THE INFLUENCE OF TOP MANAGEMENT SUPPORT ON TQM INDICATORS OF DEFECT REDUCTION AND PROFITABILITY

by

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A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Philosophy

Capella University

January 2009

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Abstract

Organizations and researchers are always in the process of trying to understand what can help make a company produce at a low defect and high profitability rate. During the tough economic conditions faced in 2008 in the United States, many organizations made difficult decisions on whether they should close factories, layoff employees, or restructure. In challenging economic times, it is necessary for management to define plans of action to help organizations survive. Total Quality Management (TQM) is a philosophy organizations can use during good and difficult times to make improvements.

The purpose of this research was to determine the commitment level required by top management in order to achieve lower defect and higher profitability rates. Top management can have an enormous influence on an organization. This dissertation concludes that top management commitment is required in an organization, and it has a positive influence on TQM indicators.

This study was conducted through a survey that used a Likert-scale. There were 222 respondents to the survey; all were members of the Society of Manufacturing Engineers (SME) from the Southeastern United States. All respondents were anonymous, and they responded to the survey via Survey Monkey through the Internet.

Results of this research show that an organization that has a strong top management commitment to TQM results in lower defects and higher profits. This study identifies 24 points that can be used to determine the support of top management in the TQM environment. There are seven points that are recommended for organizations to use immediately with their TQM effort. The seven points are as follows: top management being visible, top management stresses that quality is everyone's job, top management

sets clear goals, top management provides appropriate resources, top management acts as a coach, top management stresses teamwork and do not have work groups competing with each other, and top management is involved with quality. An organization should provide these seven points for their TQM effort, and once these seven points are stable, the organization should start applying the additional 17 points. Top management commitment to these items will lead an organization towards success.

Dedication

This dissertation is dedicated to my family. My intelligent and beautiful wife, Candace, has worked with me through this process. She allowed me the time to devote to working on this Ph.D. She is always beside me through tough and easy times. Our two children, Brian and Kristin, inspired me to continue my educational goals. I saw them working on class work, and it motivated me to reach for higher knowledge. My son also inspired me through his dedication and work ethics. He is an inspiration for any young child and adult, both academically and athletically. My daughter has also motivated me by her hard work and artistic skills. She is an excellent role model for others.

I want to personally thank all of them for inspiring me to challenge the status quo and reach for higher learning. I have learned from all three of them that education can change a person's ability to solve problems and help make this great world a better place for all living things. I dedicate this dissertation to each of them.

Acknowledgments

My parents are the first people I would like to acknowledge. They both encouraged me to be the best at whatever I set out to accomplish. They taught me the importance of school. As a young student, I was fortunate to have wonderful teachers in Head Start, elementary, and middle school. My good fortune continued through high school and college. I would like to acknowledge all my teachers because each one helped create and mold me into an individual that always strives for more knowledge. My Head Start teacher, Mrs. Elsie Thompson, created a great foundation in me. She taught me the importance of being a role model student and the necessity of changing society for the best by learning new things and being involved. I want to give two of my elementary school teachers special thanks. Mrs. West and Mrs. Evans were excellent teachers in the early years in my education experience. They taught me the key skills to being a successful student. In middle school, I met a physical education teacher who gave me purpose and meaning. Coach Shabazz taught me the value of physical fitness and the importance of taking care of the mind. He gave me the courage to always challenge myself to be the very best. Also, in middle school Mrs. Williams taught me the importance of utilizing my talents in mathematics. I consider her not only a math teacher but a counselor who made sure I enrolled in the correct classes as I moved onto high school. Mrs. Williams' concern was the greatest gift any teacher could have given me. I also had a terrific teacher in high school. She was my math teacher, Mrs. Doughty. She would not allow me to doubt myself. Thanks to all these outstanding teachers, I have been able to achieve my goals.

My committee members have been helpful throughout this process. Dr. Singh has been an outstanding and wonderful mentor, and he has guided me through this process in a manner that has allowed me to develop a better understanding of research and my topic. My committee members have pushed me to become very clear with the thoughts and flow of my writing. Dr. Benson has been very devoted to keeping me on track. My visiting committee member, Dr. Staggers, has given up a lot to participate on the committee. It is very special to have individuals like Dr. Staggers in the community who are willing to serve to help others achieve their goals. This is something our society as a whole must become better at because we all are here together, and if we can help others achieve, then our society has a chance of becoming better for everyone. Thank you for all the support and encouragement along this journey, Dr. Staggers. Dr. Benson, thank you for your determination and high spirits through this process. Dr. Singh, thank you for guiding me through this journey from start to finish. I first met you in an independent study class and at our first meeting; I realized that you would be the perfect mentor for me through the dissertation process.

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CHAPTER 1. INTRODUCTION

Introduction to the Problem

The global economy is demanding that all industries learn and implement techniques that enable them to have a competitive edge as they compete for consumer business. Over the years, many systems have been put in place in an effort to improve management involvement, quality, and profitability. These methods include restructuring, reengineering, theory of constraint, Six Sigma, lean manufacturing, High Performance Organization (HPO), continuous improvement and total quality management (TQM). The intention of this study is to determine whether a high commitment level from top management for TQM implementation achieves lower defect and higher profitability rates. TQM implementation requires total employee involvement to achieve success, and the implementation of TQM with top management commitment allows this process to empower everyone in the organization (Ciptono, 2005). Knowledge is needed so organizations can see the benefits of implementing TQM in their companies with the commitment of top management.

Organizations face challenges each and every day that determine how successful they can be from the perspective of profitability and defect levels. If management focuses on system issues, it may find that this focus will drive quality and profitability improvements. TQM is a system that continuously improves customer requirements by utilizing the commitment of all employees to produce products at a lower cost (Chang, 2005).

According to Gomez-Gras and Verdu-Jover (2005), companies that implement TQM are more flexible and willing to adjust to requirements of the environment. This type of flexibility is required in today's market. Customers are seeking companies that are willing to support their requirements, and organizations benefit from this flexibility by obtaining and sustaining business. In order to adapt well, organizations must show their employees how to be successful, and this means the employers must constantly keep their words (Salopek, 2006). The versatility of TQM offers companies benefits that can propel them in this global economy.

Background of the Study

TQM is seen as more than just doing things right the first time, but it is seen as valid in all the latest programs that are in industry today, such as restructuring, reengineering, theory of constraint, Six Sigma, lean manufacturing, HPO, and continuous improvement. Many companies use TQM to establish their quality foundation. Top management, however, can be a barrier to the success of TQM. Seminal leaders such as Dr. Edward Deming used the TQM philosophy with top management support to produce outstanding quality and profitability improvements. Dr. Deming produced his results with Japanese companies, and TQM allowed these companies to produce quality products and achieve high profit levels (Orsini, 2006). The Japanese example shows that top management involvement in a continuous improvement program may lead the organization to lower defects per million and higher profitability levels. These Japanese companies continue to use the philosophy of Deming as the Japanese economy becomes competitive on a global scale. A company that improves its level of quality is naturally

more competitive. A method called Six Sigma is used to improve the level of defects that a company produces. A company that achieves defect levels of less than 3.4 per million outcomes is considered to be best in class, and this level of quality is considered to be at Six Sigma (Davison & Al-Shaghana, 2007). This means that the process is plus or minus six standard deviations from the mean. In the industry where the researcher works, a company that achieves profit levels above 25% of standard cost is considered to be a high achieving company.

Statement of the Problem

The intention of this study is to determine whether a high commitment level from top management for TQM implementation achieves lower defect and higher profitability rates. The study used a quantitative method approach involving surveys of members of the Society of Manufacturing Engineering (SME). The understanding of how top management commitment level in TQM efforts help the success of a business can help a company to be proactive as it implements TQM (Peon-Escalante, Olivia-Lopez & Babillo-Pina, 2008). Once the reasons are known for why commitment levels are deemed important in TQM by management, a company can work to establish a competitive edge (Soltani, 2005). The topic addressed in this dissertation is as follows: The influence of top management support on TQM indicators of defect reduction and profitability.

Purpose of the Study

The purpose or objective of this study is to determine the commitment level required by top management in order to achieve lower defect and higher profitability

rates. The reasons for top management not being involved were reviewed and analyzed to determine any relationships that may exist that can link a single item or combination of items to defect and profitability levels. In any company that sells products or services, there exists the opportunity to create unacceptable work. An organization, however, has the opportunity to be effective and efficient. An example of this would be a company that provides services such as power for the home could supply erratic power or a steady stream of power, while sustained power would be desirable. The erratic power would be considered a defect or an undesirable output for the customer. A company that produces products will have certain characteristics that must be achieved to produce a quality product. For example, one of these characteristics could be thickness of paint. If the thickness is incorrect, the customer would consider the product to be defective. A company must be able to achieve Six Sigma level quality at an acceptable price in order for the company to be profitable. Profitability is a measure of how much money a company makes on the product or services that they sell. This study was conducted to give companies an opportunity to see research that may be helpful in defining success for the organization. The study explored the reasons why top management support might be less than desirable in the TQM process.

Rationale

The rationale of this study is that top management commitment level is not apparent in all TQM programs, and this may be the cause for many TQM program failures. The reasons why top management support is lacking for TQM programs were investigated, including a link between defects per million and profitability. Results are

presented to show companies the importance of top management support in TQM programs. This knowledge will be available for companies to use when they are planning to decrease defects and improve profitability. This study analyzed the beliefs that TQM does not improve quality and profitability levels. The research from this study generated new knowledge for the business community that can be used to drive improvements in a company that is competing in this global economy.

Research Questions/Hypotheses

This dissertation investigated whether a high commitment level from top management for TQM implementation achieves lower defect and higher profitability rates. TQM with management support was compared to companies that deploy TQM without management support. The study included companies that do not use TQM. These companies were evaluated on two measures, defect and profitability levels. The study was guided by the following research questions and hypotheses:

Research Questions

Have TQM implementations that had a strong top management commitment resulted in lower defect rates among members of SME in the United States of America?

Have TQM implementations that had a strong top management commitment resulted in higher profit rates among members of SME in the United States of America?

Hypotheses

(W – With, WO – Without)

H1 Null: A strong top management commitment when implementing TQM does not positively affect profitability levels.

$H1_0$ $Profit_W <= Profit_{WO}$

H1 Alternative: A strong top management commitment when implementing TQM positively affects profitability levels.

$H1_A$ $Profit_W > Profit_{WO}$

H2 Null: A strong top management commitment does not result in an increased output quality level.

$H1_0$ $Quality\ Level_W <= Quality\ Level_{WO}$

H2 Alternative: A strong top management commitment results in an increased output quality level.

$H1_A$ $Quality\ Level_W > Quality\ Level_{WO}$

Significance of the Study

This study is significant to the body of knowledge for three reasons. First, companies need a clear understanding of how to improve quality. Quality is a characteristic that potential customers look for in making purchasing decisions. Second, companies need to be profitable in order to remain competitive in this global economy. Third, there is a lack of research available to link TQM with top management support. This research placed information in the body of knowledge on how top management support can affect TQM and key measures for a company.

Abas and Yaacoob (2006) show a link between TQM, Strategic Control System, and organizational performance. Companies that implement TQM correctly achieve success in the area of organizational performance (Abas & Yaacoob, 2006). Quality management structure was reviewed and presented to show the importance of quality to top management. The analysis gives the reader an opportunity to understand quality management and offer a quality management structure that could be used by top management in other companies. This will be useful to companies that may not have the resources to be trained in creating a quality management team. This information can also be used by established companies that want to reduce defects and customer complaints. According to Chen and Huang (2006), improvements in quality will improve manufacturing cost and delivery time. Many Japanese companies utilized the TQM process to improve their quality to a level that has obtained high customer satisfaction. "Industries therefore pursue quality in product and service in order to satisfy their customers" (Ching-Chow, 2005, p. 1127). More efficient organizations produce better results, by having less scrap, and this leads a company to improve the cost and capacity of a process (Warzynski, 2005). Therefore, by employing TQM processes, companies can be more competitive.

Definition of Terms

TQM

TQM is a process that includes many strategies and focuses on doing the right things right. The strategic practices used in business are the foundation of TQM. Some common processes used in today's TQM environment are continuous improvement, lean

manufacturing, Six Sigma, HPO, use of theory of constraint, restructuring, reengineering, and supply chain management. A customer wants a product on time, to specification, and at the lowest cost. TQM processes drive an industry to reduce defects and improve profits. In order to be optimally effective, the quality management structure must address corporate philosophy, policies, procedures, organizational structure, staffing, and supplier management (Goh, 1994). TQM is a process that leads a company to making products correctly the first time and not requiring inspection operations to guarantee the customer good quality. An organization utilizes processes in a TQM environment to build quality into the product as it is being manufactured. There are many seminal leaders that can be considered the "fathers" of the TQM process, and these seminal leaders will be reviewed later in Chapter 2.

Top Management Involvement

Top management involvement is defined as the level of support that the management group shows for a strategy. It is important to have top management involvement to get associates to embrace a strategy. Associates follow by example and when they see top management engaged and supporting a strategy, the associates normally embrace this strategy. Strategic direction needs the support of top management in order to help it become part of the culture of the company.

Defects Per Million

Quality is a characteristic that is built into a product or service. Defect per million is the number of defects that will be produced per million opportunities. All products that are produced are not 100% correct and when this happens, a defect is produced. A company that wants to be considered world class must produce defects at a level of 3.4

defects or fewer per million parts produced. This is a difficult standard to obtain; however, it is obtainable with the correct quality system in place that works to be proactive and focuses on prevention and not detection. TQM drives a company to focus to this end, and this in turn builds products that the customer wants and finds to be acceptable based on quality.

Profitability

Profitability is the revenue that a company makes after all the costs are paid. A company must build quality products in order to maintain customers, or the customers will purchase from another supplier that meets their quality requirements. It is also necessary for a company to build a quality product in an environment that is effective, which means the process must not be centered on non value added operations, such as inspection to achieve a quality output. A company that is effective builds a quality product at the lowest possible cost, and this allows the company to achieve high profitability levels. Companies go into business to make money or to be effective and efficient, and profitable companies are willing to adapt to the changing environment in order to remain competitive.

Cost of Quality

The cost of quality (COQ) is the cost that an organization experiences to achieve quality product. The cost is broken down into four categories: they are appraisal, prevention, internal failure, and external failure. The internal failure category includes two sub-categories, which are scrap and rework.

Six Sigma

Six Sigma is an improvement process based on statistics, and this process yields 3.4 defects per million opportunities (Lee & Choi, 2006). Statistics is a fundamental method that validates whether a process can create a good product. The Six Sigma approach to improvements can help a company drive costs down and improve the quality of the output.

Effective and Efficient

An organization that is effective meets the needs of its customers, and an organization that is efficient meets its customer needs at a low cost (Robbins, 2005). It is possible for an organization to be effective but not efficient (Robbins, 2005).

Restructuring

Rondeau and Wagar (2003) define restructuring as a process that management uses to change task and authority relationships that drive an organization toward improving organizational effectiveness and efficiency. There are four types of restructuring: system, financial, portfolio, and organizational restructuring.

Reengineering

Ryans (1995) defines reengineering as a process of redesigning a business to obtain a competitive edge and improve profitability. The reengineering process changes the way the business is run and the way people perform their jobs. These changes include changes to policies, technology, practices, and relationships in the organization and compensation programs (Ryans, 1995). Reengineering is an improvement process that focuses on the "nuts and bolts" of a process. For this to be effective, top management must drive the reengineering process.

Theory of Constraint

Ciegis and Jasinskas (2006) define the theory of constraints (TOC) as the process of not trying to solve all problems in a situation but focusing on and solving the constraint. This approach prevents organizations from trying to take on too many projects at once. TOC, which was developed by Eli Goldrat in the 1980s (Rahman, 1998), can be used to solve a wide array of problems in different areas in industry. TOC can help solve finance, quality, marketing, production, and delivery problems (Ciegis & Jasinskas, 2006).

Lean Manufacturing

Lean manufacturing is defined by Pavnaskar, Gershenson and Jambekar (2003) as a process with a goal to reduce waste, inventory, time to market, and floor space, while at the same time producing the best in class quality. Lean manufacturing is very customer centered. It drives better quality, lowers inventories, lowers set-up times, lowers costs, raises profits, and allows for a more flexible work force. This process requires standard work flow, which ensures that a job is performed the same by all employees. By having a standard work process, continuous improvements can constantly upgrade the process. A process that is lean will make one piece at a time and does not allow inventory to build up. Making one piece at a time reduces the opportunity for making a large amount of defective product.

High Performance Organization

Companies are becoming High Performance Organizations (HPOs); they utilize the team approach, which emphasizes an organization's employees. People are considered the cornerstone of any effective organization (Kalprasad, 2006). People must

be treated with respect and their opinions valued. HPOs consider people to be their most valuable asset (Wood, 1999). This focus allows HPOs to achieve outstanding performance results (Kaliprasad, 2006).

Continuous Improvement

Continuous improvement is a process that companies use to make improvements in a cycle that is ongoing. This cycle strives for operational excellence because it does not allow a company to become complacent with improvements; the improvements are not complete enough, and the focus is placed on making things better. Tam, Deng, Zeng and Ho (2000) believe that successful continuous improvement programs have a cultural foundation for quality management.

SME (Society of Manufacturing Engineers)

SME is a group of engineers that meets on a monthly basis to discuss key issues that industries may encounter.

SME Members

SME members include members of the organization, exposition attendees, SME continuing education events, magazine subscribers of *Manufacturing Engineering*, conference attendees, and book and video buyers.

Assumptions and Limitations

There are two assumptions made for this study. The first assumption is that the SME group from the Southeast of the United States of America represents manufacturing and service industries in all of the United States of America. The second assumption is that the quantitative research strategy is the most effective method to use for this topic.

The strength of a quantitative study is utilizing statistics to back up the research questions and hypotheses to observe how managers implement and support TQM. The limitations to this approach are only successful companies may decide to respond to the study, the study does not measure the complete population, and it is regionally based. It is only a sample of the population, so there may be some companies in this area and globally for which these findings may not work to improve defect and profitability rates.

Nature of the Study (or Theoretical/Conceptual Framework)

The operative paradigm for the quality specialization is broken into two categories. The two categories are methodical procedure and methodics. The methodical procedure will be to measure the improvement of quality and profitability by company and industry. Each company will define its parts per million defect level to its customers, and each company will measure its adjusted gross profits. A company that is considered successful after the implementation of TQM with focus on Six Sigma will have a parts per million defect level below 20 or less than 3.4 and will have an adjusted gross profit of 25% or greater. The methodic will be to evaluate the companies using statistics to determine if these companies made improvements to their quality and profitability after the implementation of TQM with top management involvement. See figure 1.

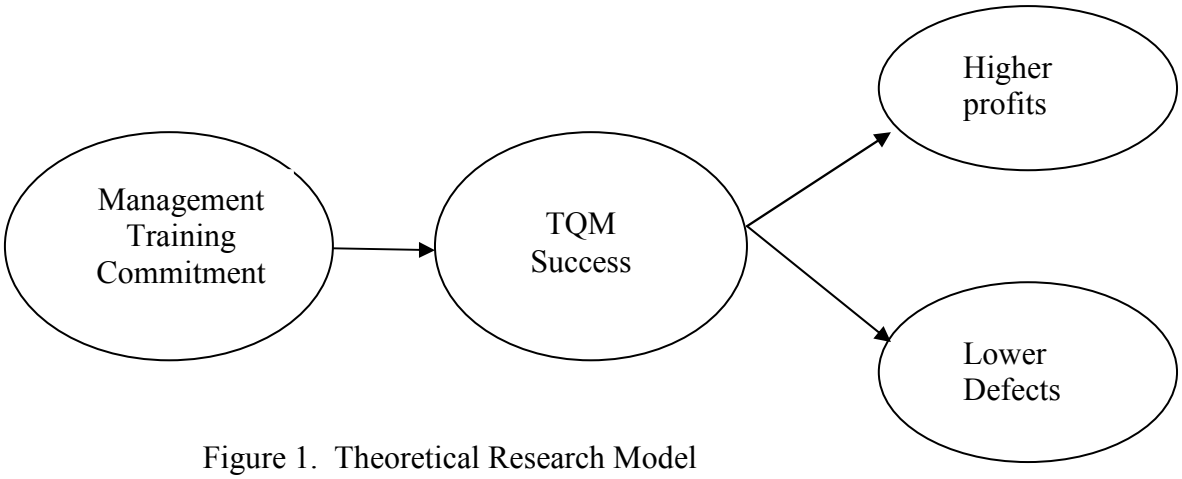

Figure 1. Theoretical Research Model

Top management involvement will be measured by the amount of money that is spent on training, the amount of time each manager spends each week on TQM, and the level that top management provides resources for TQM. TQM has been available for companies to use to improve their quality for many years. In the 1990s, many companies attempted to use this philosophy to improve quality. Today, however, TQM is not being totally embraced. Many companies need to improve their quality level, and an appropriate way to do this is by using this philosophy. In order to encourage industry to consider this method, research was conducted to determine improvements that can be made to the implementation of TQM that will improve quality levels for companies to less than 20 to 3.4 defects per million and improve profitability to above 25% adjusted gross profit.

