that they are accurate (Creswell, 2009). Frequent member checking was conducted via telephone with the primary contacts from both US Synthetic and Metalworks. By validating the findings in the data across multiple organizations leadership and cultural change requirements were identified that other organizations can utilize to more successfully transform their own organizational cultures.

Reliability indicates that the researcher's approach is consistent across different researchers and different projects (Gibbs, 2007). Reliability procedures include checking transcripts to make sure that they do not contain obvious mistakes, and continuously checking the codes and themes against the data as the data is analyzed. The intent of reliability is this study was to ensure that each interview participant was asked the same consistent set of research questions as the other so that the data could be considered reliable compared across multiple interviewees. This was accomplished by using an interview guide that contained a consistent set of research questions that every member of the interview population was asked. Reliability was established in the survey data by administering the same set of questions and hypotheses to all members of the survey population at both organizations. Every participant in the study was asked the same consistent set of questions as the other. Member checking with the primary clients also helped to validate that the emerging themes were reliable.

Data Collection and Instrumentation

This section of the methods chapter presents the primary sources of data collection that were used in conducting the study. Data collection techniques included conducting qualitative interviews, and creating and administering quantitative online surveys.

Interviews

A qualitative interviewing method consists of conducting face-to-face interviews with 6 to 8 participants per group, and involves the use of unstructured and generally open-ended questions that are few in number and intended to elicit views and opinions from the participants (Creswell, 2009). Asking questions and getting answers is a much harder task than it may seem at first (Fontana & Fey, 2000). To better assist the researcher in gathering the necessary data in these interviews, certain interview protocols were established and maintained. An interview protocol is more than a list of interview questions; it also extends to the procedural level of interviewing and includes a script of what the researcher will say before the interview, a script for what the researcher will say at the conclusion of the interview, prompts for the interviewer to collect informed consent, and prompts to remind the interviewer about the information they are interested in collecting (Jacob & Fergerson, 2012). Interview protocols become not only a set of questions, but also a procedural guide for directing a new qualitative researcher through the interview process (2012). The researcher developed interview guides that address each of these protocol areas. These guides ensure consistency and accuracy of data collection.

One critical standard for a good question and answer process is that it produces answers that provide meaningful information about what the researcher is trying to describe (Fowler, 1995). In this case, the researcher sought to describe the leadership behaviors, skills, and knowledge that enabled organizations to accomplish cultural transformation. Each interview was recorded using a personal recording device and later transcribed by the researcher into MS Word. Rubrics were utilized to code each interview transcript, and the data was analyzed and cross compared, or triangulated, to identify the themes and trends in the data.

Data gathered from the interviews were then analyzed using frequency analysis which calls for interview data to be transformed numerically by binary-izing data into ones or zeros. The numeric data was then used to report how frequently a theme occurred in the data by calculating frequency percentage and reporting results in pie chart format. These results are discussed in more detail in chapter four's presentation of results.

Online Survey

Widely accessible technology in the form of Internet-based survey tools has opened new avenues for collecting survey data (Alonzo, et al., 2011). Online surveys help reduce time and costs associated with gathering and analyzing survey data (Clayton & Werking, 1998; Gjestland, 1996; Schmidt, 1997). This study utilized the online survey tool, Qualtrics. The researcher has developed and administered over a dozen online surveys utilizing this system and is proficient in survey design and data analysis using this convenient survey tool.

One of the first decisions one must make before conducting a survey is who to include (Alonzo, et al., 2011). The selection of samples in surveys rarely involves just simple random sampling (Chambers & Skinner, 2003). Instead, more complex sampling schemes are usually employed involving example stratification and multistage sampling. More over these complex sampling schemes usually reflect complex underlying population structures, for example the geographical hierarchy underlying a national multistage sampling scheme (Chambers & Skinner, 2003). These features of the surveys were handled appropriately with applied statistical methods. In standard formulations of many statistical methods, it is assumed that the sample data are generated directly from the population model of interest, with no consideration of the sampling scheme (Chambers & Skinner, 2003). Since there are several unique populations of interest at the sponsoring organizations it was important to include all of the populations that

were part of the Lean cultural transformation and categorize those populations according to their individual roles in the process. There are several strategies for sampling each of these populations. In probability sampling, each member of the population has a chance of being selected, and one either samples randomly or systematically (Chambers & Skinner, 2003). In a random sample, each member of the population has an equal opportunity to be selected (2003). In a systematic sample, one selects participants to include in the survey using a systematic planned approach (2003). Since this study sought to solicit input from all subjects in each of the sample populations, a systematic planned approach was the most effective for determining the sampling categories.

It is important to keep in mind that well-written questions will help respondents provide accurate and reliable answers (Alonzo, et al., 2011). Since this survey included questions that some respondents may consider sensitive, it was important to communicate that the responses would remain anonymous before they began the survey. To avoid the situation where people select the safe middle option choice rather than take a stand on a topic, it is generally recommended to have an even number of response options when asking about participant's opinions on a topic (Alonzo, et al., 2011). This survey made use of forced selection questions including rating, sliding scale, and multiple choice questions. Responders were also afforded the opportunity to input text directly into many of the questions so as to gather additional insight on their experiences throughout the organizational transformation. These types of additional questions are referred to as text entry questions. Many, if not all, of the questions were developed using the same interview questions that were discussed in the previous subsection.

Finally, keeping in mind that if the survey is too long, it is likely that fewer people will complete it (Alonzo, et al., 2011), the survey design provided for concise questions tailored for each sample population.

Data Analysis

Data collected from participants, either from the qualitative interviews or the quantitative online survey, were recorded, transcribed, and coded. Much is written about methods for coding interview data: ways to think about it, how to do it, how to document it, and how to report it (Weston, et al., 1997; McAlpine, et al., 1999a; McAlpine, et al., 1999b). Generally speaking, coding is not what happens before analysis, but comes to constitute an important part of the analysis. There is a reciprocal relationship between the development of a coding system and the evolution of understanding a phenomenon (Weston, et al., 2001). For purposes of this study coding began with the big picture, an overall conception or understanding of leadership challenges and requirements, then moved in to focus on details throughout the data, and finally moved out again to see how the details may have changed the interpretation of the larger picture.

Interview data was then converted numerically by binary-izing the data into ones or zeros based on the frequency that each comment or code appeared in the interview data. Once the interview responses were transformed into numerical data, the data could be sorted to determine which leadership challenges and requirements were cited most frequently. Those requirements were then sorted and reported in pie chart format to demonstrate which leadership challenges, strategies and requirements possessed more weight or importance to the interview participants. This process is referred to as frequency analysis (Daley & Onwuegbuzie, 2010). Interview data is presented using frequency analysis in chapter four.

Many statistical methods are now used to analyze sample survey data (Chambers & Skinner, 2003). In particular, a wide range of generalizations of regression analysis, such as generalized linear modeling, event history analysis and multilevel modeling are frequently applied to survey data (2003). One of the most appealing characteristics of the online survey is the way in which they facilitate data entry and analysis. Each responder's input is tallied as it is entered which enables instantaneous download of the data for rapid analysis as soon as the survey is closed (Alonzo, et al., 2011). The online survey tool Qualtrics provided the researcher with the ability to generate statistical quantitative reports once each survey was closed. These reports were generated and analyzed using analysis of variance, or ANOVA (Norusis, 2012) to test the survey hypotheses and identify key leadership requirements for successful Lean organizational transformation. Analysis of variance consists of plotting the high and low response scores, then determining the median response rate, in order to draw conclusions from those median scores (2012). The survey data is presented using analysis of variance in chapter four.

Summary

The methodology section of this proposal explains that this is a mixed methods research study that seeks to identify and better understand the leadership requirements necessary for successful cultural transformation using Lean methods. Identifying and publishing these leadership requirements may assist other organizations in their own efforts to transform their organizational culture and operations using Lean continuous process improvement methods. The methodology section has provided a comprehensive presentation and discussion about the key aspects of facilitating this study. Chief among those aspects are the data collection and data analysis instruments and techniques used in the study. The data collection instruments used in

this study consisted of conducting qualitative interviews with key organizational subjects, and creating and administering two online quantitative surveys. Reliability was ensured by using a consistent set of interview and survey questions across all participants. The study utilized a triangulation of data strategy and member checking to validate important themes and to provide for a thorough analysis of the data. Frequency analysis and analysis of variance were used to analyze the data gathered from the interview participants and the survey respondents. This section also provided an overview of the sample population that participated in these data collection methods. A presentation of the results of these data collection and analysis methods can be found in the next chapter. Chapter four contains an unbiased presentation of the results of the study and a brief description of the study findings.

Chapter Four: Presentation of Results

The purpose of this chapter is to present the data collected from administering 2 quantitative online surveys to over 100 people and conducting 15 qualitative interviews at two Shingo Prize winning manufacturing companies. Several patterns can be used to present mixed methods data (Glathorn & Joyner, 2005). This chapter is organized by first presenting the survey data and hypothesis test results from one company's survey followed by a presentation of the interview data and research question results from that same company. The survey and interview data from these companies will be compared and contrasted to determine if there is convergence, differences, or some combination of the data present. This approach is referred to as concurrent triangulation (Creswell, 2009). The chapter concludes with a brief summary of findings and a more robust discussion of results follows in Chapter V.

Transforming qualitative data into quantitative data involves reducing themes of codes to numeric information such as dichotomous categories (Creswell & Plano-Clark, 2011). Interview data was transformed using a validated method referred to here as frequency analysis (Daley & Onwuegbuzie, 2010). This was accomplished by developing tables for the interview data, binary-izing the data into one's or zeros, and then counting the number of times a theme or code appeared in the data. Frequency of a theme was then converted into a percentage and reported in pie chart format. Daley and Onwuegbuzie (2010) used the same technique to binary-ize each theme in their study data by assigning a score of one or zero each time a theme appeared in an individual interview.

Survey results are reported using one-way analysis of variance where the low and high scores are plotted on a bar chart, and the mean is used to draw conclusions about the population responses (Norusis, 2012). Once results of each individual company's survey and interview data

are presented concurrent triangulation is used to compare and contrast the data from each company against the other. This strategy is used to further validate the research results by identifying and reporting similarities and disparities in the data from each company with the results from the other.

The chapter concludes with a summary of the results and a segue into the fifth and final chapter where the findings of the study will be discussed in detail.

Presentation of Results for US Synthetic

The following section presents the survey and interview results for US Synthetics (USS). The findings are summarized briefly at the end of the chapter.

Survey Results

Survey results are organized by the hypotheses that were tested. Four hypotheses were tested in the survey with respondents being asked to force rate their level of agreement with the hypothesis statement by percentage. Analysis of variance is used to draw conclusions about the validity of each hypothesis.

The demographics of the survey population tend to illustrate a mid-career skilled laborer with significant tenure at the company, who had little to no experience with Lean prior to implementation. The following tables provide additional detail on the demographics of the survey audience.

Table 4

Male and Female Survey Respondents from US Synthetic

#	Answer	Distribution	Response	%
1	Male		89	96%
2	Female		4	4%
	Total		93	100%

Table 4 presents the distribution between male and female survey respondents at US Synthetic. 93 people completed the survey. 96% of the respondents were male and 4% were women.

Table 5

Age Groups of US Synthetic Survey Respondents

#	Answer	Distribution	Response	%
1	Under 20		0	0%
2	20 to 29		1	1%
3	30 to 39		49	52%
4	40 to 49		30	32%
5	50 to 59		13	14%
6	60 or above		1	1%
	Total		94	100%

Table 5 depicts the age groups of the survey respondents. 84% of the respondents were between the ages of 30 and 49 with a mean age of late thirty and early 40's.

Table 6

Survey Respondent Tenure with US Synthetic

#	Answer	Distribution	Response	%
1	Under a year		0	0%
2	1 to 5 years		1	1%
3	6 to 10 years		28	30%
4	11 to 15 years		29	31%
5	16 to 20 years		30	32%
6	21 to 25 years		5	5%
7	26 to 30 years		1	1%
8	Over 30 years		0	0%
	Total		94	100%

Table 6 shows the distribution of tenure with the company from the survey participants. 92% of survey participants had been with the company between 6 and 20 years with a mean of 15.25 years.

Table 7

Leadership Roles of Survey Participants at US Synthetic

#	Answer	Distribution	Response	%
1	Individual Contributor		25	27%
2	Supervisor		10	11%
3	Team Leader		25	27%
4	Department Leader		23	24%
5	Executive		9	10%
6	Senior Executive		2	2%
	Total		94	100%

Table 7 depicts the leadership roles of the survey participants from US Synthetic. Respondents represented a wide range of leadership roles with 27% reporting they were individual contributors and 73% holding entry-level, middle and senior leadership positions.

Survey participants demonstrated a relatively low level of experience with Lean prior to the cultural transformation with 88% reporting that they possessed under a year of experience with Lean prior to the implementation. This anomaly changes significantly post implementation with 70% of survey respondents reporting 6 to 10 years of experience with Lean after their cultural transformation.

