An Ethnographic Study of Lean Manufacturing Implementation and Socialization in a Unionized Setting

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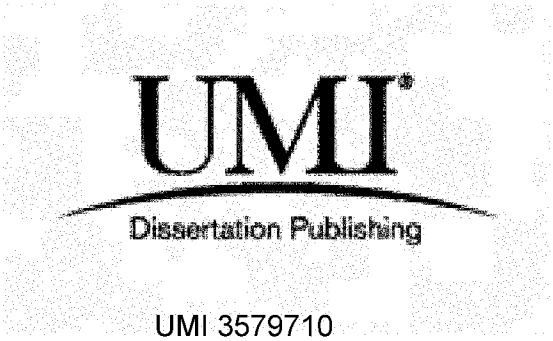

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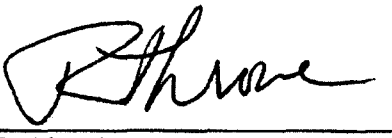

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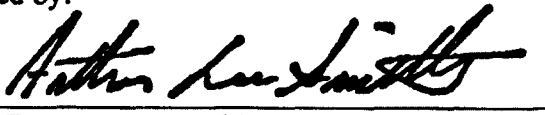

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Abstract

Competitiveness in the automobile industry has American manufacturers seeking methods to attain profitability levels, which equal or better Japanese and other Asian rivals. Lean manufacturing has emerged as the driving force associated with Japan's competitive advantage that American companies must duplicate to balance industry growth. The problem facing Western unionized automobile suppliers and manufacturers has been the ability to fully implement lean manufacturing techniques and remain competitive with Japan. Studying perceptions of Western cultural and team social interaction, which differ from those in Japan, was necessary to improve lean process implementation. Two manufacturing locations in Southeastern Michigan were selected for the study: Plant I, with approximately 400 employees, and Plant II with 300 employees. Both locations operated under a bargaining contract with the United Automobile Workers (UAW). A purposeful sample of approximately 20 employees from each location, totaling 40 participants, participated in the team observation, and a subsample of 10 participants that varied demographically, participated in individual in-depth interviews. Ethnographic qualitative data of respondent perceptions and observations were collected for four primary constructs: (a) empowerment, (b) job enlargement, (c) management commitment, and (d) changes to traditional union management philosophies, and six major themes emerged from data analysis: (a) increased workload, (b) decision-making input, (c) team participation and involvement, (d) empowerment, (e) empowered authority, and (f) resource allocation. Three minor themes also emerged: (a) training, (b) management support, and (c) organizational culture change. Four recommendations were offered for professional practice: (a) training for mid-

level management, (b) training for team members, (c) consistent focus that avails resources both human and capital in the implementation of continuous improvement projects, and (d) expansion of cultural change, and three recommendations for future research were offered: (a) expansion of research scope, (b) different plant culture and workplace relationship, and (c) team socialization training.

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Many people assisted me during the arduous journey to complete this doctoral dissertation and are too numerous to mention individually, so to all of you I wish to express my gratitude. I would like to acknowledge my wife Shelia, whose selfless patience, love and support cannot be rewarded with mere words. My parents Leroy and Ruth whose love, understanding, and support have been unwavering throughout the process. To my daughter Elizabeth and son Jonathon, your understanding and support as valuable family time was consumed by the requirements of work and study. I must go on to thank my committee chair, Dr. Robin Throne, who kept me focused with critical feedback, direction, wisdom and understanding in times of frustration and elation.

Table of Contents

List of Tables

Chapter 1: Introduction

The first decade of the 21st century has proven quite difficult for automobile manufacturers and part suppliers, leaving all parties struggling for survival (Singh, Garg, & Sharma, 2009). Global economic downturns affected the entire industry and forced two American car manufacturers into bankruptcy court and the elimination of a multitude of automotive part suppliers (Jackson, Hughes, Brickley, Tabas, & Smith, 2008). The economic upheaval forced manufacturers to reexamine operational strategies to remain viable and maintain competitive advantage (Parry, Mills, & Turner, 2010). Efforts to attain the advantage were done through a reenergized focus on continuous improvement activities, specifically "lean manufacturing" and the pursuit of waste elimination (Bayraktar, Jothishankar, Tatoglu, & Wu, 2007; Womack & Jones, 2003).

Lean manufacturing processes, such as cellular manufacturing, just-in-time (JIT), set-up reduction, cycle time losses, and a visual system to standardize work processes (Ohno, 1988), led the change that developed a competitive advantage for Japanese automobile manufactures during the late 70s (Hallgren & Olhager, 2009). Cultural and organizational differences such as management-worker trust, expectations, and empowerment have historically existed between American salaried management and an hourly workforce especially as compared with Japan (Deming, 1986; Sim & Rogers 2009). Unlike traditional Tayloristic concepts, which are directive and fixed (Taylor, 1917), lean manufacturing relies heavily on teamwork and worker input to identify, develop, and implement changes that improve efficiencies, productivity, and quality (Badurdeen, Wijekoon, & Marksberry, 2011; Marksberry, Badurdeen, Gregory, & Kreafle, 2010; Taylor, 1917). Plant culture and changing management worker

relationships are of great relevance in implementation of lean manufacturing and team concepts (Badurdeen et al., 2011; Maxwell, 2008). Researchers from the Tavistock Institute of Human Relations in London, England developed the socio-technical systems theory (STST) based on a study of mining operation improvements and the social impact to workers (Appelbaum, 1997; Cherns, 1976, 1987; Trist, Higgin, Murray, & Pollack, 1963). The numerous technical advancements of lean manufacturing parallel those of the Tavistock mining study including similarities in the social changes teams must undergo during the phases of lean implementation and team growth (Appelbaum, 1997; Pais, 2010). Focus on socio-cultural aspects of teams and a supportive organization (Appelbaum, 1997; Cherns, 1976, 1987; Trist et al., 1963) may increase the potential to attain competitive advantage using time-tested instruments of lean manufacturing (Badurdeen et al., 2011; Marin-Garcia, Pardo del Val, & Martin, 2008; Marksberry et al., 2010; Maxwell, 2008).

This chapter is an introduction to the study of the social aspects of lean manufacturing and team interaction in a unionized setting. A background discussion followed by a problem statement and the purpose of the study begin the chapter. The next segment is development of a theoretical framework, followed by the study research questions. This is followed with a discussion on the nature and significance of the study. The chapter concludes with a definition of key terms and a summary. The goal of the qualitative study is to understand the social aspects of lean manufacturing and team interaction (Rahman, Laosirihongthong, & Sohal, 2010; Singh, Garg, Sharma, & Grewal, 2010) in a unionized setting.

Background

Increasing advancement of global markets and competitiveness has many organizations looking to increase cost management, productivity, and quality performance using the value-based tools of lean manufacturing (Badurdeen et al., 2011). Gander's (2009) work on implementation of lean manufacturing described the myriad of changes that must occur in employee skill enhancement and development of an organizational culture to support change initiatives and continual growth. Traditional managerial controls were not effective in a participative environment and a paradigm shift would have to coincide with lean implementation (Gander, 2009). Womack and Jones (2003) indicated successful organizations have moved on from the command and control style of management toward a more participative and empowered style of management. Environmental and organizational relationships regarding lean manufacturing is relatively new and underexplored, and additional research may provide better understanding (Hallgren & Olhager, 2009; Kliner & Hendrick, 2008; Pais, 2010). The migration from Japan into manufacturers in the West began the evolutionary path of lean manufacturing, which is further expanding as 21st century manufacturing operations become a global arena. Integrating competitive advantage and elimination of operational constraints are prime components of lean and remain unchanged; however, the focus is shifting as the need for operational efficiencies continues to increase and meet global requirements (Schonberger, 2007; Singh et al., 2010).

Change initiatives such as lean manufacturing in unionized facilities have been more problematic due to (a) additional workload with job enlargement, (b) trust associated with empowerment and social aspects of teams, and (c) senior employee involvement (Jones & Seraphim, 2008). Several studies have reported relationships

between the technical aspects of lean manufacturing and the social aspect of teams (Follett, 1924; Fraser, Harris, & Luong, 2007; Pais, 2010; Sim & Rogers, 2009). Manufacturers in the United States attempting to garner competitive efficiencies similar to the Japanese, use STST as a conceptual framework for understanding social requirements when coupled with technological advancements (Cua, McKone-Sweet, & Schroeder, 2006; Kleiner & Hendrick, 2008; Niepce & Molleman, 1998).

One notable lean focus has been on technical applications and tools for research without exploration of Toyota's culture and its impact on successful implementation (Badurdeen et al., 2011; Niepce & Molleman, 1998; Rahman et al., 2010). Niepce and Molleman (1998) found STST principles first discussed by Trist in 1981 and further explored by Cherns (1987), that focus on worker involvement in all aspects of design and implementation of technical components of lean were necessary cultural and social changes the must be considered concurrently. Moving production from Toyota's core location in Japan into other countries, specifically into the United States has created needed adjustments for lean manufacturing (Badurdeen et al., 2011; Holweg, 2007). Some of the considerations that became noteworthy during the past decade relate to a reduced focus on individual technical components of lean and heightened awareness to the somewhat neglected, softer side or social components affiliated with application (Kleiner & Hendrick, 2008; Petterson, 2009).

Researchers have indicated that resistance to lean manufacturing within manufacturers in the United States is a multi-faceted obstacle to overcome (Jones & Seraphim, 2008; Sim and Rogers, 2009). Trust and respect for people, specifically in unionized settings, is problematic for seniority employees who often have influence on

younger worker attitudes and beliefs. Marksberry (2011) posited cultural change, social interaction, and management values are critical factors in lean manufacturing, described as mutual trust and respect for both process and people in the elimination of wasteful actions. Many American manufacturers continue to believe and act as improvement leading to competitive advantage is possible purely by implementing the technical tools of lean without considering social factors (Sim & Rogers, 2009; Marksberry, 2011). This obstacle can be overcome with soft-skill training in teamwork, worker empowerment, motivation, and organizational commitment (Rahman et al., 2010; Reed, 2009).

Problem Statement

The problem facing Western unionized automobile suppliers and manufacturers has been the ability to fully implement lean manufacturing techniques, such as cellular manufacturing, just-in-time (JIT), set-up reduction, cycle time losses, and a visual system to standardize work processes, (Singh et al., 2010) and remain competitive with Japan (Singh et al., 2009; Wee & Wu, 2009). A myriad of factors, such as adversarial relationships, job loss, managerial support and restrictive organizational culture has impeded success (Jones & Seraphim, 2008; Sim & Rogers, 2009; Turesky & Connell, 2010) and eroded market share and profits (Wee & Wu, 2009). Limited success in Western lean implementation (Brondo & Baba, 2010) has mainly focused on individual components of lean manufacturing such as cellular manufacturing and just-in-time delivery (Rahman et al., 2010) without addressing the socialization and change management strategies necessary for substantive workforce change (Gander, 2009; Joo & Lim, 2009; Pais, 2010). Plant culture and changing management worker relationship are of great relevance in implementation of lean manufacturing and team concepts

(Badurdeen et al., 2011; Maxwell, 2008). Studying perceptions of Western cultural and social interaction, which differ from those in Japan, is necessary to improve lean process implementation and attain efficiencies that support long-term viability (Brondo & Baba, 2010, Singh et al., 2009). If this and similar studies are not conducted to determine why Western manufacturers cannot equal or better efficiencies attained by Japanese companies, market share will continue to dwindle and American workers might face job loss (Brondo & Baba, 2009; Singh et al., 2009; Wee & Wu, 2009). Knowledge garnered from this qualitative study through a socio-cultural lens of STST (Appelbaum, 1997; Cherns, 1976, 1987; Trist et al., 1963) may facilitate organizational redesign and change efforts to improve efficiencies and reduce production costs (Badurdeen et al., 2011; Bayraktar et al., 2007; Pryor, Humphreys, Taneja, & Toombs, 2011).

Purpose

The purpose of this ethnographic qualitative study is to explore worker experiences and perceptions of the social aspect of teams such as empowerment, job enlargement, management commitment, and changing culture in a unionized manufacturing setting. Holistic ethnographic research (Johnson & Christensen, 2007; LeCompte & Schensul, 2010; Moore, 2011) allows for multiple perspectives of an organizational setting to analyze cross-cultural relationships from manager and employee perspectives (Moore, 2011). The study sought an understanding of union worker perceptions of lean manufacturing implementation requirements, strategies, and the resultant cultural change in two manufacturing facilities in Southern Michigan (Moore, 2011; Singh et al., 2010; Womack & Jones, 2003). Using STST (Appelbaum, 1997; Cherns, 1976, 1987; Trist et al., 1963) as a theoretical lens, an exploration occurred on

the interdependencies among team members, participant role in job enlargement (Hackman, Oldham, Janson, & Purdy, 1975) and work change complexities associated with lean technical tools. Qualitative data collection followed ethnographic guidelines (LeCompte & Schensul, 2010; Moore, 2011) using face-to-face, in-depth interviews and participant observation (Marshall & Rossman, 2011; Maxwell, 2004; Yin, 2010). Data was collected on respondent perceptions and observations regarding four primary constructs: (a) empowerment (Pais, 2010), (b) job enlargement (Joo & Lim, 2009), (c) management commitment (Mann, 2009), and (d) changes to traditional union management philosophies (Baugher, 2007; Russell, 2008). All of these components make up social aspects of lean implementation (Emiliani, 2006; Marksberry et al., 2010; Ohno, 1988; Womack & Jones, 2003). The study population consisted of three work teams assigned to various manufacturing cells within each plant. A purposeful sample of approximately 20 employees from each location, totaling 40 participants, were invited to participate in the team observation (Fowler, 2008). Further, a subsample of the total participants, 10 employees that vary demographically, were invited for individual in-depth interviews.

Theoretical Framework

Socio-technical systems theory (STST) is useful for studying the interaction between social and technical systems and the impact to performance in organizations (Trist et al., 1963), and STST provides a theoretical framework for this study to explore the interdependencies of the social aspects of teams and the technical instruments of lean manufacturing. Principles of STST explore knowledge about behaviors, feelings, and attitudes, which created a need for methodologies to examine components that are

subjective and opinion based. According to Stam (2007, 2010), advancement of research techniques using qualitative methods for social science studies has opened new developments in sociology and psychology.

More than half a century ago, researchers from the Tavistock Institute of Human Relations in London, England, developed the STST based on a study of mining operation improvements and the social impact to workers (Trist et al., 1963). This theory sought the best match between needs of the social and technical systems that provided the organization with optimal performance, which departed from traditional Tayloristic, view of work design (Appelbaum, 1997; Cherns, 1987; Pruijt, 2003). Worker involvement in the design of socio-technical systems became the topic of numerous studies and prompted a summarization of key theoretical components from the original theory (Cherns, 1976, 1987). Cherns' (1987) nine points include (a) compatibility, (b) minimal critical specifications, (c) variance control, (d) information flow, (e) boundary location, (f) multi-functionality, (g) support congruence, (h) human values, and (i) incompletion. Leading the nine principles is 'compatibility', which includes involving employees in development as well as implementation of work design practices developing creative options and flexibility (Cherns 1987).

Appelbaum (1997) indicated STST use is growing in work design processes as infiltration of technology continues to widen in all industries, specifically in the United States and Canada. Niepce and Molleman (1998) performed a comparison study of lean production and STS thinking relating the human component from each. Qualitative research findings indicated both theories deviate from traditional Tayloristic designs to include the important aspect of teamwork and cooperation. However, Niepce and

Molleman (1998) indicated a major method difference between the two systems in worker control and coordination as lean manufacturing relies on strict procedures and expert direction. Obtaining a proper mix of technical improvements under conditions that have minimal impact to the social interaction of teams and environmental conditions may provide opportunities to improve the bottom line of the organization and require simultaneous consideration (Cherns, 1987; Joo & Lim, 2009; Pais, 2010). Research is clearly lacking in several areas associated with lean manufacturing, but a prevalent one is the relationship among team members and the culture requirement from the organization to support the technical infrastructure required for lean manufacturing (Mann, 2009; Marksberry et al., 2010). STST offers a viewpoint well suited for an examination of lean manufacturing in unionized settings.

The Toyota Production System (Ohno, 1988) was responsible for the quality and financial improvements in the Japanese automobile industry during the late 20th Century (Emiliani, 2006). Western managers have attempted to mimic the Japanese style of management, which relied on a participative, cooperative environment to achieve organizational goals (Emiliani, 2006; Womack & Jones, 2003). This management transition was a major departure from tradition in Western culture where hierarchical direction preceded problem solving and implementation of improvement processes. Continuous improvement or *kaizan* (Ohno, 1988) relies on team-based activities as the major vehicle of implementation.

Historically, the domestic automobile market in the United States belonged to General Motors, Ford, and Chrysler whose dominance depended on an ability to offset competition with cost advantages associated with high volumes and mass production

(Deming, 1986; Emiliani, 2006; Womack & Jones, 2003). Toyota of Japan changed that tradition in the late 70s with imported vehicles that exploited the cost advantage against "the big three" attained by building vehicles based on customer demand and high quality (Deming, 1986; Ohno, 1988; Singh et al., 2010). Several studies indicated lean manufacturing implementation is a means to achieve competitive advantage and gain market share Hallgren and Olhager, (2009) found significant p-value coefficients of .532 in cost leadership when lean was implemented. Womack and Jones (2003) posited lean implementation must include a review of culture associated with the "Toyota way" (Marksberry et al., 2010) against "traditional" Western managerial techniques and worker involvement (Pais, 2010; Parry et al., 2010). Hofstede (1980, 1983) defined national cultures identifying four dimensions, power distance, uncertainty avoidance, feminism versus masculinity versus, and individualism versus collectivism. Scholars have studied the latter point of individualism versus collectivism extensively (Pais, 2010; Ramamoorthy, Kulkarni, Gupta, & Flood, 2007) due to effects on social behavior and is germane in teamwork and process improvements involved with lean implementation in Western manufacturing (Emiliani, 2006; Marksberry et al., 2010; Ohno, 1988;Womack & Jones, 2003).

Research Questions

The research literature has focused primarily on the techniques of lean implementation (Ohno, 1988; Singh et al., 2010) and less on the necessary cultural and social changes for the organization. Exploration of two research questions designed to improve understanding of worker perceptions, which directly relate to the socio-technical (Cherns, 1976, 1987; Trist et al., 1963) aspects of implementation of lean manufacturing

in unionized locations guided this study. The research questions seek identification of key factors impeding the implementation of lean manufacturing in unionized settings by viewing the phenomenon from various perspectives. The questions explored participant perceptions of the study constructs that include empowerment (Pais, 2010), job enlargement (Joo & Lim, 2009), managerial support (Mann, 2009), and changing philosophies of union-management relations (Baugher, 2007; Russell, 2008) that have been found to be components of lean manufacturing implementation (Emiliani, 2006; Marksberry et al., 2010; Ohno, 1988; Womack & Jones, 2003). The following central research questions fulfill the research purpose and guide further inquiry into the perceptions of workers toward lean manufacturing implementation components that serve as the study constructs.

Q1. What are unionized worker experiences with the social aspects of lean manufacturing and team interaction in a Michigan manufacturing plant?

Q2. What are unionized worker perceptions of (a) empowerment, (b) job enlargement, (c) management commitment, and (c) philosophical change in union-management relations in a lean manufacturing setting?

Nature of the Study

The nature of this study was based upon the conventions of holistic ethnography (Johnson & Christensen, 2007; LeCompte & Schensul, 2010; Moore, 2011), and was case study orientated (Moore, 2011; Zikmund, Babin, Carr, & Griffin, 2010). Plant culture and worker socialization are of great relevance in implementation of lean manufacturing and team concepts (Badurdeen et al., 2011; Maxwell, 2008) and are best suited for an ethnographic design consisting of an interview and observational approach to the socio-

cultural study problem (Kelly & Gibbons, 2008; Marshall & Rossman, 2011; Yin, 2011). An ethnographic method is appropriate for this study based on its exploratory nature, to identify the current state of social interaction of team members relative to lean manufacturing in unionized locations in Michigan from the perspective of the team members directly involved in the work culture (LeCompte & Schensul, 2010; Moore, 2011).

Two manufacturing locations in Southern Michigan were selected for the study; Plant I, with approximately 400 employees, began operations prior to unionizing the workforce. Plant II is a smaller facility with 300 employees. Both locations currently operate under a bargaining contract with the United Automobile Workers (UAW). The target population of 700 employees at the study locations was narrowed to a study sample of 40 participants approximately half from each location using a purposeful selection by the researcher. From the numerous manufacturing cells, the basis for the initial reduction was team willingness to participate in observed activities, shift assignment, and concurrence from management-union leadership. From the team sample (N=40), a subsample of 10 individuals (n=10) were invited to participate in one-on-one interviews (LeCompte & Schensul, 2010; Patton, 2002). Thus, team participant observation and face-to-face, in-depth individual interviews provided for data collection of worker perceptions of the four study constructs.