Organization of the Remainder of the Study

The next chapter, chapter 2, will review the seminal theorists, key concepts of TQM, quality management structure, and the reasons for low management commitment.

Chapter 3 will review the methodology, which includes research design, sampling plan, population, data collection, data analysis, and ethical consideration. Chapter 4 will review the results and Chapter 5 will review the conclusion.

CHAPTER 2. LITERATURE REVIEW

Introduction

Top management can influence the strategic direction of a company and determine the rate of success by the amount of involvement given to a program. TQM is a strategic direction that many companies choose to lead them through competitive markets that they are facing today. Top management must understand two areas when implementing a TQM program; these areas are the goals of the organization and change initiatives of the organization (Soltani, Lai & Gharneh, 2005). According to Soltani et al. (2005), the TQM organization building block is based on the level of senior management commitment to TQM. The TQM process involves all employees; this includes everyone from the CEO to the janitors and all the external suppliers and customers (Soltani et al, 2005). This commitment includes continuous improvement, lean manufacturing, Six Sigma, HPO, TOC, restructuring, and reengineering. The complete supply chain utilizes these principles in its drive for excellence. A quality management system is necessary for a company to manufacture a quality product that will meet or exceed the customer's requirements (Elshennawy, 2004). There are three organizational paradigms that are used by organizations, and they are rational, natural and open system. These three areas will be reviewed in this section of the paper. The key concepts of the seminal leaders offer TQM a solid foundation, and they were analyzed in this paper. Elshennawy (2004) says that a quality engineer is used by many companies to implement total quality management, lean manufacturing, and Six Sigma.

TQM, Management Involvement and Performance

Yong and Wilkinson (1999) assert that the state of TQM is dominating the way companies work in today's economy. TQM goes beyond what its founding fathers had in mind (Yong & Wilkinson, 1999). There are many studies being performed on the results of TQM. According to Yong and Wilkinson (1999), academic research being performed indicates that TQM is only a fad that will go out of fashion. Studies performed in the United Kingdom indicate that companies are achieving success from TQM (Yong & Wilkinson, 1999). Although a large level of success is being achieved in the United Kingdom, there is research that says that TQM failure rate is 80 percent (Yong & Wilkinson, 1999). Yong and Wilkinson (1999) say that much of the research on TQM implementation has been based on measuring companies against unrealistic goals, and this is why some research reports high failure rates. Research confirms that firms located in Northern England show that TQM has yielded acceptable results in the categories of employee involvement and performance results (Yong & Wilkinson, 1999). The Institute of Personnel Management conducted research on 350 human resource professionals and found that 65% of them state that their companies are being successful due to the implementation of TQM (Yong & Wilkinson, 1999). This requires additional research to understand why these companies are achieving success and why 35% of companies may not be achieving success from TQM implementation. Other research was performed on 29 companies that implemented TQM, and 22 of the 29 companies outperformed the industry average for profit margin (Yong & Wilkinson, 1999). Research in this dissertation shows why profit margins improve from TQM implementation.

A company that produces fewer defects can move those savings directly to the profit category. TQM is a process that requires a company to have tenacity and experience with this process. TQM success requires a company to continue to implement it for more than one year. Research indicates that the lack of success with TQM for some companies may be due to the management commitment not being for a time greater than one year (Yong & Wilkinson, 1999). This dissertation performed research on a population to understand if management commitment is indeed the key to a successful TQM program.

TQM implementation and sustainability require participation from management (Pinnington & Hammersley, 1997). Pinnington and Hammersley (1997) found that, through research, companies like Land-Rover were more successful when they concentrated on employees instead of management intent. Employee involvement means that their ideas are considered in the decision making process. Management involvement, however, is required to facilitate the participation of all employees in the TQM process.

The performance of a company after implementation of TQM can be measured with surveys (Yusuf, Gunasekaran & Dan, 2007). A study was conducted in China via a survey to measure performance of companies that have implemented TQM. TQM is a strategy that allows a company to improve measures such as profit and defect levels. This dissertation will utilize similar instruments that were used by Yusuf et al. (2007). Yusuf et al. (2007) state that management must not try to manage by control, but management should manage by commitment. A committed management team allows for total involvement by all employees. The performance of a company can hopefully be improved when all employees are involved through TQM.

Academic research is ongoing in the field of TQM. Examples of academic research that utilized instruments to obtain their data were reviewed as part of the research for this dissertation. The survey that is being used in this research was patterned after the surveys that were a part of academic research that was reviewed. This dissertation utilized quantitative research. Hill (2008) utilized a survey to obtain data on the subject of TQM and performance. The survey provided sufficient results for the study that was conducted. Hill (2008) stated that barriers exist to the implementation of TQM and that one of the barriers was the lack of top management support. The survey used in this study consisted of 25 questions. After evaluating this research, the researcher found that additional work and understanding was needed in the area of the lack of management support. Jordan (1997) also utilized a survey in academic research to demonstrate that TQM and performance results have a link. According to survey results from Jordan (1997), TQM is linked to some performance measures. Likert-scaled based surveys are utilized by academic research to collect data.

Webb (2002) performed academic research using interviews on TQM success rates and found that observational data was able to define why TQM appears not to be working for American companies as well as it is for Japanese companies. Webb (2002) was able to gather data from many individuals to establish that communication was a major issue in implementing TQM in American companies.

Organizational Paradigms

The structure of an organization can be determined by observing the paradigms of the business. A company that has clear and concise goals with a formal structure is an organization with a rational structure. A company with an atmosphere that shows both social conflict and social consensus is a normal system. This organization allows groups to lead the direction of the business. If the paradigm of a company is systems and subsystems to steer direction, then the company has an open system. The paradigm of an organization can be determined as one enters the door of most businesses.

Paradigms are a necessary part of our society, but paradigms can be changed. Kuhn (1996) gives an appropriate example using the moon. People on earth do not think that there is life on the moon because of the exploration that was performed. However, this paradigm could be changed if people from the earth landed on the moon and started a new civilization. Some people might regard this new paradigm with distrust. People will sometimes not accept paradigm shifts because they do not want to change; there are always some men who will hold on to the old views (Kuhn, 1996). A paradigm gains status when it is more successful than other paradigms (Kuhn, 1996). This dissertation is based more on the rational or analysis approach to paradigms. Researchers may use these approaches while performing analysis. TQM uses information from seminal leaders to build a sound process.

This research will discuss the seminal leaders that have been responsible for the rise of TQM, describe and illustrate the key concepts and elements of TQM, and describe a basic quality management structure. This research will argue that TQM, with the support of top management, can lead a company to success by reducing the company's

defect rate and at the same time raising the profit levels. The main focus of the research was to identify the reasons for low commitment of top management to the TQM deployment. Soltani et al. (2005) assert that TQM with top management support can lead to predictable quality and low cost, and these are considered 'critical success factors'.

In order for a company to be successful with TQM implementation, the company should view TQM as a radical change that can help the company. This radical change must be led with a high level of passion and motivation, and then the management team's demonstration of total commitment will help motivate all employees to become committed to TQM. A committed management team must exhibit support and not abandon TQM during times when the economy slows down or restructuring occurs.

Key Concepts of TQM

Quality is defined as the focus on customer satisfaction, which leads to a supplier working to give the customer a product that meets or exceeds expectations (Sila & Ebrahimpour, 2003). Although there is not a universally accepted definition for TQM, the process relies on theorists to develop a common theme that is universally seen in quality programs. Sila and Ebrahimpour (2003) say that the common theme used by most businesses includes continuous improvement, customer focus, human resource management, and process management. Soltani (2005) asserts that top management involvement is promising for the success of an organization. Soltani (2005) also says that top management commitment has become a leading area of study. This research will support the link between low commitment from top management and defect and profitability rates. An attempt has been made by some to establish quality awards such as

the Malcolm Baldrige National Quality Award (MBNQA) to close the gaps or disparities that may exist in a definition of TQM (Sila & Ebrahimpour, 2003). The seminal leaders or "gurus" of quality have all presented common information on the subject of TQM. According to Soltani et al. (2005), the major "gurus" for quality managements are W. A. Shewhart, W. Edward Deming, Phillip B. Crosby, A.V. Feigenbaum, G. Taguchi, K. Ishikawa, Joseph M. Juran, and William E. Conway. These individuals have presented solid theories that support the TQM philosophy. Each of these theorists shares a common thread, which is a central aspect of TQM. This thread is the continuous improvement concept (Soltani et al., 2005). Another common concept that can be found in each of their seminal works is the requirement of commitment by top management to drive success.

All the theorists mentioned above have well defined frameworks that are accepted as philosophies of quality management, and each theorist works to support the common themes of continuous improvement and top management commitment. The key concepts of TQM will be defined after reviewing each of the theorists' philosophies. These concepts will include information on restructuring, reengineering, theory of constraint, Six Sigma, lean manufacturing, HPO, and continuous improvement. The eight seminal theorists are noted as the foundation for TQM literature (Sila & Ebrahimpour, 2003). These eight individuals will be reviewed next, and not in any particular order.

Shewhart

Shewhart was born in 1891 and was a teacher of Deming. Shewhart is known for Statisical Process Control, Shewhart learning and improvement cycle, and sides to quality (Hsu, 2004). Shewhart Statistical Process Control includes a control chart that quickly detects if a measurement is out of control, which allows a team to make an adjustment

before a large sum of defective product is produced (Hsu, 2004). Shewhart (1931) also promoted the learning and improvement cycle that works to continuously improve; this was the original cycle that is being used today (Hsu, 2004). Shewhart's cycle was called plan, do, study, and act (PDSA). Shewhart is also known for defining two sides of quality, which are subjective and objective (Hsu, 2004). Subjective quality includes items such as how a product is used; objective quality is items such as dimensions or items that can be measured (Hsu, 2004). Shewhart (1931) is similar to others in this field with a strong belief in continuous improvement and management involvement.

Shewhart's philosophy, in the researcher's opinion, offers a sound feedback type approach to focus a company on making improvements. It is also the researcher's opinion that Shewhart's philosophy must have top management support in order to be effective. Companies in general, based on the researcher's experiences, do not allow top management support to drive improvement programs. These programs are started because of what seminar leaders tell companies will benefit them. It takes understanding of how a program can benefit a company before a company can achieve positive results. If the program is started and no top management intervention occurs, then the program can move towards a direction that may not be in the best interest of the strategic philosophy.

Deming

Deming was born in 1900 in Sioux City, Iowa, and he earned an electrical engineering degree from the University of Wyoming (Orsini, 2006). Orsini (2006) points out that Deming later earned a Master's degree and then followed up with a Ph.D. in mathematical physics from Yale in 1928. Japanese scientists and engineers invited

Deming to teach quality control in Japan in 1948 (Orsini, 2006). According to Orsini (2006), many managers of American and European companies learned about Deming's management theories from a June 1980 NBC film 'If Japan Can, Why Can't We?' Deming wrote an important work called *Out of Crisis*. From Deming's experiences around the world, he found that executives lack four fields of knowledge (Orsini, 2006, p.46):

1. theory of variation
2. appreciation for a system
3. theory of knowledge
4. theory of psychology

Deming felt that not understanding these fields of knowledge led companies to make defective parts (Orsini, 2006). His focus in Japan was utilizing statistics to help the companies control variation of the products (Deming, 1986). The theory of variation includes making products well enough that if they are used in assemblies that the assemblies would function properly (Orsini, 2006). Deming saw assemblies as a system. "Not only did assemblies need to be designed optimally, Deming believed the entire organization needs to operate as a system" (Orsini, 2006, p. 46). Orsini (2006) states that a system includes procedures, policies, strategies, mission, and vision, and all these items must be aligned. The system must work flawlessly; therefore, all divisions, departments, teams, and individuals must move in the same direction without competition occurring between them (Orsini, 2006). Everyone in this system must be equipped with the appropriate knowledge so that each person can complete his or her job correctly. Deming says that the management team represents prediction, and to be able to predict, the

management team must have knowledge (Orsini, 2006). Knowledge can be gained through experiences, but management must use an approach such as PDSA cycle to use data to compare and predict outcomes (Orsini, 2006). According to Orsini (2006), management education does not include much psychology, but in a management job, most of management's time is spent working with people. Deming (1986) is best known for his 14 points and these can help management understand all the issues that have been noted that management lacks. Deming's 14 points are listed below (Soltani et al., 2005, p. 1012):

1. Consistency of purpose
2. Adopting the philosophy
3. Not relying on mass inspection
4. Not awarding business on price
5. Constant improvement – Plan-Do-Check-Act (PDCA)
6. Training
7. Leadership
8. Driving out fear
9. Breaking down barriers
10. Eliminating slogans and exhortations
11. Eliminating quotas
12. Pride of workmanship
13. Education and retraining
14. Plan of action

Deming (1986) defines his first point, consistency of purpose, as creating mission and quality policy statements. These will provide direction for the organization, so that it can effectively plan, and all the employees can understand what is being done, and why it is being done (Staton-Reinstein, 2005). Adopting the new philosophy is his second point, and it means utilizing continuous improvements to ensure that processes are good and the product will be usable after the process is complete and without having to inspect or rework the product (Staton-Reinstein, 2005). Deming's third point is to cease dependence on mass inspection because this process occurs after the product has been produced. He did believe in inspection while processing the product, so that data is gathered in real time and reviewed to determine how to make the process better (Staton-Reinstein, 2005). The fourth point is to not award business based on price alone. Staton-Reinstein (2005) asserts that a relationship must be built with suppliers, and a company must look at the total process before awarding business. The supplier is an extension of the customer's company, and the supplier should be focusing on continuous improvements so that a consistent product will be produced.

The fifth point is constant improvement, and the PDCA process is employed by the company to accomplish continuous improvements (Staton-Reinstein, 2005). A company must not tolerate producing defects, inspecting for the defects, paying people to produce defects, and paying people to rework product to correct defects (Staton-Reinstein, 2005). Training is the next point, and it must be instituted for all employees. People must be trained to perform a job correctly because incorrect training leads to defective product. The training program is a center-piece to producing quality product. Leadership is the seventh point; leaders must be able to inspire all employees to achieve

quality products and services. Staton-Reinstein (2005) says that leaders must be assertive champions of quality and use others in the organization to be champions to carry forth the vision. Deming's eighth point is to drive out fear. This means that management should help all employees understand the benefits of following the quality policy (Staton-Reinstein, 2005). The next point is to break down barriers between areas. Management must be able to translate information so that all functional areas work toward the same goals without fighting barriers that may hinder their success (Staton-Reinstein, 2005). The tenth point is to eliminate slogans, exhortations, and targets for the workforce so that they understand the personal benefits they can achieve by following the quality policy (Staton-Reinstein, 2005). This point helps direct individuals not to focus on people when problems occur. Instead, it leads them to focus on the root cause of the problem (Staton-Reinstein, 2005). Deming saw targets as a place to aim for and not as an absolute because it is hard to determine where the target should be; the target could be too high or low (Staton-Reinstein, 2005).

The eleventh point says that numerical quotas should be eliminated. Deming (1986) notes the importance of setting targets and tracking progress because these concepts allow the complete team to understand when progress is made. Deming does not agree with punishing individuals for not meeting a target (Staton-Reinstein, 2005). According to Staton-Reinstein (2005), Deming believed that missing a target was due to issues with a process, and the focus must be placed on defining the root cause of the process failure. The next point says that all barriers that lead to people not being able to take pride in their job should be removed because people enjoy being able to take pride in their work. All processes should be well defined, employees trained, processes stable and

repeatable, and standard work must exist (Staton-Reinstein, 2005). The next point is to have a solid education and retraining program. Staton-Reinstein (2005) says that a company should look for ways to integrate the quality policy into each job and to utilize PDCA to educate and retrain the work force. The last point is to take action to accomplish the transformation; this means that management needs to be agents of change (Staton-Reinstein, 2005).

After reviewing Deming 14 points, it is the researcher's opinion that quality is achieved by the amount of effort put forth during the planning and manufacturing stages of a process. Deming's standard of leadership requires strong leadership to be in place, and the researcher's view of leadership is someone setting direction for the organization by keeping a strategic direction in front of the employees. The one point that Deming makes that the researcher disagrees with is the elimination of slogans. Slogans can help motivate people to stay the course and achieve the goals.

Crosby

Crosby was born in 1926 and is known for his focus on the COQ. Jeffery (2003/2004) says that quality costs are critical to defining a quality management structure. According to Jeffery (2003/2004), quality cost is the price to make the product right the first time and the cost to make corrections if it was not made right the first time. Jeffery (2003/2004) breaks down the COQ as prevention, appraisal, and failure. Crosby is known for taking the COQ one step further to show that there are two review areas for COQ; these two areas are the price of conformance (POC) and the price of non-conformance (PONC) (Crosby, 1989). Jeffrey (2003/2004) points out that the POC consists of prevention and appraisal costs and that PONC consists of appraisal and failure

costs. The failure cost can be broken down into two categories: internal and external. The internal failure cost can be broken into scrap and rework. Crosby's approach to quality management is defined in 14 steps (Crosby, 1989). Soltani et al. (2005) include the following items in the Crosby 14 step model:

1. Management commitment
2. Quality improvement teams
3. Quality measurement
4. Cost of quality evaluation
5. Quality awareness
6. Corrective action
7. Zero-defects committee
8. Supervisor training
9. Zero-defects day
10. Goal-setting
11. Error cause removal
12. Recognition
13. Quality councils
14. Repeat steps 1 - 13

The Crosby 14 step model is similar to Deming's 14 points because it requires management commitment and continuous improvement (Crosby, 1989). The first step requires management to show that they are committed to the quality program (Soltani et al., 2005). The next step calls for quality improvement teams that work to make improvements to the process on a routine basis (Soltani et al., 2005). Crosby calls for

quality measurement as the third step, and this measurement must be done so that a company knows what is being produced. This information creates a baseline to make improvements (Soltani et al., 2005). The next step is the evaluation of the COQ; this area includes POC and PONC (Jeffery, 2003/2004). All associates must be aware of quality, and it must be something that the associates consider as a worthwhile goal. The next step is corrective action, which strives to define the root causes for problems so that they are not repeated.

The seventh step is to establish a committee to focus on zero-defects (Crosby, 1989). This committee's approach will be to put in place a quality system that works to achieve zero-defects (Soltani et al., 2005). The company must have in place a supervisor training program that works to educate the team in order to have a common language on the subject of quality (Soltani et al., 2005). There needs to be a day when everyone acknowledges and celebrates the commitment to quality; the day should be labeled as zero-defect day (Soltani et al., 2005). The tenth step is setting goals for all associates so that everyone understands their commitment to quality (Soltani et al., 2005). The next step is similar to Deming's PDCA. It is called error cause removal, which eliminates the causes for errors that occur (Soltani et al., 2005). It is necessary for a company to let the associates know when they are appreciated because recognizing people motivates them to perform well (Soltani et al., 2005). Further in the list is to have a quality council that meets to set guidelines and procedures that guide the quality system (Soltani et al., 2005). The last step is to do it all over again, which pushes for continuous improvements (Crosby, 1989). The cycle for improvements cannot stop but must be continuous.

Crosby makes strong points about COQ, and he places high emphasis on zero-defects. The researcher of this study believes that a company should focus on zero defects. This focus can be achieved by having the correct system in place, but zero defects is a goal that most companies will not reach. It is the researcher's opinion that a zero defect goal drives an organization to be the best that it can. From the experience of the researcher, Crosby's philosophy is seen by many companies as a philosophy that can help reduce cost and improve quality. COQ is very important to understand for companies because it can show a company where it spends money in the quality area. A Pareto analysis of COQ can highlight the highest cost areas.

Feigenbaum

Feigenbaum was born in 1904 and is considered an expert on the subject of quality control (Soltani et al., 2005). Feigenbaum is credited for the following works: *Total Quality Control* and *What Quality Means Today*. Elshennawy (2004) describes Feigenbaum as the originator of Total Quality Control and points out that Feigenbaum envisioned four steps to allow management control. The steps Feigenbaum originated are as follows: setting quality standards, appraising conformance to these standards, acting when standards are exceeded, and planning for improvements in the standards. Feigenbaum believes that quality requirements come from the customer, and they must be met in order to maintain the customer (Feigenbaum, 1983). Feigenbaum (1983) has offered two critical points to TQM; they are that everyone in an organization is responsible for delivering the customer a quality product, and the COQ is an essential factor. Fiegenbaum (1983) defines COQ as the cost of quality disconnects (failure) and the costs of quality investments (prevention and appraisal). Feigenbaum found that cost

reductions as much as 10% of revenues could be achieved with reducing the failure (internal and external) costs (Jeffery, 2003/2004).

Feigenbaum's theory focuses on satisfying the customer and controlling the COQ. The researcher believes that reductions in the COQ and maintaining customer satisfaction at the same time improve a company's profitability. The belief of many companies is that customers must be satisfied or they will find a new supplier. Feigenbaum's theory strives for management control. By reviewing many companies, the researcher has observed that companies that show management control normally produce good quality products and services at a cost that allows them to be profitable. To verify this opinion further requires the researcher to complete research on this subject.