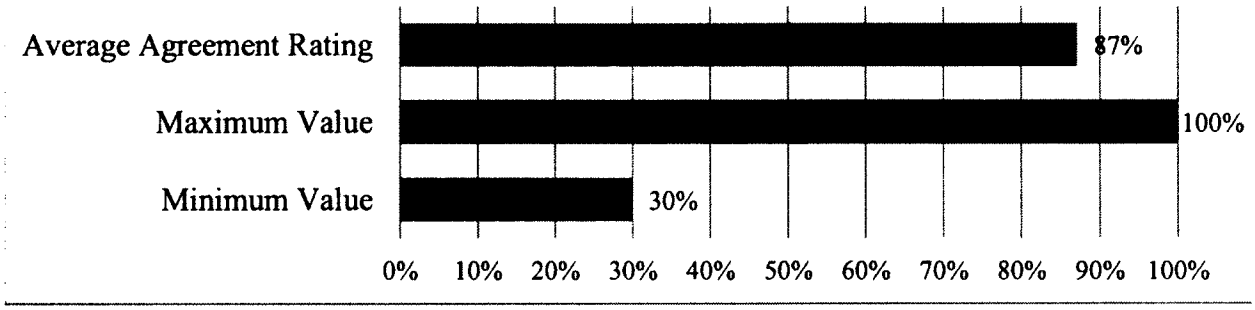

Figure 1. US Synthetic hypothesis number one. Chart depicts an 87% agreement rating among survey respondents at US Synthetic indicating that effective organizational leadership is required for successful cultural change.

Hypothesis 1

Figure 1 presents the results of hypotheses test number one. Respondents were asked to rate their level of agreement on a sliding scale with 0% being strongly disagree and 100% representing strongly agree with the following statement: Effective leadership is required for successful cultural transformation. Participants gave hypothesis number one a 87.16% average agreement rating.

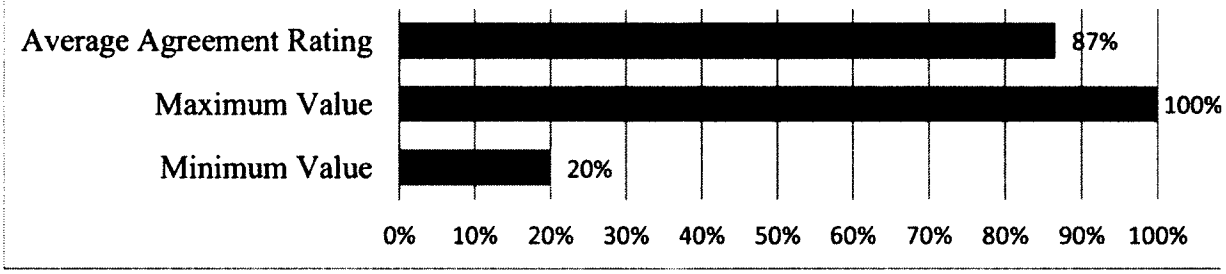

Figure 2. US Synthetic hypothesis number two. Chart depicts an 87% agreement rating among survey respondents at US Synthetic indicating that effective organizational leadership is required to sustain cultural change.

Hypothesis 2

Figure 2 presents the results of hypotheses test number two. Respondents were asked to rate their level of agreement on a sliding scale with 0% being strongly disagree and 100% representing strongly agree with the following statement: Effective leadership is necessary to sustain the gains realized from cultural transformation. Participants gave hypothesis number two an 86.55% average agreement rating.

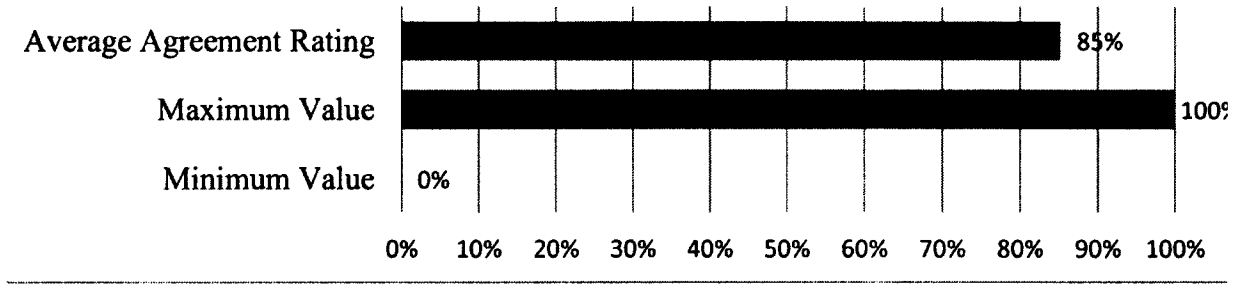

Figure 3. US Synthetic hypothesis number three. This chart reports an 85% agreement rating among survey participants at US Synthetic indicating that effective organizational leadership can be defined and developed with the organization.

Hypothesis 3

Figure 3 presents the results of hypotheses test number three. Respondents were asked to rate their level of agreement on a sliding scale with 0% being strongly disagree and 100% representing strongly agree with the following statement: Effective cultural change leadership can be determined and implemented within an organization. Participants gave hypothesis number three a 85.2% average agreement rating.

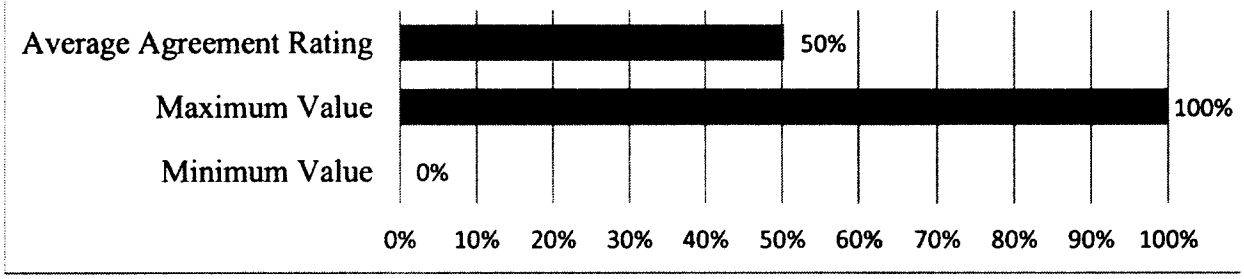

Figure 4. US Synthetic hypothesis number four. The chart reveals that survey participants had an average agreement rating of only 50% illustrating that people at US Synthetic did not feel as strongly that the organization began the Lean cultural transformation with the necessary leadership competency already in place.

Hypothesis 4

Figure 4 presents the results of hypotheses test number four. Respondents were asked to rate their level of agreement on a sliding scale with 0% being strongly disagree and 100% representing strongly agree with the following statement: US Synthetic started its Lean cultural transformation with the necessary leadership competency already in place. Participants gave hypothesis number four a 50.3% average agreement rating.

Interview Results

The interview results are organized according to the research question that was posed to the interview participants. 10 interviews were conducted at US Synthetic. All participants were males in their 30's, 40's and 50's. The average age was mid 40's. Average tenure of the group was 15.1 years with the company. All participants held leadership roles during the beginning of the Lean cultural transformation.

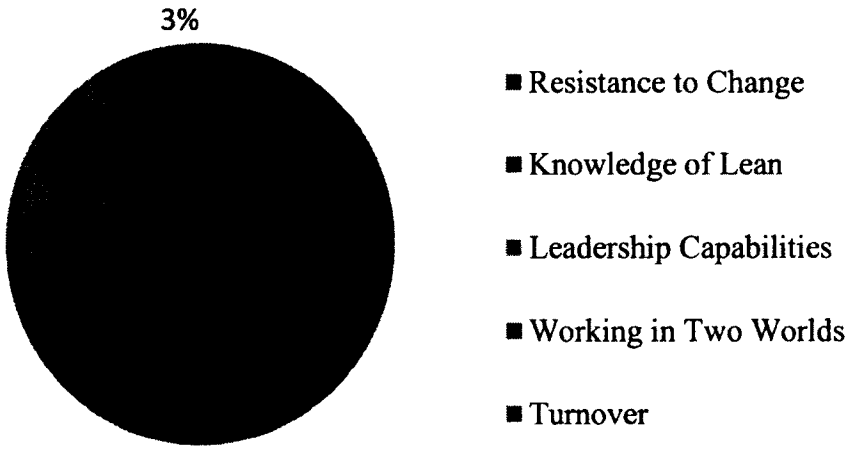

Figure 5. US Synthetic research question number one. The pie chart depicts the leadership challenges associated with Lean cultural transformation cited most frequently by US Synthetic interview participants.

Research Question 1

Figure 5 presents the frequency response data to research question number one: What are the leadership challenges associated with Lean cultural transformation?

Resistance to change includes responses that typically described individuals fear and misunderstandings about Lean and the pride that each person felt about the old company culture. Comments included: fear of losing a job, pride in the old culture and the way they did their work, each individuals personal capacity for and rate of change, misunderstanding Lean as a way to lean-out jobs.

Knowledge of Lean refers to the fact that the workforce was unfamiliar with the philosophies and tools of Lean. Comments included: lack of confidence with the tools, misunderstanding the purpose of Lean, and unfamiliarity with how to conduct the exercises and simulations.

Leadership capabilities refer to the requirements in leadership skills and knowledge necessary to teach and implement Lean. Many leaders expressed frustration with their own skill set and competency in the beginning to both learn Lean and then be able to turn around and teach it to someone else. Some comments included: no common language established, trying to get people to see the value in the changes, and not knowing how to teach the new techniques.

Working in two worlds had to do with the difficulty that respondents experienced while trying to find the extra time required to work on learning Lean tools and techniques while also still being responsible for meeting established production goals and outputs. It was difficult to continue to work to meet production goals while learning and implementing a whole new way of thinking and conducting your work. Leaders had to make time for Lean during each shift.

Turnover of course referred to the frustration associated with seeing someone choose to leave the company because they just didn't want to change. Turnover at US Synthetic was very small and leadership made it very clear from the beginning that no one would lose their job over Lean cultural change.

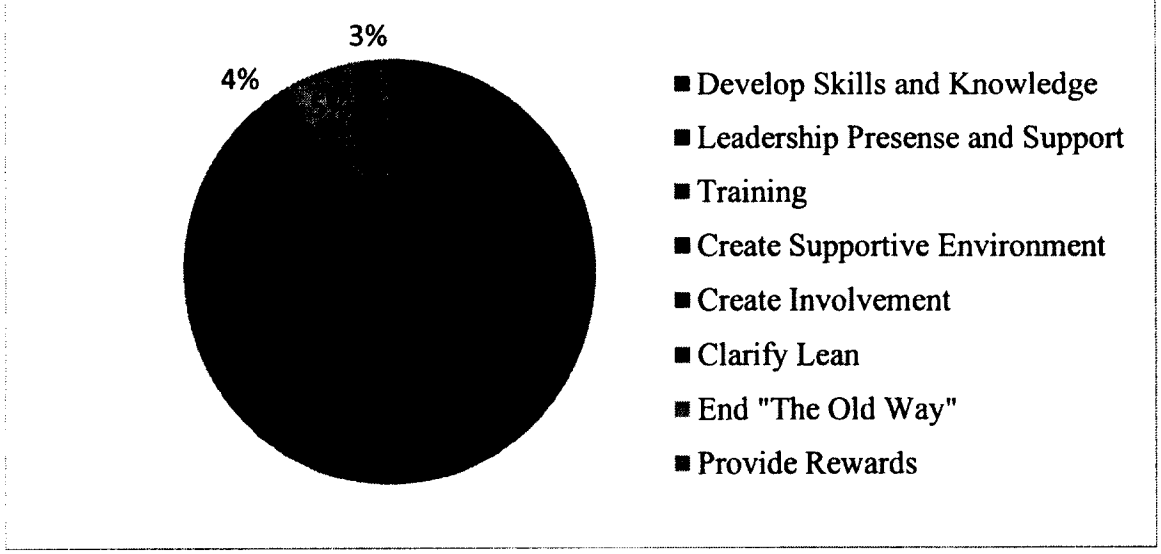

Figure 6. US Synthetic research question number two. The chart depicts the leadership practices cited most frequently by interview participants as necessary for successful cultural transformation.

Research Question 2

Figure 6 presents the frequency analysis response data to research question number two: What are the leadership practices necessary for successful Lean implementation and cultural transformation?

Develop skills and knowledge not only refers to the importance that respondents felt about their own learning and personal development but even more specifically referred to the time and effort that was spent deliberately identifying gaps in skills and knowledge of their staff members and developing those gaps by facilitating Kaisen events, running experiments, conducting exercises and simulations, and providing regular coaching and weekly training.

Leadership presence and support at US Synthetic was especially important for successful cultural change. Leaders made the decision to learn Lean and change together with the rest of the workforce. Leaders did not learn the techniques and then tell staff what to do and how to do it; instead they served as coaches and teachers who would follow up with staff and ask them what

they had done each week to improve their work. This placed responsibility and ownership for change with the individual, not with management.