Structured individual interview questions based on common ethnographic design (LeCompte & Schensul, 2010; Patton, 2002; Yin, 2010) were used to gather 10 participant perspectives and explore the espoused perception of unionized workers. The interviews sought understanding of the four central constructs of (a) empowerment (Pais,

2010), (b) job enlargement (Joo & Lim, 2009), (c) management commitment (Mann, 2009), and (d) changes to traditional union management philosophies (Baugher, 2007; Russell, 2008). These interview sessions were audiotaped and transcribed, and the interpretive data formed the baseline clusters of the study constructs. The second method of data collection was observation and copious note taking of team meetings, interaction between team members and management relative to the constructs.

Qualitative data are non-numerical, unstructured, and mostly textual that require extensive diligence to organize and extract meaning. Rigorous qualitative measurement (LeCompte & Schensul, 2010, Yin, 2010) involved seeking descriptive themes and patterns of beliefs or perceptions for the four constructs (a) empowerment, (b) job enlargement, (c) management commitment, and (d) changes to traditional union management philosophies as initial categories or codes. Interviews were transcribed into Microsoft Word. Once collected and clustered interpretation occurred using qualitative methods seeking descriptive themes and patterns of beliefs or perceptions for the four constructs from the open-ended interview questions (LeCompte & Schensul, 2010, Yin, 2010) and observation of team social interaction (Marshall & Rossman, 2011; Yin, 2011) and explication outlined by Shank (2006).

Significance of the Study

This study is significant in the pursuit of understanding the social aspect of teams specifically in unionized settings within the United States automobile industry. Studying perceptions of Western cultural and social interaction, which differ from those in Japan, is necessary to improve lean process implementation and attain efficiencies that support long-term viability (Brondo & Baba, 2010, Singh et al., 2009). The majority of literature

examining lean manufacturing centers on technical applications with minimal attention to social aspects (Chen & Meng, 2010; Lu, 1986; Moyboki, 2009; Parry et al., 2010; Pepper & Spedding, 2010; Singh & Kanduja, 2010; Turesky & Connell, 2010). This study explored cultural and social needs with minimal attention to the technical aspect. American manufacturers and workers face potential loss of profit margin and jobs if studies are not conducted (Brondo & Baba, 2010), and the study provided an understanding of job enlargement, and empowerment in unionized work locations. Niepce and Molleman (1998) examined the differences between STST and lean manufacturing and found both similar; one major difference identified in their study is involvement of the worker, which may inform the proposed study, which will explore this difference via worker perception and willingness to transcend beyond traditional union-management philosophies and seek empowerment, job enlargement. Pais (2010) indicated a need for social research considering the socialization of team members as actors in the reality of a workplace, and the current study explored the role of culture and social aspects of teamwork in Southern Michigan. Knowledge and understanding gained from this study may assist with organizational redesign and change efforts, which could improve operational efficiencies (Badurdeen et al., 2011; Pryor et al., 2011).

Definitions

Definition of the following terms offers an understanding of key operational terms and constructs included in the proposed study.

Autonomy. Autonomy refers to self-governance in matters of decision making, methods of perform tasks and a level of independence (Morgeson & Humphrey, 2006),

Job enlargement. In an effort to relieve tedious work and developing specialized workers, job enlargement, introduced in the late 1940's, involves adding variety to worker tasks, cross training and rotation of work assignments (Kreitner & Kinicki, 2001).

Job enrichment. Job enrichment is more inclusive than job enlargement by adding factors of motivation into the process. Job enrichment has links to theories of job satisfaction and seeks employee activation in mattes of improvement in both process and personal development (Hackman et al., 1975; Kreitner & Kinicki, 2001).

Just-in-time. Just-in-time (JIT) is one of the technical components of TPS that is intended to deliver a supply of manufacturing components to an assembly process as requirements indicate. JIT critically factors into the entire supply chain from raw material to finished product available for the consumer (Lu, 1986; Parry et al., 2010).

Kaizen. Kaizen is a Japanese term for 'continuous improvement' and is a process for making incremental improvements to both process and product quality. Kaizen implementation occurs by those closest to the process, namely the workers, and delivers a humanistic method to ease workload and improve conditions (Brandon & Inman, 1992; Marksberry et al., 2010).

Lean management. Lean management is the application of lean thinking where resource allocation focuses on elimination of all forms of waste. Lean management is a refinement of the previous efficiency concepts of Taylor and Ford with the inclusion of involvement of more knowledgeable workers (Drucker, 2006; Tracy & Knight, 2008).

Lean thinking. Lean thinking is an organizational revolution in the United States that corresponds to the cultural change associated with implementation of Ohno's production system. Thinking lean requires a fixation on determining methods to

accomplish more with fewer resources. Theoretically, manufacturers must develop an organization that supports providing customers with a product or service that meets their needs and timing with fewer resources and cost to remain competitive (Womack & Jones, 2003; Singh et al., 2010).

Motivation. Motivation is the fulfillment of a series of needs identified in a hierarchal order by Maslow (1954) and is critical to the success of engaging employees in technical change initiatives (Trist et al, 1963). Intrinsic and extrinsic motivation has become a focus of management in the 21st century as a means to attain higher levels of performance (Gander, 2009; Sisaye, 2005).

Semi-autonomous teams. Semi-autonomous teams are responsible for a majority of decision making and operational practices but have some boundary conditions and limitations imposed by the organization (Zafft, Adams, & Matkin, 2009). Boundary conditions and limitations, such as hiring practices and disciplinary actions, control the level of team autonomy in unionized settings, differentiating them from fully autonomous teams often associated with lean manufacturing (Pais, 2010; Zafft et al., 2009).

Toyota production system. Taiichi Ohno developed the Toyota production system (TPS) during his tenure with Toyota of Japan. This system is an integration of several socio-technical instruments, which focus on the elimination of waste in all forms (Ohno, 1998) such as JIT and cellular manufacturing. TPS is one of the most emulated managerial systems today and continues to grow as computerized applications merge with technical advancements (Bayraktar et al., 2007; Pham, Pham & Thomas, 2008).

Unionized facilities. Unionized facilities are work locations that are under the auspices of a labor organization as the exclusive bargaining agent for contractual purposes. Union organizations negotiate methods of enforcing contractual language and dealing with employee complaints against operational and managerial actions (Devinatz, 2009; Deitsch & Dilts, 2006).

Summary

The 21st century has proven quite difficult for automobile manufacturers and part suppliers as global economic downturns affected the entire industry (Jackson et al., 2008). Manufacturers reexamined operational strategies and developed plans to attain a competitive advantage for increased market share and often survival (Parry et al., 2010). Efforts to attain this advantage came via a focus on continuous improvement activities such as lean manufacturing and a pursuit of elimination of all forms of waste (Badyrdeen et al., 2011; Bayraktar et al., 2007; Hallgren & Olhager, 2009).

One significant aspect in lean evolution is exploration of social aspects and team interaction in addition to technical lean tools (Badurdeen et al., 2011; Niepce & Molleman, 1998; Rahman et al., 2010). As a theoretical framework, in exploration of the social interdependencies among team members, participant role in job enlargement (Hackman et al., 1975) and work change complexities associated with lean technical tools. Past research (Appelbaum, 1997; Cherns, 1976, 1987; Trist et al., 1963) has clearly indicate the numerous technical advancements of lean manufacturing must include simultaneous investigation in the social changes teams must undergo during the phases of lean implementation and team growth.

The problem for Western manufacturers has been attainment of a competitive advantage through lean implementation given the myriad of impeding factors, such as adversarial relationships, job loss, managerial support, and restrictive organizational culture (Brondo & Baba, 2010; Jones & Seraphim, 2008; Sim & Rogers, 2009; Turesky & Connell, 2010). Focus has clearly been on the technical components of lean such as cellular manufacturing, just-in-time delivery and reduced inventory, without an understanding of the socialization and change management strategies necessary for substantive workforce change (Gander, 2009; Joo & Lim, 2009; Pais, 2010). Resistance to lean manufacturing has come from several sources and a solution to remove barriers while emphasizing factors that drive the process is critical (Brondo & Baba, 2010; Sim & Rogers, 2009). Union worker perceptions of lean manufacturing implementation requirements, strategies, and the resultant cultural change in two manufacturing facilities in Southern Michigan was explored (Moore, 2011; Singh et al., 2010; Womack & Jones, 2003) using STST (Appelbaum, 1997; Cherns, 1976, 1987; Trist et al., 1963).

The chapter also presented the study research questions, nature, and significance of the study as well as definitions of relevant terms included in the research study and the problem facing Western manufacturers. The two research questions are designed to improve understanding of worker perceptions that relate to socio-technical (Cherns, 1976, 1987; Trist et al., 1963) aspects of lean in unionized locations formulate the study direction. The nature of the holistic ethnography (Johnson & Christensen, 2007; LeCompte & Schensul, 2010; Moore, 2011) study including its appropriateness and intent to identify the current state of social interaction of team members two unionized locations in Michigan from the perspective of involved team members was discussed

(LeCompte & Schensul, 2010; Moore, 2011). This chapter included an appraisal of the significance of this study expressed in terms of the potential use of knowledge and understanding gained that may assist with organizational redesign and change efforts, which could improve operational efficiencies (Badurdeen et al., 2011; Pryor et al., 2011).

Chapter 2: Literature Review

The purpose of this ethnographic qualitative study is to explore worker experiences and perceptions of the social aspect of teams such as empowerment, job enlargement, management commitment, and changing culture in a unionized manufacturing setting. Strategically, the literature review will examine and analyze several theories related to the Toyota Production System (TPS) (Ohno, 1988) grounded in traditional operations management. Additionally, theories relating to work teams and the social interaction of workers relating to skills, knowledge and motivational factors will be explored (Follett, 1924). Four predominant themes formulate the strategy of this literature review, (a) an historical overview, (b) processes of lean manufacturing, (c) human capital in lean manufacturing, and (d) cultural environment in a lean manufacturing setting. First will be an historic overview of the study problem followed by the process of lean manufacturing, its principles, and implementation techniques. The third theme relates to human capital--the social interaction and attitudes of the people involved in lean implementation. The final theme will discuss the cultural environment necessary to allow a successful and sustained implementation.

The review of literature focuses on exploring a theoretical and conceptual framework for historical, technical, social, and environmental factors associated with lean manufacturing. This chapter included a comprehensive review of previous studies of lean manufacturing, including concepts such a job enlargement, empowerment, socialization, and a variety lean technical tools. Preparing the review of the literature for this study, searches were conducted of online library databases and Internet search engines such as ProQuest, Journal Storage (JSTOR), EBSCOHost, and SAGE to locate peer-

reviewed scholarly articles relevant to this research project. Main sources for the literature review search were scholarly, peer-reviewed journals, within the last 5 years supplemented with classical studies and books. The key terms used in the search included *autonomy, job enlargement, job enrichment, just-in-time, kaizen, lean manufacturing, lean thinking, motivation, TPS, unionized workers, unionized locations.* Additionally, variations and combinations of these key terms were utilized.

Historical Overview

Seldom are a few individuals able to impart a dramatic impact on an industry segment with such great ardor as did Ford, Ohno, Deming, and Taylor whose independent efforts culminated in the definition of a production system (Petersen, 2002; Womack & Jones, 2003). The Toyota Production System (Ohno, 1988) was responsible for the quality and financial improvements in the Japanese automobile industry during the late 20th Century (Emiliani, 2006). Western managers have attempted to mimic the Japanese style of management, which relied on a participative, cooperative environment to achieve organizational goals (Emiliani, 2006; Womack & Jones, 2003). This management transition was a major departure from tradition in Western culture where hierarchal direction preceded problem solving and implementation of improvement processes. Continuous improvement or *kaizan* developed by Ohno (1988) relies on team-based activities as the major vehicle of implementation. Origin of TPS has been debated in literature (Emiliani, 2006; Petersen, 2002; Womack & Jones, 2003) with many crediting the achievement to Ohno. Mr. Ohno (1988) revealed TPS was the product of the Ford mass production system outlined by Henry Ford (Ford, Bakken, Bodek, & Crowther, 1988) scientific management concepts and standardized work of Taylor (1917) and quality work of Deming (1986) according to Womack and Jones (2003).

Henry Ford was an eccentric autocrat, highly manipulative of his workforce both hourly and management, often to the point of ruthlessness. This management characteristic stayed low key under a fierce policy of fear and intimidation enforced by the watchful eye of the 'Ford Service Department' headed by ex-pugilist and member of the Michigan Parole Board Harry Bennett (Barnard, 2004; Wicks, 2003). Mr. Bennett employed ex-boxers and hoodlums as members of an internal company police staff utilizing spying and violence to pry into the personal lives of the workforce and counter union organization tactics to a point of violation of the Wagner Act and the National Labor Relations Board (Barnard, 2004; Wicks, 2003). History proved that the River Rouge complex of Ford Motor Company with its approximate 90,000 workers was the toughest, most anti-union complex requiring the better part of decade to organize (Barnard, 2004; Sorensen, 2006). Ford developed a continuously moving assembly line that was a revolutionary idea in manufacturing, based on the premise of standardized work practices that transformed the automobile industry (Sorensen, 2006). The mass production system introduced by Ford involved use of highly mechanized machinery coupled with standardized parts that did not require the extensive use of skilled labor for installation (Ford et al., 1988; Sorensen, 2006). The basis for this system was a continuously moving assembly line that establish worker pace based upon the capacity of the machines and not the abilities of the worker. Mass production work on the moving assembly line initiated a series of job dissatisfaction events that led to high-levels of worker turnover such as pay, working conditions and other non-monetary issues (Barnard, 2004; Russell, 2008). Assembly line pace was so intense that workers were often unable to maintain the workload and these 'laggards' were immediately identified

and replaced by supervisors since in-process components were piled up at their work station (Ford et al., 1988; Womack & Jones, 2003). Overproduction is one of the wastes later identified by Ohno (1988) that were a hazard of traditional batch and queue manufacturing associated with mass production aimed and cost efficiencies via economies of scale (Maxwell, 2008; Singh et. al, 2010). Assembly line pace increases and worker exploitation fueled by authoritative and highly directive management philosophies become a matter of low motivation and unrest leading to worker resistance (Barnard, 2004; Sim & Rogers, 2009). Ford's assembly process became iconic, developed the foundation for worker management distrust and animosity prevalent for decades in the auto-industry, and is still a matter of concern in change management programs (Baugher, 2007; Jones & Seraphim, 2008; Sim & Rogers, 2009).

Frederick Taylor has been referred to as the father of scientific management by researchers due to his iconic systemic approach (Locke, 1982; Simha & Lemak, 2010). Comprising this system is five major principles; (a) science should be the guiding principle of management, (b) harmony should exist between management and labor, (c) cooperation should be a guide for worker behavior, (d) maximum output results from scientific management conditions, and (e) each individual should attain highest levels of efficiency (Taylor, 1917). Criticisms have been made of Frederick Taylor and his scientific management labeling him as anti-union, over simplistic in human motivation, lacking in factors of social interaction and an exploiter of workers (Lee, 1980, Simha & Lemak, 2010; Wrege & Greenwood, 1991). Taylor (1917) posited the most efficient means to viewing work performance began with standardizing tasks and tools, thus

eliminating wasteful actions, which later became a critical component of TPS (Ohno, 1988; Womack & Jones, 2003).

Taylor (1917) indicated management should be responsible for the identification of processes and manufacturing techniques that workers would perform without questioning managerial authority. Additionally, Taylor (1917) stood firmly on the premise that individuals were better performers than teams and rewards should be directly associated with individual performance. Niepce and Molleman (1998) who found that collectivism from teamwork provided better rewards in productivity and work design issues challenged this point in their study. Support for collectivism came decades later in Pais' (2010) study on self-managed teams and their contribution to higher levels of performance on the automobile industry. Taylor's reliance on time and motion studies resulted in a belief that work could be accomplished using a 'one best method' (Taylor, 1917) and managers were responsible for defining the process and more importantly monitoring adherence to those procedures. Defining job specifications and operational procedures according to Taylor (1917) was a job for 'industrial engineering' and management personnel and workers were not capable of introducing improvements. This concept increased worker management strife because workers felt distrustful of management and overburdened by an ever-increasing workload coupled with minimal wage advancements as corporate profits grew (Kulesza, Weaver, & Friedman, 2011; Locke, 1982; Sim & Rogers, 2009). Simha and Lemak (2010) found that Taylor bore the burden of negative impressions based upon textbooks, and after further research had been undertaken students found Taylor's value. Taylor's theories and contributions relating to workplace efficiencies, job standardization when coupled with organizational behavior

aspects are relevant and play a major part in organizational design today (Gander, 2009; Kulesza et al., 2011; Taneja, Pryor, & Toombs, 2011; Womack & Jones, 2003).

Deming went to Japan post WWII to help rebuild an infrastructure and industrial base nearly eliminated during the war, during his nearly three decades Deming created one of few highly emulated management systems (Edgeman & Fraley, 2008; Goldman, 2005). Deming (1986) was clearly a developer of concepts foreign to many managers relative to the use of statistics and procedures to enhance repeatability and establishing belief that customers and suppliers are all part of variation both in their performance and in expectations. This concept labeled 'systems thinking' was implementation of action-oriented tasks based upon the interrelationship and adherence to organizational goals as primary drivers (Deming, 1986; Drucker, 2006; Womack & Jones, 2003). Systems thinking transformation in Japan had a significant detrimental impact on the ability of the 'big three' to sell automobiles due to the quality deficiencies made prevalent by the products imported from Japan. Examining, measuring, and interpreting data were the cornerstones of Deming's 14 principles comprising a quality management system that established quality as the foundation of customer satisfaction, larger market share and increased profitability (Redmond, Curtis, Noone, & Keenan, 2008; Wayne, 2008).

Deming never wavered from his reliance on the management system and the vision that a cultural change shift from quality as the final approval to quality as a key factor built into the process, including the elimination of waste and wasteful actions was paramount to long-term success (Redmond et al., 2008;Wayne, 2008). Deming (1986) indicated a renewed spirit toward continuous improvement in product; process and organizational culture were factors of revitalization for 21st century manufacturers.

Deming's second importance in industry transformation occurred during the 1980's when American businesses began the search for a methodology to duplicate the success and balance sheets exhibited by the Japanese companies (Redmond et al., 2008; Womack & Jones, 2003). Deming's (1986) time-proven success in a quality structured cultural change system including elimination of waste and wasteful actions became a demand from American boardrooms still present today (Sun, 2011; Matt, 2008). Deming (1986) posited psychology should be a part of managerial curriculum since so much time was spent dealing with people as individuals and in teams while implementing the technical components of quality and statistics. This point, supported through time with numerous studies on managerial training, requires both technical and social skill enhancement, as the transition from a directive workforce to a participative environment occurs (Mann, 2009; Marksberry et al., 2010; Redmond et al., 2008). The following sector of this literature review is devoted to identifying the key technical process components that formulate lean manufacturing and their role in implementation in Western manufacturing operations aimed at duplicating the success in Japan.

Process of Lean Manufacturing

Increasing advancement of global markets and competitiveness has many organizations looking to increase cost management, productivity, quality and goal attainment through one variation or another of a team participative activity (Gil, Alcover, & Piero, 2005). Organizational process control in industrial settings has evolved with the implementation of several iterations of 'system thinking' applications and innovations that include; quality circles, self-managed teams, lean manufacturing, total quality

management and six-sigma (Hallgren & Olhager, 2009; Ohno, 1988; Womack & Jones, 2003).

Ohno's (1988) development of the Toyota Production System identified seven critical types of waste or '*muda*' to be targeted for elimination; transportation, inventory, motion, waiting, over-processing, over-production, and defects. Utilizing a concept of continuous improvement or '*kaizen*' to improve both product and process, Ohno (1988) developed several production system tools to identify and eliminate wasteful actions that did not add value to the process or organization. Ohno (1988) indicated none of the tools worked singularly as all were components of the total system design and overlapping properties existed.

These processes grounded in operational management include (a) cellular manufacturing, (b) just-in-time (JIT), (c) value stream mapping, (d) total quality manufacturing (TQM), (e) set-up reduction, and (f) visual systems (Abdulmalek, Rajgopal, & LaScola Needy, 2006; Ohno, 1988), which comprise the technical components of lean manufacturing. A study conducted by Singh, Garg, and Sharma (2009) found technical components, when properly implemented by the workforce, comprised a strategic initiative in recessionary periods. Ohno (1988) referenced the production system tools as similar to a human nervous system, for proper function to exist all the components must work in tune with one another which necessitated the development of total production maintenance (TPM) to ensure efficient equipment performance (Nakajima, 1989). TPM is a further development of preventive maintenance practices taken from United States manufacturers specifically Ford Motor

Company, post-World War II, to enhance performance and eliminate waste related to equipment failure, degradation, process flow, and cycle time losses (Nakajima, 1989).