Taguchi

Taguchi was born in 1924 and is well known for his statistical techniques that use design of experiments (DOE) to help solve problems to lead a company into quality improvement and continuous improvement efforts (Antony, Somassundarum, Fergusson, & Blecharz, 2004). Taguchi's DOE process helps reduce variations for products that are put together as assemblies, and this can allow variation reduction that helps improve the process (Elshennawy, 2004). Taguchi has offered the loss function theory and continuous quality improvements as other key areas for quality management. Taguchi states that total loss of the quality of a product is measured by the loss created by the product to society (Elshennawy, 2004). The loss function theory is "Society's loss due to performance variation is frequently proportional to the square of the deviation of the performance characteristic from its nominal value" (Elshennawy, 2004, p. 611). According to Elshennawy (2004), Taguchi requested that all target values be nominal so that the

specification and the tolerance would be held around the nominal values. In order to be successful, Taguchi listed continuous quality improvements as a top priority for an organization (Elshennawy, 2004).

Taguchi utilizes statistical techniques to help improve processes. Taguchi's technique has been seen by the researcher as a positive method to improve quality. A process that is statistically in control produces a quality product or service. The researcher has utilized this theory to make improvements in processes. It has also been seen by the researcher that top management must support this philosophy in order for it to be successful. The limited examples that the researcher has to associate improvements to quality with management support cannot be used to support this dissertation. More data must be gathered to help move towards a conclusion. Therefore, the need for this knowledge requires a research study such as this one to be performed.

Ishikawa

Ishikawa was born in 1915 and is known for the cause-and-effect diagram. The cause-and-effect diagram focuses on five key areas to help solve problems. These areas are man, machine, Mother Nature, method and material. This approach is also known as the fishbone diagram, and it works towards eliminating problems and toward continuous improvement efforts. These are the same principles that the seminal experts of quality all strive to obtain. Ishikawa also believes that top management involvement is necessary to have a successful quality program (Soltani et al., 2005).

Ishikawa's cause-and-effect theory can lead a company towards solving problems that improve quality and profitability. This theory can eliminate problems by focusing on the sources that cause problem in any process. The researcher has utilized this approach

to help solve problems, but like all the theories presented thus far, this has been seen to work when management engagement and support is present. Additional research is required to determine if this theory works better with management support.

Juran

Juran, known as the "father" of quality management, was born in 1904 and earned an electrical engineering degree from the University of Minnesota and a law degree from Loyola University (Destenfani, 2005). Juran created the Pareto analysis and when he visited Japan in 1954, he presented quality management principles to top executives (Destenfani, 2005). This experience is very similar to what Deming did during this time period in Japan. Juran's famous work is *Juran's Quality Handbook*. Juran is also well known for his trilogy, which includes quality planning, quality control, and quality improvement. Juran is considered the "father" of quality management for two reasons: the Pareto principle and the trilogy (Philips-Donalds, 2004).

The Pareto principle is a philosophy in which a few items are considered responsible for the most problems. Philips-Donaldson (2004) says that 80% of the problems can be attributed to 20% of the causes. This approach has allowed many engineers to focus on a few causes to correct numerous problems.

According to Soltani et al. (2005), the Juran trilogy is as follows (p. 1012):

1. Quality planning
    a. Set goals
    b. Identify customers and their needs
    c. Develop products and processes
2. Quality control

a. Evaluate performance

b. Compare to goals and adapt

3. Quality improvements

    a. Establish infrastructure

    b. Identify projects and teams

    c. Provide resources and training

    d. Establish controls

Quality planning is necessary so that a plan is in place with people responsible and due dates assigned. There is a need to set goals or milestones throughout the project so that measures are available to determine if the team is on target (Philips-Donaldson, 2004). The quality planning process requires that the management team understands the customer requirements and needs (Juran, 2002). This can be accomplished by working closely with the customer to define these requirements (Philips-Donaldson, 2004). According to Philips-Donaldson (2004), the product and process cycle must include the customer in order to meet the needs of the customer. The product design needs to be such that the product can be manufactured and the processes that need to be put in place can meet the requirements (Juran, 2002). Having a process that can meet the requirements is considered to be a process that will succeed. Quality control has inspection processes and procedures in place that show if a process meets the requirements, and this data should provide feedback to adjust so that the process can stay in control (Philips-Donaldson, 2004).

In order to continuously improve, it is necessary to use feedback from the quality control data to define where improvements can be made to the process (Philips-

Donaldson, 2004). These improvements shall be conducted as projects that include the employees that are responsible for running the process. It is necessary to provide the appropriate training to these employees to help complete these processes which lead to better control (Soltani et al., 2005).

After analyzing Juran's theory, the researcher of this study believes that this theory offers a foundation to TQM. Quality planning is necessary to put a robust process in place. From experience, it has been seen by the researcher that a plan is required to set the appropriate inspection plan that can achieve the appropriate results from a process. The researcher also believes that 80% of the problems link to 20% of the causes that a company may experience. This has been seen on many projects that the researcher has been associated with. Juran's trilogy is being used by many companies as part of TQM to achieve successful results. It is important to perform some additional research to see if management involvement with this theory can help determine the level of success.

Conway

Conway has a strong belief in top management involvement and continuous improvement (Soltani et al., 2005). Conway has identified six tools for quality improvement, and they are as follows (Soltani et al., 2005, p. 1012):

1. Human relation skills
2. Statistical surveys
3. Simple statistical techniques
4. Statistical Process Control
5. Imagineering
6. Industrial engineering

Conway pushes for top management involvement and for treating the associates as valued people, which requires good human relation skills (Soltani et al., 2005). Conway has also defined the need for processes that utilize statistical measures as control, and he achieves these improvements through statistical surveys, simple statistical techniques (averages, standard deviations, and control limits), and statistical process control (control charts). Imagineering is used to be innovative and place processes in action that are on the cutting edge. Industrial engineering is used to define methods and standard work flows (Soltani et al., 2005).

Critique of the Seminal Theorists

The seminal theorists have paved the way so that there is a solid quality approach available for companies to use. The approach utilizes a quality system that has high integrity and will attain high profits. Based on the exposure of TQM that the researcher has seen, the two theorists that have paved the way for TQM most clearly are Deming and Juran. Both of them spent time in Japan, and the Japanese utilized their theories to become a world leader in quality. Deming is best known for his 14 points, and these points define how the management team can implement a TQM program. Juran utilized his trilogy to focus on quality improvements. All the theorists reviewed earlier have contributed to TQM. Like Deming, Crosby had 14 points and his points focused on zero defects. It is the zero defect process that keeps the drive for continuous improvement alive. Shewhart and Taguchi are well known for their focus on statistical process control. Shewhart is also known as the father of the original PDCA cycle. Deming also embraced this cycle. PDCA helps keep a continuous cycle in place for improvements. Feigenbaum is well known for COQ and customer satisfaction. It is necessary to understand customer

requirements in order to achieve customer satisfaction. Ishikawa is responsible for the cause-and-effect diagram that works towards problem solutions. Conway understands the importance of top management involvement. The common thread that each of these experts has developed is the concept of continuous improvement and top management commitment (Soltani et al., 2005). The researcher believes that more research is necessary to help defend that top management involvement improves the success of an organization for companies in the modern society.

Organizations face global competition. The economy has broadened to include the global footprint, which has led to fierce competition. There are process improvements available for organizations to use to maintain an edge in this global economy. Eight improvement processes that are part of the TQM strategy will be reviewed. These improvement processes are restructuring, reengineering, total quality improvement, theory of constraint, continuous quality improvement, Six Sigma, lean manufacturing, and HPO. The conceptual framework will define the suitability of each concept to TQM.

Restructuring

Rondeau and Wagar (2003) have identified four types of restructuring: system, financial, portfolio, and organizational restructuring. A TQM organization utilizes these types of restructuring to improve communication and reduce costs with the help of cross functional teams. System restructuring is a planned change in the relationship between and amongst organizations (Rondeau & Wagar, 2003). Financial restructuring changes the capital structure of a business and may include buyouts, recapitalization, and debt and equity ratio changes (Rondeau & Wagar, 2003). Rondeau and Wagar (2003) contend that portfolio restructuring is connected with major changes in deployment of assets.

Organizational restructuring includes major and planned changes to an organization's structure and processes (Rondeau & Wagar, 2003). Restructuring uses continuous improvement as the foundation to make the necessary structural changes to impact the workplace in a positive manner. Khurana and Lippincott (2000) state that 86% of the 30 Dow Jones industrial companies performed restructuring from 1991 to 1995. Based on these results, many companies used this process. Restructuring should be used when a company needs to make a major change in a market to maintain competitiveness.

Reengineering

Reengineering utilizes cross functional teams, business processes, simultaneous changes, and radical performance improvements to improve quality and profit levels (Yeung & Brockbank, n.d.). The teams used in this process are from a cross section of the organization. The team is empowered to change policies and works to make the necessary changes that can improve the company's competitiveness. The team will make changes across many areas at the same time to implement the improvement ideas. Change creates the foundation to reengineering, and the concept of reengineering strives for radical change to an organization's culture. Radical change requires the support of top management, and top management involvement is a critical area for TQM. Radical change leads to dramatic process improvements such as a 90% reduction in set-up time or a 50% improvement in productivity. Savings through this process can be obtained and will drive the competitiveness of a business. Caron, Jarvenpaa and Stoddard (1994) maintain that CIGNA Corporation saved more than $100 million over a five year period through the efforts of reengineering, which uses top management commitment and strives to continuously improve.

Reengineering is a process that organizations can use to become effective and efficient. "Leaders should ask basic questions daily, set ambitious goals, make the players think, overhaul the system, and focus on processes, not tasks" (Ryans, 1995, p. 66). The reengineering journey requires a company that is committed to seeing change turn the company around and improve its bottom line. For example, the human resource profession lists cost reduction, higher quality of service, and cultural change as the three most important reasons to reengineer (Yeung & Brockbank, n.d.). Each of these items is achievable through TQM principles such as reengineering. Radical change requires a culture that will accept change. Yeung and Brockbank (n.d.) argue that stiff competition in the global economy requires companies to implement reengineering programs, which provide employee consistency, high quality, and timely services. The reengineering process can aid companies in changing their processes to meet quality and service expectations. As a way of life, the radical change that reengineering implements drives organizations to accept change and produces positive results. Stoddard, Jarvenpaa and Littlejohn (1996) predict that reengineering will yield quantum improvements, and lead to quality improvements.

Theory of Constraint

Theory of constraint methodology allows companies to focus their resources on the most important items. The TOC process prioritizes items in a manner that allows resources to solve the most pressing problem. TOC is a continuous process because when a constraint is removed, the company must continue to find the next constraint, and keep eliminating constraints in a continuous cycle of improvement (Kee, 1995). Continuous improvement is important in a TQM culture. Kee (1995) believes that TOC strives for

better communication and problem solving across an organization. This effort instills excellence in the organization. TOC focuses on continuously removing constraints from a system. Rahman (1998) argues that companies will not survive if they are not competitive, and TOC helps give a company a competitive edge. Rahman (1998) concludes that every system has at least one constraint, and since this constraint exists, there is opportunity for improvement. Once the constraint is eliminated, the organization can benefit by saving money and improving delivery. This leads to a continuous quality improvement process and supports the TQM effort.

Continuous Quality Improvement

In order to prepare to initiate a quality improvement program, it is necessary to empower employees. The stakeholders must promote effectiveness and efficiency, and the customer expects a fair price (Burkhalter, 1994). Continuous improvement is something all organizations should work toward in everything they do because improvement will keep a business on the edge of surpassing its competition. Quality improvement programs require management commitment, customer focus, supplier relationships, vision and strategy, and measurement and rewards; each of these items is central to TQM (Bullington, S., Easley, Greenwood, & Bullington, K., 2002). Chang (2005) expresses that a quality management system can be the vehicle that continuously improves an organization and maintains a competitive edge in the market place. A systematic approach must be adopted to have a continuous improvement program. Burkhalter (1994) asserts that preparing to initiate a quality improvement program, understanding continuous quality improvement, and having a process for continuous

improvement and performing critical examinations of the program, and having new initiatives are required to successfully perform continuous quality improvements.

Top management and the quality improvement process must be integrated with employees, stakeholders, and customers (Burkhalter, 1994). To support the continuous quality improvement program, all team members must also be knowledgeable on the subject. Dr. Deming's 14 points are considered the heart and soul of a continuous improvement program (Burkhalter, 1994). The process for continuous improvement must have a detailed plan, and Burkhalter (1994) reviews a cycle for this plan.

Burkhalter's (1994) cycle is PDCA. In the planning stage, measurable objectives must be documented. The do stage executes the plan and obtains key information and data. Next, the check stage performs analysis on the data. This data analysis occurs in the quantitative, qualitative, and mixed method processes. The act stage is the stage that implements actions or solutions. To further maintain the drive, a company should always look for new initiatives to implement.

New initiatives keep a team or business creative (Burkhalter, 1994). A successful program requires a team effort, so that new initiatives can be implemented. Carman (1993) concludes that involvement by top management and all employees will lead to a successful continuous improvement quality program. Other items that are important to improvements are action plans and benchmarking (Carman, 1993). Benchmarking efforts include comparing a company against other companies, defining gaps, and choosing and implementing the best practices. A company must understand that it is improved in the end by implementing new ideas. This can be accomplished through key performance

indicators (KPI). KPIs should be the measure that drives the business and will demonstrate whether continuous progress is being made.

In this process approach, quality improvements occur in a continuous cycle. This process is applicable for all types of public and private business in today's competitive global economy. It should be used in all business conditions on a daily basis. Continuous quality improvement is similar to TOC and quality improvement program. This process interfaces well in an organization that is reengineering and making improvements through any of the other processes.

Six Sigma

The Six Sigma process is a problem solving process where the focus is on identifying a root cause and implementing corrective action to prevent the root cause from recurring (Lee & Choi, 2006). By identifying the root cause of a problem and implementing corrective action, a company can improve quality, delivery, and cost. The basic step in a Six Sigma process is to develop a measurement of the effect that the process will have on the competitiveness of the company (Lee & Choi, 2006). In order to achieve this, Lee and Choi (2006) say that the process improvement must be statistically significant.

Six Sigma was created in the 1980s to cut costs, improve processes, and reduce cycle times (Llorens-Montes & Molina, 2006). Llorens-Montes and Molina (2006) contend that the Six Sigma process achieves quality levels that limit defects to 3.4 per million opportunities. The Six Sigma process is plus or minus Six Sigma around the mean, which achieves quality levels that are impeccable. The customer will receive a product from a process with less cycle time and reduced variation (Smith & Blakeslee,

2002). Most companies work to three sigma above or below the mean. The three sigma process produces 1350 parts per million opportunities that will be non-conforming (Llorens-Montes & Molina, 2006). Customers prefer the Six Sigma process, and customers are vital to the success of an organization.

Customer focus is the first principal and it is central to the Six Sigma process. Process improvement and redesigned product are important aspects of manufacturing and are considered the second principle to this process. The PDCA model is required in this approach. The Six Sigma process takes this concept one step higher. Six Sigma teams must define, measure, analyze, improve, and control the process (Revere & Black, 2003). Teamwork is considered the third principle for the Six Sigma process (Llorens-Montes & Molina, 2006). Teamwork includes employees, suppliers, and customers. Six Sigma requires that all parties in the organization will work together to create products and services from effective and efficient processes. "Six Sigma uses various improvement specialists such as Black Belts, Masters Black Belts, Green Belts and Project Champions" (Llorens-Montes & Molina, 2006, p. 488). Extensive training is required for employees to become specialists. Companies that take the Six Sigma process seriously have created corporate level positions in their organization for Six Sigma. The Six Sigma structure in many companies is similar to the quality structure. Effective use of the Six Sigma process produces positive results. The Six Sigma process has been responsible for many companies becoming the best in their markets and has allowed these companies to expand their markets (Llorens-Montes & Molina, 2006). Where it is applied, the Six Sigma process promotes continuous improvement.

Lean Manufacturing

Key tools that a lean manufacturing process uses are standard work, 5S, cross training, root cause analysis, information display, Kaizen, and set-up reduction (Pavnaskar et al., 2003). Standard work is a process in which the work is performed in the same sequence by all employees. It is a documented flow that defines the amount of time each sequence in the work environment should take. The 5S tool allows the work place to be clean; the work environment will be sorted, set in order, shined, standardized, and sustained. The work environment will also be made as safe as possible through each of these steps.

Cross training becomes necessary so that flexibility can be achieved. All employees must be able to perform multiple jobs, and they must be able to solve problems effectively. Root cause analysis utilizes five whys and fishbone diagrams to solve problems; information displays are crucial in a lean manufacturing operation. Any employee should be able to visit a work area and determine if the area is ahead or behind on all metrics. One method of doing this is called Kaizen, which is defined as a sequence of events in which a team of employees work on a single project until it is complete. Kaizen events are necessary to complete tasks at a rapid rate. This is vital to helping an organization make huge improvements in the process on items such as set-up reductions. A set-up reduction will reduce the time of a set-up, thus speeding up a process.

A lean manufacturing process will eliminate waste, make continuous improvements, utilize multifunctional teams, change manufacturing flow based on pulling instead of pushing, and display metrics to show performance (Duque & Cadavid, 2007).

Lean manufacturing is a modern process that could enhance every private and public organization in today's world. Lean processes include quality improvements and Six Sigma principles. Once a quality system is in place and improvements are made through Six Sigma, then lean manufacturing can be utilized as a standard. Lean manufacturing is an exceptional approach when used along with quality improvements and Six Sigma. Implementing lean manufacturing in conjunction with a quality improvement and Six Sigma program leads to satisfied customers and more market share.

HPO

Blasi and Kruse (2006) analyzed the number of organizations that use HPO teams and found that approximately 1% of organizations use HPOs. Based on savings and improvements that have been achieved by this 1%, other organizations could make improvements to their profits by employing HPOs. The HPO team concept help the people of an organization see that they matter and that their input is very valuable. The concept of these teams is to encourage the complete organization to work on improving the things that matter. Organizations with HPO teams see the value in people and allow the employees to improve the company. Many successful organizations utilize team work (Cohen & Bailey, 1997).

Wood (1999) maintains that HPOs are flexible and have high employee involvement. HPOs embrace the principles of TQM, which is a principle based on teams. Organizational transformation includes TQM and employee involvement (Wood, 1999). The principle is also based on flexibility; an organization that can function flawlessly has flexibility in its work force so that team members can work on the things that are most important. The principle is also based on skill formation (Wood, 1999). Skill formation

allows people to aggressively solve problems. Thompson and Heron (2005) validated through an extensive study that jobs requiring problem solving skills and high value are beneficial in a high performance organization, even if management ability is low. These employees are able to achieve outstanding results due to teamwork. Morley and Heraty (1995) believe that HPOs develop autonomy and control, flat lean structures, and teamwork. Kozlowski and Ilgen (2006) communicate that human life is built around groups working together to achieve a goal, and HPO teams are groups that work closely together in a precise manner. Formation of productive teams is based on measurement, structure, and incentives (Zenger, 2002), and the TQM philosophy places emphasis on measurement of team output, which is directly related to customer satisfaction. HPO teams can benefit from a leadership team that understands coaching (Ket de Vries, 2005). Coaches know how to listen as well as direct, and this works well with teams. The leadership team must be very good coaches if success is to be obtained. Ko (2003) asserts that employees want to be part of the team, and then they can show their commitment to the management team.

According to Uzzi and Barsness (1998), companies should also have temporary or contingent employees on their team because the contingent employee can bring strength to teams. These employees can bring new ideas, open minds, and may allow creativity to flow through the team. The contingent work force gives organizations flexible staffing and labor cost savings (Uzzi & Barsness, 1998). According to Sen (2006), departments such as information technology and human resource departments are prime targets to use contingent workers because this type work is easily done. Contingent labor can be used in the start-up of a company to provide expertise (Cardon, 2003). Later, in the expansion

and maturity stage of a company, the contingent labor offers flexibility (Cardon, 2003). This type labor offers reduced costs in both the start-up and maturity stage (Cardon, 2003). Finally, insights can be gained from contingent employees in the diversification stage (Cardon, 2003). Venables (2006) concludes that most organizations are satisfied with outsourced labor and departments. A challenge for teams in HPOs is that the infrastructure may not exist in the organization to support HPO teams that include contingent or non-outsourced employees (Carlsen, 1996). Dhar (2005) says that HPOs' cultures in most cases do not have the advantage of having processes, structures, and systems in place that will support their long term existence. Voos, Eaton and Belman (1993) write that mutual commitment is required between employees and employer in HPOs. Employees must speak up and be heard or learning will not occur; organizational learning is hampered by silence (Ramanujam & Roussseau, 2006). Muldrow, Buckley and Schay (2002) argue that employees' acceptance of new ideas will help determine if HPO teams are successful.

Critique of the Improvement Strategies

The eight improvement strategies outlined in this research have the same goals. They all work to improve profitability, quality, and customer satisfaction. These methods have their own unique approaches, but in some of the strategies, they share some of the same principles. All the approaches require management to be involved. There are various ways this may be accomplished. The management team can show involvement in all these processes by spending time asking employees questions to help drive the philosophies. If an approach is not working, then the management team must have the foresight to see this and change the approach. Management involvement can be measured

by the amount of training spent to implement and maintain the programs. The amount of resources that are placed on the programs is also a reflection of the level of management support. Resource requirements include money, capital and people. Research is needed to help outline a link between management involvement and organizational success.