While training could be considered just another theme in developing skills and knowledge it is broken out here as its own leadership practice because US Synthetic made the decision in the beginning that everyone in the company would attend the introductory Lean fundamentals training. Staff and managers attended the training together which helped to establish a common language on the floor while creating a consistent understanding of the Lean philosophies and techniques.

Create a supportive environment meant that all leaders knew that an individual could not be punished for making mistakes while trying the new methods. There was a consensus among the interview respondents that creating an environment where people were afraid to experiment or take risks because of fear of punishment would have ended the cultural transformation immediately. Therefore, leaders made staff feel safe in trying the new techniques even when they did not immediately succeed.

Create involvement meant coming up with creative ways to engage staff around the principles and methods of Lean. Some of the comments included: promote early change adopters into leadership and training roles, and assign people topics to present in weekly meetings.

Clarify Lean was a leadership practice that focused on leaders communicating that no one was going to lose a job over the Lean transition and that the word Lean did not refer to "leaning out" staff or just working harder with less support or resources. Leaders clarified repeatedly that Lean was about how we do our work and continuous process improvement.

Ending the old ways was a leadership practice that consisted of taking actions like retitling old positions that were not in alignment with Lean principles, renaming performance

measurements and metrics using Lean language, and providing opportunities for staff and leaders to visit other companies who were using Lean to see it working.

Finally, rewards were offered as a leadership practice from time to time but the sentiment among the leaders interviewed was that Lean was its own reward by establishing a more productive, safe, and engaging work environment.

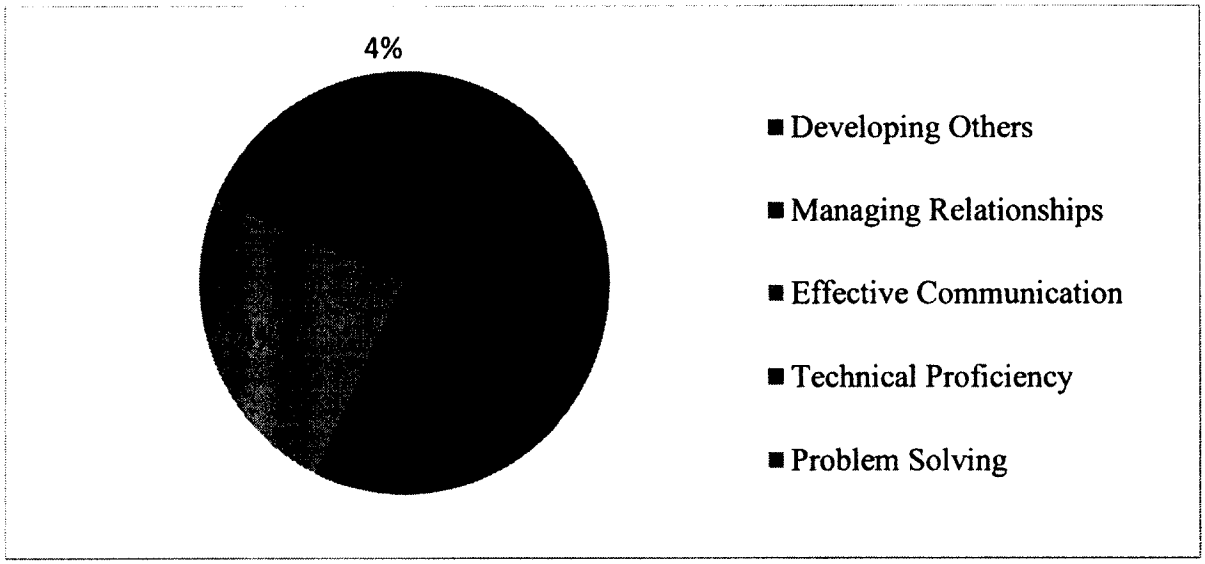

Figure 7. US Synthetic research question number three. This chart presents the leadership skills and knowledge required for successful cultural transformation as cited most frequently among interview participants at US Synthetic.

Research Question 3

Figure 7 presents the frequency analysis response data to research question number three: What are the leadership skills and knowledge necessary for successfully leading a Lean cultural transformation?

Developing others refers to the skills and competencies necessary for identifying gaps in staff member skills and knowledge and then being able to develop than gap to proficiency. Interview participants cited skills and competencies like teaching, coaching, mentoring, and following-up with staff members as part of this category.

Managing relationships refers to the skills and competencies that were described that allow one to create and sustain productive and satisfying relationships with other people in the company during a time of high and rapid change. Interview participants cited skills like patience and humility as well as dealing with conflict and difficult people as critical leadership skills.

Effective communication refers to skills that were frequently mentioned that allow someone to effectively send and receive important messages and instructions from one person to another. Participants cited competencies and skills like listening, learning to ask good questions, making presentation, and comfort with public speaking as some of the core competencies of this category.

Technical proficiency refers to one's ability to learn and master the Lean philosophy, principles, tools and techniques. And problem solving refers to an ability to remove obstacles for people while not removing responsibility, and facilitating problem solving in a group setting.

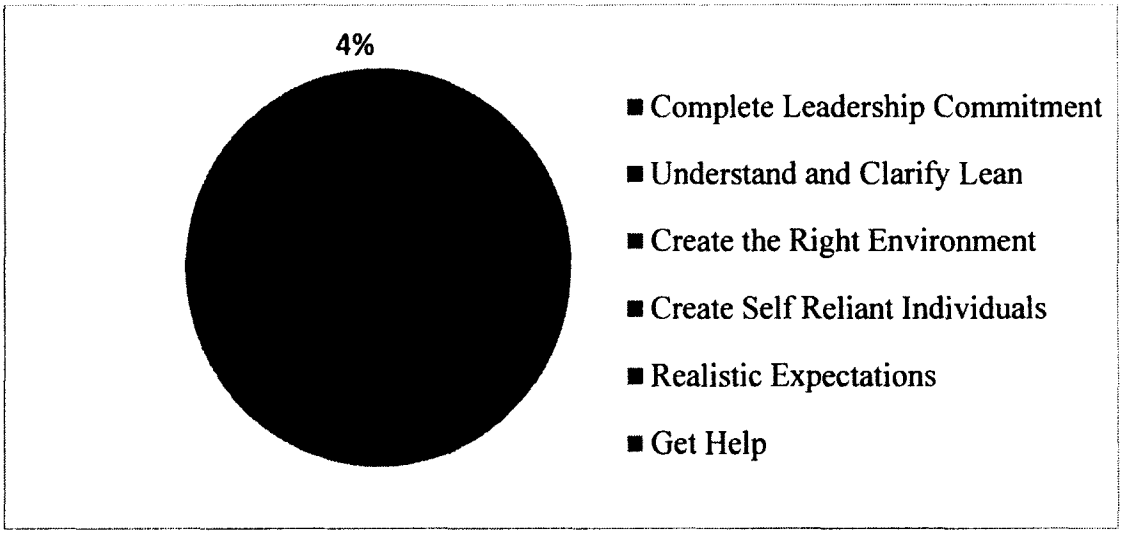

Figure 8. US Synthetic research question number four. The chart presents the leadership strategies required for successful cultural transformation cited most frequently by interview participants from US Synthetic.

Research Question 4

Figure 8 presents the frequency analysis response data to research question number four: What are the leadership strategies and advice for completing a large-scale cultural transformation using Lean methods?

Complete leadership commitment refers to comments from participants that had to do with being honest with themselves and really understanding why they were considering making such a change. Participants tended to agree that there can be no ulterior motive from management or intent to simply reduce overhead by applying some Lean tools. There was a strong sentiment that in order to do this you must be willing to invest time and money to see it work. Leadership commitment had to be pure and comprehensive.

Understand and clarify Lean means mastering the principles and tools for yourself before you can teach them to others, and taking time upfront to ensure that people understand that Lean is not about reducing or eliminating jobs but rather is about learning a new way of doing work.

Participants offered statements like; organizational change is not about tools, positive change is about our culture and how we do things; Lean is not about fixing broken people, but rather about improving our processes; and you must be able to explain why we are doing this to other people.

Create the right environment refers to comments about establishing a working environment where people feel safe to experiment with how they complete their work. Leaders recommend creating experiences for people so that they can see for themselves how the new way works and what the value is for them. Establish a common language through training and then make time in people's schedules for them to practice and integrate the new ways of doing their work.

Create self-reliant individuals means spending time to develop the skills and knowledge of other people. This requires a complete shift in thinking from managers deciding what needs to be done and telling people how to do it, to providing people with tools and training and then following up with them regularly to see how they are using those new skills and knowledge to improve their work and their own lives.

Realistic expectations refer to the amount of time it will take to transform an organizations culture and methods for doing work. Not everyone will adapt to new ways as quickly as others. Leaders suggest being patient with people and not attempting to change everything all at once; rather, create small wins and build on your success before moving on to other techniques and changes. Leaders must be willing to invest in the process and be patient for results. The kind of results leaders expect could take years to manifest.

Finally, leaders suggest that getting help in order to be successful by reaching out to other organizations that have gone through the cultural change and who are successfully realizing and

sustain gains from implementing Lean methods. Leaders recommended visiting successful Lean companies and talking with experienced leaders.

Presentation of Results for Metalworks

The following section presents the survey and interview results for Metalworks. The findings are summarized briefly at the end of the chapter.

Survey Results

Survey results are organized by the hypotheses that were tested. Four hypotheses were researched in the survey with respondents being asked to force rate their level of agreement with the hypothesis statement by percentage. Analysis of variance is used to draw conclusions about the validity of each hypothesis.

The demographics of the survey population tend to illustrate a mid-career skilled laborer with significant tenure at the company, who had little to no experience with Lean prior to implementation. The following tables provide additional detail on the demographics of the survey audience.

Table 8

Male and Female Survey Respondents from Metalworks

#	Answer	Distribution	Response	%
1	Male		10	77%
2	Female		3	23%
	Total		13	100%

Table 8 depicts the ratio of male and female survey respondents at Metalworks. 13 people completed the survey. 77% of the respondents were male and 23% were women.

Table 9

Age Groups of Metalworks Survey Respondents

#	Answer	Distribution	Response	%
1	Under 20		0	0%
2	20 to 29		1	8%
3	30 to 39		2	15%
4	40 to 49		8	62%
5	50 to 59		1	8%
6	60 or above		1	8%
	Total		13	100%

Table 9 presents the age categories of the survey respondents at Metalworks. 77% of the respondents were between the ages of 30 and 49 with a mean age of early 40's.

Table 10

Survey Respondent Tenure with Metalworks

#	Answer	Distribution	Response	%
1	Under a year		0	0%
2	1 to 5 years		1	8%
3	6 to 10 years		3	23%
4	11 to 15 years		4	31%
5	16 to 20 years		2	15%
6	21 to 25 years		2	15%
7	26 to 30 years		1	8%
8	Over 30 years		0	0%
	Total		13	100%

Table 10 presents the tenure of the survey respondents at Metalworks. 69% of survey participants had been with the company between 6 and 20 years with a mean of 14.5 years.

Table 11

Leadership Roles of Survey Participants at Metalworks

#	Answer	Distribution	Response	%
1	Individual Contributor		4	31%
2	Supervisor		4	31%
3	Team Leader		0	0%
4	Department Leader		4	31%
5	Executive		1	8%
6	Senior Executive		0	0%
	Total		13	100%

Table 11 shows the distribution of leadership roles among the survey participants at Metalworks. Survey respondents represented a wide range of leadership roles within the company with 31% reporting they are individual contributors and 69% holding entry-level, middle and senior leadership positions.

Survey participants demonstrated a relatively low level of experience with Lean prior to the cultural transformation with 85% reporting that they had under a year of experience with Lean prior to the implementation. This dynamic changes significantly post implementation with 62% of survey respondents reporting 6 to 10 years of experience with Lean after their cultural transformation.

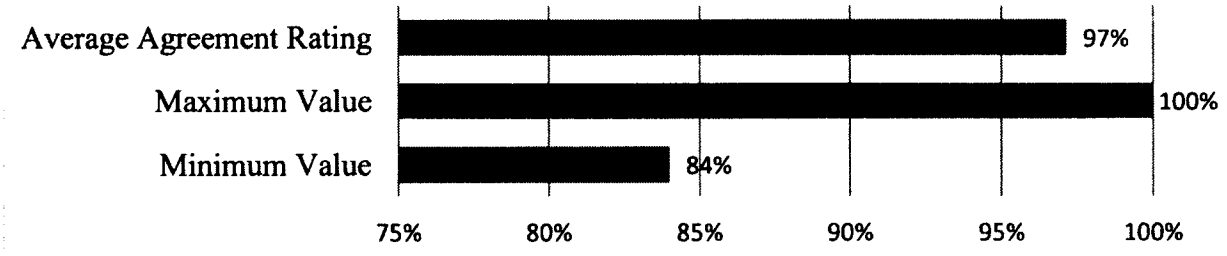

Figure 9. Metalworks hypothesis number one. Chart depicts an 87% agreement rating among survey respondents at Metalworks indicating that effective organizational leadership is required for successful cultural change.