A major difference between Japanese and American tenants related to machinery, specifically in unionized facilities, is who performs the work on the equipment. American manufacturers tend to have a group of people who operate the machines with another performing maintenance whereas Japanese manufactures meld the assignments together (Nakajima, 1989; UAW-Ford Agreement, 2007). This fundamental concept began an arduous journey for Western unionized manufactures to develop a framework to incorporate a key component in Ohno's (1988) production system, people, with the tools that make the system function (Joo & Lim, 2009; Niepce & Molleman, 1998; Pais, 2010).

Deeply grounded in operations management theory, Goldratt (1984) developed the theory of constraints (TOC) which initiated numerous studies and a host of broad theoretical concepts relating to manufacturing production. Several studies reduced TOC and other operations management theories to improve manufacturing performance (Gupta & Boyd, 2008). One area that garnered a great deal of notoriety was 'lean manufacturing,' a theoretical concept identified in the mid-seventies by Womack and Jones, (2003), which all but become synonymous with TOC (Gupta & Boyd, 2008). This theory for Western managers based in a large part on the Toyota Production System (TPS) developed by Taiichi Ohno (1988) in the revitalization of manufacturing in Japan. This management transition is a major departure from tradition where hierarchal direction has been the process for problem solving, and implementation of improvement processes for decades. Lean manufacturing utilizes a series of instruments to review the production

constraints and places highest priority on elimination of waste and maximization of value added actions (Pham et al., 2008).

Adding to lean understanding, recent studies of lean manufacturing has offered integration of operation management theories, or sub-theories of lean manufacturing, into a 'system thinking' approach to implementation (Parry et al., 2010). This integration occurs using a variety of instruments or tools grounded in operational management. The following are process related samples indicative to those related to lean manufacturing: cellular manufacturing, just-in-time (JIT), value stream mapping, total quality manufacturing (TQM), set-up reduction, and visual systems (Tracy & Knight, 2008).

Constraints are not limited to only process related activities as they also contain elements related to social and motivational activities of the people responsible to carry out the actions. An area that has added and will continue to add understating to lean manufacturing relates to social and environmental conditions. The use of work teams has been acknowledged as a key component in implementation of lean manufacturing and the transformation of organizational structures from a traditional hierarchal organizational to a participative environment (Pais, 2010). Work design theories considering characteristics such as; autonomy, intrinsic motivation, social support, and internal team leadership (Zafft et al., 2009) are all interconnected with lean manufacturing and supply insight into the interrelationship of team members (Fraser et al., 2007).

Goldratt's (1984) original theory posited that organizational structure and resources must be aligned to both foster and support identifying and eliminating constraints, which is a major component in lean manufacturing and the pillars of the Toyota Production System (Parry et al., 2010). Environmental and organizational

relationships regarding lean manufacturing are relatively new and underexplored, which improve with further research (Anvari, Zulkifli, Yusuff, Hojjati, & Ismail, 2011). One point of view relates to a lean focus on technical applications and tools for research and the little exploration of Toyota's culture and its impact on successful implementation (Badurdeen et al., 2011). Several obstacles impede the potential success such as: management not being measured on the principles of improvement, employee attitudes, job enlargement, lack of resources and one major factor is a unionized workforce. Some researchers would codify unionized facilities as unfavorable for implementation of lean manufacturing or continuous improvement programs due to worker attitude and skill level (Jones & Seraphim, 2008; Sim & Rogers, 2009).

Several controversial issues and open areas exist within lean manufacturing; the following are a few examples of those areas. Lean and its 'system learning' has been traditionally connected within the business field of manufacturing, but recent studies are further reducing this theory and making generalizations into other industries and disciplines (Joo & Lim, 2009). Building construction, hospital administration, service call centers, and human resources are just a few examples of service sectors that are attempting to operate under lean manufacturing principles, specifically value chain management (Piercy & Rich, 2009; Yu, Tweed, Al-Hussein, & Nasseri, 2009). Application of lean concepts has a major impact to the working environment and cultural atmosphere, often overlooked as lean theory, when reduced to a variety of multi-dimensional technical instruments directly aimed at problem-solving (Sim & Rogers, 2009). This single factor impedes successful implantation of lean and requires further exploration.

An additional area of controversy, which relates directly to this student authors' dissertation is lean implementation in a non-Toyota location that specifically is unionized. Research has indicated that resistance to lean manufacturing within manufacturers in the United States has a multi-faceted obstacle to overcome. First is the difference in culture and organizational support for lean implementation (Badurdeen et al., 2011) between Japanese management and that of Western manufacturers. Secondly, unionized employees with high seniority and their historic controversial and low trust relationship with management provide an enormous barrier (Sim & Rogers, 2009). Gander (2009) posited informal managerial controls and cultural development that keep from reverting to the 'old way' when technical change was underperforming were critical to success. Research has indicated that implementation of the technical factors of lean are reliant upon action of workforce and little or no research studies aspects of social and group interaction (Pais, 2010; Fraser et al., 2007).

Many organizations have become 'lean' via the implementation of the various tools, however, "it is apparent that there is a need to understand the entire system in order to gain maximum benefits" (Singh et al., 2010, p. 158). The author's statement came from a study of a production facility in India that centered on the lean instrument of Value Steam Mapping (VSM). This work reviewed the internal and external value stream and focused on improvements to the internal segment via theoretical application. Results indicated operational performance gains using additional lean manufacturing tools to eliminate the seven wastes such as: TAKT time for part flow, inventory reduction of work in process, and a reduction of manpower requirements all technical components identified by Ohno (1988). The link between application and theory was sound in this

study, using a case study methodology; however, limitations exist for generalizations across manufacturing industry as only one site formed the study location.

An additional study addressed Japanese manufacturing and focused on the cumulative philosophy of the multiple dimensions of Just-in-time, inventory reduction, and batch and queue to offset the competitive advancements from China and Korea (Daniel, Reitsperger, & Morse, 2009). The study explored a sampling of Japanese automotive and electronic manufacturers to determine if they still adhere to the cumulative principles of a production system, which indicated support for reduction of inventory to expose quality issues. The strategy showed a reliance on the people pillar relationship of TPS (Ohno, 1988) regarding empowerment and team decision-making, including attitudes of top management toward these principles (Marksberry et al. 2010; Martinez Leon & Farris, 2011). The study indicated continued support for the value of; just-in-time, inventory reduction, six-sigma, quick change over, and design flexibility, specifically in automobile industries, which are components of lean (Daniel et al., 2009; Pepper & Spedding, 2010).

Lean methodologies associated with constraint-based scheduling was the topic of the third study which was conducted via two cases studies, that examined how practitioners of lean use scheduling and just-in-time delivery to enhance performance (Van der Krogt, Geraghty, Salman, & Little, 2009). This study followed the notion that organizations should not focus on a single implementation tool of lean but instead should utilize all the improvement techniques. This included a review of the importance of organizational culture to understand the lines of communication, roles and responsibilities of the workforce and supplier relationships (Joo & Lim, 2009; Van der

Krogt et al., 2009). The study was quite sound in its understanding and application of lean concepts utilized to provide a robust production operation which was supported by; single minute exchange of dies (SMED), cellular manufacturing, Kanban for replenishment triggering and value stream mapping to eliminate wasteful activities. The study developed a scheduling model that when implemented support the major concepts of lean and its components and contribute to theory validation.

One of the first phases of lean implementation and waste elimination is establishing an orderly workplace managed in most part by visual cues. Workplace order is defined as neatness, cleaning, work standardization, sequential operations and all conditions remain stable (Bayo-Moriones, Bello-Pinatdo, & Merino-Diaz de Cerio, 2010). The authors of the study utilized a questionnaire survey and interview methodology in numerous manufacturing facilities in Spain to explore the relationship between 5's usage and performance. The five pillars are *seiri* or sort, *seiton* or set in order, *seiso* or shine, *seiketsu,* which is to standardize, and the final *shitsuke* means sustain (Bayo-Moriones et al., 2010, Ohno, 1998). Sorting items not needed for machine operations and removing them from the work area is a visual method to begin improvements in machine operation and worker safety. Once the clutter is removed, the next step of setting things in order is a starting point for continuous improvement activities such as; labeling, efficient storage and location for production materials, and identification of non-production items (Bayo-Moriones et al., 2010; Ohno, 1998). Shine or cleaning the equipment and work area to uncover machine defects and necessary maintenance repairs occurred with the operators in Japan. Traditionally specialists perform this work in Western manufacturing, specifically in unionized facilities.

Nakajima (1989) posited cleaning and inspecting equipment to be the first step in total equipment maintenance (TPM), which is a critical factor in lean implementation (Ohno, 1998; Womack & Jones, 2003). Standardizing manufacturing and maintenance processes is a difficult pillar to accomplish (Bayo-Moriones et al., 2010) and relates to Taylor's (1917) principles of scientific management, which strive to find a best method for an activity or task. The final pillar sustaining requires a diligent and relentless monitoring of workplace activities to keep from returning to the status quo once the initial change has occurred (Bayo-Moriones et al., 2010; Hirano, 1995; Jones & Seraphim; 2008). Bayo-Moriones, Bello-Pinatdo, and Merino-Diaz de Cerio's (2010) study did not consider all of the components of lean manufacturing but relied on one instrument for investigation. Findings indicated a positive relationship between 5's and performance improvements, which concurs with additional studies (Bayo-Moriones et al. 2010; Hirano, 1995). The study provided an accurate description the instrument and application throughout the industries under study, but the correlation to the central theory lacked in soundness. Lean manufacturing offers far more to an organization than is represented in this study and further research would be required to ensure sustained performance and improved via the total systemic view (Liker & Morgan, 2011; Martinez-Leon & Farris, 2011).

Ohno's (1998) original systemic organizational view, evidenced in application one of the often-utilized tools of TPS, namely JIT which is reliant on a mixture of both internal and external factors for success. JIT's main function is the reduction of internal inventory and speed of delivery to and from external sources of the supply chain while keeping operational processes at maximum levels of efficiency (Holweg, 2007; Peterson, 2002; Wee & Wu, 2009). In a study on JIT Wang, Chen, and Chang (2011) indicated

statistical significance in inventory reduction, cost of goods sold, and increased sales at a significant level of .05 in companies that practiced JIT compared with traditional companies. Numerous firms in the United States found some level of manufacturing revitalization with JIT methodologies guiding supply chain management and internal process improvements (Moybodi, 2009; Wang et al., 2011). Internal process improvements on material, equipment efficiencies, inventory reduction and excess labor to produce what the customer wants, when it is needed yielded increased profit margins and competitive advantage for companies utilizing JIT (Holweg, 2007; Wang et al., 2011). Sanders (2011) found when JIT methodologies supplemented with electronic data interchange (EDI) increase benefits to the organization and help management meet objectives for improved quality, cost, and inventory reduction. However, JIT remains dependent on the operational efficiencies of process equipment, which are able to perform to espoused production rates when called upon (Ohno, 1998; Van der Krogt et al., 2009; Womack & Jones 2003). Transferring data for production requirements using EDI is part of the long-term relationship between customer and supplier, which increases the bond and willingness to become partners in action, a concept that was original in JIT philosophy and is of greater import today as manufacturing becomes a global arena (Moybodi, 2009; Sanders, 2011; Wang et al., 2011). Electronic part tracking and inventory control available via EDI allows manufacturers to sequence operations at part facilities to be in-line with assembly plant requirements thus eliminating ordering errors and excess parts for the just in case (Sanders, 2011; Wang et al., 2011; Womack & Jones, 2003).

JIT relies on equipment that is capable to run when needed, this fact added to smaller batch numbers make the changeover of equipment occur more often and is critical in the supply chain and adding value to the process. Singh and Kanduja (2010) studied a foundry in India and explored the die change procedure where the concept of single minute exchange of dies (SMED) was in place. This process included standardizing and rehearsing die changes to find the most efficient methodologies involving both process and people to minimize changeover time while maintaining quality in the product (Ohno, 1998; Lu, 1986; Singh & Kanduja, 2010). Singh and Kanduja (2010) provided links between additional lean concepts such as: 5's, poka-yoke or fool proofing, bottleneck analysis, and six sigma analysis tools to achieve changeover times that were greatly reduced and sustainable. This study exhibited a sound understanding of lean and enabled the problem associated with long change over times and the impact to just-in-time and inventory size to be substantially reduced. This is a fine example of theory in action, which supports the notion that systemic views of operations should accompany lean activity for optimal performance success and social interaction of team members (Liker & Morgan, 2011; Pais 2010).

Results from a host of studies relating to the technical innovations associated with lean manufacturing indicate an ever-increasing requirement for knowledge workers and skill enhancement. These studies found that human capital training and knowledge transfer must be included in strategic plans to implement continuous improvement processes (Hallgren & Olhager, 2008; Kleiner & Hendrick, 2008; Liyanage, Elhag, Ballal, & Li, 2009; Pais, 2010).

Human Capital in Lean Manufacturing

In his research on lean management, Emiliani (2006) indicated respect for people and enhancement of their respective skill levels would be required in order to achieve any level of successful implementation of lean manufacturing. The formation of small groups has a record dating back to the beginning of time with a family or clan whose collective aim was survival (Nicholson, 1997). Similarly, Pais (2010) found that gains from the formation of semi-autonomous teams created a method to combat competition and increase efficiency for automobile component manufacturers and improve corporate survival. The past two decades have provided a plethora of research and opinions regarding the establishment and value of work groups or teams in the workplace (Follett, 1925; Lewin, 1951) and are of great importance in the implementation of lean manufacturing (Niepce & Molleman, 1998; Pais, 2010). Spurred by the business successes in Japan during the late 1970s, many firms began implementing employee participation or involvement programs in an effort to duplicate those workplace efficiencies and achievements (Deming, 1986; Pais, 2010; Singh et al., 2010). American management began a long and ongoing journey to seek ideas from employees that would make their jobs easier and more efficient (Womack & Jones, 2003) thus increasing levels of morale, worker job satisfaction and enrichment (Hackman, et al., 1975; Pais, 2010).

In their study on lean manufacturing, Niepce and Molleman (1998), indicated the socio-technical relationship of work teams was a key component in transformation of organizational structures from a traditional hierarchical organizational to a participative environment. This finding garnered support in later studies, which confirmed teams were a critical vehicle to attain competitive advantage (Gill et al., 2005; Maxwell, 2008;

Womack & Jones, 2003). Utilizing a team concept to implement lean manufacturing techniques requires the examination of many group and team related theories such as the theory of group development (Tuckman & Jensen, 1977), social development of the workplace (Lewin, 1951), motivational theories developed by Maslow (1954), and the theory of job enlargement and enrichment (Hackman et al., 1975). Work design theories considering characteristics such as; autonomy, intrinsic motivation, social support, and internal team leadership (Cherns, 1976, 1987; Morgeson & Humphrey, 2006; Zafft et al., 2009) will supply insight into the interrelationship of team members.

Kleiner and Hendrick (2008), and Joo and Lim (2009) found organizational culture, job complexity, and factors of human development to be key components in implementation of work design projects that required intrinsic motivation in industrial settings. Leadership of organized labor recognize effective teams often deliver benefits to their organization in the form of improved quality, increased productivity and lower costs (Baugher, 2007; Devinatz, 2009). United Automobile Worker (UAW) leadership in contractual language, indicate the need for participative programs (UAW, 2007) to improve efficiencies, and address the ongoing controversy with teams being detrimental to labor union functionality (Devinatz, 2009). Supporting the value of groups identified by Follett (1924) as being superior to individual achievements, labor has softened its position toward teams and participative programs (Baugher, 2007; Devinatz, 2009) with negotiated inclusion of team participation and activities. An example of labors position change is using non-skilled labor to assist with troubleshooting and changeover activities traditionally assigned to skilled workers (UAW, 2007).

Overlapping job assignments created a need to better understand and develop the skills, knowledge and motivational factors for unionized workers while expanding traditional job design roles (Joo & Lim, 2009; Morgeson & Humphrey, 2006; Pruijt, 2003). These enlarged job duties meet resistance as many unionized workers view implementation of lean techniques or continuous improvement activities as a threat, specifically with higher seniority employees (Sim & Rogers, 2009). Potential job loss and combination of traditional workplace roles and classifications are highly important to union organizations (Landon, 2008) all of which play a part in team implementation and knowledge sharing associated with lean manufacturing. Some researchers would codify unionized facilities as unfavorable for implementation of lean manufacturing or continuous improvement programs due to worker attitude and skill level (Jones & Seraphim, 2008; Sim & Rogers, 2009).

Teamwork and worker attitudes are shifting; peer pressure is becoming a means to attain worker compliance toward work rules and operational guidelines, while workers are accepting the responsibilities of enlarged jobs with little or no additional compensation (Joo & Lim, 2009; Gander, 2009; Russell, 2008). Womack and Jones (2003) indicated successful organizations are moving from the 'command and control' style of management toward a more participative and empowered style of management. Gander's (2009) work on implementation of lean manufacturing described the myriad of changes that must occur in skill enhancement and development of an organizational culture to support change initiatives and continual growth. Gander (2009) indicated traditional managerial controls were not effective in a participative environment and a 'paradigm shift' would have to coincide with lean implementation, and managing cultural

change was on equal value to managing the lean process which complemented findings from additional studies (Kleiner & Hendrick, 2008; Trist et al., 1963).

Yamamoto and Bellgran (2010) conducted a case study of two Swedish manufacturing companies to determine the mind-set that leads an organization to implement the tools of lean. Findings of this study supported Gander's (2009) concept of a 'paradigm shift' that include channeling the focus of team members and management working through problems and developing a systemic view that becomes the culture and driving force for a lean process. Increasing employee involvement and participation activities have proven to be highly beneficial to organizational performance (Gander, 2009; Yamamoto & Bellgran, 2010). Recognizing human capital as a tremendous organizational asset, which needs maximization for the value it provides was of interest in a study conducted by Raines (2011). Findings indicated employees, when engaged in early stages of a project and believed their input and opinions were of value improved project outcome. Raines (2011) found management could involve employees in safety projects in various ways including; communication of goals, brainstorming sessions, and allowing employees some control of inspection procedures and observation practices. These employee engagement methodologies are similar to Gander's (2009) concepts of shifting emphasis from management direction to a participative state and garnering the knowledge and passion of the workforce. Utilizing engagement techniques to harness the power of involved employees is a critical component in the application of lean tools, and implementation of change initiatives (Raines, 2011; Sim & Rogers, 2009).

In their work on front-line ideas for lean, Robinson and Schroder (2009) posited ideas generated from work teams who focused on small incremental improvements

proved to have high levels of sustainability with little resistance. Findings indicated front-line workers were capable of generating high numbers of suggestions, which were easy to implement often for little cost that made marked improvements in the organization (Robinson & Schroder, 2009). Front-line improvement and participative problem solving are the heart of the *kaizan* process identified by Ohno (1998), which has been the topic of numerous studies (Marksberry et al., 2010; Robinson & Schroder, 2009; Womack & Jones, 2003).

Traditional management strategies related to the formation and implementation of change initiatives, specifically lean manufacturing, has shifted focus to included and require worker knowledge and participation. Several studies including one conducted by Anand, Ward, Tatikonda and Schilling (2009) found continuous improvement methodologies involving an engaged, motivated and knowledgeable worker provided a formidable base for attaining high levels of efficiency (Pais, 2010; Parry et. al, 2010). Treatment of the workforce as an equal or greater capital asset is paramount to overcoming the weakness of traditional management philosophy that provides ideas and improvement activities aimed at attaining a competitive advantage (Anand et al., 2009; Marksberry et al., 2010). Taking cues from the technical components of lean manufacturing such as JIT, TQM commonly referred to as the technical infrastructure components and connecting them to the humanistic or people components was the basis for developing a continuous improvement framework (Anand et al., 2009; Niepce & Molleman, 1998). Depending on an underlying theory of organizational learning, Anand, Ward, Tatikonda, and Schilling (2009) framework consisted of three segments (a) purpose, which was the organizational direction for improvements, (b) process that

considered a culture of constant change using standardized practices and processes, and (c) people with a plan to develop training paths, which support the technical advancements. The authors indicated continuous improvement initiatives are a dynamic process that must consider framework components simultaneously as all are interrelated to the organization, which supports Ohno's (1998) original concept of a lean being systemic. Exploring the learning capabilities and perceptions of individuals as part of the people component revealed certain people are suited to some roles, but might not be capable or willing to perform all roles (Anand et al., 2009; Hackman et al., 1975).