All eight strategies are applicable in today's market. The researcher believes that the lean manufacturing approach offers TQM the best chance of success. The lean manufacturing approach builds on quality and will lead to radical changes based on the organization needs. All eight strategies can help businesses improve. Lean manufacturing is the one approach that blends all of the others with it; restructuring and reengineering are processes that should be used as a last resort. The concept of lean manufacturing builds a conceptual framework that uses quality as the base, quality improvements and continuous improvements as the stem, and theory of constraints and Six Sigma as the methods to drive change on a continuous improvement cycle; therefore, lean manufacturing, from the researcher's point of view, produces the best results.

Many of the improvement methods use problem solving to obtain improvements; this problem solving must happen at a rapid rate. These eight strategies represent the framework of TQM. See appendix A. In order to achieve the appropriate level of support, a sound quality management structure should be in place.

Quality Management Structure

Quality represents the pillars of an industry and is considered one of the central areas that helps achieve customer satisfaction. The quality management team is responsible for controlling the cost of quality, and these costs consist of internal failure, external cost, prevention, and appraisal. The focus of the management team should be on

prevention, not detection. In a strong manufacturing operation, the quality management structure utilizes TQM to build quality into products and services that are delivered to the customer.

In any industry, it becomes necessary to reject and rework product for different reasons. The quality structure that controls the cost of rejecting and reworking makes up the internal failure team. Another group in the structure that is similar is called the external failure team. This team works to reduce the cost of rejects and reworked product that may have made it to the customer. The prevention team is where a company needs to put focus. The prevention team's work will reduce the need for all the other teams. The appraisal costs are the costs associated with performing inspection operations. The work that this quality structure completes is a continuous process that follows the PDCA strategy. By implementing a cost of quality improvement program, a company will build processes that produce quality goods, and the organization will achieve reduced costs (Kanji, 1990).

Define Quality System

A quality system requires a manual that outlines how the company handles quality. The manual is made up of work instructions that discuss the involvement of top management in the quality system. The manual describes how the company uses statistical process control (SPC), performs audits, calibrates gauges, handles supplier management, implements corrective actions and preventive actions, and describes the interaction between processes. This manual is the heart of the quality system.

Define Quality Management Structure

A quality management structure must start at the highest levels of a company. The organizational structure of most companies consists of a President or Chief Executive Officer (CEO). The CEO should have a director or Vice President of quality that reports directly to him or her. This structure sets the tone for the rest of the organization and will stress or emphasize quality as a top priority. "A successful quality program requires a complete commitment from all levels of the organization, but if the results are a satisfied customer base, commitment of resources is justified" (Huff, 1998, p. 29). This commitment must also be evident in the quality management team. The quality management structure is made up of the quality system, manufacturing, and supplier management. A strong quality structure utilizes Dr. Deming's 14 points as the foundation for the quality system.

Quality Management System Structure

According to Bandyopadhyay (2005), the emergence of ISO-9000 leads a variety of industries to adopt industry specific quality standards. For example, a safety critical industry such as the aerospace industry requires documents to be maintained by suppliers for a longer time period than the electronics industry is required to maintain documents. In addition, the automotive quality management system structure requires companies to put in place a Technical Specification (TS) -16949 quality system.

A TS-16949 system includes the following major areas: scope, normative reference, terms and definitions, quality management system, management responsibility, resource management, product realization and measurement, analysis, and improvement. A quality management system must define the boundaries for the quality system; these

boundaries are the scope of the system. The normative reference uses an international standard as a reference, and TS-16949 defines terms and definitions. Some key terms in the document are supplier, organization, and customer (West, 2003 – 04). The reference to organization is the company that is putting the process in place. Suppliers are companies that supply to the organization (West, 2003 – 04). Customers are those that the organization sells product to (West, 2003 – 04). In order to be successful, a company needs a quality management system in place to meet customer demands on a consistent basis.

The quality management system should include a quality policy. This system is made up of a quality manual that includes documented procedures and shows interactions between the processes of the system. The quality system must define how to control documents and records and will prevent companies from using documents that are outdated. The quality system establishes a method of reviewing, distributing and implementing customer specifications (West, 2003 – 04). The quality system structure should include record retention criteria, which will allow a company to maintain traceability once product or services has made it to the customer. The quality management system or structure is required to delineate management responsibility (West, 2003 – 04).

An organization's top management team must show that it is committed to the development and implementation of the quality management system by maintaining efficient processes (West, 2003 – 04). The management team must demonstrate customer focus. The management team must demonstrate that it carries out the quality policy. The management team must show that planning for quality objectives is apparent. The

management team must document responsibilities and communicate these throughout the organization. Tan and Tan (2002) state that clear communication defines clear requirements and leads to improved quality. The management team must also demonstrate that the quality management structure or system is reviewed at planned intervals (West, 2003 – 04). This includes reviewing and monitoring quality objectives in an effort to maintain optimal performance.

In order to have an effective system, resources must be in place and committed. Resource management makes sure that appropriate resources are in place to allow a company to meet customer satisfaction (West, 2003 – 04). The personnel performing the work must be trained properly to meet quality requirements; personnel competence must be evaluated in order to demonstrate that employees are capable of performing the work at the appropriate quality levels. Resource management includes maintaining an infrastructure that will allow quality product to be produced (West, 2003 – 04). There should be contingency plans in place to handle emergency situations. A safe and clean work environment is also required to achieve the product quality levels. When training and resource management exist in an appropriate environment, quality product is ensured.

In order to produce a product, a process to create the product must be in place. Product realization includes establishing the processes, quality controls, and planning to carry out the manufacture of the product (West, 2003 – 04). A change control process is required so that processes and documents are not changed without the necessary approval levels. The purchasing of raw materials is included in this section. This method requires the organization to obtain product from ISO 9001:2000 suppliers (West, 2003 – 04). The

next section requires work instructions and controls to be in place to help control manufacturing product. Set-up verification and in-process inspections are required to help an organization achieve quality product.

To obtain inspection results, an organization is required to measure and analyze product. The organization must measure, monitor and analyze product and processes to allow the organization to achieve quality results (West, 2003 – 04). This helps drive a company toward customer satisfaction. The organization is required to perform internal audits to determine if the quality system is working. If a company finds nonconforming product, then it must have a process in place that defines how this product is handled (West, 2003 – 04). These product non-conformances must be eliminated with the use of corrective action. Preventive actions must also be taken to show that an organization is working to be proactive, and continuous improvement is required.

The aerospace industry has a quality system requirement called Aerospace Specification (AS) -9100. This standard is very similar to TS-16949. It includes all the same elements as TS-16949, but it has stricter record retention requirements.

Supplier Quality

Supplier quality is an important aspect in the quality management structure. The product supplied to a company by a supplier is the basis for establishing good quality products for the customer. The supplier quality team must put in place a robust program to ensure that the incoming quality meets or exceed expectations. This program includes performing audits at the supplier, incoming inspection, and requiring the supplier to have an ISO certification (Tague, 1995). A supplier must also meet delivery standards and quality standards.

Quality Manual

Every company should have a quality manual. A quality manual outlines the steps necessary to be carried out in order to achieve customer requirements (Tague, 1995). The quality manual should be used and understood by all employees because every employee has responsibility for quality. The quality manual is the central tool that defines the process for meeting quality requirements.

Problem Solving

In any manufacturing operation, problems will occur. Because of this, the quality management structure needs to have a problem-solving philosophy. Many companies use Shanin or lean Six Sigma. Both these processes strive to define the root cause and put corrective action in place so that the problem does not occur again (Tague, 1995). Some beneficial tools that can be used during the problem solving phase are 8 Discipline reports, 5-why's, and cause and effect diagrams (Tague, 1995). In applying these methods, the quality management structure will allow people in the organization the time to meet with cross functional teams to complete 8 Discipline reports.

Monitoring problems requires a cross functional team to be formed. The team must clearly define the problem with a problem statement which includes who, what, when, where, and how. The team must then draw a containment window around the problem and find any product that falls into this containment window. Once the problem is contained, activity begins and includes defining the root cause of the problem (Tague, 1995). The root cause of the problem is something that can be turned off and on or controlled. Once the root cause is defined, the team must define a corrective action in

order to prevent the problem from recurring. The team must take a "big picture" approach and combine this corrective action to other similar processes that could create the same defect. The final step in the process is to congratulate the team on solving the problem.

In the root cause stage, there are two items that can help define the root cause. They are the 5-why approach and the cause-and-effect diagram. The 5-why approach is very simple. The cross functional team asks the question why five times and will eventually get to the root cause. The cause-and-effect approach uses a fish bone diagram to determine if the problem is associated with man, machine, measurement, Mother Nature or methods (Tague, 1995). Once the problem has been identified, prevention of further problems can be put into place.

Problem Prevention

The most important point is to have a quality structure that focuses on problem prevention. Problem prevention is correcting something before it becomes a problem. The major tool used in the manufacturing operation to prevent problems is a Process Failure Mode Effects Analysis (PFMEA). This tool looks at each process step and visualizes where problems can happen (Pearch & McRoberts, n.d.). The problem prevention team will put controls into place to detect the problem. The team should focus on items that are called poke-yokes. These devices are built into the process and are designed to not allow defects (Tague, 1995). This method detects a problem and shuts the machine down before a defect occurs.

Layered Process Audit

In a manufacturing or service operation, the quality management structure benefits from layered process audits, which are performed in layers. The first layer would

be performed by the operator. In this system, the poke-yoke device would be checked daily by the operator. The next layer would be the operator's supervisor. The supervisor would perform the poke-yoke check once per week. The third and final layer would be performed by the supervisor's manager. The manager would check the poke-yoke device once per month. The frequency of checks by each layer can be defined as appropriate. The team would develop a list of items that would be on the layered process audit. An organization using this method can use processes like Quality Function Deployment to help define items early that should be on a layered process audit. Quality Function Deployment helps put a robust process in place prior to production (Lager, 2005).

Work Instructions and Standard Work

In order to maintain consistency in manufacturing or service areas, work instructions are used to explain how the work should be conducted. These instructions allow the manufacturing or service area to achieve standard work. Once standard work is achieved, a base line is set. With a base line established, the quality team has a point of reference on which to base improvements. All employees use the standard process, and this helps yield consistent results. The quality management structure audits this standard work to make sure everyone is following the process precisely. Solid work instructions and standard work must be in place to run the processes in order to achieve consistent output (Karpavicius, Cvilikas & Gatautis, 2007).

Change Management

Organizational change is required in the business world today in order to remain competitive. Organizational change involves culture change due to global marketing and the economy. Culture change is defined as changes made in an organization that are

consistent to the company's objectives (Robbins, Hodge, Anthony, Gales & Clawson, 2005). Associates usually do not readily accept organizational changes in their jobs. According to Robbins et al. (2005), support is required by top management to make change successful. Top management is essential to organizations because businesses face change everyday, and a structure must be in place to handle change. Robbins et al. (2005) define change as simply the alteration of the status quo. Any change may be regarded as a problem by some associates. This situation can cause an organization to be outdated unless change is presented in a positive light.

Matheson (2007) says that the job market requires employees to accept change in order to remain competitive. If companies, however, are prepared for change, then they can be successful at it. The change management process is important, and if companies prepare properly for change, then the success of change is ensured.

It is necessary for communication channels to be open and clear so that feedback is given in all directions. In addition, the outcome from change must be measured so that teams can see the effect. There needs to be clear measures developed and displayed so everyone involved with the changes can see the progress, and a team can learn from these measures. If the outcome is negative, then the team will know not to move in this direction. If the outcome is positive, then the team will continue to move in this direction.

TQM is an organizational change method that is one of many strategic change directions that organizations use to drive improvements in general. There are six areas that will be discussed that can be changed in an organization. These areas are goals and strategy, people, products and services, technology, organizational development, and culture change (Robbins et al., 2005). The goals and strategy of an organization are

normally reviewed and changed each year. These are necessary items to review and change to drive the industry in a certain direction.

People that make up the organization can be changed (Robbins et al., 2005). The business world continues to reduce the number of employees in an effort to improve the bottom line. This change causes other people's jobs to change. Downsizing is one way organizations can be changed. It is important for organizations to inform people about downsizing situations. People must be able to adapt to change. For example, Matheson (2007) reviews the librarian profession and shows how they must accept change as the job market dictates. People can affect organizational change by being moved into different companies or positions in the same company. In order for companies to compete internationally, many companies are hiring individuals from the countries that they want to compete in. The key to successful change is being prepared for change.

If companies are prepared for change, then they can be successful at it. Products and services are fundamental areas where change can affect the organization. A company that can introduce new products and services may be able to penetrate markets that are not crowded and not as competitive (Robbins et al., 2005). This enables a company to compete from the ground up. This also may require a company to change its innovation level.

Companies must review and change their technology in the business environment. Many companies have turned to robotics, computer aided manufacturing, and other automations to remain competitive (Robbins et al., 2005). Temple (2007) says that Texas is the number one growing business state in the United States of America. This has caused the state to change its approach to training the workforce. The state is using

innovative ways to train these individuals. This innovation has been broken into types of training.

The University of Texas offers three types of training. They are management development program, excellence in leadership, and senior management program. These programs give University of Texas graduates an understanding of the changes that industry faces (Temple, 2007). Temple (2007) is a proponent of integrating the workforce and education so that people will be prepared for the change environment. The change management process is important, and if a business follows this process, changes will be implemented successfully. Organizational development is crucial to make sure your organization continues to develop talent. Organizational development is an area that works to improve the social functioning of an organization (Robbins et al., 2005). The use of survey feedback, process consultation, team building, and diversity training are necessary to improving the organizational development (Robbins et al., 2005).

The last type of change to be reviewed is culture change. To change the culture in an organization, top management is required to show support, and this type change requires major shifts in the organization (Robbins et al., 2005). This area involves all the areas that have been discussed. In order to change the culture, the organization must focus on its customers, empowerment, team based management, continuous improvement, communication and feedback. Customer focus includes internal and external customers. It is important to understand and know a company's customers (Robbins et al., 2005). Empowerment of the people is crucial. If people know that their thoughts will be used, then they are empowered to make them work. "The idea behind empowerment is to give responsibility to people who are involved with the work process"

(Robbins et al., 2005, p. 63). This leads to having teams committed to the change process. Team based management utilizes teams to work through issues and changes. The teams use the continuous improvement philosophy to measure and track their progress.

The benefits of a change management culture are numerous. A change management culture will affect cost reductions, inventory reductions, continuous improvements and innovations. Companies work every day to reduce costs so that they can be competitive. These cost reduction programs include making changes to processes that will produce a quality output at faster rates. A change that drives for inventory reduction is changing a manufacturing process from a batch process to a cellular process. The cellular process concept produces product one piece at a time. The cellular process has been responsible for reducing inventory by as much as 60% in many manufacturing and service companies. Innovation is responsible for changes that take a company to a different level. Innovations are normally changes that are radical, but all these changes drive toward continuous improvements.

The change process must be defined so that an organization can be successful. A cross functional team recognizes a need for a change. The process should start with completing a form that defines the possible change. The change should include the plans and analysis, goals, and tactics. The change should then go to a cross functional team that includes top management for approval. Once the change is approved, the company should run a pilot to verify that it will work. This pilot study will include data and analysis. The data should be evaluated and if necessary, the plan should be changed. The next step will be to modify the plan and adjust as necessary. At this stage, the plan is ready to be communicated to others who will be affected. There should be two-way communication

and feedback. The change is now ready for implementation. The team should perform follow-up to make sure the implementation is sound. This change process will help a company implement changes more effectively.

The changes must be facilitated by top management, which must be supportive of changes (Robbins et al., 2005). There must be a champion that leads the facilitating. A company must inform its people about changes (Robbins et al., 2005). Communication is central in the success of changes.

A change management process can lead a company to growth and sustainability. A company that needs to grow has to determine how to obtain additional business. One way to obtain additional business is to decrease the cost of making your product. To change your cost structure requires a change in your process. This may cause a company to implement new processes or make revolutionary changes to current process. It may be as simple as having an employee be responsible for two machines instead of one. A great initiative will be Kaizen events to drive a company to make changes. Kaizen events are focused events that change how work is performed.

Companies need to have a documented plan for achieving quality (Upal, 2005). This documented plan will include a quality system and control system to obtain quality results. Companies also must hold their employees accountable for meeting quality requirements (Upal, 2005). However, even with well documented plans, sometimes programs are not effective. All change programs require top management support in order to obtain success (Robbins et al., 2005).

TQM is a strong base for the quality structure to build upon, but it is not always successful. The seminal leaders, key strategies, and quality structure are the main areas to

draw from when implementing and sustaining an effective TQM program. According to Wu (2006), customer satisfaction can be achieved by implementing programs like TQM, which drives a company to understand and know what the customer wants. Top management involvement and continuous improvement are defined by the seminal theorists as the way to effectively put the strategies of TQM in place. It is important to have in place a quality structure that addresses the prevention category in COQ. The focus in the structure should be on preventing issues from occurring. TQM failures happen every day, and it is important to review the reasons why TQM sometimes fail.

Reasons for TQM Failure

According to Soltani (2005), TQM fails because of the following reasons: (a) implementation problems, (b) lack of all employees striving for the same goals, (c) poorly defined or non-existent goals, (d) poor planning, (e) fear of change, (f) lack of management commitment, (g) deep-seated management-worker antagonism, (h) work overloads, (i) failure to provide proper training and appropriate resources, (j) lack of real people involvement, (k) employee resistance, and (l) lack of an integrated performance measurement system. TQM implementation should use a structure so that when problems are encountered, they can be resolved. Adequate preparation leads to a smoother implementation process. In an organization in which all employees are not moving towards the same goals, TQM will not survive (Soltani, 2005). Goal setting must be clear, in-place and implemented by the management team. Planning is the key in everything that a company does because if there is no plan or blueprint to define how to achieve, then achievement will be at a low level or will not exist (Soltani, 2005). The management

team must support the TQM process by its actions and resource allocations and by allowing associates the time to participate in the required activities (Soltani, 2005). Management support will also set the tone for having an organization with a change mentality and associates that do not fear change. The management team must work with the associates to create an environment in which there is a partnership and relationship that keeps communication open and makes sure that associates are not angry with management (Soltani, 2005). Associates' workloads must be based on sound analysis so that the work that they perform can be accomplished. This means giving all associates the proper training to perform their jobs and including them in decisions that can help make their jobs easier. The performance measurement system should be such that the associates understand how they can meet the stated goals. All of these reasons that hinder TQM implementations must be non existent for a program to be successful. One of these reasons, however, has the ability to help impact all reasons stated, and that is lack of management involvement. The researcher believes more research is required to understand this item. Therefore, this dissertation utilized research to help understand management involvement and how it links to the success of an organization. Peon-Escalante et al. (2008) assert that the lack of senior management support on major initiatives like TQM leads to failure. Sila and Ebrahimpour (2003) define top management commitment as the most critical factor in implementing and sustaining TQM.

Reasons for Low Involvement of Top Management

Soltani et al. (2005) found that the CEO and the management team with low commitment is a threat to the success of TQM. The reasons for the low commitment to TQM by top management are as follows according to Soltani et al. (2005):

1. lack of knowledge about TQM
2. ineffective internal communication between management and employees
3. low engagement of other levels of management within the organization
4. mobility of management
5. not taking risks and making radical changes through the TQM initiative

Low awareness of TQM by senior management makes management less or not committed to TQM implementation, which leads to ineffective results (Soltani et al., 2005). If employees see that top management is not interested in TQM, then they will not be committed to the initiative either (Soltani et al., 2005). "As a consequence of a lack of sufficient training of TQM techniques, it is argued, people will resist or at least be less committed to any change inititives" (Soltani et al., 2005, p. 1016). When communication between management and employees does not occur, the management team will not be able to communicate the TQM initiative. Low management involvement and inadequate management systems can lead to failure in as many as 85% of companies (Jahen, 2000). This research will give a perspective on whether this is true.

The mobility of top management has also been defined by Soltani et al. (2005) as a major reason for low commitment to TQM by top management. In today's economy, CEOs are replaced often in less than two years, and this leads CEOs into not supporting initiatives such as TQM (Soltani et al., 2005). It has been found by Soltani et al. (2005)

that this problem exists even in non-profit organization represented by the government. The lack of stability in management causes companies not to make improvements in their systems, and this mobility of management is considered by Deming a deadly sin for business (Soltani et al., 2005).

According to Soltani et al. (2005), CEOs may avoid taking risks and making radical changes because they are afraid that it may cost them their jobs. "As the problems facing TQM organizations have deepen, instead of adapting effectively to TQM initiatives, the CEO and his or her senior management team will focus on easier things to do" (Soltani et al., 2005, p. 1017). By not taking risks and making radical changes such as implementing TQM, CEOs and senior management have a poor track record. When companies are not achieving success to the level required to compete in the global economy, senior management must implement proven strategies such as TQM to improve their success levels. This research is needed to give CEOs and other management members some data that shows that management involvement can make a difference in the level of success obtained by the organization. This can help CEOs better make decisions on why they should make improvements and not be afraid of being replaced.