Hypothesis 1

Figure 9 presents the results of hypotheses test number one. Respondents were asked to rate their level of agreement on a sliding scale with 0% being strongly disagree and 100% representing strongly agree with the following statement: Effective leadership is required for successful cultural transformation. Participants gave hypothesis number one a 97.15% average agreement rating.

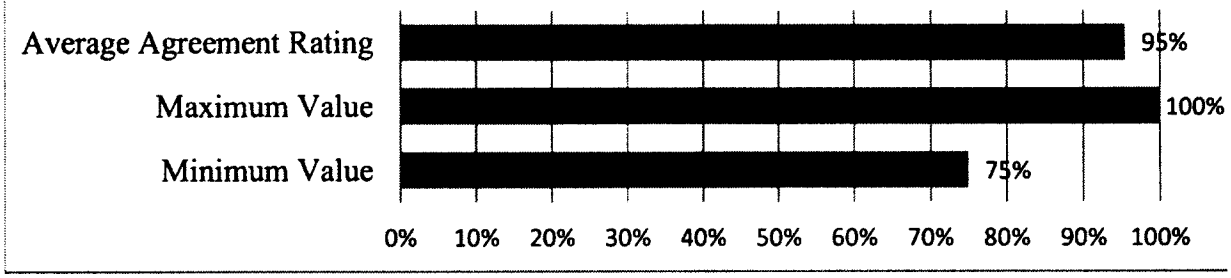

Figure 10. Metalworks hypothesis number two. Chart depicts an 87% agreement rating among survey respondents at Metalworks indicating that effective organizational leadership is required to sustain cultural change.

Hypothesis 2

Figure 10 presents the results of hypotheses test number two. Respondents were asked to rate their level of agreement on a sliding scale with 0% being strongly disagree and 100% representing strongly agree with the following statement: Effective leadership is necessary to sustain the gains realized from cultural transformation. Participants gave hypothesis number two a 95.46% average agreement rating.

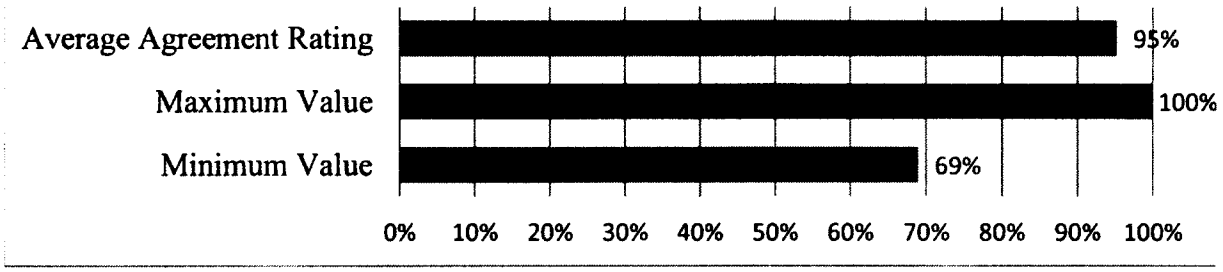

Figure 11. Metalworks hypothesis number three. This chart reports an 85% agreement rating among survey participants at Metalworks indicating that effective organizational leadership can be defined and developed with the organization.

Hypothesis 3

Figure 11 presents the results of hypotheses test number three. Respondents were asked to rate their level of agreement on a sliding scale with 0% being strongly disagree and 100% representing strongly agree with the following statement: Effective cultural change leadership can be determined and implemented within an organization. Participants gave hypothesis number three a 95.23% average agreement rating.

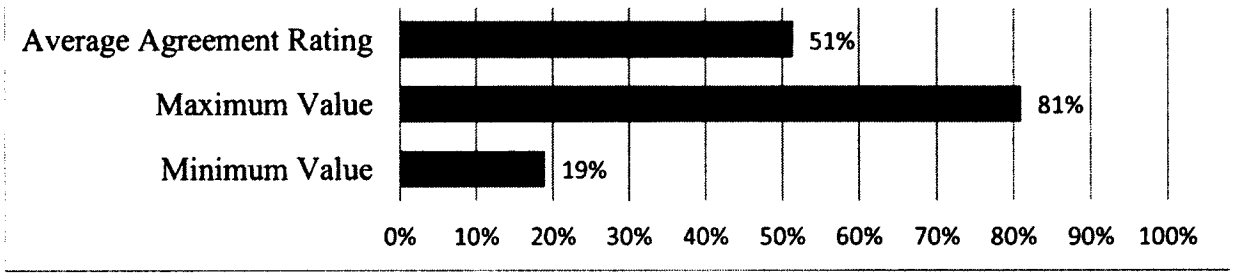

Figure 12. Metalworks hypothesis number four. The chart reveals that survey participants had an average agreement rating of only 50% illustrating that people at Metalworks did not feel as strongly that the organization began the Lean cultural transformation with the necessary leadership competency already in place.

Hypothesis 4

Figure 12 presents the results of hypotheses test number four. Respondents were asked to rate their level of agreement on a sliding scale with 0% being strongly disagree and 100% representing strongly agree with the following statement: Metalworks started its Lean cultural transformation with the necessary leadership competency already in place. Participants gave hypothesis number four a 51.46% average agreement rating.

Interview Results

The interview results are organized according to the research question that was posed to the interview participants. 5 interviews were conducted at Metalworks. 60% were female and 40% male. The average age was early 50's. Average tenure of the group was 22 years with the company. All participants held leadership roles during the beginning of the Lean cultural transformation.

Figure 13. Metalworks research question number one. The pie chart depicts the leadership challenges associated with Lean cultural transformation cited most frequently by Metalworks interview participants.

Research Question 1

Figure 13 presents the frequency response data to research question number one: What are the leadership challenges associated with Lean cultural transformation?

Resistance to change refers to the actions and behaviors of the technical staff represented by the union. The resistance stems from people's misunderstanding of Lean and the fear that they would end up losing their jobs because of the new ways.

Knowledge of Lean refers to the leadership team not knowing anything about Lean when they first started. Even with training for the managers it took some time to develop the principles and techniques into skills and knowledge that they could pass on to the rest of the organization. Turnover refers to the union strike. The union organized a strike because of Lean and never came back to work. The company almost didn't survive the ordeal and attribute their survival to the irony that if they had not been as far along with the implementation of Lean that they would not have survived the strike.

Couldn't sustain the gains refers to leading into the transformation with the Lean tools and hoping that people would adopt the practices. The leaders tended to agree that a tools-only approach did not work and staff members would just allow their shop area to resort back to the old ways as soon as the managers took their eyes off the process. The leaders struggled to get staff members to take ownership of the change and the new methods and tools.

Leadership capabilities and support refers to the condition of the leaders coaching, training, and teaching skills before the implementation of Lean began. The leaders had to develop their own capabilities as they went along.

Working in two worlds refers to the dynamic of needing time to learn and implement Lean while still using the old ways of production to meet production goals and timelines. Leaders had to make time for themselves and others to work on the principles and techniques during each shift.

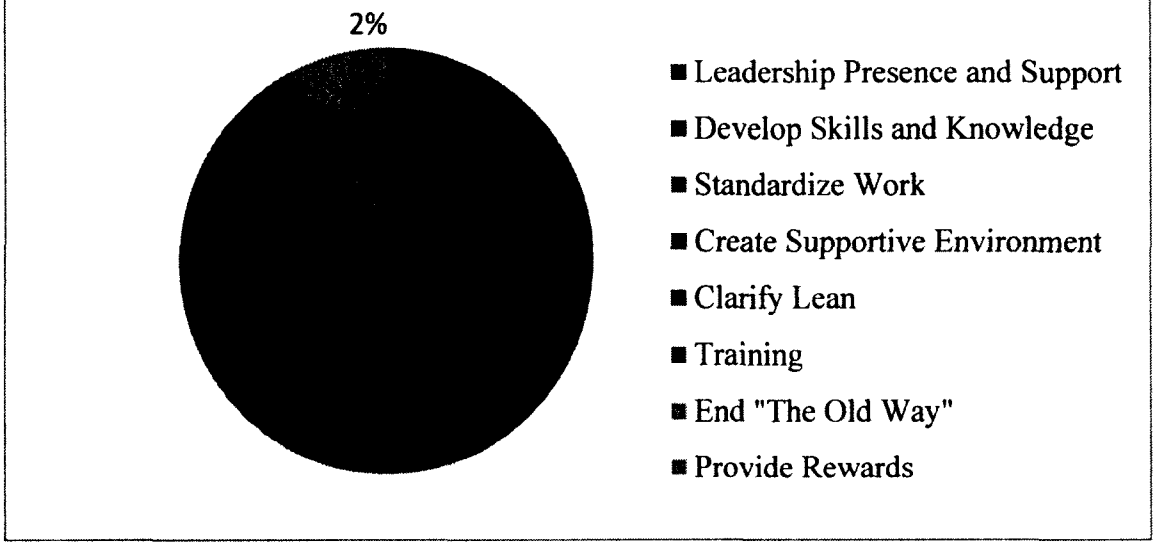

Figure 14. Metalworks research question number two. The chart depicts the leadership practices cited most frequently by interview participants at Metalworks as necessary for successful cultural transformation.

Research Question 2

Figure 14 presents the frequency analysis response data to research question number two: What are the leadership practices required for successful Lean implementation and cultural transformation?

Leadership presence and support refers to managers learning the principles and techniques first then teaching them to others. Managers worked as the trainers and teachers for the rest of the company. Leaders comments included the importance of having senior leadership backing and being sure that all managers where spreading the same message to the staff.

Develop skills and knowledge refers to the importance of identifying gaps in skills and knowledge and developing them through training, exercises and simulations, and coaching. Interview participants cited using the 5's to clean and organize the shop floor and the importance of creating their own problem solving model.

Standardize work refers to creating and documenting one-way that a job should be completed no matter who is performing the function. The managers determined how people should be spending their time during each shift.

Create supportive environment refers to increasing engagement by starting out slowly, having hourly employees join in Kaisen events and other meetings, and keeping the message positive.

Clarify Lean means taking the time to talk with employees and reassure them that Lean is not about "leaning out" staff, but rather about improving processes. Managers must be able to communicate why the company is changing.

Training refers to the training that the managers went through in the beginning to learn about Lean. Only the managers attended the training which was conducted by an outside consultant. Leaders also commented on the importance of reading and learning on their own to further master their understanding of Lean principles and techniques.

End the old ways refers to steps taken to stop old behaviors. For example, the company rewrote part of their performance management assessment taking out things like "fire-fighting" and replacing them with problem solving and other Lean techniques.

Provide rewards refers to the efforts the company took to reward staff for utilizing the Lean tools.

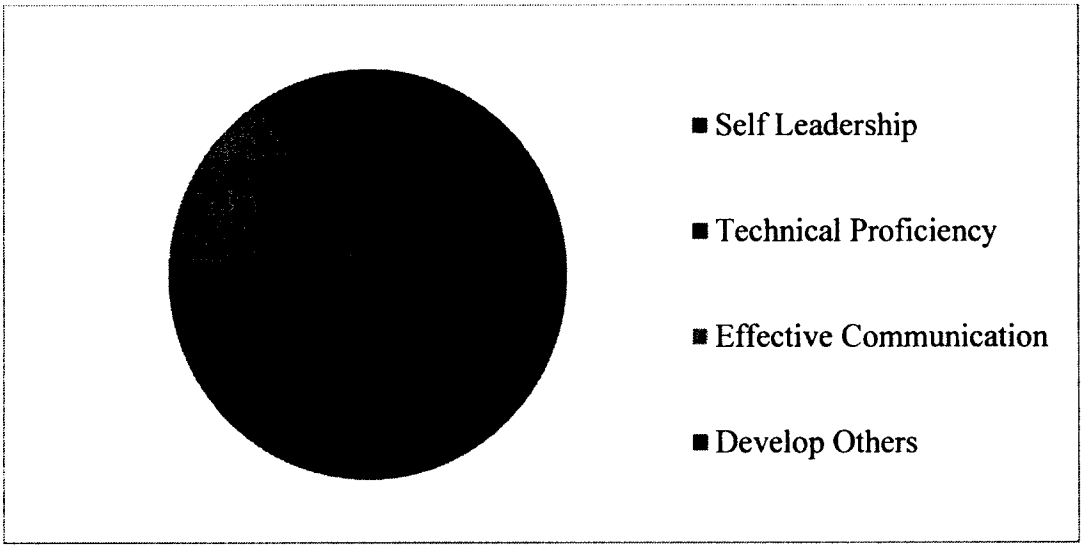

Figure 15. Metalworks research question number three. This chart presents the leadership skills and knowledge required for successful cultural transformation as cited most frequently among interview participants at Metalworks.

Research Question 3

Figure 15 presents the frequency analysis response data to research question number three: What are the leadership skills and knowledge necessary for successfully leading a Lean cultural transformation?