Knowledge transfer and multi-discipline training are some of the needs of an effective lean organization, as equipment becomes more technically sophisticated, harnessing the expertise of workers and transferring that knowledge to others is of critical importance (Anand et al., 2009; Daniel et al., 2009; Kleiner & Hendrick 2008). Efforts to eliminate some of the gaps in knowledge is addressed by intermingling academics and practitioners in the workplace where those with knowledge on 'how' are in direct contact with those need to understand 'why' (Tracy & Knight, 2008). Reinforcement of the new direction must be consistent, reflect successful accomplishments, and become part of the everyday business activities between theorists and the workforce (Anand et al., 2009; Gagnon et al., 2008). According to Pryor, Humphreys, Taneja, and Toombs (2011), "many of the scientific management theories originated in the workplace by people who were practitioners as well as theorists...[and] applications were documented through observation, and theories were declared relevant and valid by the researcher practitioners" (p.964). This statement supports the conviction of many scholars that technological tools, training, team interaction, and application must be integral

components working simultaneously to improve conditions and knowledge (Anand et al., 2009; Daniel et al., 2009; Pryor et al., 2011).

Organizations in the 21st century are finding the value in transference of knowledge from seasoned employees to those either newly hired or transitioning through the levels of the organization via promotional opportunities (Liyanage et al., 2009; Straus, Tetroe, & Graham, 2009). Translation of theoretical concepts is contained in this knowledge sharing process, which takes information and mutually shares that knowledge. This person-to-person communication process requires those with the knowledge to simplify into understandable terms what needs to take place, why it is of importance, and how the individual will be affected (Liyanage et al., 2009 ; Straus et al., 2009). Translation and knowledge transfer is an iterative, dynamic, and ethically driven complex process that implies a dual directional flow of information. Communication and feedback were found to be important factors in developing long-term improvement and knowledge sharing between workers, management on the internal organizational structure as well as developing a structure for those of the entire supply chain (Liyange et al., 2009; Pryor et al., 2011).

Changes in manufacturing in the past 30 years has provided a much more technical operation; requiring highly skilled workers, which is computer driven and must consider transnational movement of product and information. This transformation has placed greater emphasis on the import of attaining knowledge from seasoned workers and the ability to utilize information technology systems of lean manufacturing (Chow, Finney, & Woodford, 2010; Yamaji, & Amaska, 2008). Reed (2009) posited educational systems should rely greater on an action-based relationship between theory and practice

in an effort to garner knowledge from current workers in the workforce society that once transmitted to business students provides real world application. Exploring Human Resource (HR) process to develop methods to increase the value of human capital via a systemic view is one method of significantly improving the operational position of a company (Chow et al., 2010; Reed, 2009). Study findings from Mann (2009) supported Reed's (2009) concept that indicated human capital in both technical and social skills requirements needed to be an integral component in lean manufacturing implementation strategy. Mann (2009) and Reed (2009) found skills were lacking in management and leadership as well as within the front-line workforce, which was detrimental to attaining expected process improvements. Creating the architecture for training requires accurate information as an input, which relies on a proper investigation into procedures and practices. A methodology to attain this information with a high level of accuracy is performance of a job analysis (Chow et al., 2010; Hackman et al., 1975) by a qualified individual or group. Specific outcomes from a proper job analysis include requirements for (a) knowledge (b) skills (c) abilities and (d) other characteristics (KSAO's) for current or new incumbents to perform tasks, within an organizational environment (Chow et al., 2010; Cudney & Elrod, 2011). Numerous methods exist for obtaining and gathering data including worker input from both interview and observation, which is similar to qualitative investigation techniques (Chow et al., 2010; LeCompte & Schensul 2010). After obtaining the data, a training matrix detailing the necessary KSAO's in comparison to the actual skill sets of the employees ensure proper plans are put into action to bridge the gap. Obtaining worker knowledge, input and standardizing work are key factors of lean manufacturing, which must consider both technical skill needs as well as social

interaction in semi-autonomous teams (Chow et al., 2010; Kleiner & Hendrick, 2008; Pais, 2010).

Human resource management in the last decade now recognized for its value as an asset in attaining a sustainable competitive advantage over competitors with similar products and process. Traditional advantages occurred when one had either financial, resources advantages, economies of scale or technological advancements, however, improvements in mass transportation of deliverable items and a global economy have organizations focusing more to internal sources for advantageous positioning (Hallgren & Olhager, 2009; Wen-Chang, Chien-Hung, & Ying-Chien, 2011). Ohno's (1998) concept for the people pillar of TPS supports internal methodologies of engaging the workforce (Raines, 2011) in knowledge gathering and employee development (Yamaji, Sakai, & Amasaka, 2007). Researchers have identified several approaches to improving internal human capital to attain competitive advantage in the marketplace including (a) career path opportunities, (b) training for both technical and social needs, (c) employment stability and job security, (d) job enlargement and enrichment to improve employee participation, and (e) establishing a reward system to share in success (Chow et al., 2010; Mann, 2009; Wen-Chang et al., 2011). Fliedner and Mathieson (2009) found human resource management aims that improve career development, training, and human relations skills were significant factors identified by respondents in their study. Leadership, teamwork, problem solving and change management, all factors of human resource management, were indicated via a Likert-type scale as statistically significant components (Fliedner & Mathieson, 2009). Findings from Hackman, Oldham, Jenson and Purdy's study on job enrichment in 1975 posited employees performed at

significantly higher levels when they perceived their ideas and thoughts were meaningful surrounding five core dimensions. Skill variety, task identity, task significance, personal responsibility, and knowledge or results via feedback and communication comprised the five identified factors (Hackman et al, 1975), which related to additional studies and the relationship between technical and socialization training needs (Chow et al., 2010; Niepce & Molleman, 1998; Majchrzak, 1997; Morgeson & Humphrey, 2006; Sim & Rogers, 2009).

Lean thinking and knowledge driven process improvements rely upon the collective cooperation between theorists and practitioners, human capital now recognized as vital in any change initiative is receiving exploration by researchers to verify and understand its value. Conditions vary within different organizations and no specific template is applicable for ready implantation, Pais (2010) found understanding and establishing a level of team self-management, based organizational hierarchy, set up a workplace democracy, which avoided alienation and resistance. Numerous research projects have found the relationship between technical skills of human capital are directly related to effective socialization and soft skills in both management and the workforce and critical in lean implementation (Kleiner & Hendrick, 2008; Lewin, 1951; Pais, 2010; Sim & Rogers 2009; Womack & Jones, 2003). Ohno's (1998) concept for people or human capital, which was explored by various management experts in the decades since inception. Findings have proven that sustainability of lean manufacturing is attainable only by understanding human factors and making them part of everyday operations, thus creating a cultural shift toward participative involvement (Cherns, 1976, 1987; Deming, 1986, Drucker, 2006; Marksberry et al., 2010; Raines, 2011).

Cultural Environment in a Lean Manufacturing Setting

In a work on organizational ecology, Hannan (2005) indicated that organizations are 'imprinted' with social, cultural and technical features that are common in the environment when founded. This imprint develops an inertia that strongly resists any deviation to the status quo and can often lead to failure in organizational development and change efforts. Change efforts in unionized facilities face additional burdens due to management worker relations, which historically are adversarial (Deitsch & Dilts, 2006). This relationship has changed since the foundation of the UAW, from brutal conflicts toward a partnership in organizational success (Sorensen, 2006). Implementation of a teamwork concept to replace autocratic workforce direction has been the topic of many organizational development research projects in the past decades (Pais, 2010; Sisaye, 2005). Data indicate a marked increase in idea generation and successful implementation of innovative improvements to both processes and products (Gil et al., 2005). Flattening organizational structures with team implementation has provided cost savings, which increase the likelihood of additional success since the people responsible for implementation are participants in its generation (Sisaye, 2005).

Development of an organizational structure that will deliver an environment to promote creativity and maintain a proactive position with idea generation and its potential benefits or possible failure is paramount in innovative organizations (Gil et al., 2005). Organizations are dynamic and have driving and resisting forces, often independent of one another, which work to support or resist change from the status quo. Recognition of the forces from both individual and organizational sources and developing actions to

minimize their impact is prevalent in the sustaining phase of change (Gander, 2009; Gil et al., 2005).

Environmental and organizational relationships regarding lean manufacturing is relatively new and underexplored and additional research will provide a better future understanding. One point of view relates to a lean focus on technical applications and tools for research without exploration of Toyota's culture and its impact on successful implementation (Badurdeen et al., 2011). Researchers have indicated that resistance to lean manufacturing within manufacturers in the United States is a multi-faceted obstacle to overcome. The first obstacle to overcome is the difference in culture and organizational support for lean implementation (Badurdeen et al., 2011) between Japanese management and that of Western manufacturers, coupled with differing views on worker development and involvement (Gagnon, Jansen, & Michael, 2008: Pais, 2010). Secondly, legacy attitudes based on historical perceptions of unionized employees with high seniority and a controversial and low trust relationship with management provide an enormous barrier (Sim & Rogers, 2009) that will require training and time to overturn (Brondo & Baba, 2010; Shook, 2010). Training in social interaction and team development (Marin-Garcia et al., 2008; Maxwell, 2008) is the methodology that will allow technical implementation of lean manufacturing outside traditional "Toyota culture" (Marksberry et al., 2010; Reed, 2009).

Success of an enabling culture and positive team social interaction (Marksberry, et al., 2010) in America, occurred with the joint venture between General Motors (GM) and Toyota in Freemont California namely, NUMMI (Shook, 2010). GM managed the Fremont plant, the UAW represented the hourly workers, the location ranked as possibly

the worst manufacturing location in the company with high absenteeism, work stoppages, and poor quality and cost ratings (Shook, 2010). Behavioral guidelines that considered the phases of team development and social interaction (Lewin, 1951) augmented the technical skill requirements of TPS or lean manufacturing. UAW and GM leadership took advice from the consulting firm and using employee involvement created a participative environment, which was a shift from traditional adversarial cultural conditions. Implementation of TPS as NUMMI resulted in the plant attaining awards for efficiency in both quality and cost (Shook, 2010). Freemont provides support for the value of following lean manufacturing principles as a cost advantage, and full implementation can occur by following the entire process and must consider the environment and social interaction of the team members. Similar findings came from a study by Scherrer-Rathje, Boyle, and Deflorin (2008) in their research project on a global manufacturer of food processing machines and equipment. Like NUMMI the company was struggling and change was necessary to improve viability due to market demand and a need to reduce inventory costs (Scherrer-Rathje et al., 2008; Shook, 2010). Lessons learned from both locations included several common themes; management commitment, involvement of semi-autonomous teams, an understanding of the cultural and social involvement associated with a 'new way' of working and understanding that lean is the groundwork for a learning organization (Scherrer-Rathje et al., 2008; Shook, 2010, Drucker, 2006).

Just developing an understanding of TPS or lean does not mean that an organization can have any measure of success transforming itself into a lean organization without developing knowledge about the circumstances and culture required to facilitate

long-term learning. Liker's (2003) work on the 'Toyota way,' based upon his 20-year career of studying Toyota, summarized the critical two pillars that support TPS as a system are, (a) continuous improvement, and (b) respect for people. Continuous improvement or *kaizen* is the continual challenge to the status quo and is germane to all facets of the organization (Liker, 2003; Marksberry, 2011). Liker (2003) found the true value of continuous improvement was creating an atmosphere of continual learning in an environment that embraces change and involvement. Organizational development that embraces change occurs with an engrained unity toward respecting the people, which from Toyota's perspective, manifested in employment security and active participation in job activities and enlargement (Joo & Lim, 2009; Liker, 2003; Womack & Jones, 2003). Liker's (2003) second key pillar, respect for people, expounds on Ohno's (1998) original concept of engaging people in all aspects of the production system to garner, knowledge and improvement in process. Liker (2003) and Marksberrry (2011) found management's primary role in emulating the value of lean manufacturing identified by Toyota during their rise to manufacturing prominence lies in developing a long-term cultural strategy to match organizational values to daily action. Culture according to researchers is extremely ambiguous phenomenon with a variety of meanings, which do not facilitate easy study criterion. Liker (2003) indicated observation of the wide variety of singular components that encompass the total culture make up the many obstacles including morals, values, knowledge, as well as tangibles such as logos, artifacts, and buildings. Marksberry (2011) supported this finding positing many cultural frameworks exist proposed by sociologists and anthropologists, which every individual organization must validate for espoused cultural issues.

Taleghani (2010) indicated cultural requirements for lean manufacturing needed to cause management to convey through actions that leaning thinking is ordinary and consistent from the top to the bottom of the organization. The author posited lean culture is divided into two parts, those requirements aimed at internal factors and the second category aimed at supplier relationships. Developing a learning environment and training employees is one of the first phases of cultural improvement, which corresponds to strategic change and suggested to begin in a pilot area to ensure correctness prior to a full-scale charge (Marksberry, 2011, Taleghani, 2010). A pilot area concept develops the necessary infrastructure, outlined by Anand, Ward, Tatikonda, and Schilling (2009), which coordinates the organization toward a common purpose, elevating standardized process and improvement methods, while preparing the people within the workplace for sustained behavioral change (Singh et al., 2010; Taleghani, 2010; Womack & Jones, 2003). Additional internal organizational improvements identified by Taleghani (2010) in the pilot area included minimizing scheduling changes, keeping work assignments consistent to develop cohesiveness of the workforce, and pushing decision making to the lowest levels of the organization. Studies by Pais (2010), Joo and Lim (2009), found empowering workers by including them in problem-solving to be critical first steps in transforming an organizational culture to be participative, creative and motivated thus improving operational efficiencies. Taleghani's (2010) final internal improvement, supported with numerous additional studies, is managing the conflict and friction that develop within the teams and the organization due to the social interaction (Kleiner & Hendrick, 2008; Lewin, 1951; Sim & Rogers, 2009).

External organization improvements identified by Taleghani (2010) first focused on developing a mutual trust and commitment in a long-term relationship with suppliers, supported by Sanders (2011) with the inclusion of EDI for supplier manufacturing interchange of production data. The long-term commitment with a laser focus on customer satisfaction was a point identified by Emilaini in 2006 and further explored by Cudney and Elrod in 2011 challenging traditional supplier relations based purely on cost. These studies indicated implementation of a proper lean philosophy required several years depending on the size of the firm and current organizational culture. Conclusions from Taleghani (2010) point to implementation barriers that are consistent with additional studies relating to management knowledge about lean concepts, lack of understanding of existing and required cultural factors for lean, and not providing a clear established tangible goal for improvement (Abdulmalek et al., 2006; Badurdeen et al., 2011; Chow et al., 2010; Daniel et al., 2009).

Workers play a central role in lean manufacturing where people considered assets need training and development to provide maximum input with high levels of flexibility, motivation, and multifaceted knowledge and skills (Liyange et al., 2009; Scherrer-Rathje et al., 2008). Changes such as these force people from the comfort zone, which while easy for some is extremely difficult for others (Sim & Rogers, 2009) and forms the basis for a *kaizen* culture (Mishra & Gupta, 2010). Taking cultural cues from Holfstede (1980), Mishra and Gupta (2010) defined *kaizen* culture as "the collective behavior of people using common corporate vision, goals, shared values, beliefs, habits, systems, and symbols... people start valuing such things they start to exhibit the same in their actions" (p. 60). This cultural exploration, conducted as a case study of three manufacturing

locations in India, indicated management commitment toward funds, time, and additional resources paved the foundation to make the dominant organizational culture one of continuous improvement values (Mishra & Gupta, 2010). Several technical tools were utilized in the three study locations to enable change toward lean manufacturing concepts such as 5's, JIT, TQM, Kanban, and TPM all of which were found to be components in the overall system supporting the work of several researchers (Jones & Seraphim, 2008; Joo & Lim 2009; Nakajima, 1989; Ohno, 1998). Mishra and Gupta (2010) posited cultural change necessitates continual evaluation of the quality and skills of management and the workforce to encourage candidates capable of developing a participative creative environment, and resource allocation for training to attain those skills is a management priority. Mishra and Gupta (2010) demonstrated differences exist in Japanese culture from that of Iran and its workforce, making template forms of technical tools and change initiatives difficult to implement until those cultural issues are understood and addressed by the host organization.

Social and cultural differences presented themselves as issues of failing deployment initiatives in Asian countries outside Japan as well as internal to the founding nation (Rahman et al., 2010; Schonberger, 2007; Sim & Rogers, 2009). Chen and Meng (2010) performed a study of Chinese enterprises reviewing the ability to implement lean production methodologies on the mainland and found it difficult for various reasons. One major obstacle Chen and Meng (2010) identified in Chinese manufacturing related to only paying attention to lean tools without developing an understanding of the philosophy of lean and its relationship to the people involved in the process. Chinese workers lacked in experience with automation and technological advancements in manufacturing that

precipitated a desire for achieving quick results with lean tools that study results indicate is a long-term and continual process to implement (Gander, 2009; Marksberry, 2011). Other factors Chen and Meng (2010) identified as hindrances to successful implementation were indiscriminately aping the success of others using a specific lean tool without understanding the essence of lean manufacturing and its systemic impact to the entire organization and making it blend. Assuming a process is successful within a particular organization, therefore, it will be successful at another is a factor demonstrated with results from several studies (Marksberry, 2010; Ramamoorhty et al., 2007) found to be false even to the point of confliction in some cases within the same organization (Doolen, VanAken, Farris, Worley, & Huwe, 2008; Scherrer-Rathje et al., 2009). Change efforts including continuous improvement activities are largely team-based, requiring support from management with resource allocation and participation to demonstrate high levels of commitment that become evident in the everyday workplace and develop a culture to embrace not accepting a status quo mentality. Findings from Chen and Meng (2010) posited mastering the value of lean manufacturing in Chinese manufacturing required a shift in culture since Chinese people are trained to follow their leaders, therefore, visible management commitment and encouragement of exploring change in work practices would lead lean involvement. Accepting the fact that change efforts, specifically, in behavior modification and organizational culture are long-term and require a keen focus on establishing a learning atmosphere require training and endurance. Ramamoorthy, Kulkarni, Gupta, and Flood (2007) found comparisons of individualism and collectivism to be important in understanding organizational culture

and developing plans to conform an organization into one that supports a vision for continuous improvement.

Kaizen is mostly team-based so understanding and overcoming a tendency for any individual to harbor knowledge to retain notoriety and power is contrary to lean thinking expectations. Continuous improvement actions affect organizational performance including outcomes for human resources such as employee attitude, knowledge, and motivation toward willing acceptance of enlarged responsibilities, and participation in team activities (Doolen et al., 2008; Mishra & Gupta, 2010). Al Smadi (2009) recognized *kaizen* implementation as a major factor in organizational change and improved operational competitiveness, but required management to amend attitudes toward worker interaction and utilize participative methods to engage creative and innovative ideas. Marksberry, Badurdeen, Gregory, and Kreafle (2010) inferred management development in continuous improvement actions required learning special skill sets to enhance leadership interaction with workers and placing emphasis on team work and respect for people. Mann (2009) found management leadership skills relating to both technical and social aspects of lean concepts were minimal in many locations and significant changes to human resource practices were necessary to improve communication and interaction. These cultural and development changes in manager worker relations is the foundation for implementation of lean manufacturing and as early stated varies from organization to organization and national cultures (Chen & Meng, 2010; Marksberry, 2011; Ramamoorthy et al., 2007).

Organizational and cultural differences with lean manufacturing techniques was the topic of a study of South Korean automobile manufacturer Hyundai Motor Company

as it transplanted operations from Asia to Alabama in the United States (Jo & You, 2011). Consensus among researchers indicate foreign transplants can only be successful in the United States, outside the luxury market, when they employ lean manufacturing techniques identified by Japanese automaker Toyota (Emiliani , 2006; Marksberry, 2011; Womack & Jones, 2003). Scholars debate whether successful manufacturing transfers depend on corporate strategy or additional factors such as differing environment, national culture differences, and definition of what lean manufacturing contains. Some Japanese firms have found difficulty transferring outside of the home country, which supports the belief that not all lean implementation can or will be implementation of lean tools without regard for the social and cultural aspects (Chen & Meng, 2010; Doolen et al., 2008; Ramamoorthy et al., 2007). Jo and You (2011) indicated the production system utilized by Hyundai differed from traditional Japanese production system concepts, worker skills did not carry such a predominant factor, and reliance was more on technological flexibility. This deviation from tradition correlated with findings from Chen and Meng (2010) indicating environmental conditions and specific cultures dependent on varied approach to lean manufacturing and its related social factors. Jo and You (2011) indicated a major difference between Hyundai and Western manufacturing philosophies is organizing work to be flexible and responsive to customer and reduce the mass production mentality. Numerous manufacturing researchers agree this to be one major obstacle in Western culture that hinders success in implementation (Jones & Seraphim, 2008; Sim & Rogers, 2009; Singh & Kanduja, 2010). Marksberry (2011), Jo and You (2011) described similar findings indicating a lean production system, described as socio-technical, grows in value depending on how an organization combines technical

components with social interaction resulting in successfully gaining operational efficiencies. Jo and You (2011) declared scholars agree national barriers are not impossible to overcome and transferability of a production system by local institutions is achievable with identification and elimination of internal socio-cultural issues.