Confirmation of Defects Per Million Improvements

Quality culture has emerged in areas other than the industrial sector over the last five years and has achieved adequate results in financial services, education, social services, and health care (Saizarbitoria, 2006). According to Saizarbitoris (2006), a world quality management system called ISO 9000 has been a common system for all countries to use in an effort to drive their quality management system (QMS)

(Saizarbitoria, 2006). Experts indicate that the ISO 9000 standard helps companies have better control over their operations and improved quality of products and services (Saizarbitoria, 2006). "Another important effect that ISO 9000 certification produces on company results consists of an improvement in the brand image offered by the company" (Saizarbitoria, 2006, p. 786). Companies that have used TQM or ISO have shown a marked decrease in the number of customer complaints (Saizarbitoria, 2006).

Confirmation of Profitability Improvements

Experts disagree on whether TQM produces desirable results. According to Saizarbitoria (2006), the profitability of a company improves after implementing TQM. This increase in profitability is linked to an improved attitude of the workers because they are more motivated to detect and solve problems. On the other hand, there are some such as Yeung, Cheng and Lai (2006) that say TQM programs fail to give companies competitive advantages. Ciptono (2005) believes that TQM implementation leads companies to confront quality issues that can help them achieve world class standards and operational excellence.

From a theoretical view, TQM, once implemented, will help a company become successful. However, not all companies have been successful with TQM implementation. After reviewing literature for this study, the researcher has not found data that makes a strong link between top management commitment level for TQM implementation to achieving lower defect and higher profitability rates. This is the reason additional research is required to review if TQM makes improvements for companies in this competitive economy.

Implications for Future Research

This literature review has discussed many concepts that build TQM. The TQM process utilizes all these concepts to create an atmosphere that industries can use to continuously improve. This study reviews companies that have implemented the concepts of TQM. The information that is generated in this study may lead to the need for future research in the field of TQM to help define how a company should implement TQM. It is necessary for companies to properly implement this process in order to maximize the results.

Conclusion from Seminal Theorists

All eight seminal theorists believe that an organization must work towards continuous improvement and management involvement. Continuous improvement motivates a company to always challenge themselves to be better. Even if the company is the best in its market, it must continue to look for ways to become better, or it may lose the competitive advantage that it carries. Management involvement is the way organizations can motivate all employees to perform at their best. The management team can understand the state of the business if it is involved on a daily basis with all employees. The management team can help employees see the benefit of TQM programs by working hand in hand with the employees and displaying that this process is a long term solution to help make everyone's job more effective and efficient. In a TQM process, it is important everyone understands that flexibility is necessary so that a company can meet customers' changing needs. These seminal leaders all understand that continuous improvement and management involvement are the fundamentals to having a

successful quality program. This research will focus on why management does or does not become involved with TQM programs.

Sampling

The sampling for this study will be defined in detail in Chapter 3. The sampling plan will include both manufacturing and service companies. The focus of the study will be regional. A regional study will be conducted to help companies in a certain region understand some potential benefits that they may receive by keeping top management involved in the TQM programs. Deming (1986) concludes that top management involvement is critical to the success of the quality program.

Research Methods

The research design and methodology will be reviewed in detail in Chapter 3. This study is quantitative, and a survey will be used for the quantitative portion of the study. The quantitative study will allow the researcher to work with numerical data.

Overall Results

The results of this study will be presented in Chapter 4. There have been similar studies performed on the subject of TQM. The researcher has not found a study exactly like this one. Other studies indicate that TQM failures may be the result of the lack of management support. In this study the researcher will link management support in TQM programs with profitability and quality levels. These results will be conducted to gain information that can be added to the "Body of Knowledge".

Chapter Summary

TQM is a way to empower the workforce, which can drive an organization towards operational excellence that includes low defect and high profitability rates. The eight seminal theorist and eight focus areas for quality improvements have set the stage for organizations to utilize a process called TQM. Many items have been identified as problems that lead to poor TQM implementation, but from the literature review, it is the lack of top management involvement or commitment that has been the biggest reason for failure and poor results yielded by TQM implementation. In order to make a strong case for this, additional research is required and this dissertation offers some research on this subject.

CHAPTER 3. METHODOLOGY

The purpose of this study is to determine whether high commitment levels from management for TQM implementation lead to low defect and high profitability rates. To do this, it is necessary to understand reasons why TQM implementation fails and to analyze data and determine from the research the biggest reasons for failure of TQM. This study will be conducted on a certain sample and further study may be required. This study will perform research in an attempt to understand why low commitment levels in management exist for TQM implementation. A survey will be administered to obtain quantitative data to determine reasons for low management commitment. The relationship between the level of top management commitment found in TQM will be measured to note what differences are seen in defect and profitability rates.

This research utilizes the analytical approach. The analytical approach for this study utilized survey data to show if improvements can be made to the system with top management support. The rational and system approaches were utilized to make the knowledge creation complete and reality was defined by using the analytical approach.

The analytical approach was used to research the issues of improving quality and profitability in organizations. Analysis was performed from seminal theorists' works to define techniques that companies can use to improve their quality. A system approach to controlling quality is presented, and the system includes a quality management system and TQM. TQM focuses on making system improvements that will guide the performance of the organization. People are a very important component of any system, and this research focuses on understanding people. Humans drive an organization and

must be treated with respect and held accountable so that good results will occur (Sanford, 2003). Research on improving communications and the structure of the quality management team was used to show how to improve quality. As quality is improved, the COQ should be reduced, lower defects produced and higher profits achieved.

This study required data to be gathered on key variables that will give concrete and measurable results. The key variables are defect levels, customer satisfaction, profitability, cost of quality, commitment level of management to TQM, commitment level of other employees, and words versus actions. These key variables will support the purpose and answer the research questions of this study by showing the importance of top management involvement in the TQM strategy. The key variables will make a link between top management commitment level to TQM and the level of quality and profitability produced.

The design included companies from three organizational models; the models are rational, natural, and open systems. Scott and Davis (2007) note that the three paradigms partially conflict, partially overlap, and partially complement each other. Kuhn (1996) notes that the paradigms are closely related to normal science. Kuhn's definition of normal science includes law, theory, and application (Kuhn, 1996). The three paradigm models, along with law science, theory, and applications, are responsible for promoting business success in today's environment. TQM is the theoretical portion that the companies use in this study to strive for operational excellence.

Research Design

The research design will be quantitative, and the quantitative study used statistical analysis to analyze the data. The data was gathered from random employees, and it included some questions that obtain pretest data showing the profitability and defect levels before TQM was implemented. A pretest is used to gather data on the subject (Swanson & Holton, 2005). The design included a time series, and the time series includes monitoring the profitability and defects over time (Swanson & Holton, 2005). The time period that data was gathered in this study represented a company's defect and profit levels over many years. This study determines whether a high commitment level from top management for TQM implementation achieves lower defect and higher profitability rates. The profitability will be reached by having less scrap, and the defect reductions will lead to fewer customer complaints, and thus will reduce the cost of quality. Statistical techniques were used to describe, compare, associate, predict, and explain the connection of profitability and defects with TQM. The standard deviation was used to define and describe how much variation is seen from the mean changes of the key variables (Swanson & Holton, 2005). Statistics were used to compare the relationship of the variables. The study includes companies that manufacture or provide services, and the data will be broken into two main categories. The first category is the level of quality and profitability the companies had without management commitment to TQM. The second category is the level of quality and profitability for companies with management commitment to TQM. The survey has questions that ask for data both prior to implementation and after implementation of TQM. A quantitative study is appropriate for

this research design because the measurements of quality and profitability levels are factual numbers. The level of management commitment can be measured with a number.

The research question is bridged through the social science paradigm of reality as a concrete determining process. TQM leads to reality that is concrete and a level of quality that can be measured and observed. Quantitative data will define if a company is successful in the level of defects and profits produced. Defects and profits are measurable, and a customer can clearly measure the number of defects and amount of profits that it may receive. The reality of TQM produces key variables that are concrete and objective. Management commitment is measurable, and the level of commitment that management gives to TQM can affect the level of profitability or quality level. The reality is quite predictable and can be determined by the environment or management participation level.

Effective TQM practice may be addressed in a company that has organizational commitment to each of the principles and concepts of TQM. The principles of TQM include pleasing the customers, managing by facts, people based-management, and continuous improvement (Kanji & Asher, 1993). A company that employs these principles will create a product with low levels of defects. A defect level of less than 3.4 parts per million defines a company at a Six Sigma level with effective TQM practices. The outcome will be known by the level of defects produced. Zero defects leads to 100% customer satisfaction for quality. This also leads to improved profitability levels.

This research will be based on information that can be measured through quantitative data. As pointed out by Arbnor and Bjerke (1997), reality is perceived as

tangible, concrete and real. The researcher used the following criteria to align to a paradigm:

1. Understand if the research issue can be measured.
2. Understand if the research issue is related to a subject on mankind or humanity. This paradigm is about the basic need to survive (Arbnor & Bjerke, 1997).
3. Understand if the research issue is related to information or goals.
4. Understand if the research issue is related to a system, and utilize situations to base the outcome for similar situations.
5. Understand if the research deals with flow charts and surveys. The need to understand the process or method makes up this paradigm (Arbnor & Bjerke, 1997).
6. Understand if the research deals with a person. The belief is that individuals are creative and are able to create knowledge (Arbnor & Bjerke, 1997).

Research is essential so that new knowledge may be added to our society. Swanson and Holton (2005) define research as an orderly investigative process that works toward a specific outcome. The outcomes from research help organizations become better prepared to compete in the marketplace; research findings are used by organizations as evidence of a need to make major changes. In today's marketplace, a central issue is organizational change; organizational change allows new knowledge to shape organizations, and this allows a society to move to more advanced levels. Changes in organizations are driven by new Internet capabilities, increased globalization, changes in industry growth rate, changes in purchasing and use of the product, product innovation, technological change and manufacturing process innovation, marketing innovation, and

product innovation (Thompson, Strickland & Gamble, 2007). TQM demands organizations be able to adapt to change at a rapid pace, and organizations demand an effective approach to handling change (Worren, Ruddle & Moore, 1999). According to Holt, Armenakis, Field and Harris (2007), organizations must be ready for change before change can be implemented, and the leadership team must be committed to these changes, and the change must be beneficial to the organization. Theorists and researchers use three main methods to conduct research. The three main methods of research used by researchers are qualitative, quantitative, and mixed, and each method offers benefits to the researcher (Swanson & Holton, 2005). This dissertation used the quantitative method approach.

Quantitative Background

Many researchers find the quantitative method of research to be more robust than other methods (Shah & Corley, 2006). Zikmund (2003) asserts that quantitative research determines a quantity or information that is numerical. Quantitative methods may be experimental designs or nonexperimental designs (Zikmund, 2003). Swanson and Holton (2005) say that appropriate nonexperimental designs are surveys, correlational data, developmental information, descriptive details, and Delphi process.

According to Swanson and Holton (2005), the nonexperimental design uses current situations in a certain category to study a phenomenon. This type research can be used in situations where it is not practical to perform a true experiment, variables are too numerous to control, or there is a need for descriptive quantitative data (Swanson & Holton, 2005). Surveys are used to gather information on participants in order to understand the participants' attitudes or behaviors (Cooper & Schindler, 2006).

Descriptive research is used to portray characteristics of a population. Descriptive research is factual and answers who, what, when, where, and how (Zikmund, 2003). Descriptive statistics show frequency distributions and use measures of central tendency and other measures to describe a sample or population. An example of descriptive studies describing a population would be to use height, race, and gender to describe the populations in a study (Swanson & Holton, 2005).

The quantitative method is able to compensate for the weakness of the other methods such as qualitative (Onwuegbuzie & Leech, 2005). Srnka and Koeszegi (2007) recommend that quantitative research be used when numbers are required to display the data. According to Cooper and Schindler (2006), the quantitative method is a sound approach to research. According to Luana-Reyes and Andersen (2003), an observation is a technique that should be used while gathering data. The data from the observations may need to be categorized and coded by the researcher (Kitchener, Beynon & Harrington, 2002). This prevents confidential information from being placed in the research. Research adds new knowledge to our society such as being used to make improvements in social and educational programs through a framework that utilizes understanding and communication (Hadar & Soffer, 2006).

Population

The population for this study is members of SME that are manufacturing and service companies which attempted TQM implementation. SME members include members to the organization, exposition attendees, SME continuing education events, magazine subscribers of Manufacturing Engineering, conference attendees, and book and

video buyers. The entire population will not be surveyed in this study. A sample of 5,500 people will be surveyed to represent the population. The sample will be from companies in the SME chapter located in the southeast region of the United States of America. The research methodology involves gathering information on these companies' TQM efforts through quantitative surveys. These members will be given a 38 item survey that includes questions that determine the level of top management commitment. The survey will also ask questions related to background information of the respondents and why low levels of commitment exist as it relates to defect and profitability rates.

A pre-test study was conducted for the survey and questionnaire. A group of 25 employees at a manufacturing and servicing company completed the surveys. During the pre-testing, it was determined that a few questions needed to be rewritten in order to be clearer. These changes were made, and the instruments are considered complete. It also was found by the 25 respondents that the survey takes 10 to 15 minutes to complete. It was indicated that the questionnaire or interview could be conducted in 10 minutes. After further analysis, it was determined that the questionnaire was not necessary for this study. All respondents found the instruments to be understandable and meaningful. Based on the pre-test, the survey instrument is considered acceptable to use for the actual research. A pilot study was conducted to verify the results of the pre-test, and these results will be presented later.

Sample

The participation in this study was voluntary, and the results will be kept anonymous. The dependent variable in this study is the responses to the survey and the

independent variables are the commitment of top management, defect, and profitability levels. The sample size will be developed based on the population. Sternstein (1996) recommends that the sample size be at least 30 from the population. Swanson and Holton (2005) recommend 10 observations for every independent variable. This study has three independent variables; therefore, a sample size of 30 would be adequate. The surveys for this study will be distributed to 5,500 individuals that work in various industries. The 5,500 individuals will be representative of the membership in the southeast of the United States of America for SME. SME corporate headquarters granted approval to distribute the surveys through Survey Monkey. Survey Monkey will only allow one response per respondent by utilizing a cookie on each respondent's computer. This eliminates replication in the survey. The researcher will not be able to determine the name of the respondents that do reply to the survey, and this eliminates researcher bias. These industries will include automotive, aerospace, industrial, and service related companies. It is expected that approximately 4% of the people will respond to the survey. Therefore, 200 surveys are expected to be returned because not all people will return the surveys. This number meets Sternstein's (1996) minimum of 30 and Swanson and Holton (2005) requirement of 30. The numerical calculation for sample size with a z-score of 1.96, confidence level of 95%, confidence interval of 2 computes a sample size of 97 to 217. If a sample size of 100 is achieved, then the sample size will be considered acceptable. The 100 people sample meets the 30 people minimum requirement. The focus of this survey was on the manufacturing and service sectors of the industries listed above. This focused the study and allows data to be available for the manufacturing and service sectors.

Setting

The setting for gathering data will be through an internet based survey with SME members. The survey will be conducted through Survey Monkey.

Instrumentation / Measures

The study will utilize the quantitative method. The study will be survey based with measurements for defect and profitability levels obtained from the companies that are being evaluated. The survey includes four sections. The sections are background information, top management, defect level, and profitability. The background section will consist of eight questions. These questions gain background information on each respondent. The top management, defect level, and profitability sections consist of thirty questions that focus on determining the reason why management may or may not support TQM and whether the companies surveyed are achieving low defect levels and high profit levels. See appendix B. The questions are broken into two parts; 15 of the questions determine the level of support from top management, and 15 questions determine if the company has low defects and high profits. The questions that focus on defect and profitability levels are broken down into two sub categories. One sub-category consists of seven questions that focus on defect levels and the other sub-category consist of eight questions that focus on profitability levels. The respondents answer 28 of the questions with a 5- point scale as follows:

(1 = strongly disagree, 2=mildly disagree, 3=neutral, 4=mildly agree, 5=strongly agree)

Two of the questions were based on a yes and no answer and the scale for these two questions are as follows:

(1=yes, 2=no)

This study included manufacturing and service companies. The research questions and hypotheses used in this study are as follows:

Research Questions

Have TQM implementations that had a strong top management commitment resulted in lower defect rates among members of SME in the United States of America?

Have TQM implementations that had a strong top management commitment resulted in higher profit rates among members of SME in the United States of America?

Hypotheses

(W – With, WO – Without)

H1 Null: A strong top management commitment when implementing TQM does not positively affect profitability levels.

$H1_0$ $Profit_W <= Profit_{WO}$

H1 Alternative: A strong top management commitment when implementing TQM positively affects profitability levels.

$H1_A$ $Profit_W > Profit_{WO}$

H2 Null: A strong top management commitment does not result in an increased output quality level.

$H1_0$ $Quality\ Level_W <= Quality\ Level_{WO}$

H2 Alternative: A strong top management commitment results in an increased output quality level.

$$H1_A \text{ Quality Level}_W > \text{Quality Level}_{WO}$$

Data Collection

The data was collected through an internet survey from SME members in the southeast of the United States of America. The surveys were e-mailed to SME members with a link to the Informed Consent Form and the survey. Each member had only one chance to submit the survey. The surveys were verified by the program that runs the survey data so that no participant completed more than one survey. The data was exported to a statistical database to perform the statistical analysis.

Treatment / Intervention

This study does not include any intervention. This study was nonexperimental.

Data Analysis

The Statistical Package for the Social Sciences (SPSS) software was used to analyze the quantitative data. The variables are independent and dependent. The dependent variable in this study is the item that is being studied (Quarterman, Pitts, Jackson, Kim & Kim, 2005). The independent variable is the item that can be measured and is considered to be related to the dependent variable (Quarterman et al., 2005).The independent variables in this study will be defect and profitability rates, and management commitment is a categorical independent variable. The responses to the survey will be the

dependent variable. A relationship between the reasons for poor implementation and defect and profitability rates was established. The relationship described above was studied through regression analysis and other statistical reviews performed inside SPSS. Descriptive statistics were used to show frequency distributions and measures of central tendency. The confirmatory factor analysis was used to understand the relationship between the observed variables and the latent variables (Wu, 2006).

The results of the research study will be published, but the information will be coded so that the identity of an individual or company will not be revealed. The data will be coded so that it does not show how it was collected. If a company's profitability rate is 40%, then the data will show that company x has a profitability level of 40%. This protects the company and the individual.

Validity and Reliability

The validity of the survey used in this study was defined by allowing seven professionals to evaluate the survey and questions for validity to determine if they would give the results that the research questions expect to obtain. Validity is understood as an instrument that measures what it is intended to measure (Swanson & Holton, 2005). The aspects of validity that were used to evaluate these instruments are face validity and construct validity. Face validity means that the respondents accept the questions and that the questions appear appropriate to the research. Based on analysis performed by experts, the survey and interview questionnaire both have outstanding face validity. As stated earlier, the interview questionnaire was not necessary in this study. The construct validity

evaluates the instruments and defines relationships for the data. The final communality estimates (FCEs), standard deviations, and correlation matrix were used to quantify and determine relationships for the validity of this study.

A study must be reliable before it can be considered valid. Reliability is defined as consistency (Swanson & Holton, 2005). There are three types of reliability; these types are test-retest method, alternative form method, and internal consistency method (Swanson & Holton, 2005). The internal consistency measure is known as the Cronbach's alpha method. This method is used in many studies that are conducted by professional researchers (Swanson & Holton, 2005). Cronbach's alpha method was used in this study.

This study includes a cross section of businesses that make the results reliable. The businesses are from different industries in the manufacturing and service sectors. The face validity was determined by seven professional experts in the total quality management field with combined quality experience of 138 years. The experts were requested to review the instruments and determine if they measure top management involvement and make a link to defect and profitability levels. Each expert stated the number of years that they have worked in the quality field, and they defined their current position. The seven experts all agreed that these instruments will indeed meet the measurement requirements for this dissertation. The completed evaluation forms by the experts that agreed to allow the form to be published are located in Appendix C. The construct validity was determined by the relationships of the data through statistical tools.

Cronbach's alpha was used to obtain a numerical value that shows that the study is reliable. This exhibits reliability of this study. According to Norusis (2006), a Cronbach's alpha of $> .70$ is acceptable, but a value $> .80$ is considered a better value.

Cronbach's alpha in the pre-test study was > .80 at a value of .974. A pilot study was also conducted for this survey.

Pilot Study

The Cronbach's alpha completed for the pilot study consisted of 51 people from the researcher's personal contact list, and these individuals are similar to the SME group that the final survey was conducted on. The time to complete the survey did not exceed 15 minutes. There were no modification requests from the respondents to the survey. Based on these findings, the researcher believes that the survey is clearly defined and understandable. The Cronbach's alpha was > .80 on all the factors, which are management commitment, defect, and profitability levels. The overall Cronbach's alpha was .903 for the pilot study. This is greater than the minimum of .70 and the instrument is considered to be reliable.

Ethical Considerations

The Institutional Review Board (IRB) guidelines were used in this study and the required training was completed by all required members of the committee for this dissertation. Ethical research will ensure that the subjects are not exposed to anything harmful, and the information in this research will be properly cited and carried out in an honest manner.