Self-leadership refers to the skills that were necessary to learn Lean and become an effective coach and teacher for other people. Some of the skills mentioned include educating yourself on Lean, staying positive, and learning to deal with uncomfortable situations. Technical proficiency refers to learning and mastering the Lean principles and techniques and being able to teach them to others,

Effective communication refers to the skills necessary for explaining why the company is changing and to teaching others the principles and techniques at different levels and positions throughout the company, and develop others refers comments about the importance of being able to develop the skills and knowledge of other people.

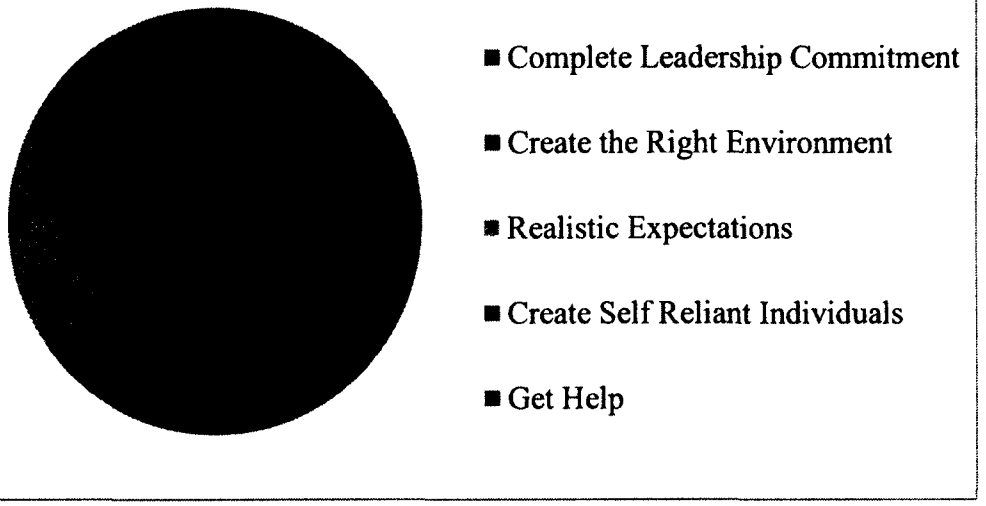

Figure 16. Metalworks research question number four. The chart presents the leadership strategies required for successful cultural transformation cited most frequently by interview participants from Metalworks.

Research Question 4

Figure 16 presents the frequency analysis response data to research question number four: What are the leadership strategies and advice for completing a large-scale cultural transformation using Lean methods?

Complete leadership commitment refers to comments from participants that had to do with having 100% belief in the process and the tools. Participants pointed out that you will be challenged and tested at every corner during this large scale change and that you must be able to stay strong and committed to seeing it through.

Create the right environment refers to comments that participants made about creating and sustaining an environment where people can experiment with how they do their work, and getting everyone involved with the effort.

Realistic expectations refers to comments made by participants that it takes time, that things won't change overnight, and that you can't do everything all at once. Leaders

recommended that your organization be sure you want to change everything about who you are and how you do work. It was clear that these leaders learned that cultural change is far more than implementing a few new tools or processes.

Create self-reliant individuals refers to comments made by participants that people need the tools and training to make the change, and that it will take them time to master the techniques. This category suggests that it is important for leaders to help other people to start thinking for themselves instead of simply waiting for management to tell them what to do and how to do it.

Finally, get help refers to seeking assistance from outside the organization by either contracting with a qualified consultant or visiting other companies who have successfully migrated to Lean.

Discussion of Findings

Analysis of variance or ANOVA was utilized to plot the high, low, and median response rates from participants in the survey. These response rates were converted and reported in bar chart format and conclusions were presented about the validity of each hypothesis. A frequency analysis technique utilized and published by Daley and Onwuegbuzie (2010) was used to transform interview data into numbers using a binary scale to count the number of times a theme occurred in the interview data. The numeric frequency was converted into percentages and reported in pie chart format.

Combining the results of the two companies yields an average median agreement rate of 92% for hypothesis number one and 91% for hypothesis number two. These findings reflect strong validity that effective organizational leadership is required for creating and sustaining successful cultural change. It is interesting to note however that both organizations reported that

they did not have enough organizational leadership in place when they initially started their Lean cultural change. Combining the results of hypotheses number four yields an average median agreement rate of only 50.5% clearly suggesting that both companies thought that their leadership strategies, skills and practices were not fully developed to the level each organization needed prior to the start of their cultural transformation. Fortunately however, both organizations tended to agree that organizational leadership can be developed along the way. Combining the results of hypothesis number three yields an average agreement rate of 90% demonstrating strong validity from both organizations that effective organizational leadership can be identified and developed within an organization.

While there was some variance in the reported leadership challenges that each organization experienced, both companies tended to agree that 'resistance to change' and 'knowledge of Lean' were the two largest challenges encountered during their cultural transformations. These two leadership challenges alone accounted for 73% of all reported leadership challenges at US Synthetic and 67% of the challenges reported at Metalworks for an average of 70% between the two companies.

Effective leadership practices varied somewhat from one organization to another too but the top three practices were the same with 'develop skills and knowledge' having a combined average of 55%, 'leadership presence and support' scoring a combined average of 25.5%, and 'create supportive environment' totaling a combined average of 12.5%. Together these three leadership practices accounted for 93% of the leadership practices reported as necessary for creating and sustaining large-scale cultural change.

Leadership skills and knowledge proved to be the area where the two organizations differed the most with Metalworks reporting that more than half of the required skills and

knowledge had to do with 'self-leadership' and US Synthetic reported that more than half of the required skills and knowledge had to do with 'developing others' and 'managing relationships'. Where the two companies did tend to agree in this category was that 'technical proficiency' and 'effective communication with staff' made up the majority of the other half of required leadership skills and knowledge with a combined average of 40%.

Both companies agreed that the most important leadership strategy was 'ensuring complete and total leadership commitment' to understanding and supporting the Lean cultural change. This one strategy accounted for a combined average of 35.5% with 'create the right environment' scoring the second highest strategy at a combined average of 20%. These two leadership strategies together, account for over half of the advice that the companies would offer other organizations that were considering a Lean cultural change. 'Create self-reliant individuals' was next highest strategy with a combined recommendation of 15.5% and 'setting realistic expectations' was a close fourth at 14% of the combined percentage points. Other strategies included 'getting help' and 'understanding Lean'.

Summary

This chapter presented the results of conducting 10 qualitative interviews with leaders from US Synthetic and 5 qualitative interviews with leaders from Metalworks who were part of each organization's large-scale cultural change using Lean methodology. This chapter also presents the results of administering two online surveys to over 100 people from these same two companies which was designed to test the study's four main hypotheses. The interview data was analyzed using frequency analysis made popular by Daley and Onwuegbuzie (2010) and the survey results were presented using analysis of variance.

The data confirms that effective organizational leadership is a requirement for successful large-scale cultural change. The data also reveals that the leadership strategies, practices, skills, and knowledge necessary for successful large-scale cultural change can be identified and developed to increase an organization's chances at realizing success. A more robust discussion of these findings is presented in the next chapter along with limitations and implications for practice. Chapter five will discuss the conclusions of the study by answering the research questions and hypotheses, and present a cultural change leadership model that has been developed based on the results of the study. This model may assist other companies with their own large-scale cultural changes using Lean methods to catalyze and sustain a culture of continuous process improvement.

Chapter Five: Discussion of Results

The purpose of this chapter is to present a discussion of the results for this mixed methods research study on organizational leadership and cultural change. An initial and cursory discussion of the results was presented in chapter four; this chapter will build on these initial findings to reveal critical leadership practices, patterns of behavior, and leadership strategies that can be utilized to facilitate successful cultural transformation at any organization.

The chapter first answers the research questions posed in chapter one and reveals the insights learned from testing hypotheses about the importance of organizational leadership during times of cultural change. A model for realizing successful cultural change emerges from careful consideration of the data gathered and analyzed from two successful organizations. This model is presented and discussed as part of the chapter's findings and conclusions.

Limitations and implications of the study are discussed and recommendations are made for considering future studies on effective leadership and cultural change. Throughout the chapter leadership quotes from the interview participants from both companies are presented to further validate and clarify many of the findings.

The chapter ends with a summary of the key findings and insights learned from the successful facilitation of this important and interesting mixed methods research study.

Findings and Conclusions

This section of the chapter answers the quantitative and qualitative research questions posed in chapter one and examines the results of testing each of the study's hypotheses by triangulating the survey and interview data from both US Synthetic and Metalworks

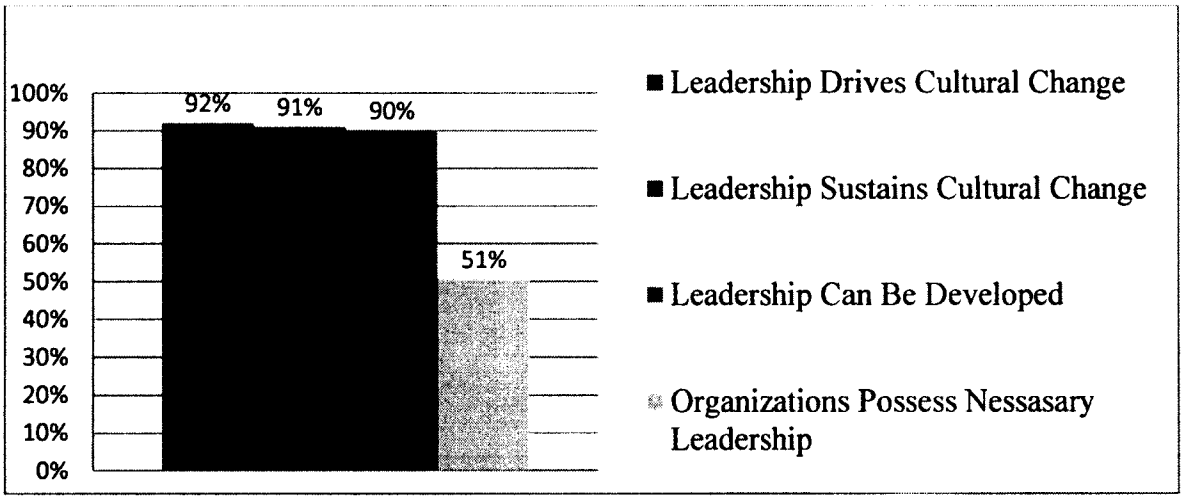

Figure 17. Triangulated hypotheses data. This chart demonstrates that there was strong agreement with hypotheses 1, 2, and 3 from both companies, and that both companies did not agree as strongly that organizations enter into large-scale cultural transformations with the required leadership already in place.

Hypotheses and Research Questions

This study sought to answer the central quantitative question; does the quality of an organization's leadership determine the outcome of Lean cultural transformations?

The answer to this question is revealed by examining the results of the hypotheses tests conducted in the two online surveys. Figure 17 presents the triangulated results of the hypotheses data. Over one hundred individuals who had participated in a successful large-scale cultural change were asked to rate their level of agreement with the following hypotheses about the impact and importance of organizational leadership during times of cultural change and organizational transformation. Triangulation of the data from both companies demonstrated a high agreement rating of 92% indicating that effective leadership is required for successful Lean implementation and cultural transformation. The respondents also concurred that effective leadership is necessary to sustain the gains realized from Lean process improvement implementation with a triangulation of data rate of 91%. In other words, nearly everyone who

participated in the survey reported that effective organizational leadership is required for catalyzing and sustaining cultural change.

Somewhat ironically the survey also revealed that most companies begin large-scale cultural changes with the necessary leadership competency already in place. Respondents only rated this hypothesis with a 50.5% agreement and yielded the survey's only 0% agreement rating. This data suggests that many companies enter into large-scale cultural change initiatives significantly unprepared for the leadership demands and requirements of such an endeavor. Fortunately however, the results of the survey also revealed that effective Lean leadership can be determined and implemented within an organization with an average triangulated agreement rating of 90%. This suggests that any organization can prepare for cultural change and increase their chances for success by evaluating and strengthening their organizational leadership skills and knowledge prior to and during the cultural transformation. Examination of these results clearly demonstrates resounding agreement that the quality of an organization's leadership does in large part determine the outcome of Lean cultural transformations.

With effective leadership occupying such an important and critical place in the successful transformation of organizations and organizational culture, what then, are the organizational leadership requirements necessary for completing such an important transformation? This is the central qualitative question of the study. By conducting 15 interviews with leaders from two award winning organizations, who had successfully completed a large-scale cultural transformation, and cross comparing or triangulating their interview data with survey responses from a larger audience of over 100 people, the leadership requirements and secrets to facilitating successful cultural change were identified.