Lean manufacturing concepts, based upon waste elimination, rely on *kaizen* activities, which are innovations in work practices that do not require large capital investments and provide opportunities to improve operational efficiencies. These factors are quite similar to studies conducted by the Tavistock Institute on British coal mining operations during postwar reconstruction in 1949 and formulate the early stages of examining social-technical interaction that later included lean manufacturing (Niepce & Molleman, 1998; Trist, 1981; Trist et al., 1963). Cohen-Rosenthal (1997) indicated the role of unions in STS implementation, grossly overlooked, which weakened information dissemination, and the critical role of worker acceptance to merging technology in the workplace. Labor markets demands, recruitment, and training designs for lean manufacturing are critical components, which require union involvement to attain the best workers for the tasks. Union leadership, representing automobile workers, in the past few decades has recognized the value of lean manufacturing and softened their stance toward stringent work rules and guidelines (Landon, 2008; Russell, 2008). Changing attitudes with UAW leadership has developed an internal philosophical and cultural change that addresses former hostilities toward management and has proven beneficial to both the membership and companies in terms of long-term success with quality and productivity improvements (Baugher, 2007; Devinatz, 2009). Womack and Jones (2003) studied lean manufacturing extensively and concluded implementation

plans must consider culture and social aspects in addition to technical tools. The "Toyota way" (Marksberry et al., 2010) might not be the single answer, however, Western managers need to understand social and cultural differences and employ non-traditional managerial techniques when dealing with the workforce and team members (Pais, 2010; Parry et al., 2010). Understanding union roles (Baugher, 2007; Cohen-Rosenthal, 1997), relating to socio-technical systems prompted numerous studies that sought the best match between needs of the social and technical systems and provided the organization with optimal performance (Appelbaum, 1997; Cherns, 1987; Pruijt, 2003).

One area of controversy for union leadership is the tendency for foreign transplants to locate in states that have passed right-to-work legislation and avoid unionized workers and hindrances of contractual language (Vedder, 2010). Jo and You (2010) indicated Hyundai chose Alabama as a location due in part to factors of labor markets and non-unionized locations. Jo and You (2010) avowed worker skill was not as important to Hyundai's version of the production system and worker rotation with a team or cell was infrequent and contrary to common philosophies and practices of organized labor as well as the Toyota mentality. Hyundai's production system supports Niepce and Molleman's (1998) findings in a comparison of lean manufacturing and STST relating to the human component where lean relies on strict processes and expert direction whereas STST includes more participative teamwork. Appelbaum (1997) found STST use was expanding work design processes as infiltration of technology widens in industries in the United States and Canada. Properly mixing technical improvement tools and social interaction of teams simultaneously has proven to boost the financial and working conditions throughout Western organizations (Cherns, 1987; Joo & Lim, 2009; Pais,

2010; Singh, 2010). Research on lean manufacturing and the social aspects of team interaction is clearly an area further exploration is necessary since organizations become more diverse with global expansion. Work design developed a prevalent theme throughout this literature review with the relationship between technical tools and social interaction requiring a solid infrastructure lead by transformational leaders that support lean manufacturing concepts (Liu, Shah, & Schroeder, 2006; Kirkman, Chen, Farh, Chen, & Lowe, 2009; Mann, 2009; Marksberry et al., 2010). STST offers a viewpoint well suited for an examination of lean manufacturing in unionized settings.

Summary

Globalization and competition have forced 21st century companies to be innovative in operational processes and seek methods to improve efficiencies, leading to increased financial profits (Singh et al., 2009). This review presented four predominant subsections; an historic overview of lean manufacturing (Emiliani, 2006; Ohno, 1988; Womack & Jones, 2003) and process of lean manufacturing (Abdulmalek et al., 2006; Gil et al., 2005; Hallgren & Olhager, 2009; Ohno, 1988). The third section covered human capital and team social aspects (Deming, 1986; Gill et al., 2005; Morgeson & Humphrey, 2006; Zafft et al., 2009). The review concluded with an examination of the cultural environment in a lean manufacturing setting (Deitsch & Dilts, 2006; Jones & Seraphim, 2008; Pais, 2010; Sim & Rogers, 2009; Sisaye, 2005).

The seven types of waste identified by Ohno (1988), now common in 21st century manufacturing, resulted in the creation of a host of 'tools' to eliminate wasteful conditions. These instruments became the change mechanism that developed a competitive advantage for Japanese automobile manufactures and are germane today

(Hallgren & Olhager, 2009). Cultural and organizational differences have historically existed between salaried management and hourly workforce, especially when compared with the Japanese (Deming, 1986; Sim & Rogers 2009). Similar to the study of Tavistock miners (Trist et al., 1963), technological advancements in lean manufacturing have created a significant impact on the social structures in implementation teams (Appelbaum, 1997; Gil et al., 2005; Pais, 2010; Zafft et al., 2009). Unionized facilities create additional barriers to team implementation based upon an adversarial relationship with management specifically when high seniority employees are included (Jones & Seraphim, 2008; Sim & Rogers, 2009).

Many research findings explored the value of work groups or teams in the workplace (Follett, 1925; Lewin, 1951) and are of great importance in the implementation of lean manufacturing (Niepce & Molleman, 1998; Pais, 2010) and development of human capital to create a competitive advantage. Knowledge transfer and multi-discipline training are critical as equipment becomes more technically advanced and the workforce expands (Anand et al., 2009; Daniel et al., 2009; Kleiner & Hendrick, 2008). Development of worker knowledge entails some critical components of job complexity, motivation, factors of human development, and enhancement of technical skill sets (Doolen et al., 2008; Kleiner & Hendrick, 2009; Mishra & Gupta, 2010).

Benefits from cohesive teamwork (Baugher, 2007; Follett, 1924) and motivational theories (Maslow, 1954; Singh et al., 2010) evidenced the requirement of social development for successful teams and change implementation. Increasing focus on the socio-cultural aspects of teams and a supportive organization (Appelbaum, 1997; Cherns, 1976, 1987; Trist et al., 1963) will greatly increase the potential to attain competitive

advantage using the time-tested instruments of lean manufacturing (Badurdeen et al., 2011; Marin-Garcia et al., 2008; Marksberry et al., 2010; Maxwell, 2008).

Workers play a central role in lean manufacturing where people considered assets, need training, and development to provide maximum input with high levels of flexibility, motivation, and multifaceted knowledge and skills (Liyange et al., 2009; Scherrer-Rathje et al., 2008). Changes such as these force people from the comfort zone, which while easy for some is extremely difficult for others (Sim & Rogers, 2009) and forms the basis for a *kaizen* culture (Mishra & Gupta, 2010). Understanding union roles (Baugher, 2007; Cohen-Rosenthal, 1997), relating to socio-technical systems prompted numerous studies that sought the best match between needs of the social and technical systems and provided the organization with optimal performance (Appelbaum, 1997; Cherns, 1987; Pruijt, 2003).

Chapter 3: Research Method

The purpose of this ethnographic qualitative study was to explore worker experiences and perceptions of the social aspect of teams such as empowerment, job enlargement, management commitment, and changing culture in a unionized manufacturing setting. Holistic ethnographic research (Johnson & Christensen, 2007; LeCompte & Schensul, 2010; Moore, 2011) allows for multiple perspectives of an organizational setting to analyze cross-cultural relationships from manager and employee perspectives (Moore, 2011). The study sought an understanding of union worker perceptions of lean manufacturing implementation requirements, strategies, and the resultant cultural change in two manufacturing facilities in Southern Michigan (Moore, 2011; Singh et al., 2010; Womack & Jones, 2003). Using STST (Appelbaum, 1997; Cherns, 1976, 1987; Trist et al., 1963) as a theoretical lens, an exploration will occur on the interdependencies among team members, participant role in job enlargement (Hackman et al., 1975) and work change complexities associated with lean technical tools. Qualitative data collection followed ethnographic guidelines (LeCompte & Schensul, 2010; Moore, 2011) using face-to-face, in-depth interviews and participant observation (Marshall & Rossman, 2011; Maxwell, 2004; Yin, 2010). Data was collected on respondent perceptions and observations regarding four primary constructs: (a) empowerment (Pais, 2010), (b) job enlargement (Joo & Lim, 2009), (c) management commitment (Mann, 2009), and (d) changes to traditional union management philosophies (Baugher, 2007; Russell, 2008). All of these components make up social aspects of lean implementation (Emiliani, 2006; Marksberry et al., 2010; Ohno, 1988; Womack & Jones, 2003). This chapter reviews the research method and design for the

study, including the participants, materials, or instruments for data gathering. Additionally, data collection methods and analysis practices are chapter components followed by methodological assumptions and study limitations. The concluding segment outlines consideration and proposed methods on ethical assurances and participant protection.

The research literature has focused primarily on the techniques of lean implementation (Ohno, 1988; Singh et al., 2010) and less on the necessary cultural and social changes for the organization. Exploration of two research questions designed to improve understanding of worker perceptions, which directly relate to the socio-technical (Cherns, 1976, 1987; Trist et al., 1963) aspects of implementation of lean manufacturing in unionized locations guided this study. The research questions seek identification of key factors impeding the implementation of lean manufacturing in unionized settings by viewing the phenomenon from various perspectives. The questions explored participant perceptions of the study constructs that include empowerment (Pais, 2010), job enlargement (Joo & Lim, 2009), managerial support (Mann, 2009), and changing philosophies of union-management relations (Baugher, 2007; Russell, 2008) that have been found to be components of lean manufacturing implementation (Emiliani, 2006; Marksberry et al., 2010; Ohno, 1988; Womack & Jones, 2003). The following central research questions fulfill the research purpose and guide further inquiry into the perceptions of workers toward lean manufacturing implementation components that serve as the study constructs.

Q1. What are unionized worker experiences with the social aspects of lean manufacturing and team interaction in a Michigan manufacturing plant?

Q2. What are unionized worker perceptions of (a) empowerment, (b) job enlargement, (c) management commitment, and (c) philosophical change in union-management relations in a lean manufacturing setting?

Research Method and Design

Ethnographic research has become a widely utilized method to study and understand human socio-cultural problems to develop corrective approaches that may provide a positive improvement for the study community (LeCompte & Schensul, 2010) and allows for multiple perspectives of an organizational setting to analyze cross-cultural relationships from manager and employee perspectives (Moore, 2011). The study methodology was holistic ethnography (Johnson & Christensen, 2007; LeCompte & Schensul, 2010; Moore, 2011) and case study orientated (Moore, 2011; Zikmund et al., 2010). Plant culture and changing management worker relationship are of great relevance in implementation of lean manufacturing and team concepts (Badurdeen et al., 2011; Maxwell, 2008) and are best suited for an ethnographic design consisting of an interview and observational approach to the socio-cultural study problem (Kelly & Gibbons, 2008; Marshall & Rossman, 2011; Yin, 2011). Ethnographic techniques allow for more interpretative and explorative research design, which is less rigid than quantitative studies and support the investigation of cultural and social issues more extensively (Marshall & Rossman, 2011; Yin, 2011). This study based on perceptions and beliefs and not on theoretical testing, fulfills the parameters of an ethnographic design, and is appropriate for research question exploration.

Ethnographic application is primarily research driven and supplemented by action plans developed from the findings for inclusion at the study locations (LeCompte &

Schensul, 2010; Moore, 2011). Application of this qualitative study through a socio-cultural lens of STST (Appelbaum, 1997; Cherns, 1976, 1987; Trist et al., 1963) may facilitate organizational redesign and change efforts to improve efficiencies and reduce production costs (Badurdeen et al., 2011; Bayraktar et al., 2007; Pryor et al., 2011).

An ethnographic method is appropriate for this study based on its exploratory nature, to identify the current state of social interaction of team members relative to lean manufacturing implementation in unionized locations in Michigan from the perspective of the team members directly involved in the work culture (LeCompte & Schensul, 2010; Moore, 2011). The research design allowed development of patterns and themes for the organization and may provide understanding of the issues associated with a team-based work system. These patterns and themes developed under the four primary constructs: (a) empowerment (Pais, 2010), (b) job enlargement (Joo & Lim, 2009), (c) management commitment (Mann, 2009), and (d) changes to traditional union management philosophies (Baugher, 2007; Russell, 2008), all of which are components of the social aspects of lean implementation (Emiliani, 2006; Marksberry et al., 2010; Ohno, 1988; Womack & Jones, 2003).

Two manufacturing locations in Southern Michigan were selected for the study; Plant I, with approximately 400 employees, began operations prior to unionizing the workforce. Plant II is a smaller facility with 300 employees. Both locations currently operate under a bargaining contract with the United Automobile Workers (UAW). Qualitative data collection followed ethnographic guidelines (LeCompte & Schensul, 2010) using participant observation, and 10 individual face-to-face, in-depth interviews

involving team members, which provided relevant qualitative data to fulfill the purpose of the study.

Participants

The target population of 700 employees at the study locations will be narrowed to a study sample of 40 participants approximately half from each location using a purposeful selection. Researchers indicate sample sizes in ethnographic studies are most commonly between 20 and 30 participants, which allow exploration of a broad range of experiences and establish a point of saturation to fulfill data credibility (Mason, 2010; Russell & Gregory, 2003). From the numerous manufacturing cells, the basis for the initial reduction was team willingness to participate in observed activities, shift assignment, and the concurrence from management-union leadership. The study population consisted of three teams from each location without demographic constraints. The only inclusion criterion was t the teams must be currently experiencing ongoing implementation of lean manufacturing. The selection was from a sampling frame of total operational teams to obtain a purposeful sample of approximately 20 employees from each location, totaling 40 participants, to participate in the team observation.

From the team sample (N=40), a subsample of 10 individuals, five from each location (n=10), were invited to participate in one-on-one interviews (LeCompte & Schensul, 2010; Patton, 2002). Data from Human Resources that considered the demographic characteristics of gender, seniority, and race/ethnicity guided invitations for the 10 individual interviews to establish a representative sample of study participants, similar to plant demographics (Fowler, 2008; Yin, 2010). Thus, (a) team participant observation, and (b) face-to-face, in-depth individual interviews provided data collection

of worker perceptions of the four study constructs. Observation and interviews are important tools in the study of human subjects to garner knowledge about attitudes, feelings and behaviors (Fowler, 2008) and have been critical research techniques in the ethnographic studies of organizational development in the past decades (LeCompte & Schensul, 2010; Porras & Roberts, 1980; Yin, 2010).

Materials/Instruments

The materials for data collection consisted of 10 interviews following a rubric (see Appendix A) which provided 16 sub-questions to support the study research questions. The second instrument was observation and copious note taking of team activities such as meetings, continuous improvement activities, and interaction with team members during production periods and followed a rubric as a guide (see Appendix D).

Data Collection, Processing, and Analysis

Manufacturing plant culture and changing management-worker relationship are of great relevance in implementation of lean manufacturing and team concepts (Badurdeen et al., 2011; Maxwell, 2008). Ethnographic research has become a widely utilized method to study and better understand human socio-cultural problems to develop corrective approaches that may provide a positive improvement for the study community (LeCompte & Schensul, 2010) and allows for multiple perspectives in data collection (Moore, 2011). Interview questions developed for this study and the research questions were tested with a panel of lean implementation professionals in the automobile manufacturing arena to ensure validity.

Structured individual interview questions based on common ethnographic design (LeCompte & Schensul, 2010; Patton, 2002; Yin, 2010) of 10 participants explored the

espoused (Argyris, 1982) perception of unionized workers. The interviews sought understanding of the four central constructs of (a) empowerment (Pais, 2010), (b) job enlargement (Joo & Lim, 2009), (c) management commitment (Mann, 2009), and (d) changes to traditional union management philosophies (Baugher, 2007; Russell, 2008). Qualitative audio-taped interview sessions (Yin, 2010) lasting approximately 30 to 60 minutes with the 10 participants provided interpretive data, once transcribed, which established the espoused view and become the baseline for observation of the entire team process.

Ethnographic observation techniques (LeCompte & Schensul, 2010; Yin, 2010) of team meetings, production operations, management to hourly member interaction, and hourly team-to-team interaction, using the sub-questions as a basic rubric, provided theory-in-use data (Argyris, 1982). Observations of numerous team meetings and lean manufacturing activities via note taking occurred at each location during the research process. Complementary data (LeCompte & Schensul, 2010; Yin, 2010) was elicited such as extensive note taking and collection of nonverbal data during the one-on-one interviews and observation of teams. Supportive data collection activities such as these provided a level of triangulation assisting with validity of the study (LeCompte & Schensul, 2010; Yin, 2010). Conducting multiple measures of the four constructs ensured rigorous data and enhanced interpretive study credibility, and included audio recording of interviews and written observations. Observation and interview responses were the predominant data collection methods and resulted in analysis to establish patterns and themes (Patton, 2002, Yin, 2010). Observation of team activities may provide valuable insight and enable data representative of the social interaction periods

and participant beliefs surrounding the constructs. Demographic characteristic data of interview participants (Shank, 2006) was collected to include gender, employee seniority, and race/ethnicity.

Data was analyzed using rigorous qualitative measurement seeking descriptive themes and patterns of beliefs or perceptions for the four constructs from the interview questions (LeCompte & Schensul, 2010, Yin, 2010) and observation of team social interaction (Cozby, 2009; Marshall & Rossman, 2011; Yin, 2010). Data reduction steps first occur when a researcher decides what information to transcribe and what to leave out (LeCompte & Schensul, 2010; Onwuegbuzie, Leech, & Collins, 2010). The depth of the interview is an indicator of the amount of information put to text (Miles & Huberman, 1994, Turner III, 2010), which in this case is significant. Researcher transcription of audiotaped sessions supplemented copious observational note taking, as the primary data collection method. Miles and Huberman, (1994) indicated one hazard of full interview transcription is the potential for disclosure of personal information about another participant that is not germane to the study and could cause personal or social harm. The four constructs are the basis for data coding and serve as the first attempt of grouping the respondent information related to the study problem and will be evolutionary within the study. Data coding initially will correspond to the four study constructs or "chunks" (LeCompte & Schensul, 2010), followed by interpretative data analysis, to develop sub-codes of experiences, expectations, and social characteristics. Aggregated and categorized responses based on commonality from interview questions, supported with notes from observation sessions, guided the sub-codes" (LeCompte & Schensul, 2010; Yin, 2010).

Methodological Assumptions, Limitations, and Delimitations

This study was limited to two manufacturing locations in Southeastern Michigan, which may not be a representative sample for unionized workers in the whole population of the United States. More information about team socialization and interaction in other areas that have dissimilar social groupings to this study might provide data that is inconsistent with the findings. An additional limiting factor is contained in the locations perception of what is "lean manufacturing" and how progressive the relationship between the hourly and salaried workforce. An additional limitation results from the study being a micro-ethnographic design, which relies on observation in this case of one individual where tendencies of bias can occur.

Several assumptions occur with this study. First, the data are assumed accurate and reliable. Second, the data collection, processing, and analysis of results are assumed error free. An additional assumption of this study is that participants are truthful in responding during the interviews. It is also assumed that responses are not targeted to fulfill predetermined outcomes based on apprehensions or expectations in the workplace. The final assumption is that observed behavior in meetings and team activities are part of normal work life and not staged for data collection.

Utilizing only one researcher will provide for accurate data collection and processing thus eliminating any potential errors associated with multiple handling. Respondents have no reason to provide responses and exhibit behavior that is not normal and truthful since they are protected with anonymity. Observation of behavior and off-line conversations will determine the validity of behavior and workplace environment.

Ethical Assurances

Ethical human research protects participants from harm, promotes honest information gathering, respects individual rights to participate and retain privacy, and obtains informed consent throughout the entire project (Wainwright & Sambrook, 2010; Wester, 2011). Maintaining high standards in scientific research has universities devoting special attention to researchers working on dissertation projects, and no data was collected until approval from the Northcentral University Institutional Review Board was attained (Wester, 2011). The participant interview questions (see Appendix A) for this research study do not contain any sensitive personal questions or display any personal information linked to an individual.