CHAPTER 4. RESULTS

Summary of Research Design and Methodology

This study was conducted using a survey that was sent electronically to 5,500 SME members in the Southeast area of the United States of America. The survey yielded 222 responses, which is a responses rate of 4%. This response rate was greater than the minimum of 30 responses and is considered sufficient for this study. The data was statistically evaluated with SPSS Version 15.0. The results will be presented in this chapter, and the interpretation of the results will be shown in Chapter 5.

A summary of statistics will be presented that gives details on the mean and standard deviation for the variables. The background information about the respondents will be presented to define the sample that was chosen for this study. Next, management involvement details will be presented to show the level of commitment from management. Next, defect level data will be shown to display the level of defects that the respondents were producing in their organizations. Profitability graphs and details will be displayed to depict the level of profitability seen at the respondents' organizations. Next, factor analysis details will be shown to determine the key factors for this study. The final communalities will be displayed to show the extraction values. Next, R-square will be displayed for the variables, and a chapter summary will be presented.

These details will be used to perform the analysis of the results that will be shown later in this dissertation. All variables used in this study were defined as being reliable through Cronbach's alpha. The Cronbach's alpha for this study was greater than the .70 minimum. The actual Cronbach's alpha was .875, and this was performed on the

222 respondents of the actual study. This allows this study to be considered reliable and to offer new knowledge to be used to make improvements in society.

Summary Statistics

In this study, there were some questions that were worded in a reverse manner. This was incorporated into the survey to detect if the survey was being answered without being fully comprehended. The two questions that were reversed have been compensated and changed to be consistent with all other questions. The means and standard deviations for the dependent variables are shown in Table 1, and Table 2 shows this information for the independent variables.

Table 1

Means and Standard Deviations of the Dependent Variables (Responses)

N= 224

Statement	Mean	Standard Deviation
Top Management Sets Clear Goals	4.1667	1.0439
Top Management Provides Appropriate Resources	3.6577	1.2727
Top Management Coaches	3.5450	1.24590
Top Management Involvement in Quality	3.7883	1.20529

(Continued on next page)

Table 1 (Continued)

Statement	Mean	Standard Deviation
Top Management Performance Linked to Quality Goals	3.6667	1.20206
Top Management Turnover is Stable	4.0991	1.16086
Top Management Utilizes Team Approach to Set Goals	3.7117	1.22484
Top Management Says Quality is Everyone's Job	4.2883	1.03239
Top Management Includes Suppliers	3.6622	1.19134
Top Management Encourages Teamwork	3.8108	1.20342
Top Management Involvement Throughout the Organization	4.0541	1.1283
Employee Suggestion Program in Place	3.3694	1.34486
Teams Solve Problems	3.7297	1.21414
Employee Accountability	3.8559	1.20967
Employees Have Defect per Million Goals	2.5135	1.29995
Customer Scorecards Includes Defects per Million Goals	2.9459	1.38406

(Continued on next page)

Table 1 (Continued)

Statement	Mean	Standard Deviation
Customer Defines Defects per Million Goal	2.7568	1.33668
Top Management Communicates Profitability Data	3.5225	1.41323
Quality Goals Linked to Profitability	3.5946	1.24674
Profitability Rate Improved by Teams	3.9144	1.1040
Improvement Teams Document Events	3.1216	1.34413
Project Event Calendar Exists	3.1982	1.34413
Employees Understand Profitability	3.4144	1.32821

Table 2

Means and Standard Deviations of the Independent Variables

N= 224

Statement	Mean	Standard Deviation
Top Management Involvement Evident	4.0811	1.16227
Defect Per Million Acceptable	3.2072	1.30517
Defect Per Million below 20	2.9144	1.46354
Defect Per Million 3.4 or Less	2.4910	1.37443
Defect Per Million Rate above 20	2.8874	1.36899
Profitability Rate Meets or Exceeds 40%	1.6757	.46918
Profitability Rate Between 25% and 40	1.3739	.48492

Background Information about Respondents

Figure 2 shows that the majority of the respondents, 37.4% or 83, work for companies with fewer than 100 employees. The next highest was companies with greater than 800 employees at 25.2% or 56. Next, 16.2% or 36 responded with 100 to 200 employees.

Figure 2. Size of Organization
1 = Less than 100 employees
2 = 100 to 200 employees
3 = 200 to 300 employees
4 = 300 to 400 employees
5 = 400 to 800 employees
6 = Greater than 800 employees

Figure 3 shows that 79.7% or 177 of the respondents work in the manufacturing sector, and 18.5% or 41 work in the service sector. There were 1.8% or 4 respondents that work for both sectors.

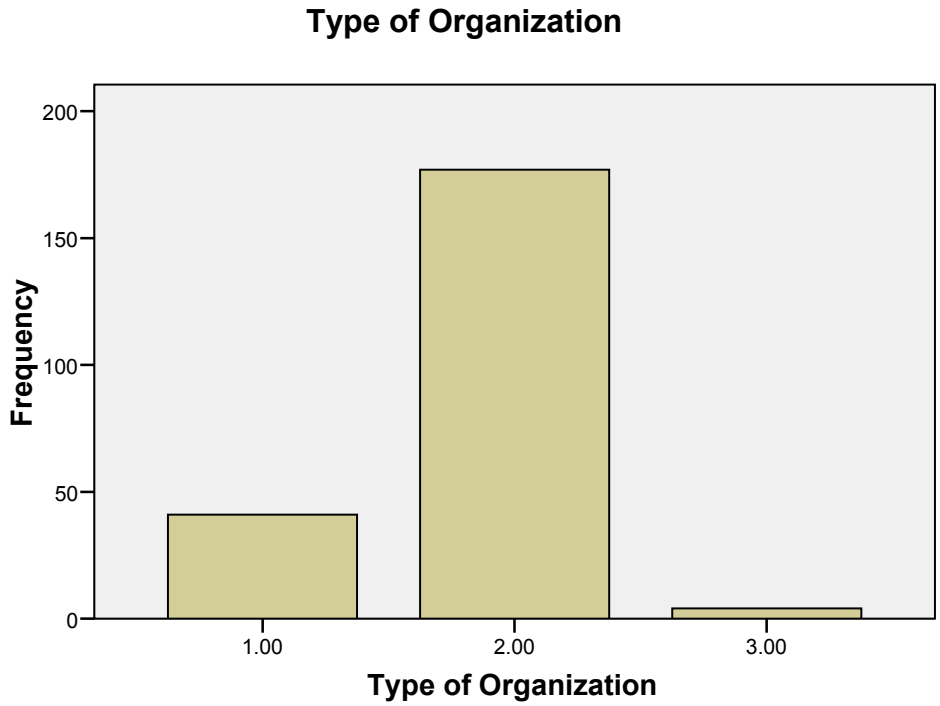

Figure 3. Type of Organization
1 = Service
2 = Manufacturing
3 = Manufacturing and Service

Figure 4 shows that the majority of the respondents are in an industry other than Automotive, Industrial or Aerospace and represent 34.2% or 76. Next, respondents from the Automotive and multiple industries are tied at 22.1% or 49.

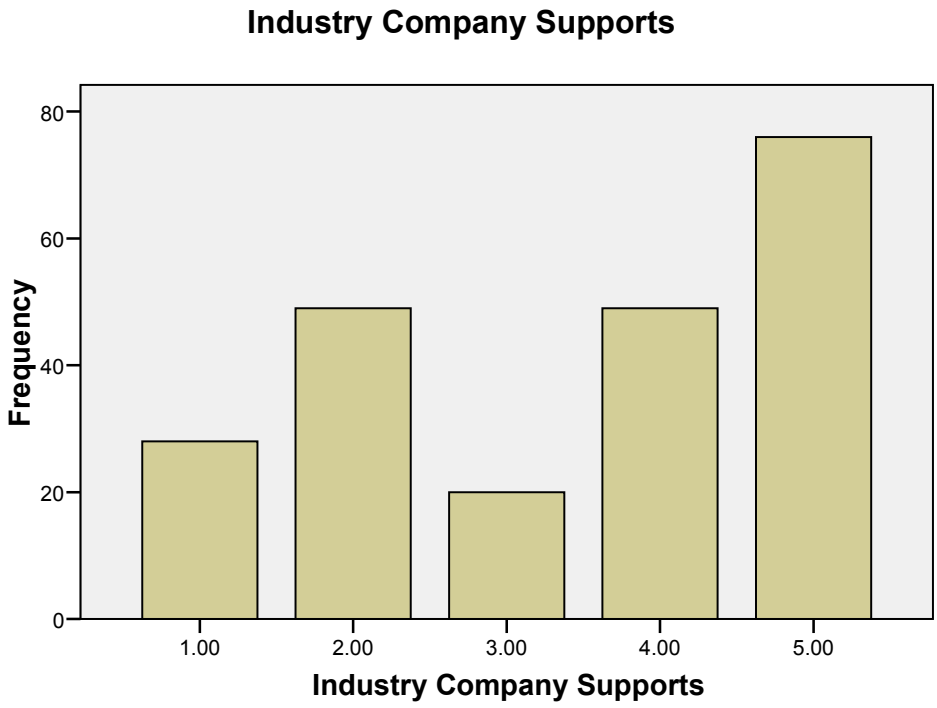

Figure 4. Type of Industry
1 = Automotive
2 = Industrial
3 = Aerospace
4 = Multiple industries (Automotive, Industrial, Aerospace, etc.)
5 = Other

Figure 5 shows that the majority of the respondents are Caucasian at 85.1% or 189, and the next biggest group was African-American at 4.5% or 10. There were 4.1% or 9 Hispanic respondents.

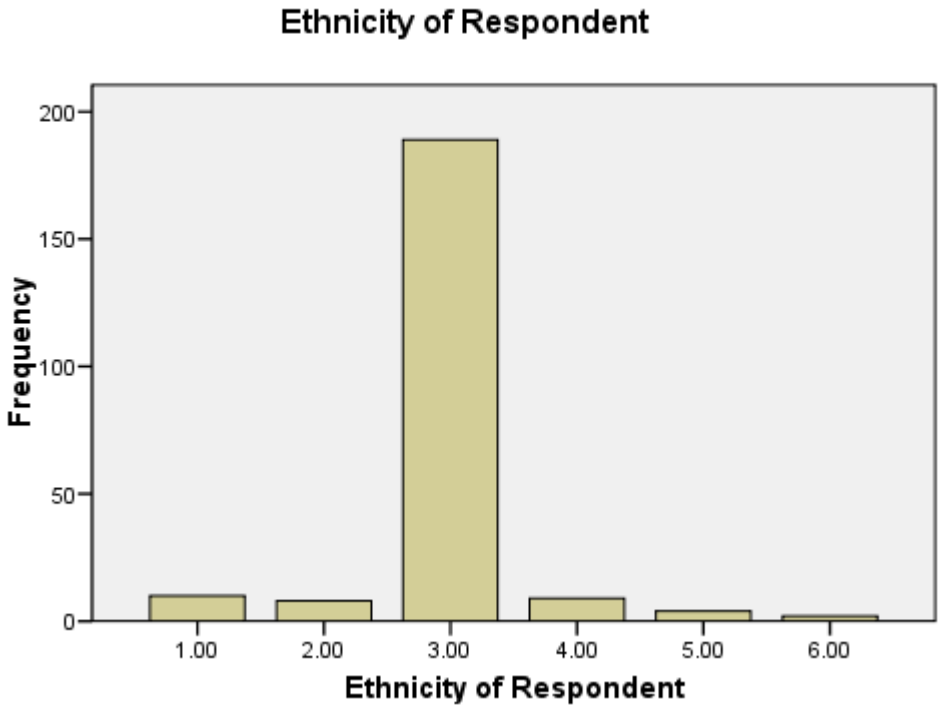

Figure 5. Type of Ethnicity
1 = African American
2 = Asian
3 = Caucasian
4 = Hispanic
5 = Other
6 = No answer

Figure 6 shows that the majority of the respondents have a Bachelor's degree at 48.2% or 107. Next, 23.4% or 52 of the respondents have Master degrees, and 10.4% or 23 of the respondents have Associate degrees.

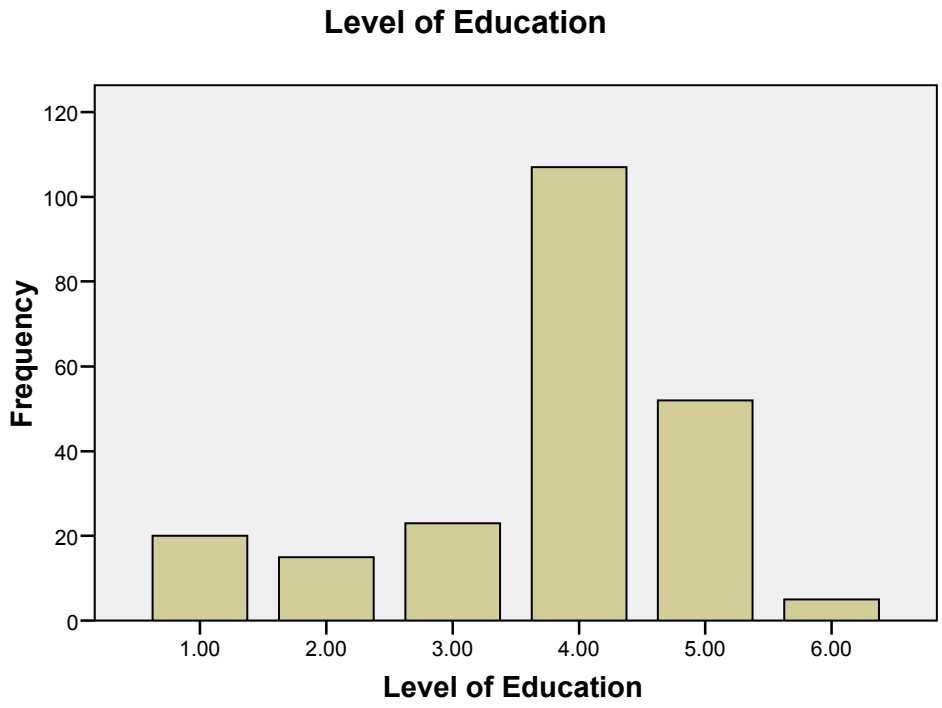

Figure 6. Level of Education
1 = High School graduate/GED
2 = Technical college
3 = Associate degree
4 = Bachelor's degree
5 = Masters degree
6 = Doctoral degree

Figure 7 shows that the respondents represent various job functions that include management, engineering, accounting, purchasing, and quality. The largest category is management at 59% or 131 respondents. Next, 25.7% or 57 of the respondents are engineers, and 4.5% or 10 of the respondents work in the quality assurance area.

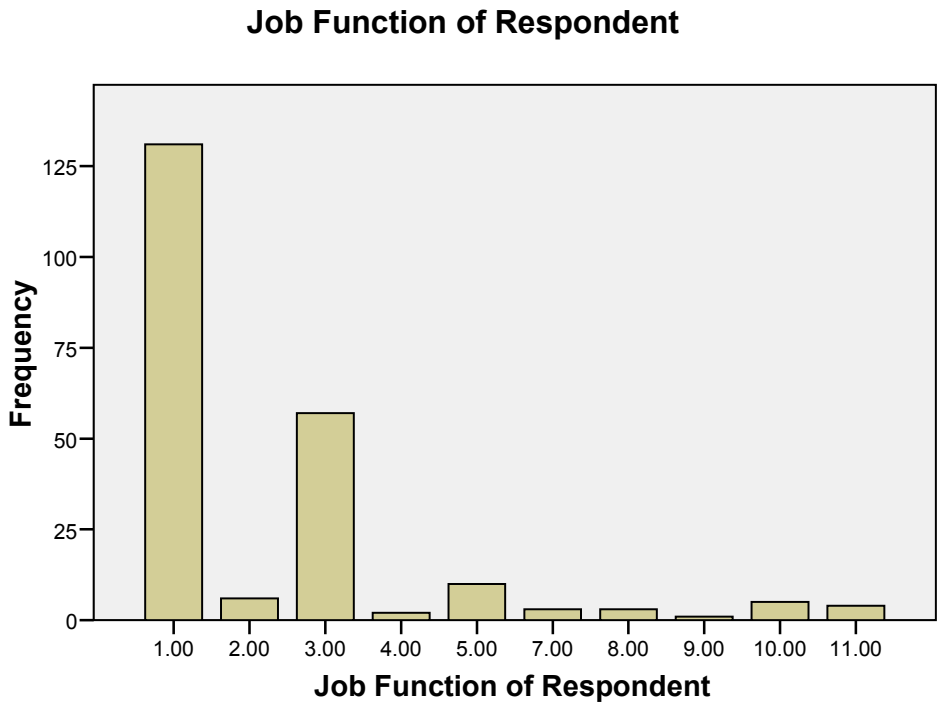

Figure 7. Type of Job Function
1 = Management
2 = Operative
3 = Engineering
4 = Production control
5 = Quality Assurance
6 = Clerical
7 = Accounting
8 = Information technology
9 = Human resources
10 = Manufacturing
11 = Maintenance

Figure 8 shows that the majority of the respondents are from middle management at 43.2% or 96. The next highest level was top management at 36.5% or 81, and 20.3% or 45 of the respondents are non-management.

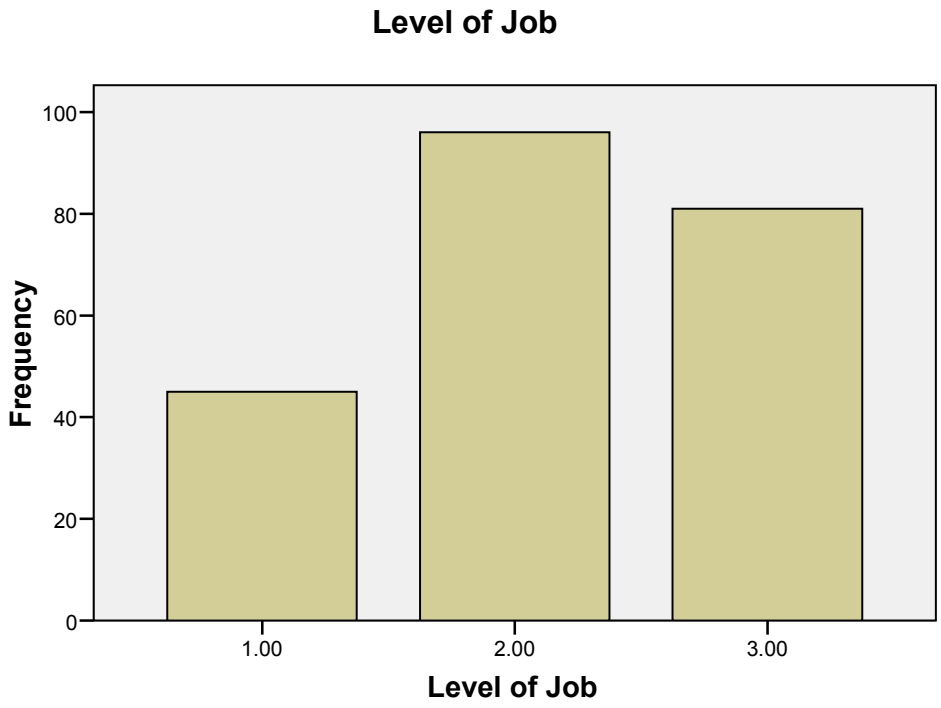

Figure 8. Level of Responsibility
1 = Associate or non-management
2 = Middle Management
3 = Top Management

Figure 9 shows that the majority of the respondents are male at 92% or 206. There were 7.2% or 16 female respondents.

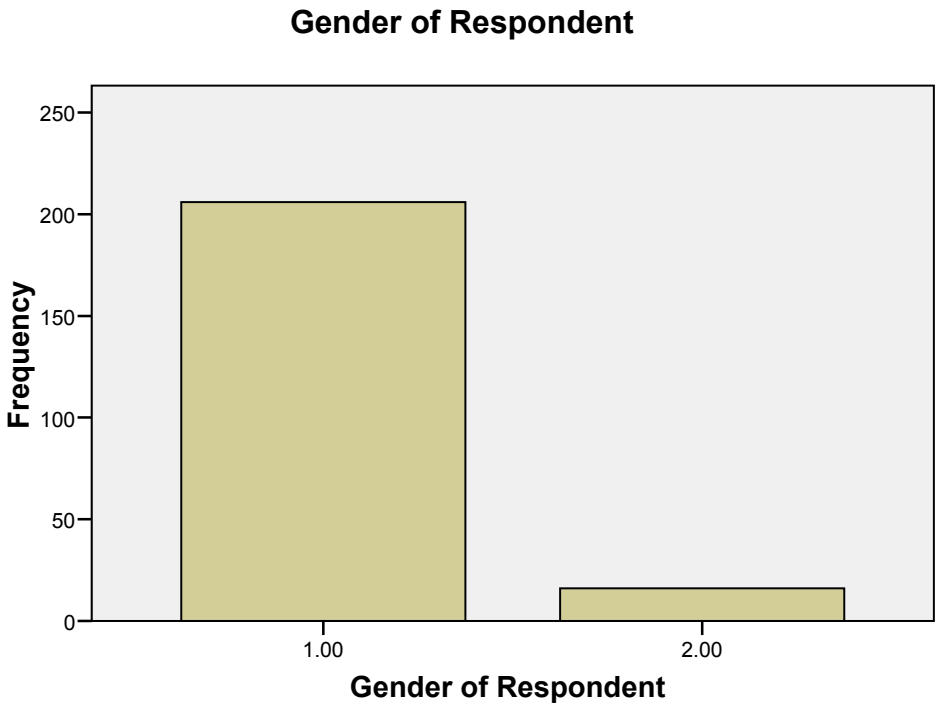

Figure 9. Gender
1 = Male
2 = Female

Top Management Involvement

When asked if top management involvement is evident each day, the majority of the respondents, 50% or 111, said that they strongly agree that top management involvement was evident. This can be seen in Figure 10. Next, 32.9% or 73 of the respondents mildly agree, and 9.5% or 21 of the respondents were neutral.