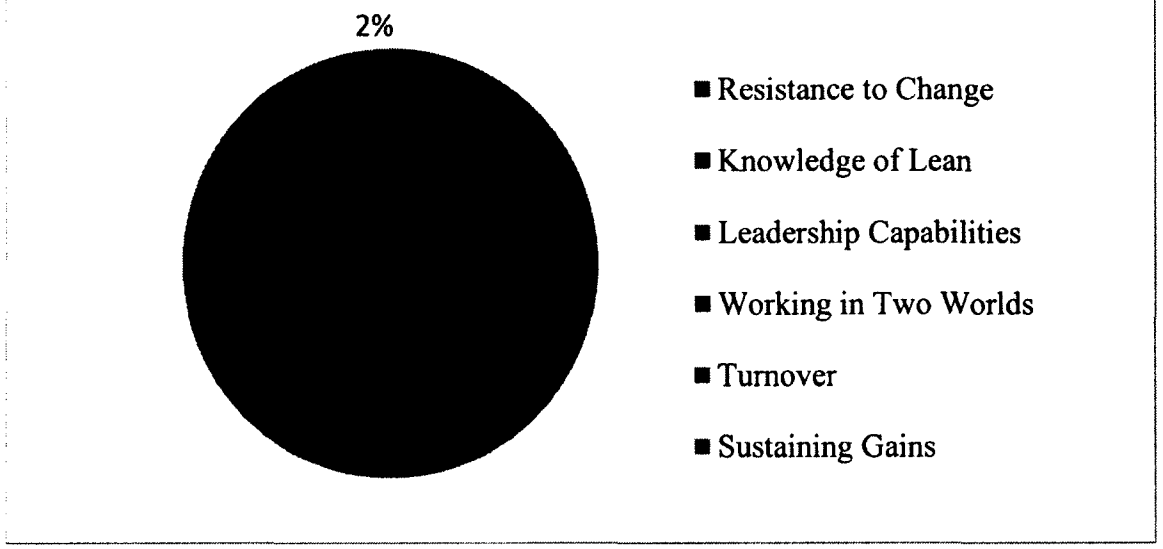

Figure 18. Triangulated leadership challenges. This chart presents the combined leadership challenges from both US Synthetic and Metalworks.

The study started by identifying and examining the leadership challenges cited by both organizations. Figure 18 reveals the triangulated data from both US Synthetic and Metalworks. The main leadership challenges encountered during cultural change were resistance to change, knowledge of Lean, internal leadership capabilities, the ability to work simultaneously in two worlds, turnover, and sustaining initial gains.

By examining the response to these challenges taken from both leadership teams, it is possible to identify the necessary leadership practices, skills, knowledge, and other secrets to success required for overcoming these challenges. Figure 19 demonstrates that the ability to develop new skills and knowledge, ensuring leadership presence and support, creating the right environment, and providing training accounts for 80% of the leadership practices necessary for transforming an organization's culture.

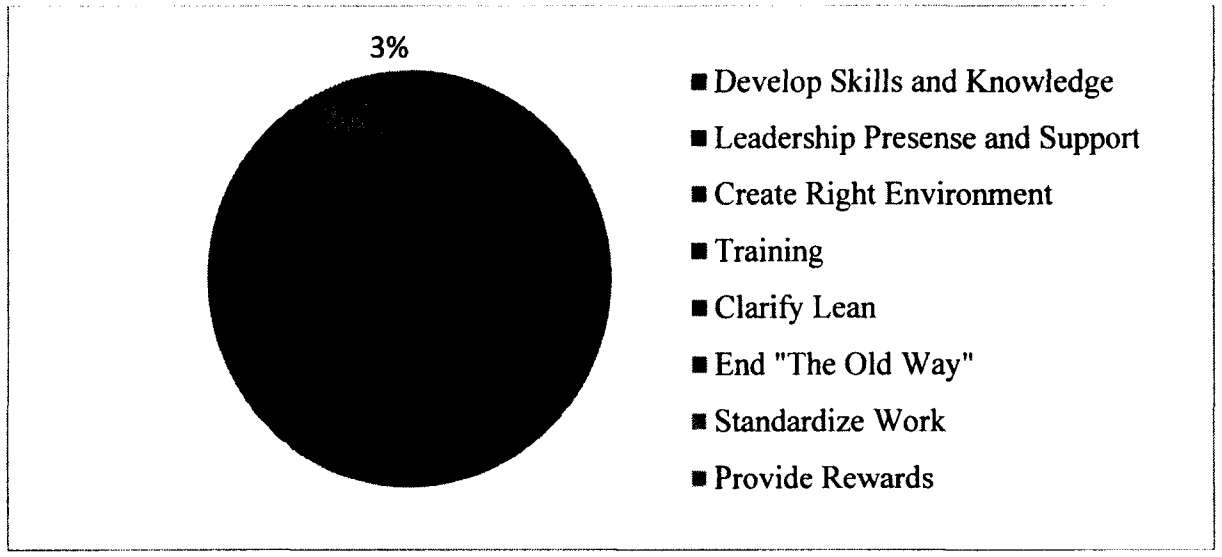

Figure 19. Triangulated leadership practices. This chart combines the results from US Synthetic and Metalworks to reveal the required leadership practices for ensuring successful cultural transformation using Lean methods.

Figure 20 triangulates the data from both companies concerning the required leadership skills and knowledge necessary for successfully leading a Lean cultural transformation. The data reveals that effective communication skills, technical proficiency and mastery of Lean principles and techniques, and effective relationship management account for over 75% of the reported leadership skills and knowledge required for leading successful cultural change.

Finally, figure 21 presents the combined leadership strategies and advice for ensuring successful cultural transformation. Triangulating the data from US Synthetic and Metalworks reveals that ensuring complete leadership commitment, and creating both the right environment and self-reliant individual's accounts for nearly 90% of the recommended strategies and advice for successfully completing a large-scale cultural change.

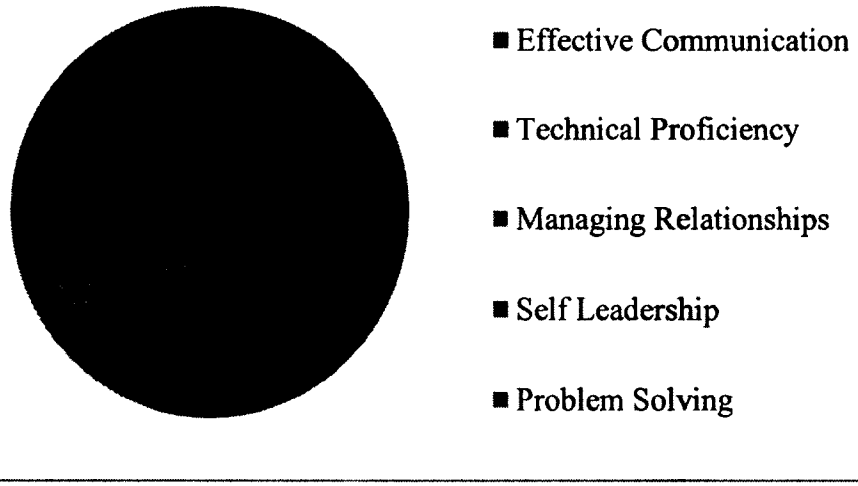

Figure 20. Triangulated leadership skills and knowledge. This chart combines the results from US Synthetic and Metalworks to reveal the required leadership skills and knowledge necessary for ensuring successful cultural transformation using Lean methods.

By answering the research questions and addressing the hypotheses presented in this study, a cultural change model emerges from the data. This model may be utilized by other organizations to prepare for and facilitate their own successful Lean cultural transformations. The model is discussed in greater detail in the following section.

Figure 21. Triangulated leadership strategies and advice. This chart combines the results from US Synthetic and Metalworks to reveal the required leadership strategies and advice necessary for ensuring successful cultural transformation using Lean methods.

Cultural Transformation Model

The purpose of this section is to present a cultural transformation model that emerged from conducting a mixed methods research project with two Shingo Prize winning manufacturing companies in the United States. The model below describes the environmental stimuli that are driving the need for cultural change in today's organizations. These stimuli are well documented in the literature on leadership effectiveness, continuous process improvement, and cultural change (Boatman & Wellins, 2011; Bonaccorsi, 2011; Darling, 2009; George, 2002; Jenkins, 2012; Ng, et al, 2010). The model in figure 22 reveals the five leadership commitments necessary for successfully facilitating a prize winning cultural transformation. The model describes the results organizations may realize by completing such a cultural transformation and demonstrates how a more focused, flexible, and competitive organization can evolve from such cultural transformation efforts. The section concludes with additional observations and insights learned from the study participants.

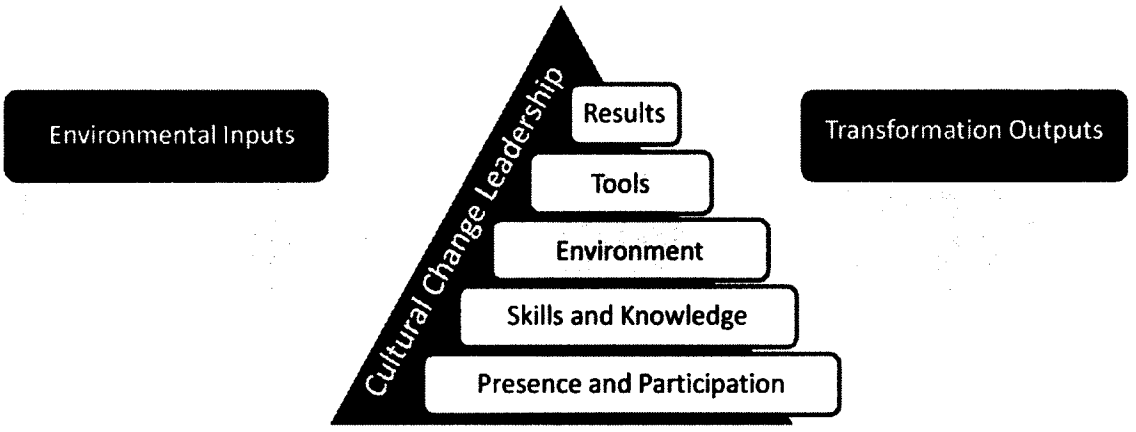

Figure 22. Cultural transformation model. The figure presents the cultural transformation model that emerged from careful analysis of triangulated interview and survey data.

It has been established from a review of the literature that companies today are facing increasing pressure from customers and competitors (George, 2002). Organizational leadership and the United States socioeconomic system is in a state of turmoil unlike any in recorded history, thereby calling for adjustments of major importance for the meaningful development of organizations (Boatman & Wellins, 2011; Darling, 2009). Economic changes have forced manufacturing and service industry companies alike to seek new production and operations strategies in order to enhance their competitiveness in the global market place (Bonaccorsi, 2011; Darling, 2009; Jenkins, 2012; Ng, et al, 2010). Although many companies are turning to this emerging continuous process improvement strategy, the vast majority of today's organizational change efforts fail to produce their intended business results which lead to significant increases in costs, time, people, customers, and a reduction in the faith of leadership (Anderson & Ackerman-Anderson, 2001). Despite the millions of hours and dollars spent on efforts to improve key business processes companies report significant dissatisfaction with a critical aspect of those change efforts; leadership (Martinez, 1995).

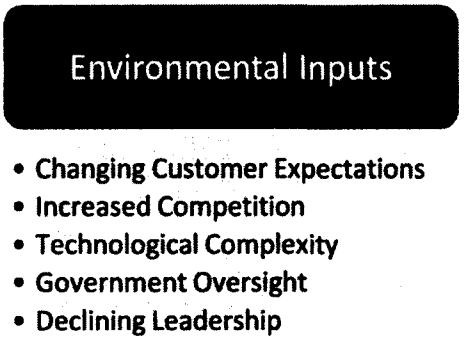

Figure 23. Environmental Inputs. This figure depicts many of the internal and external environmental factors that influence the need for organizational transformation.

Relying solely on new technology and tools to drive organizational change are no longer enough to ensure success or competitiveness in today's business environment (Svensson & Wood, 2006). It has been well researched and documented that effective organizational leadership is what sets companies apart today and that this critical competency must be developed just like any other business process (2006). Ironically, we also know that during this challenging economic time when strong and effective leaders are needed most, organizational leadership in America is at an all-time low (Bersin & Associates, 2011; Boatman & Wellins, 2011; Darling, 2009; Heifetz, et al., 2009; Svensson & Wood, 2006). These changes in the internal and external environment are represented in the first component of the cultural change model as seen in figure 23.

Customers are placing increased demands on organizations to provide higher quality products and services, faster and cheaper than they ever have before. These customer demands create a need for companies to lower their operating costs while developing flexibility and increasing production and service levels. The world's business environment has grown increasingly competitive as new technology rapidly increases globalization. This new technology

has also grown in complexity and organizations must finds ways to create both flexibly and rigor in their strategies and processes to survive and seize on emerging opportunities presented by these new methods for doing business in an increasing global marketplace. Local, federal and international political and governmental policy is also placing increased demands on companies to operate in compliance with new legislation from complex federal oversight like Sarbanes Oxley to a complex web of local requirements and restrictions like Assembly Bill 1825. These government inputs are forcing companies to find new ways of conducting and reporting business operations and results. Finally, the deteriorating efficacy and availability of effective organizational leadership has left organization with a dilemma unlike anything we have seen in the recent past; where have all the good leaders gone? These stimuli serve as the environmental inputs that drive how companies must respond to the world in which they operate. These inputs create the need for companies to seek new strategies for competing and succeeding.