Ethical decision-making surrounding full information disclosure when obtaining participant consent is paramount in research projects (Antes et al., 2007). This is of major importance when using qualitative data collection methods, since participant and researcher relationships are critical in obtaining accurate and trustworthy data (Wainwright & Sambrook, 2010; Yin, 2010). The study utilized a university-provided checklist as a model for developing a consent form to include the above factors. APA (2010) guidelines require participants be informed of their rights to participate or withdraw from a research project at will and what the consequences and benefits of participation entail. These assurances along with those of the Belmont Report of 1979 (Gabriele, 2003) had three foundational principles; respect for persons or autonomy, beneficence, and justice (U.S. Department of Health & Human Services, n.d) to protect participant rights.

Relating autonomy to the study, a consent form was utilized and fulfilled consent requirements (U.S. Department of Health & Human Services, n.d.). The study group was comprised of all adults that have completed minimum educational requirements, high school diploma, or general education degree (GED) as a condition of employment, which alleviated any concerns with participant ability to make a deliberate and informed decision about participation. No identifiers other than signatures on consent forms were included in any of the research materials thus ensuring full anonymity to participants.

Beneficence is the second principle of the Belmont Report, and it refers to maximizing benefits while minimizing any risks to the participants while keeping the interests of the people in mind at all times (Gabriele, 2003), and any risk to study participants is minimal or non-existent, confidentially was maintained, with no peer pressure relating to participation. Benefits from successful implementation of lean manufacturing relate to job security and profitability so the participants could see both intrinsic and extrinsic value equated to success (Womack & Jones, 2003).

The final ethical principle, *justice,* is purely the equal sharing of benefits and risks of the research (U.S. Department of Health & Human Services, n.d.). Issues of equity must be addressed by those conducting the research and inclusion or exclusion of groups due to age, ethnicity, gender or any other criteria must have a scientific justification that would need approval of the ruling IRB (Shank, 2006; Yin, 2010). The manufacturing facilities for the study were diverse and precautions ensured that a representative sample of the entire plant population was included in the study. Since one of the prevailing principles of union organizations is, seniority (Deitsch & Dilts, 2006) data collection included all shifts, as less senior employees work the off shifts.

The remaining assurances relate to access via gatekeepers and their hierarchical positions relative to the participants (Schram, 2006), relating the purpose of the study, and information sharing with the study participants. Entrance to the facility comes under granted authority of the plant manager and the union bargaining committee who hold no direct authority in the chain of command over the participants (see Appendix C). Both parties were willing participants and perceived a value for the organization. A component for observation and interview sessions was inclusion of the purpose statement of the project thus informing all parties of the study intent.

The study maintained high ethical standards relating to participant risk, proper data collection and reporting as outlined in qualitative research guidelines (Artino & Brown, 2009; LeCompte & Schensul, 2010; Shank, 2006; Yin, 2010). Rigorous adherence to formulated study methodologies will improve fieldwork results and provide repeatable data. Collection of data from multiple sources, such as interviews and observation, for construct measures support trustworthiness and richness; improve interpretative predictability, and reliability, while allowing openness and relationship building between the researcher and participant (Patton, 2002; Shank, 2006; Yin, 2010). Internal factors of credibility including participant interest, mortality due to shift change or turnover level, and multi-shift operations did not create flux of the study group. Recent economic changes, including worker relocation and lay-off (Landon 2008) have fractured worker relations between lower and higher seniority employees and risk producing data with differing philosophical perspectives (Prohaska & Etkin, 2010).

Summary

Plant culture and past behaviors between salaried management and hourly workers are of great relevance in implementation of lean manufacturing and team concepts, the proposed methods will develop cultural themes for the organization and provide understanding of the issues associated with a team-based work system. A qualitative ethnographic method is appropriate for the study to identify the relevance of social interaction of team members to lean manufacturing implementation in unionized locations in Michigan (LeCompte & Schensul, 2010; Moore, 2011; Yin 2010).

Participants from the target population of 700 employees narrowed to a study sample of 48 participants for observation techniques and further reduced to 12 participants in the structured individual interviews (LeCompte & Schensul, 2010; Yin, 2010). Interview questions are the basis for data collection and serve as a rubric in observations are chapter inclusions. Data collection methods, process, and analysis via manual techniques cover respondent perceptions and observations of four primary constructs (a) empowerment (Pais, 2010), (b) job enlargement (Joo & Lim, 2009), (c) management commitment (Mann, 2009), and (d) changes to traditional union management philosophies (Baugher, 2007; Russell, 2008). Study limitations, assumptions, and an extensive review of ethical practices concluded the chapter offerings.

Chapter 4: Findings

The purpose of this ethnographic qualitative research was to explore worker experiences and perceptions of the social aspect of teams such as empowerment, job enlargement, management commitment, and changing culture in a unionized manufacturing setting. Exploration of two research questions designed to improve understanding of worker perceptions, which directly related to socio-technical systems theory (STST) (Cherns, 1976, 1987; Trist, Higgin, Murray, & Pollack, 1963) and aspects of implementation of lean manufacturing in unionized locations. The following research questions guided inquiry into the perceptions of workers toward lean manufacturing implementation components that served as the study constructs.

Q1. What are unionized worker experiences with the social aspects of lean manufacturing and team interaction in a Michigan manufacturing plant?

Q2. What are unionized worker perceptions of (a) empowerment, (b) job enlargement, (c) management commitment, and (c) philosophical change in union-management relations in a lean manufacturing setting?

The research questions identified key factors relative to implementation of lean manufacturing in unionized settings by viewing the phenomenon from various perspectives. The questions explored participant perceptions of the study constructs that include empowerment (Pais, 2010), job enlargement (Joo & Lim, 2009), managerial support (Mann, 2009), and changing philosophies of union-management relations (Baugher, 2007; Russell, 2008) that have been found to be components of lean manufacturing implementation (Emiliani, 2006; Marksberry et al., 2010; Ohno, 1988; Womack & Jones, 2003).

The data were gathered during a five-month period from May 2013 through September 2013 at the study locations. Interview and observation sessions began with an explanation of the purpose of the study, followed by discussion surrounding participant confidentiality. Participant informed consent forms attained prior to any method of data collection ensured adherence to IRB regulations. Ten semi-structured, one-on-one interviews were conducted from a purposeful selection taken from the observation group of 40 participants. The interview questions rubric (see Appendix A) initiated participant-researcher interaction and established the foundation of worker perception for the study constructs. Observation of team activities were recorded using the rubric (see Appendix D) both in formal team meetings and informal plant floor activities provided visual data that were analyzed into clusters based upon team experiences and the four study constructs. These observations occurred during production operations, seven weekly team meetings of approximately 30 minutes in duration, and two full day Kaizen events during the course of the five-month period. Observation of team activities provided visual confirmation and refutation of espoused perceptions and beliefs attained during the interview process. This chapter explores research results for this qualitative study, contains basic demographic information for participants, and includes an evaluation of the findings by the researcher. Evaluation of the findings in this study were based on a theoretical framework of STST (Cherns, 1976, 1987; Trist et al., 1963). The final section of this chapter is a summary of key points presented in this chapter.

Results

Before conducting the one-on-one interviews, a panel of three lean implementation professionals reviewed the interview rubric (see Appendix A) and the

observational rubric (see Appendix D) for clarity, relevancy and the ability to produce data germane to the study. The professionals from the automobile manufacturing arena suggested no changes to the rubrics and data collection commenced. The audio-recorded interview data were transcribed into Microsoft Word and observational data were imported into Microsoft Excel. Demographic characteristics were analyzed in Microsoft Excel, and raw data were analyzed for pattern recognition and clustering using the four study constructs as initial codes via manual content analysis. Categorization and coding of primary patterns were completed using Dedoose ™ evaluation software. Validation of the coded themes was performed by individual response checks with the study instrumentation.

Demographic characteristics. The 40 study participants were demographically clustered in the 2- to 5-year range for seniority. The majority of participants were male (60%) and reported race as Caucasian (60%) followed by African American (30%), and Arab American (10%), which closely mirrored the plant demographic characteristics. The 10 participants selected for the one-on-one interviews taken from the study group included six males and four females who reported race as Caucasian (6), African American (3), and Arab American (1). Frequency tables for the sample demographic characteristics can be found in Appendix E.

Major themes. Raw data were analyzed using manual content analysis and categorization and coding of primary patterns were completed using Dedoose ™ evaluation software. Validation of the coded themes was performed by individual response checks with the study instrumentation, which resulted in six major themes (see Table 1). One major theme that emerged related to question one, and five were

associated with research question two. Major themes are presented in order of frequency and include: (a) increased workload, (b) decision-making input, (c) team participation and involvement, (d) empowerment, (e) empowered authority, and (f) resource allocation.

Table 1

Major Themes

Themes	Frequency	Percent
1. Increased Workload	40	100
2. Decision-Making Input	40	100
3. Team Participation & Involvement	36	90
4. Empowerment	36	90
5. Empowered Authority	36	90
6. Resource Allocation	36	90

Note. $N = 40$.

Theme 1: Increased workload. All participants were consistent with their perception of job enlargement, indicating it was an increase in workload and involved learning more about the entire cell operation. This point was expanded upon by Participant 10 who stated, "Enlargement is adding additional work load to an employee, rotating jobs to learn the responsibilities of the entire work cell." Participant 10 also said, "Enlargement could also be explained as assisting in changeovers when the line is not running or performing equipment inspections during down time." Similarly, as stated by Participant 6, enlargement is "The addition of more work, responsibility and an expansion of traditional work duties. An example of this would be replacing the team leader or supervisor when something needs to be done and they are not available."

Participant 2 elaborated on job enlargement and said, "I already have an enlarged job as I perform work on all the stations in the cell at one time or another and have been for some time." Similarly, Participant 10 was often observed assisting in changeovers and performing other worker's duties to assist and leading the rotation of workers through the various stations in the work cell. Team members were frequently observed taking on additional duties in the production lines and performing safety inspections on equipment prior to operating. One cell had a worker eliminated because of workload rebalancing, and production numbers remained consistent as operators took on the additional tasks. Participant 2 was observed performing the role of team leader for several hours while still maintaining production rate at the assigned workstation. Observation of team members on the plant floor provided many characterizations of workers accepting additional responsibility outside their normal job duties. Operators assisted with machine changeovers, moved materials with lift equipment, and in some cases took on the role of line leader when the regular member was engaged in other activities. Participant 9 stated job enlargement was "An expansion of duties and responsibilities both internal to the cell and within the plant as a whole." Similar beliefs were indicated by Participant 3 who indicated, "[Enlargement is] more responsibility, like the new vacuum form job that really starting to take off. We had one cell now we have four." Participant 5 indicated job enlargement included, "Bringing more to the table, setting a reasonable pace to the line, taking on additional things and increasing experience."

All participants indicated a willingness to do more as Participant 5 stated succinctly, "I would like to do more." Likewise, willingness to do more was observed during team meetings and especially one of the all day events, team members worked

past normal quit time to finish a project. Participant 7 demonstrated this and said, "This is my livelihood I don't mind putting in the off the clock time and have a great responsibility to make our plant successful. Each person has something to bring to the plate and we must all work harder and smarter to keep the plant viable." Similar thoughts were expressed by Participant 2 who claimed, "We will do whatever it takes to make the place successful so the plant will remain open and eventually I will be able to retire." Furthermore, a willingness to do more was expressed by Participant 9 who stated, "This is my place of employment, which provides for my family and living expenses. I would be willing to assume higher levels of workload if given the proper support to improve the key factors in plant performance of safety, quality, and cost." This theme represents the workers values in job protection through teamwork.

Theme 2: Decision-making input. According to all respondents, empowerment is an important aspect in the workplace centered on the ability to have input into decision-making. Participant 7 stated, "Empowerment is being able to have input in decision making in work rules and being able to take an active role in the plant and working conditions." Supporting input in decision-making Participant 9 pointed out, "Empowerment is the ability to influence decision making with the proper level of authority to enact actions once they are defined without seeking prior approval." Observation of teams in action both on the floor and in team meetings provided numerous characterizations of decision making input. Brainstorming sessions were held that produced a host of ideas, which were narrowed by the team who developed a plan for implementation. Many ideas were rejected outright by team decision as too costly or

infeasible to implement. Suggestion boxes were visible throughout the facility and many team members were observed using those boxes.

Theme 3: Team participation and involvement. According to 36 participants (90%), team involvement was high since employees spend a great deal of time working together and encourage everyone to participate in team activities. Participant 5 stated, "I have a great deal of team involvement, we always work as a team and not a bunch of individuals." Clarification came from Participant 6 who reported, "I spend 8 to 10 hours a day with my team members so we interact constantly. We spend more of our waking hours together during the workweek than we do with our family so I would say our involvement is as high as it can get." Team members were observed actively involved during team floor activities such as work cell rearrangement, semi-formal meetings reviewing part quality, and during production runs within daily operation time. Team members were observed during a routine production run performing duties such as changeover assistance, machine inspections, and helping team members with respective duties. Additionally, team members encouraged others to take an active role and increase participation all of which are characteristics of participative behaviors. An example of participative behavior was apparent as team members eagerly aided other workers and performed cleaning that was clearly outside their work classification. This team formed by a group of individuals, behaved in a highly cohesive and participative manner

A majority of participants (90%) indicated team participation to be extremely high and most relied on experience from outside the workplace as a basis for bringing appropriate team social behaviors and roles into the workplace. When asked about team participation, Participant 4 indicated, "Not just in the plant but I am highly active in

softball, relay for life and many fund raising activities and I coach several sports. I participate in every event that we have in the plant and I am the coordinator of our Blue Sky initiative, which is community projects." Similarly, Participant 6 posited, " I have participated in teams since childhood, and I am involved in numerous Kaizen events, fund raising, and social activities such as: Christmas, Easter Egg, and Halloween parties for the workers and family." Formal and informal sources provided perspectives of their experience to team members as reported by Participant 9 who said, "I participate on many recreational teams, social groups as well as teams in the workplace. I feel all of this provides a high level of experience." Participants indicated team members were involved in outside of work activities such as (a) fundraising events, (b) athletic teams, (c) coaching, and (d) social functions. Participant 1 stated, "We socialize both at work and after work as well. Several of my co-workers have been to my house and I have been to theirs as well." Numerous examples presented during observation of formal team meetings of social behaviors and social interaction such as: (a) problem solving, (b) idea generation, (c) group cohesiveness, (d) body language, (e) and respect for other team members. The team introduced several ideas and held energetic problem solving discussion during the cell rearrangement of a Kaizen event. Attendance at one fundraising event held offsite proved team members were strong social partners as the event was held to raise funds for a terminally ill co-worker and all team members were present and active.

Theme 4: Empowerment. Thirty-six participants (90%) indicated they, as well as others, were empowered in the organization. Participant 4 reported, "Empowerment is a feeling of self-worth and being able to accomplish a goal. Sometimes supervisors'

delegate tasks and people feel empowered to make those tasks happen, which improves their self-worth." Participant 6 said, "Empowerment is the ability to accomplish a task without a lot of interference from others and not requiring one to seek approval before acting." Participant 6 also stated, "That comes back to a choice we make as workers of how far we are willing to push the envelope." Participant 5 indicated, "Everyone has some level of empowerment and it is up to the individual to exercise it." Observation of team activities in Kaizen events provided evidence that participation was high and team members were attentive and seemed willing to accomplish the defined tasks without seeking assistance. Most respondents perceived empowerment as an individual choice that one is willing to accept or not. Participant 6 said, "Empowerment is not something someone can just give to you. It requires a willingness to seek the authority from an hourly perspective." Additional support came from Participant 9 who reported, "Empowerment is an individual choice. No one is given empowerment one must be assertive in action and be willing to accept the responsibility and authority associated." Furthermore, Participant 2 said, "Some people are empowered and some have too much empowerment and don't utilize it properly. Some people have empowerment and don't use it because they feel too timid." Participant 1 had a slightly different opinion reporting, "People are empowered, that is an individual choice to accept or refuse. Some of the leaders are empowered but not many of the average workers." Observation of several floor activities provided categorization that various levels of empowerment did exist and the stronger individuals in the team were more assertive in exercising empowering behaviors. Some team members were observed letting others take the lead

and act only as a participant. This occurred during the one of the cell rearrangement sessions during the Kaizen event.

Theme 5: Empowered authority. Numerous respondents (90%), that included Participants 7 and 9, indicated they were willing to accept more authority and responsibility to become empowered at a higher level. Participant 9 stated, "I would be willing to accept a great deal more authority and likely more responsibility if the authority levels are included. It is hard to do something only to be held back by someone in a position of authority that might not have all the necessary information." Similarly, Participant 7 posited, "I would love to have more authority and would like to be consulted on business related items and get a chance to impact conditions of the plant and union members in a proactive mode and not reactive." Participant 5 presented a different view stating, "[I have] as much authority as I want and I don't need any more." Observations taken during the first all day Kaizen event provided several examples of empowerment, the greatest of which occurred after about one hour into the event. The management Kaizen leader had to leave the facility to attend to a personal matter and one of the team leaders took charge and kept the team focused on the cell rearrangement and improving housekeeping in the area for several hours. The team was able to make great progress in accomplishing the tasks they determined were necessary to improve production by reducing the walk time required by the operator. An additional observation of import was the team determination that a job aide should be created that detailed the location of the component parts to maintain order and sustain the change, which they developed.

Theme 6: Resource allocation. Thirty-six participants (90%) reported management did not support teams with resource allocation. Participant 7 commented, "They say yes but their actions speak otherwise. They want the easy stuff that does not cost any money. When it comes to the check book or policy changes they still make the decisions and hope we get on board." Similar statements were added by Participant 8 who posited, "Management says they support empowering employees but in reality it is only words, which are not supported by actions." Participant 6 added the following statement on managerial commitment, "Management is supportive only at an arm's length. If they do not generate the idea for improvement, it is often lost. No funding is made available to support change, which makes me think this is often for show not a reality." Participant 10 presented a strong opinion on resource allocation stating, "Middle managers are not willing to expend recourses such as skilled trades or money to make some of the changes the team suggests." Observation of one Kaizen event provided no evidence that additional skill trades workers were available and when queried the Kaizen manager admitted there was no official budget from which to draw funds. Participant 10 stated, "We had some items that were in storage and needed to be moved for workspace, which would have involved spending some funds to extend the overhead crane rail. Management members were not willing to even investigate the cost to savings."

Minor themes. Data analysis resulted in three minor themes that emerged from an analysis of participant responses and observations, which are presented in Table 2.

Table 2

Minor Themes

Themes	Frequency	Percent
1. Training	28	70
2. Management Support	28	70
3. Organizational Culture Change	28	70

Note. $N = 40$.

Minor theme 1: Training. Participants indicated team training was minimal from the company and that they relied heavily on experiences from the outside to work effectively in a team environment. Many participants cited participation in recreational activities as a foundation for an understanding of team roles and relationships. Participant 6 said, "I have lots of training working a team environment, described team training. This began when I participated in sports during my school years and has followed me through adulthood." Participant 9 also noted, "I have had a lot of team training, none of which was supplied by the company. The UAW has provided me with several classes which I have taken and many through outside courses in school." Observations provided further characterizations that teams functioned well. Participants 6 and 9 reported social skills were necessary to actively participate in teams regardless of source. Team leader coaching was observed as new workers were assigned to the production lines; however, no observations were available for a formal training matrix for use in team training. Some team members indicated training was increasing, but existed primarily as technical- and equipment-related issues and not team building.

Minor theme 2: Management support. Respondent perceptions were divided for management support. Twenty-eight participants responded (70%) with a perception that management provided support for lean manufacturing and an empowered work environment. Participant 3 reported, "Yes, we had a meeting today with our supervisor and she was encouraging and let us know the expectations of the customers and then empowered us to make the parts and keep the machines running." Observations of supervisors in team activities provided evidence of high levels of encouragement and multi-directional conversations with management. Participant 3 further described this: "We rearranged a cell that was totally boxed in and made a great deal of work space improvements for the operators. This is not our department and the supervisors were quite cooperative in implementing our ideas, and allowing us to work on the cell rearrangement." Participant 4 said, "We get support from managers. I feel they have my back and I can be honest with them without a feeling of judgment and can seek assistance." An example of good management support was also described by Participant 4: "Cell 11 was getting a bottleneck of parts and we went in on a weekend to balance the workload some to improve part flow and ease some of the tasks to share the work. This not only improved the performance of the cell but increased worker morale." Observations of management commitment were divided as front line supervisors were attentive to the team while on the floor and in team meetings; however, various levels of management did not always exhibit consistent support for lean and team activities. Some levels of management displayed varying supportive behaviors while other mid-level managers exhibited a lack of support and commitment. During a Kaizen event, a mid-level manager involved with material handling avoided the area on two separate

occasions by taking a circuitous route from office to office. Participant 2 said, "It depends on what management level you are talking about. Most supervisors will help but some are not willing to participate. It depends on which one you get, the lower levels are ok but the middle levels have no support, but the top managers are willing to support employees." Participant 10 added, "Management from the highest level in the plant support employees and teamwork, however middle management is still fixated on production numbers. At the front line, supervisors are supportive. Our Kaizen manager was recently reassigned to launch a new line and the activities are still sporadic today."