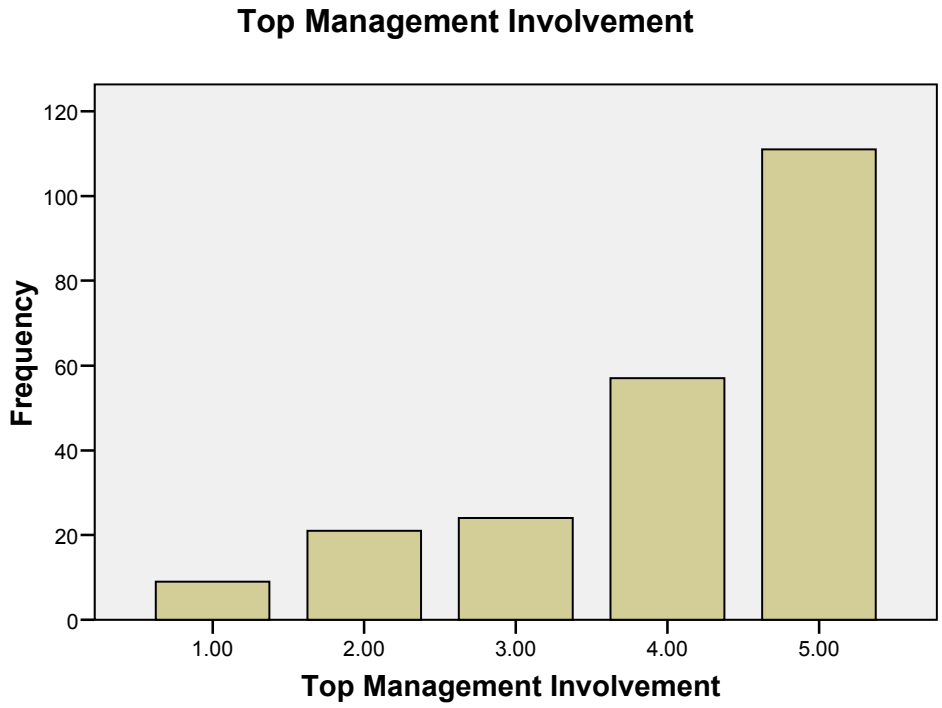

Figure 10. Top Management Involvement Evident
(1 = strongly disagree, 2=mildly disagree, 3=neutral, 4=mildly agree, 5=strongly agree)

As shown in Figure 11, 48.2% or 107 of the respondents strongly agree that top management set clear goals. Next, 32.9% or 73 of the respondents mildly agree, and 9.5% or 21 of the respondents were neutral on whether management set clear goals.

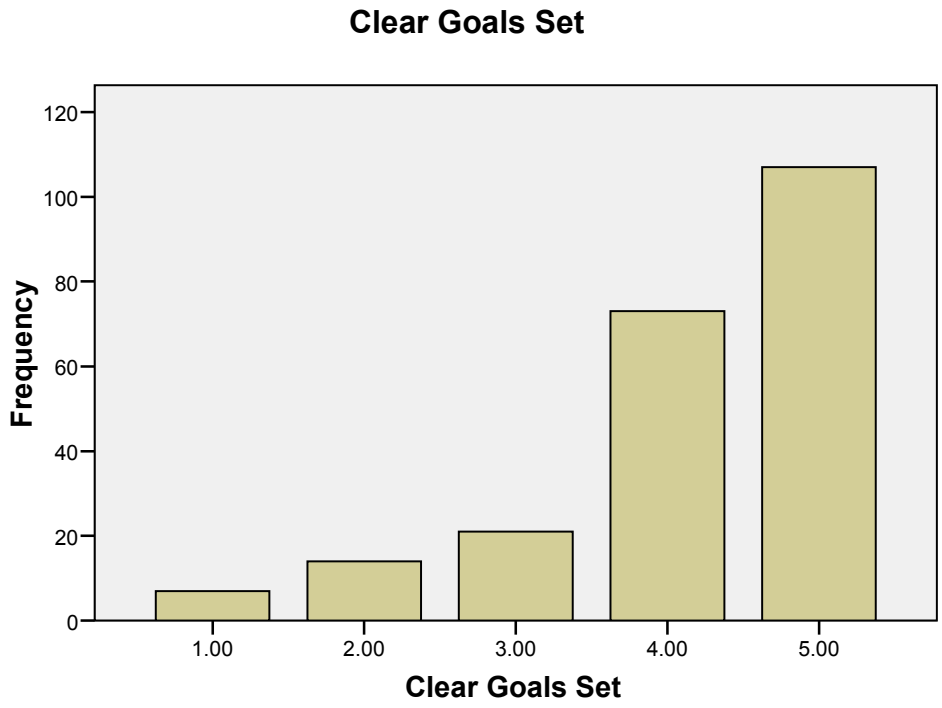

Figure 11. Top Management Sets Clear Goals
(1=strongly disagree, 2=mildly disagree, 3=neutral, 4=mildly agree, 5=strongly agree)

Figure 12 illustrates that 32.9% or 73 of the respondents mildly agree that top management provides the appropriate resources. These resources include money, time, training, and capital equipment. Next, 31.5% or 70 of the respondents strongly agree that the required resources are provided. Next, 14.9% or 33 of the respondents mildly disagree that top management provides the appropriate resources.

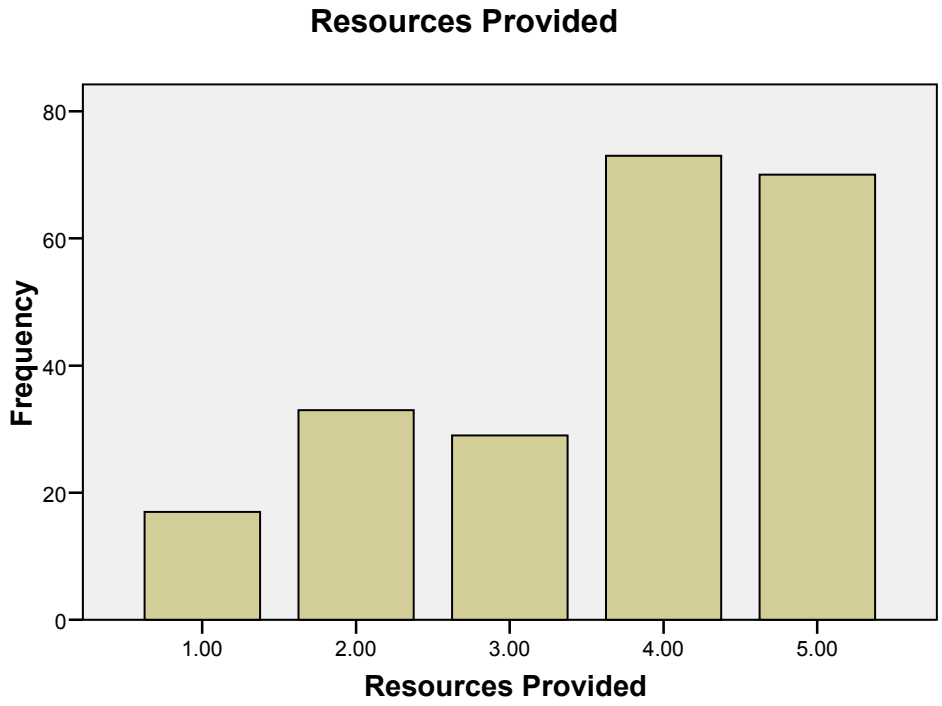

Figure 12. Top Management Provides Appropriate Resources
(1=strongly disagree, 2=mildly disagree, 3=neutral, 4=mildly agree, 5=strongly agree)

Figure 13 shows that the majority of the respondents, 34.7% or 77, mildly agree that top management coaches the employees, and 25.7% or 57 of the respondents strongly agree that top management coaches. There were 16.2% or 36 of the respondents who mildly disagree that top management provides coaching.

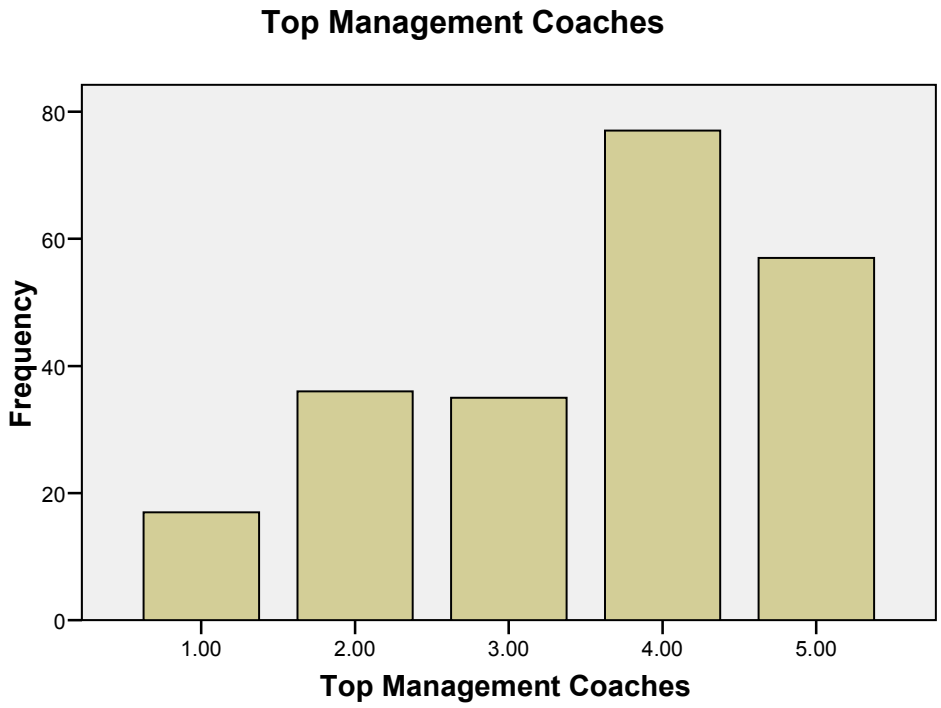

Figure 13. Top Management Coaches
(1=strongly disagree, 2=mildly disagree, 3=neutral, 4=mildly agree, 5=strongly agree)

Figure 14 below shows that 35.1% or 78 respondents strongly agree that top management is visible in the organization. Next, 32.4% or 72 respondents mildly agree that top management is visible; 14.0% or 31 of the respondents mildly disagree that top management is visible.

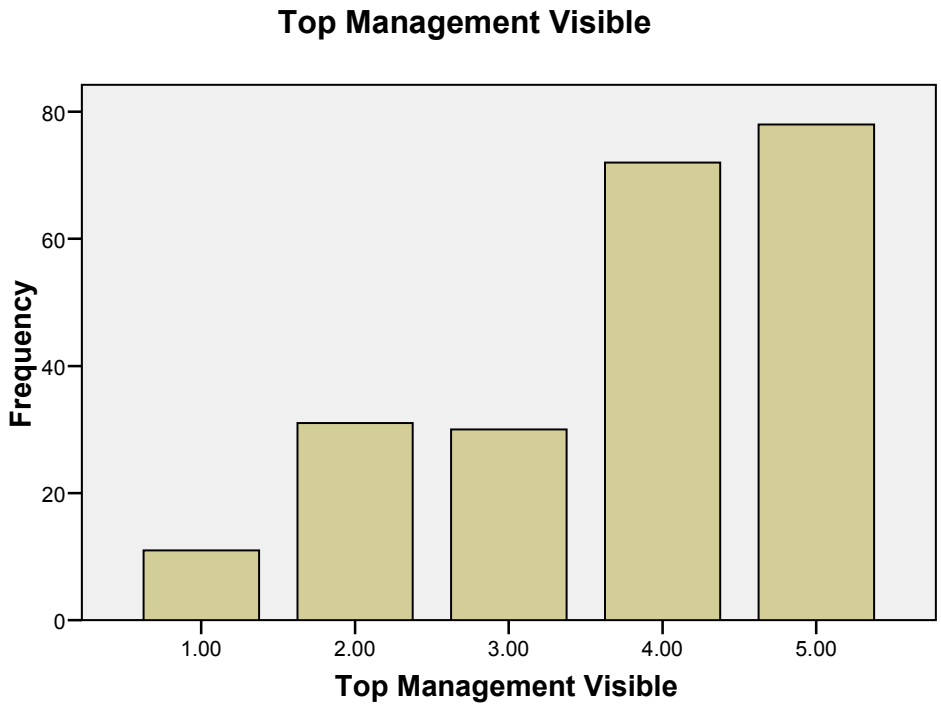

Figure 14. Top Management Involvement in Quality
(1=strongly disagree, 2=mildly disagree, 3=neutral, 4=mildly agree, 5=strongly agree)

Figure 15 shows that 31.1% or 69 respondents mildly agree that top management's performance measures are linked to quality. There were 35.1% or 78 of the respondents who strongly agree that a link exists between top management performance measures and quality. Next, 19.8% or 44 respondents are neutral on this subject.

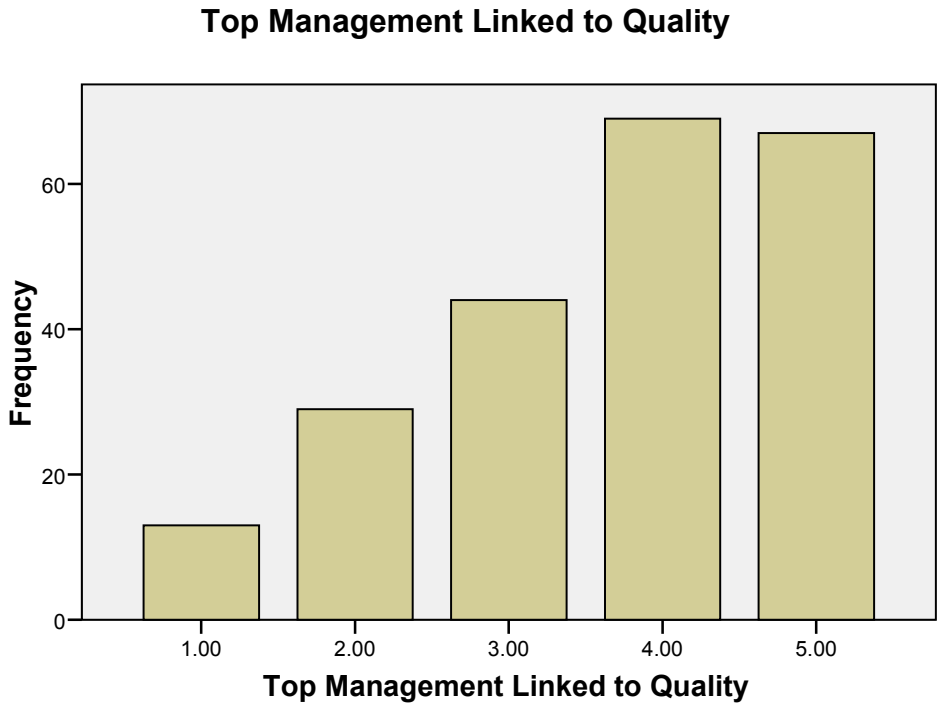

Figure 15. Top Management Performance Linked to Quality Goals
(1=strongly disagree, 2=mildly disagree, 3=neutral, 4=mildly agree, 5=strongly agree)

Figure 16 illustrates that 50% of the respondents strongly agree that top management turnover is stable, and 27.9% or 62 respondents mildly agree. This means that top management does not change jobs on a regular basis. Next, 9.0% or 20 respondents mildly disagree that top management turnover is stable.

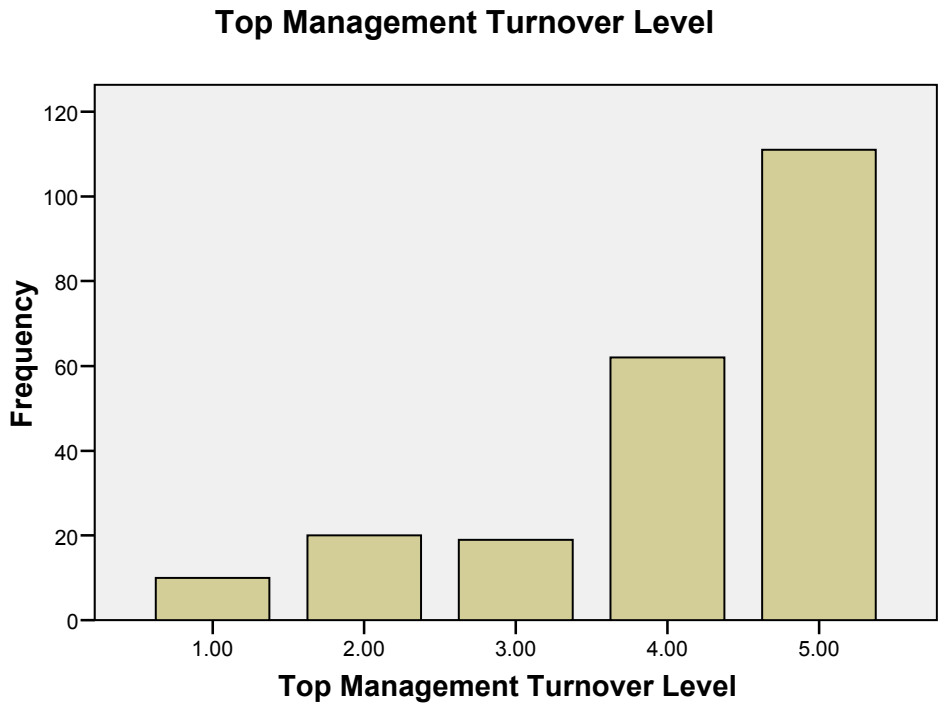

Figure 16. Top Management Turnover is Stable
(1=strongly disagree, 2=mildly disagree, 3=neutral, 4=mildly agree, 5=strongly agree)

Figure 17 shows that 36% or 80 of the respondents mildly agree that employees are included in setting quality goals. Another 31.1% or 69 strongly agree that employees are involved with the quality goals. Next, 14.4% or 32 of the respondents mildly disagree that employees are involved in setting quality goals.

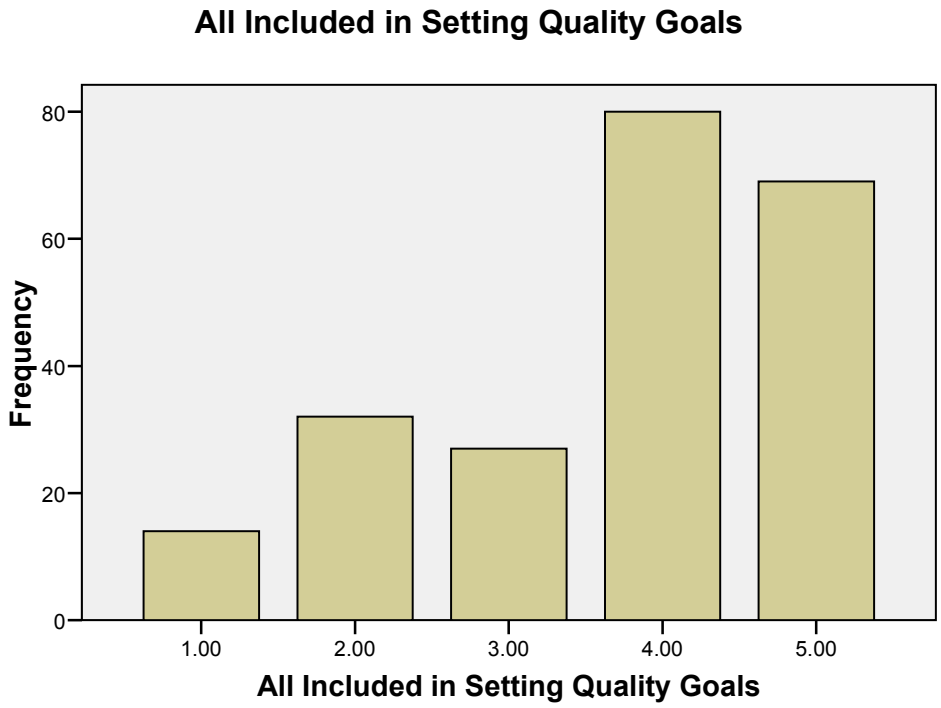

Figure 17. Top Management Utilize Team Approach to Set Goals
(1=strongly disagree, 2=mildly disagree, 3=neutral, 4=mildly agree, 5=strongly agree)

Figure 18 illustrates that 57.7% or 128 of the respondents strongly agree that quality is everyone's job, and 24.8% or 55 respondents mildly agree; 9.0% or 20 respondents were neutral on this item.