Fortunately, some companies have found a solution to these challenges in the form of continuous process improvement techniques and tools. By building on the foundations established by Edward Deming with total quality management (TQM), Six Sigma, and the Toyota Production Model these companies have revealed a way to increase top line sales while driving bottom line profit growth; they are improving their safety records and dramatically reducing their workers compensation claims; they are improving employee satisfaction, engagement and productivity; they are reducing their environmental impact, and they are increasing customer satisfaction and retention across the board during a time when other companies are struggling or failing to keep up. Some of these outputs are represented visually in the outputs section of the cultural change model as seen in figure 24.

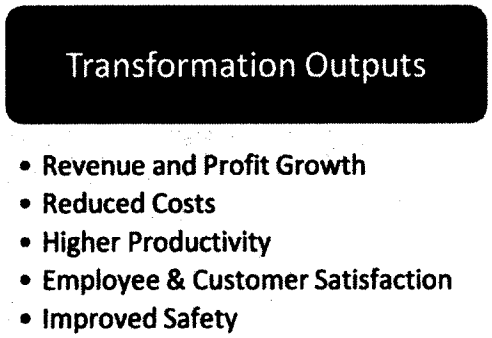

Figure 24. Cultural transformation outputs. This figure depicts some of the improvements organizations realize from successful organizational cultural transformation using Lean methods.

To achieve these types of award winning results takes complete commitment to relearning what and how you and your organization adds value to customers, and requires completely changing the culture of your organization - or as one Lean Production Manager put it, "This will flip everything about how you think and work." (J. McLelland, personal communication, September 19, 2013)

By conducting a series of qualitative interviews with leaders at these companies and by administering a quantitative online survey to over 100 people at multiple organizations who have experienced this cultural transformation, it has been possible to develop the following cultural transformation model. The model depicted in figure 25 begins by establishing the foundation for any large scale cultural change and moves up through the following stages of change in their order of importance and impact on catalyzing and sustaining a cultural transformation.

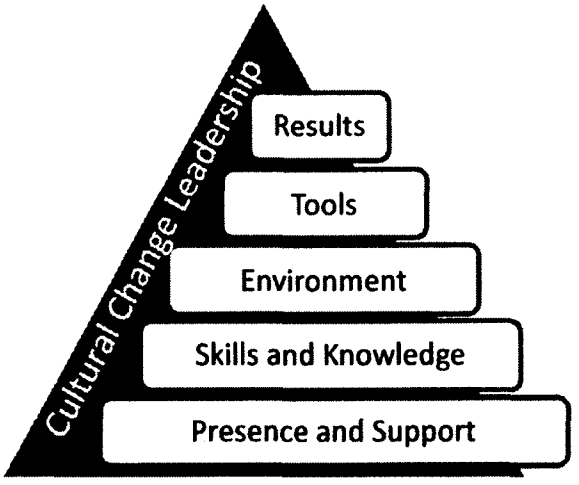

Figure 25. Cultural Change Leadership. The figure is a visual representation of the leadership requirements for successful cultural change.

The model is the shape of a pyramid suggesting that the foundational elements of the model must be ensured first followed by each of the ascending leadership requirements. These stages of cultural transformation are also represented visually by their size and importance according to the frequency with which they appeared in the study interview and survey data. Establishing leadership presence and participation in the transformation is nearly three times the importance as say new tools, techniques or technologies for example. This may produce something of a dilemma for some people. Leaders who think that making more money is a simple matter of implementing some new tools or disruptive technology will be greatly disappointed to learn that the implementation of tools and technology in this model come later in the transformation and account for only a small portion of the work that must be done to ensure full cultural transformation. Eric Pope, Operations Vice President at US Synthetic put it this way, "This is about cultural change, not just applying a bunch of tools" (E. Pope, personal communication, September 21, 2013). Figure 25 presents the leadership requirements necessary for successful cultural transformation.

Leadership Presence and Participation

Perhaps the single most important and critical element to achieving Lean cultural transformation was reported to be the role that organizational leadership plays in the process. Sue Caudill, Value Stream Manager exclaimed, "Without the full support and participation from senior management you may as well just forget it." (S. Caudill, personal communication, September 26, 2013). Complete commitment and support to total transformation, from the CEO or owner of the company to the most entry level supervisor, is the first and most critical element of the Lean cultural transformation. Without it the effort will struggle and most likely fail, costing the company precious money, time, and the reputation of its senior leadership team. Company leaders must be tenacious in their efforts to change how people think about their work and the value that they add for customers and be even more patient for results. The most enlightened Lean leaders agree that the transformation is never complete, that they are always seeking new levels of continuous improvement. The role of leadership is to catalyze the change but Lean is not something that can be done to other people. Forcing others to comply will only create resistance and build animosity in the environment. Instead, leaders must model the way by participating in all activities from the initial training on Lean principles and techniques to the facilitation of Kaisen events. Leaders must frequently and consistently 'Walk the Gemba' or go and see for themselves how people are progressing and applying what they are learning. "You must go to where your people work and see for yourself, in order to feel their pain," advised Rob Galloway, CEO of US Synthetic (R. Galloway, personal communication, September 17, 2013). Leaders who think that simply writing a check for training or new equipment is enough support will be disappointed when initial results are not sustained. Cultural change must become the philosophy, the language, and the vibration of the entire plant or organization and that will not

happen until leaders are present and participating in the endeavor. This means that company managers and owners must be willing to invest the time and money necessary to make the transformation successful and there must be an understanding among management that this effort is a process that may take many years to accomplish. With complete and total commitment and participation from organizational leadership the organization will be ready to take the next step in their transformation.

Develop Skills and Knowledge

Organizations reported experiencing higher rates of success and less resistance to change when they took the time to invest in initial comprehensive training for ALL staff members on Lean fundamentals. From the production and assembly floor to the offices in accounting and human resources, everyone went through training at US Synthetic. This initial training helped to create a common language for all staff members around Lean and afforded leaders another opportunity to demonstrate their presence and participation in the cultural transformation. This comprehensive inclusion sends a message to all members of the company that this is important, is here to stay, and everyone will be a part of it. Team member not only begin developing their skills and knowledge but also see that their organizational leaders are committed to the process and expect each team member to come up with the new ideas and processes for continuous improvement. Comprehensive initial training for all staff members is critical to success. Team members will sense that there is only a limited interest and commitment in truly changing the organization when they see that only a handful of managers or select individuals from operations are chosen to complete the initial training. The company must go through this change together and that means investing in everyone upfront with adequate training.

Once initial training is completed effective leaders seek to create self-reliant individuals by continuing to develop the skills and knowledge of each person in their organization. Training is only the beginning of the development of skills and knowledge. Leaders must learn to identify gaps in each team member's knowledge about Lean principles and techniques and facilitate regular business simulations, exercises, and Kaisen events to develop those gaps. Nick Sloan, Production Manager, explained that, "Leadership and management must support the team members, not the other way around." (N. Sloan, personal communication, September 19, 2013). The most effective leaders will leave developing and implementing new process improvements up to the individuals doing the work; their role will become one of constant coaching and teaching, ensuring that their people have the skills and the knowledge necessary for assessing the quality of their work and making continuous improvements. Nick went on to explain that, "Leaders started to realize that they needed to create flexibility in their time and production scheduling to make room for Lean work, training and exercises" (N. Sloan, personal communication, September 19, 2013). This requires that leaders make time in daily schedules for people to continue to work on Lean training, exercises, simulations, and experiments. Working in two worlds at once can be challenging but it is necessary in order to eventually make the transition over to Lean operations.

With a base line of Lean knowledge established from initial training, and individual skills continuing to be developed by regular exercises and simulations, leaders can begin to follow up with staff and team members with continuous coaching and teaching to see how people are applying the new knowledge and tools. Eventually, leaders can place other people in charge of leading Kaisen events and implementing new solutions and processes. As individuals become more and more self-sufficient they can be placed in roles where they continue to develop their

leadership capacity by training others and coaching new team members on the fundamentals of Lean. This is an important part of the successful cultural transformation; individuals must feel that they are in charge of their work and their destiny and are driving the development and implementation of new ideas and techniques for completing their work, not management. Leaders must resist the temptation to come up with all of the solutions and new processes. Managers reported experiencing high levels of resistance when they created the value stream maps and expected staff members to comply with new processes. In order to overcome resistance to change the most effective leaders focus on developing their team members then letting them come up with the process improvements using the new tools.

Establish the Right Environment

There is an old saying that states "people won't care about how much you know, until they know how much you care". In order to begin the transformation process, well before turning attention to the implementation of tools or measuring results, effective cultural change leaders set about creating an environment where people feel safe in the wake of significant change. When it comes to Lean cultural change this is important for two reasons. First, people cannot place themselves in a state of openness to new ideas and practices if they are preoccupied with the belief that these same changes may end up costing them their jobs. Until people understand what Lean is and that no one will be losing their jobs as a result of its implementation, there will always be resistance and fear toward the cultural transformation of the organization. Therefore, effective leaders ensure that it is communicated clearly and repeatedly to every person in the organization that this new endeavor is not about eliminating jobs, or coercing people into doing more work with less, but that it is about improving processes and adding more value to our customers and our own lives. This must be accomplished early in the

process and echoed repeatedly throughout the transformation. Communicating the message that no one will lose their job over Lean must be repeated loudly and often. By its very title Lean can be misinterpreted by staff members as a way to reduce jobs. Effective leaders must communicate publicly in meetings and in other regular company correspondence that no one is going to lose their job over Lean. This message will help to calm people and assure them that no one will lose their job because of improving processes and increasing production capacity. This message must come early and be repeated often in group settings like training and meetings, and individually between managers and their staff. By establishing an environment where people trust that their jobs are safe, effective leaders reduce resistance to change.

Next, leaders must create an environment where everyone has a common language and basic understanding of Lean and its principles and techniques. Successful companies accomplish this by investing in Lean fundamentals training for all staff members. To save a few dollars by only training managers in Lean is short sighted and foolish and will not establish the right environment. Adam Earl, Customer Engineer, explained that, "You must be prepared to spend a dollar now in order to make or save ten dollars later." (A. Earl, personal communication, September 18, 2013). By sending everyone to fundamentals training staff and leaders are equipped with a common understanding about what Lean is, and is not, and an environment is established where everyone possesses a common set of terminology, definitions, and explanations about what and how to use Lean tools and techniques. Just as importantly, leaders at successful companies create an environment where people feel safe to experiment with their new found knowledge and skills. "The first time someone learns that they will be punished for making a mistake when trying the new methods, it's over," explained William Wooten, Production Manager, "Nothing will kill cultural change faster than that." (W. Wooten, personal

communication, September 18, 2013). Successful companies realize that part of learning involves taking risks, and that those risks can sometimes fail. Effective leaders participate in the learning process and coach staff members through successful experiments and learn how to give constructive feedback when team members make mistakes.

Making important changes in the work environment also includes techniques like promoting early adopters of the change into training and teaching roles. Other leaders actively seek to change the old ways by changing job descriptions and job titles to align with Lean principles and techniques. Many times production supervisor positions can be done away with and replaced with Value Stream Manager titles, and performance management and annual review processes can be updated to focus people on solving problems and adding customer value instead of 'firefighting' or reacting to daily crises.

Finally, effective change leaders realize that people will be working in two worlds at once in the beginning of the transition. Leaders must help people balance their regular established production requirements and other responsibilities of their jobs with the importance of completing Lean training, conducting exercises and simulations, and attending Kaisen events. This may involve reducing production expectations slightly in the beginning of the transition in order to make time for learning and implementing Lean. In time the old schedule will be replaced by a leaner more effective process and work schedule.

Effective leaders actively reduce people's resistance to change by establishing an environment where people do not fear losing their jobs, feel comfortable trying new things, share a common understanding and language about Lean, and support flexibility in schedules and production while the organization learns the new ways.

New Tools, Techniques, and Technologies

There is a reason why Lean tools and techniques come much later in the cultural change model and account for a far smaller representation than leadership presence and participation, creating the right environment, and developing new skills and knowledge. The literature and personal correspondence revealed that many companies enter into Lean implementation thinking that the tools and techniques are all it takes to start realizing gains. At the same time we have seen that most companies that lead into this important change with the tools and techniques are disappointed to find that the techniques themselves only yield surface-level value and temporary changes. Kandy Alverson, Production Supervisor and Buyer, explained how surprised and disappointed the management team was initially when, after committing significant amounts of time and effort to having employees perform the 5 S's and organize and clean the production floor, that only a few weeks later the shop had reverted back to its unorganized, messy, and inefficient state. "We were so excited that the techniques had left the floor looking better than ever before, but a couple weeks later the place was a mess again" (K. Alverson, personal communication, September 25, 2013). Kandy and her colleagues learned that tools and techniques alone will not sustain change, that creating and sustaining permanent award winning results would require a much more comprehensive and challenging endeavor starting with full commitment and participation from all levels of organizational leadership in the change effort. Tools are an important component of the cultural change model but they will not drive sustainable results without first creating an environment where people understand that the organization is changing how it thinks about producing value, has invested deeply in the training and development of Lean skills and knowledge, and maintains an environment where people feel safe to experiment with what they are learning. Scott Lakari, Vice President of Operations,

reflected, "75% of what we have accomplished is from self-reflection and realizing we needed to do things differently, and 25% was from implementing new tools" (S. Lakari, personal communication, September 26, 2013). Once the other leadership commitments have been established and maintained, then the organization is ready to begin implementing new tools.