Minor theme 3: Organizational culture change. Participant responses and visual artifacts presented verification that cultural change was occurring in the organization. Participant 9 noted "Some of the activities have opened the lines of communication between management and the union leadership, which is a positive factor," and continued that "the culture in the plant is a holdover from the previous owners, which was adversarial and not trustful. Visual artifacts, such as the UAW flag and company shirts with both logos, displayed indicated the cultural changes were in process. Participant 4 verbalized this and stated, "[continuous improvement and lean projects] have made the relationship stronger, they can see our perspective, and we get a chance to see them from their side as well. It increases our knowledge of customer demand, tack-time, and how many person-hours the parts pay for so we are all working better together."

Charts and graphs with both the company and union logos were posted in visible locations and indicated key measurable indicators for the plant, demonstrating the change in directive control. Participant 3 posited, "We have to continue to improve. Sometimes we hear that we need that and things are going to change. However it only lasts a few

days and we are right back to where we started from." Observation of artifacts in conference rooms and break areas provided further visual evidence that change initiatives were ongoing in various phases within the plant setting.

Evaluation of Findings

The purpose of this ethnographic qualitative research was to explore worker perceptions and experiences of the social aspect of teams such as empowerment, job enlargement, management commitment, and changing culture in a unionized manufacturing setting. Data analysis resulted in six major and three minor themes. One major theme emerged related to question one, and remaining five were associated with research question two. The major themes were (a) increased workload, (b) decision-making input, (c) team participation and involvement, (d) empowerment, (e) empowered authority, and (f) resource allocation. The three minor themes included (a) training, (b) management support, and (c) organizational culture change. Following is an evaluation of theme findings as compared and contrasted with current research.

Increased workload. Overlapping job assignments, expansion of traditional work roles that developed into an increased workload presented in this major theme. Frederick Taylor (1917) developed the theory of scientific management principles, which provided for standardized work practices through time and motion studies. Increased workload as a theme in this study is similar to findings from Taneja, Pryor, and Toombs (2011) on the relevancy of Taylor's principles in the current workplace. Increased workload for team members created a need to understand a larger job scope with expanded work roles (Taneja et al., 2011), which is indicated in this major theme. Potential job loss and combination of traditional workplace roles and classifications associated with job

enlargement remain important to union organizations (Landon, 2008) as evidenced in this theme. These enlarged job duties often meet resistance as many unionized workers view implementation of lean techniques or continuous improvement activities as a threat according to Sim and Rogers (2009). Some researchers would codify unionized facilities as unfavorable for implementation of lean manufacturing or continuous improvement programs due to worker attitude (Jones & Seraphim, 2008). Evidence in this theme contrasted the negative findings of Sim and Rogers (2009) on resistance, and Jones and Seraphim (2008) on worker attitude as team members were willing to accept additional work and enlarged jobs to keep plant operations viable.

Decision making input. Findings from Hackman, Oldham, Jenson, and Purdy's study on job enrichment in 1975 supported the proposition that employees performed at significantly higher levels when they perceived their ideas and thoughts as meaningful. Two decades later, Niepce and Molleman (1998) found collectivism from teamwork provided better rewards in productivity and work design. Recent studies by Pais (2010) and Joo and Lim (2009) supported those previous studies, finding that empowering workers by including them in decision-making was a critical first step in transforming an organization to be participative, creative and motivated, thus improving operational efficiencies. This theme from the current study compared with noted research studies that indicated input in decision-making was a major consideration. Results indicated front-line workers were capable of generating high numbers of suggestions and improvement ideas, which were easy to implement often for little cost concurring with the findings of Robinson and Schroder (2009).

Team participation and involvement. Continuous improvement or *kaizan* developed by Ohno (1988) relies on team-based activities as the major vehicle of implementation. Spurred by the business successes in Japan during the late 1970s, many firms began implementing employee participation or involvement programs in an effort to duplicate those workplace efficiencies and achievements (Deming, 1986; Pais, 2010; Singh et al., 2010).

Pais (2010) found that gains from the formation of semi-autonomous teams created a method to increase efficiency for automobile component manufacturers and improve corporate survival. Conditions vary within different organizations and no specific template is applicable for ready implementation, Pais (2010) also found establishing a level of team self-management that is connected to the organizations hierarchy provides workplace democracy to ease alienation and resistance. This major theme of the current study was similar to the work of Pais (2020) where results found team participation and involvement to be high and based primarily on developing roles and skills from outside the workplace. Anand, Ward, Tatikonda, and Schilling (2009) found continuous improvement methodologies involving an engaged, motivated and knowledgeable worker provided a formidable base for attaining high levels of efficiency, which was also evidenced in this study. Numerous research projects, including the current study, found team activities more effective with team socialization and soft skills in the workplace and critical components in lean implementation (Kleiner & Hendrick, 2008; Pais, 2010).

Empowerment. Front-line improvement and participative problem solving are the heart of the *kaizan* process identified by Ohno (1998), which has been the topic of

numerous studies (Marksberry et al., 2010; Robinson & Schroder, 2009; Womack & Jones, 2003). Womack and Jones (2003) indicated successful organizations moved from 'command and control' style of management toward a more participative and empowered management style. Implementation of a teamwork concept to replace autocratic workforce direction has been the topic of many organizational development research projects (Pais, 2010; Sim & Rogers, 2009; Sisaye, 2005; Taleghani, 2010). Raines (2011) found management could involve employees in projects in various ways including: communication of goals, brainstorming sessions, and allowing employees control of inspection procedures and observation practices. Recognizing human capital as an organizational asset for the value it provides was of interest in a study conducted by Raines (2011) whose findings indicated employees, when engaged in a project and believed their input and opinions were of value improved project outcome. The major theme found workers were empowered and involved. Observation during floor activities and Kaizen events indicated employees did demonstrate behaviors of empowerment by introducing ideas, enacting changes, and involving themselves in problem solving which is consistent with other recent studies (Marksberry et al., 2010; Pais, 2010; Sim & Rogers, 2009; Raines, 2011; Taleghani, 2010).

Empowered authority. Results from this theme indicated not all people were capable and or willing to accept the responsibility of empowerment. Some people were timid, non-assertive, and comfortable being a follower, while others assumed an authoritative role and exhibited authoritative behaviors. This was similar to findings by Zafft, Adams, and Matkin (2009) who indicated team leadership and behavior complexity determined the level of team performance in self-managed teams.

The empowered authority theme was supported by recent study results that indicated workers play a central role in lean manufacturing where people need training and development to provide maximum input, flexibility, motivation, and multifaceted skills (Liyange et al., 2009; Scherrer-Rathje et al., 2008). Changes such as these force people from their comfort zone, which while easy for some is extremely difficult for others (Sim & Rogers, 2009). *Kaizen* is mostly team-based so understanding and overcoming a reluctance to accept and act in an empowered manner is important to a participative environment (Marksberry et al., 2010). According to Mishra and Gupta (2010), continuous improvement activities affected performance including outcomes for human resources such as employee attitude and motivation toward a willing acceptance of enlarged responsibilities and empowered participation in team activities. Empowered authority presented as a theme from an exploration of the capabilities and perceptions of individuals and revealed certain people were suited to some roles, but might not be capable or willing to perform all roles, which is similar to the findings from Anand, Ward, Tatikonda, and Schilling (2009). This major theme presented results that some team members were content with the role of a follower and did not desire the authority and responsibility that is part of empowerment, similar to other study findings (Mishra & Gupta, 2010).

Resource allocation. Lean manufacturing concepts, based upon waste elimination, rely on *kaizen* activities, which are innovations in work practices that do not require large capital investments and provide opportunities to improve operational efficiencies (Marksberry et al., 2010). As equipment becomes more technically sophisticated, harnessing the expertise of workers and transferring that knowledge to

others is of critical importance requiring allocation of resources to additional training and manpower (Anand et al., 2009; Daniel et al., 2009; Kleiner & Hendrick 2008). Evaluation of this major theme contrasted previously mentioned results and indicated this organization is not following proven success factors with proper resource allocation. Numerous times the Kaizen manager had to turn down implementation ideas because no funding was available and several suggestions would have only involved a shifting of skill trades labor. Research findings by Daniel, Reisperger, and Morse (2009) and Fliedner and Mathieson (2009) found allocation of resources to initiate and sustain continuous improvement must be a decision supported by all levels of management and part of everyday operations creating a shift toward participative involvement, which is contrasted by evaluation results for this theme.

The purpose of this ethnographic qualitative research was to explore worker perceptions and experiences of the social aspect of teams such as empowerment, job enlargement, management commitment, and changing culture in a unionized manufacturing setting. Data analysis presented six major themes previously discussed and three minor themes. The three minor themes include (a) training, (b) management support, and (c) organizational culture. Following is an evaluation of theme findings as compared and contrasted with current research.

Training. In his research on lean management, Emiliani (2006) indicated respect for people and enhancement of their respective skill levels would be required in order to achieve any level of successful implementation of lean manufacturing or continuous improvement. Marksberry, Badurdeen, Gregory, and Kreafle (2010) found management development in continuous improvement actions required learning special skill sets to

enhance leadership interaction with workers and placing emphasis on teamwork and respect for people. Training in social interaction and team development (Marin-Garcia et al., 2008; Maxwell, 2008) coupled with technical training in equipment advancements is the methodology that will allow for successful implementation of lean manufacturing outside traditional "Toyota culture" (Marksberry et al., 2010; Reed, 2009). Study findings and the emergence of minor theme one, training, contrasted the previously referenced studies. Observation and conversation with team members indicated that no social or team training was being delivered by the company. Most training was in the form of technical hands on and given by other team members or the team leader, which concurred with several studies on self-managed teams and lean implementation (Mann, 2009; Pias, 2010; Pryor et al., 2011). No schedules were evident that indicated the team was or will be exposed to formal team training in the worksite at this time. Study findings from Mann (2009) supported Reed's (2009) concept that indicated human capital training in both technical and social skills requirements needed to be an integral component in lean manufacturing implementation strategy. Training references observed in the formation of this theme presented that team members participated in recreational teams and membership in social clubs as a means to learn appropriate behaviors and roles for team interaction. Fliedner and Mathieson (2009) found human resource management for a successful lean organization should include technical hands on training, career development, and soft skills for all levels of the organization, some of which were not apparent in the data collected in relation to this theme.

Management support. Mann (2009) found management leadership skills relating to both technical and social aspects of lean concepts were minimal in many locations and

significant changes to support a participative empowered environment were necessary to improve communication and interaction. Al Smadi (2009) recognized *kaizen* implementation as a major factor for continuous improvement and lean implementation, which required management to amend attitudes toward worker interaction and utilize participative methods to support creative and innovative ideas. According to findings by Marksberry, (2011) the 'Toyota Way' relies on management seeing the problems first hand, which departs from normal *kaizen* philosophy to focus on teamwork and respect for people. To accomplish desired results the entire organization should engage employees in problem solving matters, which contrasted with this study's findings that indicted mid-level managers did not support continuous improvement activities and a participative environment. Brondo and Baba (2010) found success with implementation of lean participative concepts required managerial support from the top to the bottom of the organization, as previously stated the current findings indicated mid-level mangers did not support team activities, which contrasted with the work of Brondo and Baba (2010). Mann (2009) found transitioning from a directive environment to a participative, cooperative environment to achieve organizational goals to be a departure from traditional Western management concepts and is difficult for some to follow. This was evidenced in findings for this theme; observations proved a tendency to return to traditional behaviors in troubled times (Gander, 2009; Mann, 2009; Turesky & Connell, 2010).

Organizational culture change. Research has indicated several barriers exist relative to organizational culture and the implementation of participative programs including lean manufacturing. Several obstacles impede the potential success such as:

employee attitudes, job enlargement, lack of resources and one major factor is a unionized workforce. One obstacle reported was the difference in culture and organizational support for lean implementation (Badurdeen et al., 2011) between Japanese management and that of Western manufacturers. An additional obstacle was , unionized employees and their historic controversial and low trust relationship with management provide an enormous barrier as reported by Sim and Rogers (2009). As a minor theme, organizational culture change supported this difference in culture and presented a need to overcome a controversial and low trust relationship. Previous owners of this company instilled an environment that was adversarial and lacked any level of trust; findings indicated cultural change is occurring and will take time to erase negative feelings, supported with studies conducted by Brondo and Baba (2010) and Shook (2010).

Union leadership, representing automobile workers, has recognized the value of lean manufacturing and softened their stance toward stringent work rules and guidelines (Landon, 2008; Russell, 2008). Changing attitudes with UAW leadership developed an internal philosophical change that addressed former hostilities toward management and has proven beneficial to both the membership and companies in terms of long-term success with quality and productivity improvements (Baugher, 2007; Brondo & Baba, 2010; Devinatz, 2009). Visual artifacts in the location of the current study indicated that this theme is relevant and change is happening. Simple things like displaying the UAW flag and having both company and union logos on communications and uniforms were creating a positive culture in the organization.

Gander (2009) indicated traditional managerial controls were not effective in a participative environment and a 'paradigm shift' would have to coincide with lean implementation. According to Gander (2009), managing cultural change was equal in value to managing the lean process, which complemented findings from additional studies (Brondo & Baba, 2010; Kleiner & Hendrick, 2008; Trist et al., 1963). Supporting the theme of organizational cultural change, and similar to the findings of Gander (2009) and Brondo and Baba (2010), observations indicated workers were driving change initiatives in the plant and management was taking a secondary role. An example of this was the newly formed safety team that had one of the union members developing and producing the agenda for the meetings, without managerial input.

Summary

The purpose of this ethnographic qualitative research was to explore worker experiences and perceptions of the social aspect of teams such as empowerment, job enlargement, management commitment, and changing culture in a unionized manufacturing setting. The specific problem was the need to analyze and understand Western automobile parts suppliers and manufacturers ability to implement lean manufacturing techniques (Singh et al., 2010) in a unionized setting and remain competitive with Japan (Singh et al., 2009; Wee & Wu, 2009).

Study results originated from interviews with 10 participants, via a one-on-one format, and observations of 30 additional team members in team meetings, floor activities, and Kaizen events. The audio-recorded interview data were transcribed into Microsoft Word documents and observational data imported into Microsoft Excel.

Construct categories formed the framework for coding and labeling of the primary patterns using Dedoose ^{TM} evaluation software.

Six major and three minor themes presented as a result of data analysis. Major themes were presented in order of frequency and include: (a) increased workload, (b) decision-making input, (c) team participation and involvement, (d) empowerment, (e) empowered authority, and (f) resource allocation. Three minor themes emerged (a) training, (b) management support, and (c) organizational culture. This chapter also presented an evaluation of findings based upon critical analysis of the results performed by the researcher. The major themes confirmed team participation and involvement coupled with decision-making input, and empowerment, transformed into an increased workload, which were factors in implementation of lean manufacturing (Joo & Lim, 2009; Pais 2010; Robinson & Schroder 2009; Singh et al., 2010). Major theme, resource allocation, and two minor themes (a) training, and (b) management support, contrasted conventional practices identified in literature for successful lean implementation (Daniel et al., 2009; Fliedner & Mathieson 2009; Mann, 2009; Marksberry et al., 2010; Pias, 2010; Pryor et al., 2011). The results presented in this chapter both contrasted and confirmed findings from prior research and make addition to the literature regarding implementation of lean manufacturing in a unionized setting.

Chapter 5: Implications, Recommendations, and Conclusions

The purpose of this ethnographic qualitative research was to explore worker experiences and perceptions of the social aspect of teams such as empowerment, job enlargement, management commitment, and changing culture in a unionized manufacturing setting. The problem facing Western unionized automobile suppliers and manufacturers has been the ability to fully implement lean manufacturing techniques (Singh et al., 2010) and remain competitive with Japan (Singh et al., 2009; Wee & Wu, 2009). Studying perceptions of Western cultural and social interaction, which differ from those in Japan, was necessary to improve lean process implementation and attain efficiencies that support long-term viability (Brondo & Baba, 2010, Singh et al., 2009). The majority of literature examining lean manufacturing centered on technical applications with minimal attention to social aspects (Chen & Meng, 2010; Lu, 1986; Moyboki, 2009; Parry et al., 2010; Pepper & Spedding, 2010; Singh & Kanduja, 2010; Turesky & Connell, 2010); therefore, this study explored cultural and social needs with minimal attention to the technical aspect.

Qualitative data was collected on respondent perceptions and observations regarding four primary constructs: (a) empowerment (Pais, 2010), (b) job enlargement (Joo & Lim, 2009), (c) management commitment (Mann, 2009), and (d) changes to traditional union management philosophies (Baugher, 2007; Russell, 2008). The study was limited to two manufacturing locations in Southeastern Michigan, which may not be a representative sample for unionized workers in the whole population of the United States. An additional limiting factor was the perception of "lean manufacturing" and the level of progressiveness in the relationship between the hourly and salaried workforce.

Ethical decision-making surrounding full information disclosure when obtaining participant consent is paramount in research projects (Antes et al., 2007), and study procedures and interactions with human subjects maintained high ethical standards relating to participant risk, proper data collection and reporting as outlined in qualitative research guidelines (Artino & Brown, 2009; LeCompte & Schensul, 2010; Yin, 2010).

The study was essential to Western automobile suppliers and manufacturers seeking to implement continuous improvement activities and lean manufacturing (Singh et al., 2010) to remain competitive in the global automobile market (Brondo & Bab, 2010; Turesky & Connell, 2010) and may assist leadership with implementation cues. This chapter is comprised of three segments. The first is a discussion on the implications of the study, connected to the study problem and purpose by discussing the research questions individually. Second, researcher recommendations for both practical applications of the study and further research are presented. The final section is the conclusion, which summarizes the key points of the chapter.

Implications

This study's results offered understanding of the social aspect of teams specifically in unionized settings within the United States automobile industry. American manufacturers and workers have faced potential loss of profit margin and jobs if studies were not conducted (Brondo & Baba, 2010), and the current study provided an understanding of job enlargement, and empowerment in unionized work locations. Niepce and Molleman (1998) examined the differences between STST and lean manufacturing and found both similar; one major difference identified in their study is involvement of the worker. This current study explored unionized worker perceptions

and a willingness to transcend beyond traditional union-management philosophies and seek empowerment and job enlargement. Following is a discussion on the implications of study findings, which were connected to previous literature and theory as well as the study problem and purpose.

Pais (2010) indicated a need for social research that considered the socialization of team members as actors in the reality of a workplace, and the current study explored the role of culture and social aspects of teamwork in Southern Michigan. Knowledge and understanding gained from this study may assist with organizational redesign and change efforts, which could improve operational efficiencies (Badurdeen et al., 2011; Pryor et al., 2011).

Question 1. The primary focus of the first research question was to determine the experience of unionized workers with social aspects of team interaction and the implementation of lean manufacturing principles. Major theme 3, team participation and involvement, was supported by literature that demonstrated the value of team interaction and participation (Anand et al., 2009; Deming, 1986; Pais, 2010; Singh et al., 2010) in the implementation of continuous improvement. Implications of theme 3 reflected the high involvement of team members in activities both inside and outside the workplace. Gander (2009) and Marksberry (2011) found teamwork to be a critical component in managing people and implementation of lean manufacturing, which affirmed theme 3. Several studies have also reported relationships between the technical aspects of lean manufacturing and the social aspect of teams (Follett, 1924; Fraser et al., 2007; Pais, 2010; Sim & Rogers, 2009). Theme 3 illustrated how teams were active and involved; therefore, implementation of technical lean components was more cohesive.

Implications of minor theme 1, training, were linked to the study problem, and evidenced most of the training conducted related to technical aspects and did not contain soft skill enhancement or team socialization. Team members relied on experiences from outside the workplace for proper behavior and roles, which paralleled work design theories considering characteristics, such as: autonomy, intrinsic motivation, social support, and internal team leadership (Zafft et al., 2009), were interconnected with lean manufacturing and supply insight into the interrelationship of team members (Fraser et al., 2007). Thus, major theme 3, team participation and involvement, and minor theme 1, training, offered contribution to the existing literature associated with the value of teamwork and the necessity of social training as indicated in previous research projects involving implementation of lean manufacturing (Fraser et al., 2007; Pais, 2010; Zafft et al., 2009). Implications of these study findings contributed to socio-technical theory (STST) developed by Tavistock researchers (Cherns, 1976, 1987; Trist, Higgin, Murray, & Pollack, 1963) with emergence of themes relative to team involvement and interaction. Several factors identified in the study problem such as job loss, strict adherence to traditional job classifications that hinder lean implementation were not indicated in findings of this study.