The tools mentioned most frequently throughout the interviews and the survey as the most impactful to generating and sustaining value to the company and its customers included the regular and consistent facilitation of Kaisen events, value stream mapping, the five S's, and running simulations and exercises. These tools and techniques not only removed waste from existing processes but, even more importantly, catalyzed people at all levels of the organization to start thinking deeply for themselves about how they do things, how those activities and processes either add or do not add value for customers, and how changes in their work might generate additional improvements. Slowly each of the companies began to shift away from their traditional culture of waiting for management to make decisions and simply following orders handed down from upon high, to supporting the generation and implementation of new ideas generated from every employee. Production Manager, Nick Sloan, explained, "Leadership and management began developing and supporting the team members, not the other way around. Team members used the tools to produce so many new ideas and process improvements that we had a hard time even keeping up with them" (N. Sloan, personal communication, September 19, 2013). This is the time and place that leaders and staff finally began to see things start to come together. If you have laid a strong foundation by tending to the first three leadership requirements then people will begin thinking and acting differently. It has been demonstrated that it takes a significant amount of time and patience to get to this stage of the model, and that successful leaders must be realistic with their expectations and demonstrate patience for results.

Tracking and Communicating Results

As companies begin to realize results in the form of improved processes, increased capacity, increased employee and customer satisfaction, and reduced safety related incidents and accidents, effective leaders seize on these initial signs of progress to reinforce their commitment to the change effort and to communicate success to staff and customers. It is hard to argue with results, and any remaining resistance to change can quickly evaporate once staff members see for themselves that the Lean cultural transformation is going to work and make their job more satisfying and safer. Therefore, results must be attended to deliberately as part of the cultural change model and effective leaders will create a clear line of sight to the progress people are making.

In order to create that clear line of sight, leaders must establish new metrics and communicate progress to the rest of the company in regular meetings and in public areas. Effective leaders use this as an opportunity to further end the old ways by establishing new goals and measurements that support Lean implementation and cultural transformation. When your data reporting system supports Lean concepts, it will be easier for you to stay consistent with Lean principles (Krichbaum, 2007). Krichbaum (2007) suggests setting up a five category scorecard that can be used to track and communicate progress in the Lean cultural transformation. Those categories consist of metrics for evaluating safety, people, quality, responsiveness, and financial progress (2007). Safety refers to maintaining a safe workplace, people measures the development and retention of people who have the skills to deliver to the customer, quality refers to how successful the company is meeting customer, governmental, and internal requirements, responsiveness means people are meeting the needs of the customer, and financial metrics measure whether or not the company is making money. Table 12 presents

some of the measurements that can be used to track and communicate cultural transformation progress and results.

Many of the interview participants noted that the results of a Lean cultural transformation are the reward in and of themselves. Working in an area where one's ideas and suggestions are valued and implemented reinforce the behavior that is necessary for successful implementation of tools and techniques. Effective leaders also understand that people change at different rates and that it will be important to be patient for results from each person as those results may come at very differing rates and pace. David Brady, Human Resources Director, reminds others, "Don't expect everyone to come along in the same way or at the same speed" (D. Brady, personal communication, September 17, 2013. Effective leaders help people to get results by making time to celebrate early and ongoing accomplishments and by recognizing that not everyone will change in the same manner or at the same pace. These acts of recognition will help to reinforce a culture of self-reliant thinking and decision making and support organizational leaders in their efforts to create and maintain a supportive environment.

Table 12

Lean Cultural Change Metrics

Category	Measurement
Safety	Reportable Incidents
	Days worked without a lost time accident
	Ergonomic Management
People	Targeted Training Hours
	Voluntary Turnover
	Production to Skilled Trades Ratio
Quality	Delivered Quality
	Rework / Repair Cost
	Customer Complaints
Responsiveness	On Time Delivery
	Manufacturing Lead Time
	Inventory Turns
Financial	Margin $
	Manufacturing Space Used
	Conversion Cost (Labor $ / Unit)

Summary

The cultural change model demonstrates how external and internal environmental influences like changing customer expectations, increased competition, increasing technological complexity, increasing government oversight, and declining leadership effectiveness are forcing companies to find new ways to respond to increasing environmental complexity. The cultural transformation model emerged from the successful facilitation of this mixed methods research study. The model demonstrates how successful companies proactively transform their organizational cultures by creating and maintaining complete leadership commitment, presence and participation in Lean implementation and organizational change. Effective leaders transform their organizational culture by establishing and sustaining a supportive environment that focuses

on creating self-sufficient individuals, and invests deeply in the ongoing development of new skills and knowledge at all levels of the organization. Leaders at these companies take the time to set realistic expectations for themselves and others and are patient for results as they tenaciously tend to the careful and thoughtful long-term implementation of new tools and techniques (instead of seeking only short-term or temporary gains from a tools-based change strategy). Effective leaders of cultural transformation using Lean methods develop metrics that are aligned to their cultural transformation goals and objectives and celebrate progress by rewarding and recognizing individuals and teams for their growing commitment to change and the creation of value for their customers. By attending to the leadership requirements at each step of the cultural change model organizational leaders have been able to create and sustain a culture of continuous process improvement that yields transformational outputs like increased revenue and profit growth, reduced costs, higher productivity, increased employee and customer satisfaction, improved safety and fewer accidents, and higher quality products and services.

Limitations of the Study

There were relatively few limitations to this study and those dynamics exerted a very limited influence in the data collection, analysis, and development of conclusions about organizational leadership and cultural change. Those limitations consisted primarily of the type of organizations participating in the study, the diverse geographic location of the researcher and the sponsoring organizations, and the comparative size of the two organizations.

To increase the validity of findings this study used a triangulation of data strategy which cross compared and analyzed the data collected at one organization with the findings at another organization. This strategy increases the validity of emerging themes (Creswell & Plano-Clark, 2011). Triangulation can be performed successfully with two or more organizations. This study

was fortunate enough to identify and confirm two Shingo Prize winning manufacturing organizations for the study. Validity may have been increased by locating a service industry organization to participate in the study in order to triangulate the manufacturing organization data with a successful service organization like a bank, hotel, or hospital.

The researcher and sponsoring organizations were all located in different states. This geographic diversity helped to increase the validity of data but also limited the study design to using telephone interviews and an online survey tool. While these mixed data collection instruments proved effective in gathering the necessary data for the study, the researcher may have collected even more data if it were possible to actually visit each of the organizations and observe the culture at work.

Finally, a larger interview and survey pool from the second sponsoring organization may have provided additional validity to the triangulation of data.

While these limitations may have had an impact on the study, its findings and conclusions were validated by member checking and triangulation of the data. This validity strategy has yielded a strong and valuable set of best practices and a competency model that can be used by other organizations to improve their own organizational change efforts.

Implications for Practice

The study revealed several implications for practice. Through careful data collection, analysis, and triangulation of data it was revealed that organizations can improve their chances for successful organizational change by developing and implementing a rigorous leadership development strategy. This strategy should focus on gaining and sustaining commitment to organizational and cultural change from all levels of leadership in the organization. Leaders should focus their efforts on mastering their own technical knowledge of Lean principles and

techniques so that they can be effective coaches and mentors. It was demonstrated that effective leaders focus on identifying gaps in skills and knowledge of their staff and team members and relentlessly seek to develop those gaps by facilitating exercises, training, and business simulations designed to increase team member competency. Successful cultural change leaders establish an environment where people can run experiments and practice using the new knowledge and skills that they are developing without fear of retribution for making mistakes. Leaders must practice establishing an environment where people can 'plan - do - and learn' over and over again. Finally, leaders must change their focus from practicing a simple, limiting, and short term approach of implementing tools for short term and immediate results to a strategy of creating self-reliant individuals through the patient and tenacious development of each individual.

Implications of Study and Recommendations for Future Studies

This study successfully identified the leadership requirements for facilitating large-scale organizational culture transformation using Lean continuous process improvement techniques. The data gathered from leaders and team members at successful organizations was used to develop a best-practices competency model for facilitating organizational cultural change. This model can be used by other organizations to develop their own cultural change strategies and plans and to help them increase the return on investment from their own cultural transformations. The results of this study will help other organizations complete successful cultural transformations and these transformations have proven to produce measurable improvements in customer and employee satisfaction, product quality, productivity and profitability.

Future studies may build on these findings by locating and including service industry companies in their research designs. Triangulating the results of manufacturing companies with

the findings from service industry organizations may further validate the cultural change leadership model or may reveal other important leadership practices, skills, and knowledge to help organizational leaders plan for and execute successful large-scale change initiatives.

Conclusion

The purpose of this study was to identify the leadership practices, skills and knowledge necessary for facilitating a large-scale cultural transformation using Lean methods.

A review of the literature revealed that effective organizational leadership is at an all-time low in the United States and that organizations are struggling to locate or develop adequate levels of leadership to help them compete in a business environment characterized by increasing pressure from customers and competitors, mounting technological complexity, and global competition (Bersin & Associates, 2011; Boatman & Wellins, 2011; Darling, 2009; George, 2002, Heifetz, et al., 2009; Svensson & Wood, 2006). Forward thinking organizations are responding to this crisis by adopting methods like Lean continuous process improvement to develop their internal capacity for process analysis and the elimination of waste in their production and service processes (Abdi, et al., 2006; Erlich, 2006; Imai, 1997; Maleyeff, 2006; Page, 2005). This literature review demonstrated that tenacious implementation of a process improvement strategy can also develop a sustainable organizational culture that values efficiency and perfection in everything they do (Bass & Riggio, 2005; Jones, 2005; St. Andre, 2011; Stempfle, 2011; Tapping & Shuker, 2002; Wood Digest, 2009). The study revealed what appears to be an opportunity in the continual process improvement literature. This missing link is a well-defined set of leadership practices, strategies, skills, and knowledge necessary for effectively facilitating this large-scale cultural transformation.

The study utilized a mixed methods design to gather and analyze both qualitative and quantitative data from two Shingo Prize winning organizations. The data was collected by conducting fifteen qualitative interviews with leaders from both organizations who have successfully led others through the challenges of cultural change. The data from the interviews were transformed into numerical results using a frequency analysis where interview data were binary-ized into ones and zeros so the frequency of responses could be transformed and reported mathematically. The qualitative data was analyzed to identify leadership challenges and the leadership skills, knowledge and practices necessary for leading others through these challenges. Quantitative online surveys were administered to both organizations to test the validity of the study hypotheses about the role of organizational leadership during times of high cultural change. Over one hundred people completed the survey representing both organizations. This data was analyzed using analysis of variance or ANOVA in order to successfully draw conclusions from the median response rates in the data.

The study validated that effective organizational leadership is required for successful cultural transformation and that these necessary leadership practices, skills and knowledge can be defined and developed within an organization. The study also established that many, if not most, organizations begin change efforts without the necessary leadership skills and knowledge present within the organization. Measuring the response rates from the participants produced a cultural change leadership model that summarized these critical leadership practices, strategies, skills and knowledge. That model describes how organizations must begin cultural transformations by first ensuring complete leadership commitment and participation at all levels of the organization and that leaders must be willing to work and learn with their constituents through the process. Leaders must develop their ability to improve the skills and knowledge of

others by facilitating exercises and simulations, and by investing in the training of all staff members in new operational principles and techniques. The cultural change leadership model demonstrates how establishing an environment within the organization where people feel safe and secure in their positions, and safe and secure in running experiments and trying new things is critical to successful cultural change. Leaders must be willing to let go of the old ways themselves before they can expect others to do the same. The model reveals that the implementation of Lean tools is the last of the required leadership practices. If the other stages of the model are followed and exercised with persistence and tenacity, the right tools for creating efficient and continuous improvement will be developed and applied by each individual staff member. Successful execution of the model will result in staff members gaining the knowledge and confidence necessary to analyze how they complete their work, develop solutions for continually evolving and improving their own area of responsibility, and adding value for customers.

Effective organizational leadership is a core competency for any organization considering large-scale cultural change. Cultural change can improve operational efficiencies and result in reduced costs, increased production capacity, higher employee and customer satisfaction, and increase revenue growth and profit percentages. This study has demonstrated that in order for organizations to achieve these results they must ensure complete leadership and staff engagement, invest in the development of leaders and staff members, establish and maintain a supportive environment, and cultivating the patience necessary for producing award winning results.

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