Question 2. The second research question focused on four categories: (a) empowerment, (b) job enlargement, (c) management commitment, and (c) philosophical change in union-management relations. Five major themes emerged as a result of this research question: (a) increased workload, (b) decision-making input, (c) empowerment, (d) empowered authority, and (e) resource allocation. Additionally, two minor themes emerged: (a) management support, and (b) organizational culture change.

Study findings, major theme 1, job enlargement, was as an increase in workload, which added to study findings of Sim and Rogers (2009) and Joo and Lim (2009). Major theme 1 implied a willingness to accept an additional workload without monetary incentive to keep the worksite viable. Theme 1 emerged from the exploration of interdependencies among team members, participant role in job enlargement, and work change complexities associated with lean technical as aligned with the study purpose. As discussed in the review of the past literature, potential job loss and combination of traditional workplace roles and classifications remain important to union organizations, (Landon, 2008) all of which have been essential to team implementation and knowledge sharing associated with lean manufacturing. The emergence of theme 1, job enlargement, implied potential job loss and traditional workplace roles were not a factor in the study location and understanding a larger job scope was pertinent (Landon, 2008; Taneja et al. 2011).

Major theme 2, decision-making input, implied this was a form of idea generation and a means to improve plant metrics on safety, quality, and performance. Results implied front-line workers were capable of generating high numbers of suggestions and improvement ideas, which were easy to implement which was consistent with the findings of Robinson and Schroder (2009). Supporting the value of theme 2 findings, Pais (2010) and Joo and Lim (2009) indicated including workers in decision-making was a critical first step in transforming an organization to be participative, creative and motivated. Daniel, Reitsperger, and Morse (2009) conducted a study of Japanese automotive and electronic manufacturers to determine if they still adhere to the cumulative principles of the Toyota Production System (Ohno 1988). Their findings

indicated a strategy that relied on the people pillar relationship of TPS (Ohno, 1988) regarding empowerment and team decision-making, which included input in decision-making. Additional discussion in the literature review related to decision-making input included a study conducted by Raines (2011) whose findings indicated employees, when engaged in early stages of a project believed their input and opinions were of value and improved project outcome. Raines (2011) found management could involve employees in safety projects in various ways including; communication of goals, brainstorming sessions, and allowing employees some control of inspection procedures and observation practices. These previous studies supported the current study findings and the emergence of major theme 2, decision-making input.

Major theme 4, empowerment, implied all workers had some level of empowerment, which connected to major theme 5, empowered authority, that implied workers must assume leadership and exert authority to attain greater empowerment. One purpose of this study was to ascertain the perception of respondents relative to the construct empowerment via interviews and observation, and the emergence of themes 4 and 5 connected to findings discussed in the past literature (Anand et al., 2009; Mishra & Gupta, 2010; Pais, 2010). Implications of theme 4 were similar to findings by Pais (2010) who conducted a study of self-managed teams in the auto components industry that manufacture, steel cables, seat covers, and electric steering rotors in Northern Portugal. The study reviewed the relationship with lean implementation and teams as the vehicle for continuous improvement activities. One finding from the current study was the lack of self-managed teams, as there remained a reporting process to a line supervisor or leader. Similarly, leaders at the current study location did not provide the traditional

command and control of the workforce that had been historical in the automobile industry.

Rahman, Laosirihongthong, and Sohal (2010) pointed out that implementation of just the instruments of lean manufacturing is not enough; cultural aspects and management commitment must be included as well. Support for this position came from Fraser, Harris and Luong (2007), in their study on cellular manufacturing that pointed out; managers, team leaders, and operators value communication, training, and support. Each of these studies implied there was a great deal more to implementation of lean manufacturing than just application of the tools, which was affirmed with findings of the current research project. Discussion in the review of past literature also indicated a change in attitude with UAW leadership has developed an internal philosophical change that addresses former hostilities toward management and has proven beneficial to both the membership and companies in terms of long-term success with quality and productivity improvements (Baugher, 2007; Brondo & Baba, 2010; Devinatz, 2009). This reflected the ongoing cultural change at the current study location were workers indicated improvement with adversarial relationships and lack of trust attributed to previous ownership.

Findings of this study and emergence of major theme 6, resource allocation, implied that proper focus was not occurring in the study locations for allocating labor and capital to support lean implementation. Management support from all levels and proper focus on resource allocation were found lacking in this study and exhibit the reason some Western firms have a hard time imitating lean practices as indicated in the study problem. These minor study themes, (a) management support, and (b) organizational culture

change make addition to literature and substantiate findings by other researchers (Turesky & Connell, 2010; Shook, 2010).

Recommendations

Study findings and implications of those findings make additions to literary research regarding the implementation of lean manufacturing in the automobile industry. Regarding the implementation of lean manufacturing in unionized settings, the study results provide additional literature contributions about team socialization and interaction. Knowledge garnered from this qualitative study may facilitate organizational redesign and change efforts to improve efficiencies and reduce production costs in unionized locations. Study findings may also serve as a foundation for additional research, related to lean implementation in automobile manufacturing and parts suppliers. Study results additionally provided recommendations for practice and additional research, some of which were supported by previous studies.

Recommendations for practice. The first recommendation for practice is to establish a training curriculum to develop soft skills and foster behaviors consistent with a participative environment, specifically targeted to mid-level managers. Minor theme 2, management support, indicated mid-level managers did not support and value teamwork in continuous improvement. Major theme 6, resource allocation, and minor theme 3, organizational culture change, were connected to behavior modification and understanding the organizational value of a participative environment and teamwork. This recommendation was also supported by studies in the review of literature (Cherns, 1976, 1987; Mann, 2009; Marksberry et al. 2010; Pais, 2010; Trist et al., 1963).

The second recommendation for practice is also in regard to training as team socialization and role training should be a formal process for all team members, which will provide continued skill enhancement and allow team maturation in defined team stages (Porter & Wimmer, 2012). This training may assist workers in understanding the value and importance of themes that presented in the study; (a) major theme 1, increased workload, (b) major theme 2, decision-making input, and (c) major theme 4, empowerment.

The third recommendation for practice is for leadership to develop a consistent focus via an organizational alignment that avails resources both human and capital in the implementation of continuous improvement projects. Major theme 6, resources allocation presented due to a lack of resources. This recommendation is supported with findings or previous studies that highlight the value of management supporting teams with resources (Marksberry et al., 2010; Singh et al., 2010).

The final recommendation for practice is for both management and union leadership to continue fostering a culture that is participative and supported with evidence that change has occurred and is not a passing fad. Support for this recommendation comes from two minor themes (a) management support and (b) organizational culture change and several previous study findings (Marksberry et al., 2010; Rahman et al., 2010; Singh et al. 2010).

Recommendation for future research. Research projects generate opportunities for further research, often due to limitations and the study purpose. Three recommendations for future research were offered: (a) expansion of research scope, (b) different plant culture and workplace relationship, and (c) team socialization training.

These recommendations for additional research are briefly discussed in the following paragraphs.

Generalization of the study conclusions was limited and further research was recommended to expand the scope of the study to include a major unionized automobile manufacturer within the United States. A mixed-method study should be conducted using both quantitative (survey and questionnaire) and qualitative (interviews and observation) tools to obtain data to further explore the theme findings of the current study as results may continue to improve understanding of the role of teams in lean manufacturing. The current study was conducted in Southeastern Michigan and the sample may not have been representative of unionized workers in other geographic locations; therefore, continued quantitative research should consider an expanded sample size. More information about team socialization and interaction in other areas that have dissimilar social groupings to this study might provide valuable data and results. This recommendation was supported by major theme 3, team participation, and major theme 4, empowerment, as well as minor theme 1, training. As noted, future quantitative research should expand the study sample to a more diverse population and seniority differential.

The second recommendation for additional research relates to plant culture and the perception of 'lean manufacturing' coupled with the level of progressiveness in the relationship between the hourly and salaried workforce. The current study was conducted at a location that was reportedly highly adversarial due to the previous owner's behaviors and trust was an issue. Minor theme 3 organizational cultural change, implied conditions and relationships had improved. Future research using a quantitative cross-sectional design would allow for investigation of the impact of organizational culture

change, as a variable to implementation of lean manufacturing, with a sample where harmonious conditions could provide valuable information and results to the industry. This method should incorporate objective measures to common lean metrics, as supported by the theme findings from the current study, such as safety, cost, and productivity that would also allow for an analysis of the impact of culture change and isolated negative factors to implementation.

A third recommendation for future research is supported by minor theme 1, training, whereby an inferential quantitative study with a causal-comparative design would investigate the effects of team socialization training on the organizations ability to implement lean manufacturing. Results from this study may continue to improve understanding of the value of team training and assist in organizational design in manufacturing facilities (Pais, 2010; Trist, Higgin, Murray, & Pollack, 1963; Trist, 1981).

Conclusions

The purpose of this ethnographic qualitative research was to explore worker experiences and perceptions of the social aspect of teams such as empowerment, job enlargement, management commitment, and changing culture in a unionized manufacturing setting. The study problem that faces Western unionized automobile suppliers and manufacturers is the ability to fully implement lean manufacturing techniques (Singh et al., 2010) and remain competitive in the global marketplace of today (Singh et al., 2009; Wee & Wu, 2009). This study is essential to better understand unionized workers ability and willingness to implement lean manufacturing, transcend beyond traditional union-management philosophies, and seek empowerment and job enlargement.

Six major and three minor themes presented. Major themes included: (a) increased workload, (b) decision-making input, (c) team participation and involvement, (d) empowerment, (e) empowered authority, and (f) resource allocation. Three minor themes emerged (a) training, (b) management support, and (c) organizational culture.

Results of this study indicated unionized workers accepted an additional workload associated with job enlargement, which departed from traditional roles similar to the findings of (Landon, 2008; Taneja et al. 2011). Further implications indicated metrics on safety, quality and productivity may improve with team involvement and participation in decision-making and idea generation, which concurred with findings of Robinson and Schroder (2009). Study results implied empowered workers received most of their team social training from sources outside, and management did not properly allocate resources to support a successful team environment. Implications for organizational culture change indicated trust had improved between hourly and salaried workers, which in turn reduced the adversarial relationship.

Four recommendations for professional practice were offered: two related to establishment of a training curriculum for (a) mid-level managers, and (b) team socialization and roles to provide skill enhancement and allow team maturation. The third recommendation for practice offered was connected to major theme 6, resource allocation, requesting leadership to develop a consistent focus that avails resources both human and capital to continuous improvement projects. The final recommendation for practice urged management and union leadership to continue to foster a culture that is participative and supported with evidence change has occurred.

Three recommendations for future research were offered: (a) expansion of research scope, (b) different plant culture and workplace relationship, and (c) team socialization training. The study for expansion of scope was recommended to follow a mixed-method design at a major automobile manufacturer. The second recommended study would investigate different plant culture and workplace relationships using a quantitative cross-sectional design to investigate the impact of organizational culture change as a variable to implementation of lean manufacturing. The final future research recommendation (c) team socialization training offered an inferential quantitative causal-comparative study to investigate the effects of team socialization training on the organizations ability to implement lean manufacturing.

Knowledge and understanding gained from this study may assist with organizational redesign and change efforts, which could improve operational efficiencies (Badurdeen et al., 2011; Pryor et al., 2011). Findings of this study support and make addition to theory identified in previous studies of STST principles by Niepce and Molleman (1998) as first discussed by Trist (1981) and further explored by Cherns (1987). These principles focused on worker involvement in all aspects of design and implementation of technical components, and cultural and social changes were considered concurrently. This study sought an understanding of union worker perceptions of lean manufacturing implementation requirements, strategies, and the resultant cultural change in two manufacturing facilities in Southern Michigan (Moore, 2011; Singh et al., 2010; Womack & Jones, 2003). Using STST (Appelbaum, 1997; Cherns, 1976, 1987; Trist et al., 1963) as a theoretical lens, an exploration occurred on

the interdependencies among team members, participant role in job enlargement and work change complexities associated with lean manufacturing.

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Appendixes

Appendix A: Interview Rubric

Date: _____ Interviewee Number _____

Duration: _____ Minutes

Greetings I am Mike Keck a Ph.D. candidate from Northcentral University and will be conducting this interview to obtain your views on empowerment, job enlargement, management commitment, and changing philosophy of the UAW and management. I would like to tape record our conversation, with your permission. This will assure my ability to carry on an attentive conversation with you and provide accurate data collection for my study. This study is be conducted by me and there is no reference to individuals reflected in data collection, analysis or reporting. If you are agreeable to the tape recording, we can begin.

1. What is empowerment?

2. How much authority and responsibility do you feel you have in decision-making?

3. How much authority and responsibility do you want?

4. Do you see others in the organization as empowered?

5. Describe the training you have experienced in working in a team environment.

6. Do you feel that this is adequate or how would you improve it?

7. How would you define job enlargement?

8. How much involvement do you have with other workers in your team?

9. What is your experience in team activities?

10. Explain how much additional work you are willing to perform to improve, quality, cost, safety and overall profitability.

11. Does management exhibit support for empowering employees?

12. Provide an example of a continuous improvement project you felt got good support from management.

13. Provide an example of a continuous improvement project you felt did not get management support.

14. Does your continuous improvement program affect the way you view your contractual rights as a worker? Explain

15. How/ do you feel continuous improvement activities has changed union-management relations?

16. Explain your feelings on plant culture relating to continuous improvement activities such as lean manufacturing.

This has been very helpful in my study, and I would like to thank you for your participation. Again, I assure you that all your comments will remain confidential.

Appendix B: Informed Consent Form

An Ethnographic Study of Lean Manufacturing Implementation and Socialization in a Unionized Setting

What is the study about?. You are invited to participate in a research study being conducted for a dissertation at Northcentral University in Prescott, Arizona. The study is interested in your thoughts and opinions about how you view lean manufacturing and its related social and cultural components. There is no deception in this study.

What will be asked of me? You will be asked to answer some questions and make comments on how you view empowerment, job enlargement, management commitment and the changing philosophy of unionized labor. It is estimated the interview will last between 30 and 60 minutes. As a team member, you will also be observed during team meetings, continuous improvement activities, and interaction with team members during production periods.

Who is involved? The following people are involved in this research project and may be contacted at any time:

Researcher	Michael Keck	Phone (734)735-4540
e-mail:	mkeck@chartermi.net	
Mentor	Dr. Robin Throne	Phone (888)327-2877 x6029
e-mail:	rthrone@ncu.edu	

Are there any risks? There are no known risks in this study. However, you may stop the study at any time. You can also choose not to answer any question that you feel uncomfortable in answering.

What are some benefits? There are no direct benefits to you of participating in this research. No incentives are offered. The results will have scientific interest that may eventually have benefits for people and organizations considering lean manufacturing.

Is the study anonymity/ confidential? The data collected in this study are confidential. Your name or personal information is not linked to data. Only the researchers in this study will see the data.

Can I stop participating the study? You have the right to withdraw from the study at any time without penalty. You can skip any interview questions if you do not want to answer them.

We would be happy to answer any question that may arise about the study. Please direct your questions or comments to Michael Keck or Dr. Throne via the contact information above.

Signatures

I have read the above description for the study, An Ethnographic Study of Lean Manufacturing Implementation and Socialization in a Unionized Setting. I understand what the study is about and what is being asked of me. My signature indicates that I agree to participate in the study.

Participant's Name : _____ Researcher's Name: _____

Participant's Signature: _____ Researcher's Signature:_____

Date:_____

Appendix C: Letters of Collaboration

From: Patricia.Gornick@jci.com
Sent: Thursday, January 10, 2013 3:35PM
To: mkeck723@comcast.net
Subject: Fw: Dissertation Research Request

Mike,

We would be happy to help you out. Our plant manager has asked that you share with us what will be included in your research paper. Please contact me so we can make necessary arrangements.

Patti Gornick
Human Resources Manager
Johnson Controls - Frenchtown 1

NOTICE: The contents of this e-mail may be confidential, legally privileged, proprietary or otherwise protected from disclosure to other than the original intended recipient. If you are not the original intended recipient, any use, disclosure, copying, distribution, forwarding, printing, or any action taken in reliance on the contents of this e-mail is strictly prohibited. If you are not the intended recipient, please disregard and immediately delete the e-mail, including any attachments, from your computer system and destroy any paper copies of the e-mail you printed.

From: Michael Keck [mkeck723@comcast.net]
Thursday January 10, 2013 12:31 PM

To: Patricia.Gornick@jci.com
Human Resource Manager
Johnson Controls - Frenchtown I

Cc: JamesDicarlo@gmail.com
Plant Chairman

Re: Approval of Research Activities

Greetings:

I am a PhD candidate for Northcentral University, and currently employed as a financial secretary for the UAW. I am completing my dissertation titled An Ethnographic Study of Lean Manufacturing Implementation and Socialization in a Unionized Setting. This

study will examine the changing cultural and social aspects associated with technical advances occurring in the workplace.

As part of the requirements of the study, I will be conducting six structured interviews, approximately 30-60 minutes in length, and observing three team's activities such as meetings, continuous improvement activities, and worker-to-worker interaction.

Stringent measures will be taken to ensure interviewee confidentiality and data management. I will be willing to share findings from the study if the organization so desires.

I am seeking permission from your organization to conduct the outlined activities at your location, and look forward to your reply.

Sincerely,

Mike Keck
Doctoral Candidate – Northcentral University
2621 Deborah
Monroe, MI 48162
(734) 241-6320 x321
(734) 241-2873 – Home
(734) 735-4540 – Cell
mkeck@chartermi.net

From: Jillian.Czlapinski@jci.com
Sent: Thursday, January 10, 2013 4:35PM
To: Michael Keck
Subject: Dissertation Research Request

Of course Mike.

Jillian Czlapinski
Human Resource Manager
734-289-1282 Ext 1228
JCIM- Frenchtown II Facility
1833 Frenchtown Center Drive
Monroe, MI 48162

please disregard and immediately delete the email, including any attachments, from your computer system and destroy any paper copies of the email you printed.

From: Michael Keck [mkeck@chartermi.net]
Sunday, December 30, 2012 12:41 PM

To: Jillian Czlapinski@jci.com
JCIM Plant II Human Resource Manager

Cc: Craigboggs94@yahoo.com
Plant Chairman

Re: Approval of Research Activities

Greetings:

I am a PhD candidate for Northcentral University, and currently employed as a financial secretary for the UAW. I am completing my dissertation titled An Ethnographic Study of Lean Manufacturing Implementation and Socialization in a Unionized Setting. This study will examine the changing cultural and social aspects associated with technical advances occurring in the workplace.

As part of the requirements of the study, I will be conducting six structured interviews, approximately 30-60 minutes in length, and observing three team's activities such as meetings, continuous improvement activities, and worker-to-worker interaction.

Stringent measures will be taken to ensure interviewee confidentiality and data management. I will be willing to share findings from the study if the organization so desires.

I am seeking permission from your organization to conduct the outlined activities at your location, and look forward to your reply.

Sincerely,

Mike Keck
Doctoral Candidate – Northcentral University
2621 Deborah
Monroe, MI 48162
(734) 241-6320 x321
(734) 241-2873 – Home
(734) 735-4540 – Cell
mkeck@chartermi.net

Appendix D: Observation Rubric

Date: _____ Activity _____

Duration: _____ Minutes

Greetings my name is Mike Keck and I am a Ph.D. candidate from Northcentral University and will be performing an observation of your meeting, floor activity, CI project today. I will observe team behaviors to ascertain your demonstration of empowerment, job enlargement, management commitment, and the relationship of the UAW and management. This study is be conducted by me and there is no reference to individuals reflected in data collection, analysis or reporting. Notes will be taken of observations for performance of these constructs as well as tallies of frequency.

- Examples of Empowering Behaviors
    - Idea generation
    - Problem solving discussion
    - Multi-directional conversation
- Examples of Social Interaction
    - Body language
    - Participation levels
    - Group cohesiveness
- Examples of Job Enlargement
    - Willingness to engage
    - Acceptance of additional duties
- Examples of Management Commitment
    - Visual artifacts
    - Resource allocation
- Examples of Union/Management relationship
    - Involvement with team activities

- Visual artifacts
- Inclusion in cultural beliefs

Appendix E: Sample Demographic Characteristics

Table E1

Teams: Seniority

Characteristic	Frequency	Percentage
Less than 2 years	0	0
2-5 Years	40	100
5-10 Years	0	0
10+ Years	0	0

Note. *N*=40.

Table E2

Teams: Gender

Characteristic	Frequency	Percentage
Male	24	60
Female	16	40

Note. *N*=40

Table E3

Teams: Race/Ethnicity

Characteristic	Frequency	Percentage
Caucasian	24	60
African American	12	30
Arab American	4	10

Note. *N*=40.