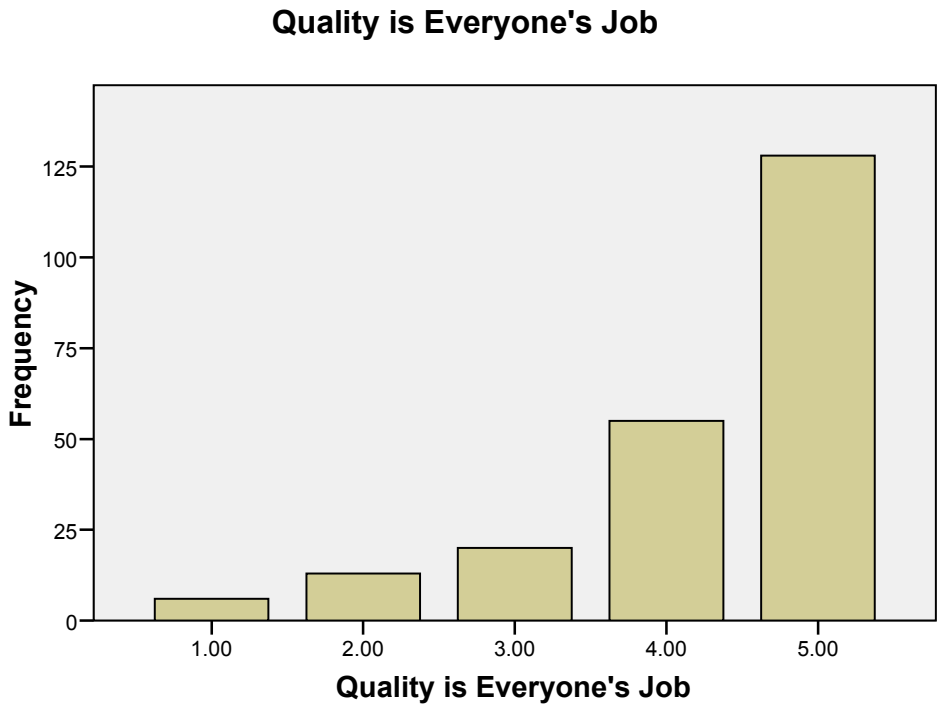

Figure 18. Top Management Says Quality is Everyone's Job
(1=strongly disagree, 2=mildly disagree, 3=neutral, 4=mildly agree, 5=strongly agree)

Figure 19 shows that 37.4% or 83 of the respondents mildly agree that suppliers are included in the TQM process, and 27.5% or 61 respondents strongly agree. Next, 14.9% or 33 respondents were neutral on this item.

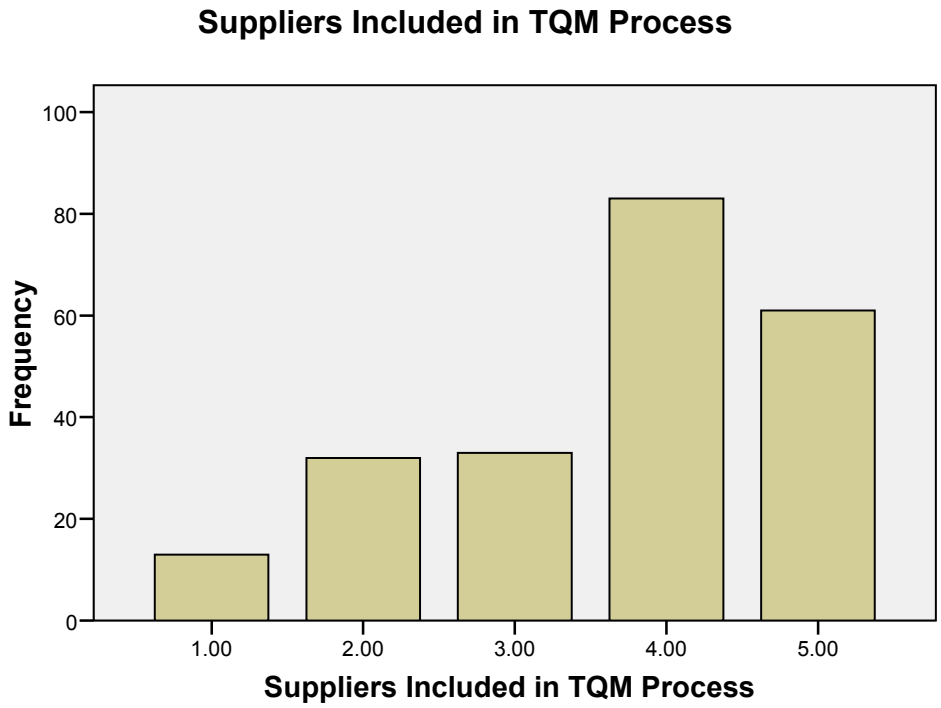

Figure 19. Top Management Includes Suppliers
(1=strongly disagree, 2=mildly disagree, 3=neutral, 4=mildly agree, 5=strongly agree)

Figure 20 below displays that 36.5% or 81 of the respondents strongly agree that top management builds teamwork and not competition between work groups. There were 31.1% or 69 of the respondents who mildly agree with this item. There were 14.4% or 32 of the respondents that were neutral on this item.

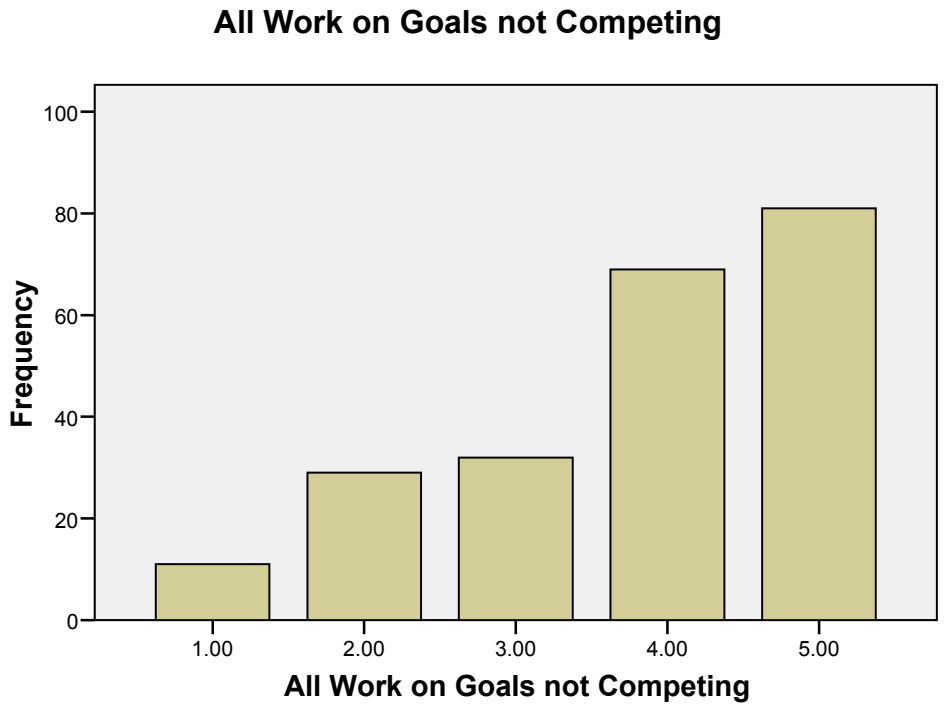

Figure 20. Top Management Encourages Teamwork
(1=strongly disagree, 2=mildly disagree, 3=neutral, 4=mildly agree, 5=strongly agree)

Figure 21 illustrates that 45.5% or 101 respondents strongly agree that top management is involved with quality; 31.5% or 70 respondents mildly agree with this item. There were 9.9% or 22 of the respondents that mildly disagreed with this item.

Figure 21. Top Management Involvement throughout the Organization
(1=strongly disagree, 2=mildly disagree, 3=neutral, 4=mildly agree, 5=strongly agree)

Figure 22 below displays that 28.3% or 64 of the respondents mildly agree that a suggestion program is in place for employees to share their ideas with management. Another 24.3% or 54 respondents strongly agree with this item. There were 19.8% or 44 of the respondents who were neutral on this item.

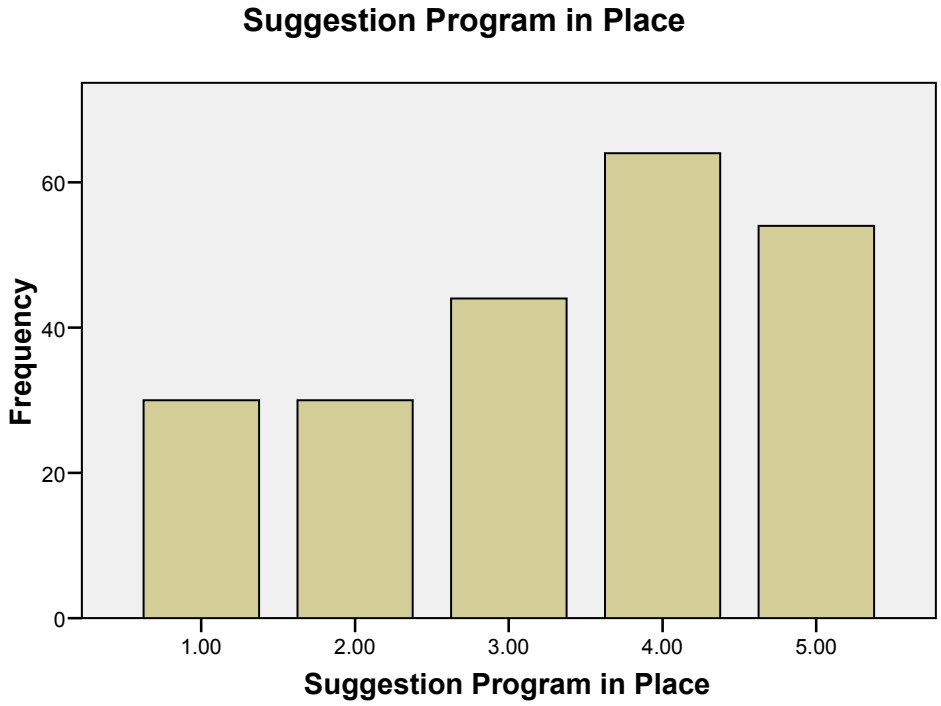

Figure 22. Employee Suggestion Program in Place
(1=strongly disagree, 2=mildly disagree, 3=neutral, 4=mildly agree, 5=strongly agree)

Figure 23 shows that 32.9% or 73 of the respondents mildly agree that teams solve problems in their companies; 32.4% or 72 respondents strongly agree that teams are used to solve problems. Next, 16.2% or 36 of the respondents were neutral on this item.

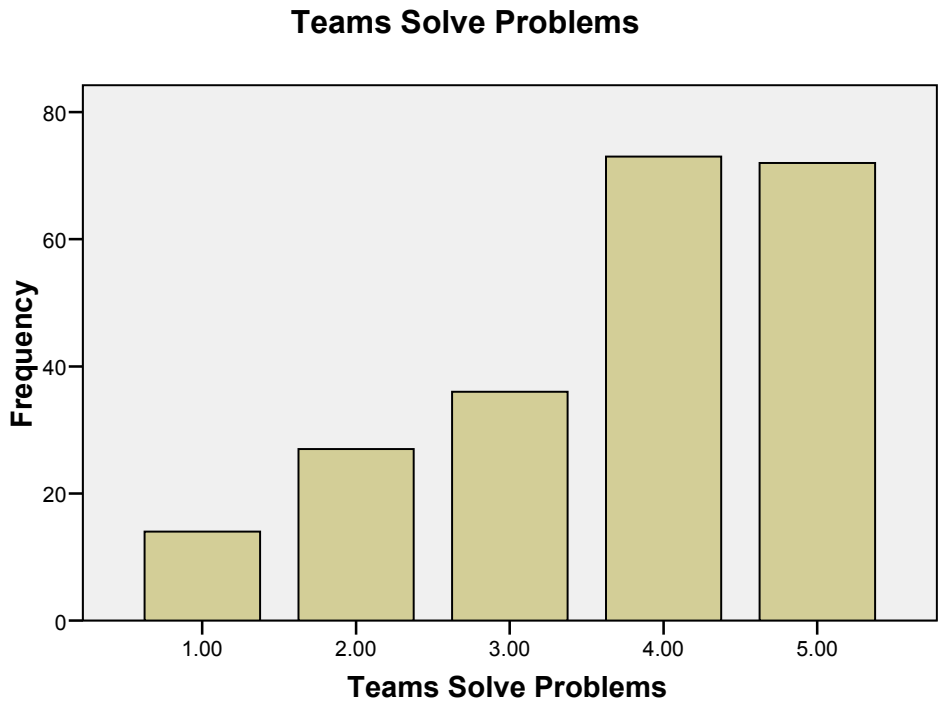

Figure 23. Teams Solve Problems
(1=strongly disagree, 2=mildly disagree, 3=neutral, 4=mildly agree, 5=strongly agree)

As shown in Figure 24, 37.4% or 83 of the respondents strongly agree that employees are held accountable for meeting goals and actions. Likewise, 33.3% or 74 of the respondents mildly agree with this item. There were 13.5% or 30 respondents who were neutral on this item.

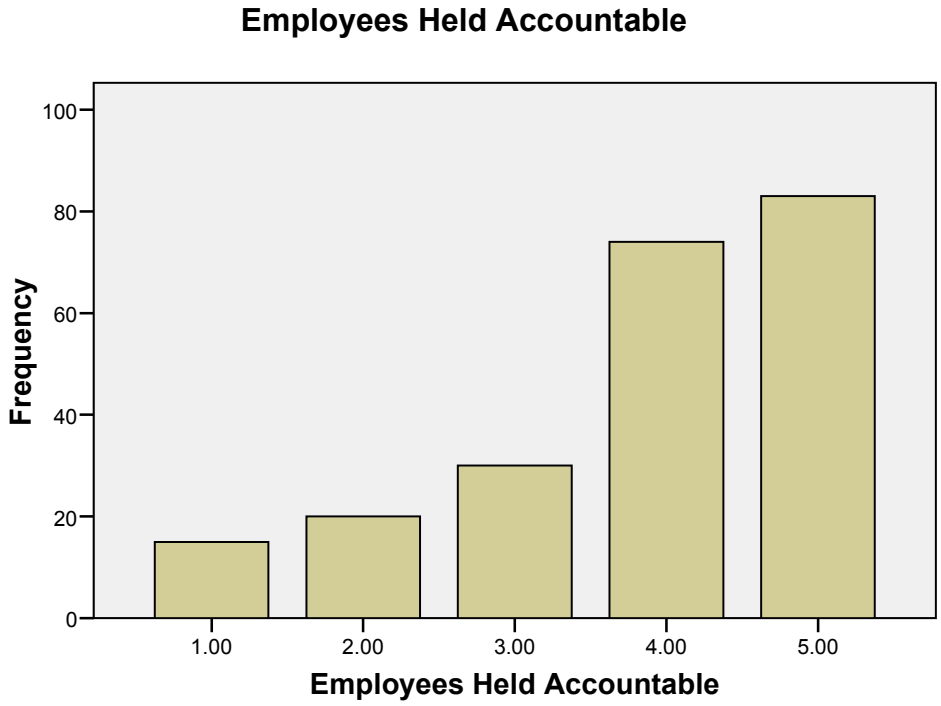

Figure 24. Employee Accountability
(1 = strongly disagree, 2=mildly disagree, 3=neutral, 4=mildly agree, 5=strongly agree)

Defect Level

Figure 25 illustrates that 27.5% or 61 respondents ranked their company at an acceptable defect level as neutral; 23.9% or 53 respondents mildly agreed. Another 19.8% or 44 respondents rated this item as strongly agree that the defect level was acceptable.

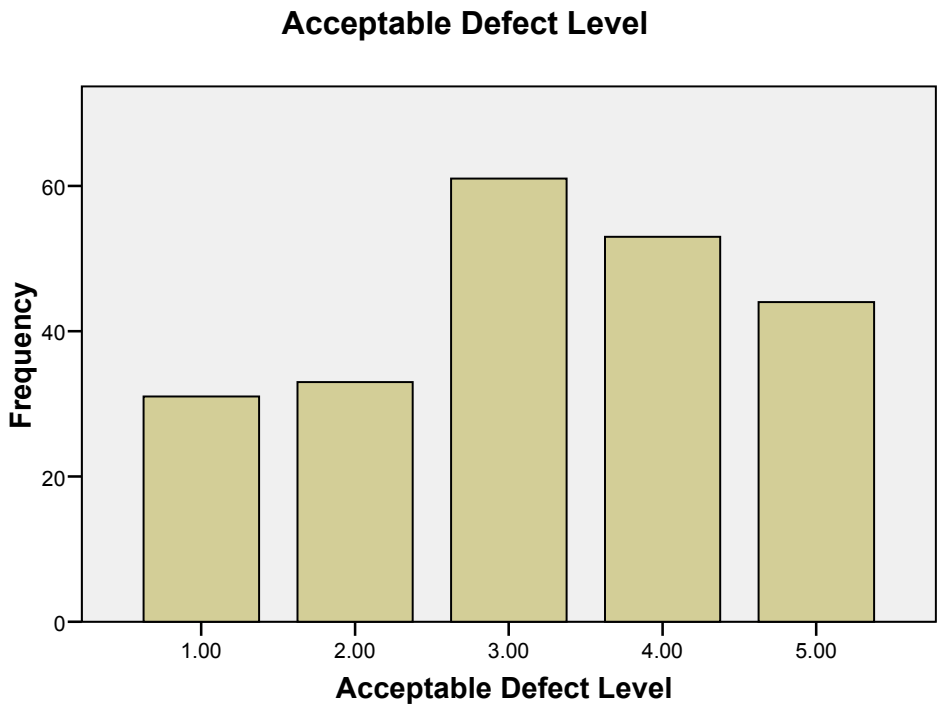

Figure 25. Defect Per Million Acceptable
(1=strongly disagree, 2=mildly disagree, 3=neutral, 4=mildly agree, 5=strongly agree)

Figure 26 below displays that 29.3% or 65 respondents were neutral on a defect per million rate below 20. There were 26.6% or 59 of the respondents who strongly disagree that their company is achieving a defect per million rate below 20. Next, 21.2% or 47 respondents ranked this item as strongly agree.

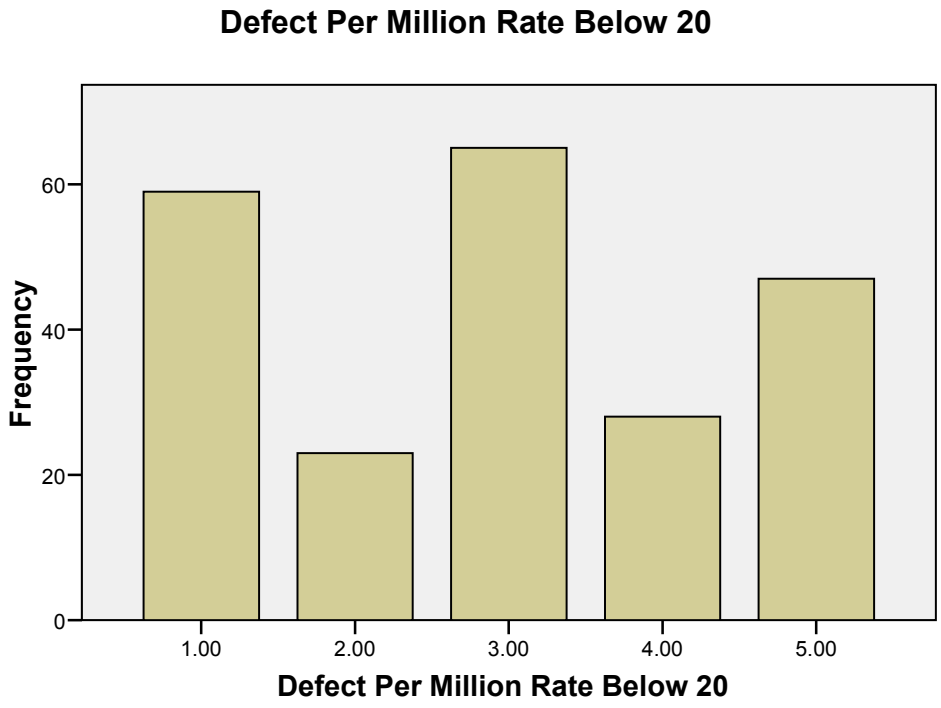

Figure 26. Defect Per Million below 20
(1=strongly disagree, 2=mildly disagree, 3=neutral, 4=mildly agree, 5=strongly agree)

Figure 27 shows that 36.0% or 80 respondents strongly disagree that their companies are producing less than 3.4 defects per million; 30.6% or 68 of the respondents were neutral on this item. There were 12.2% or 27 respondents that found their companies to both mildly disagree and strongly agree.

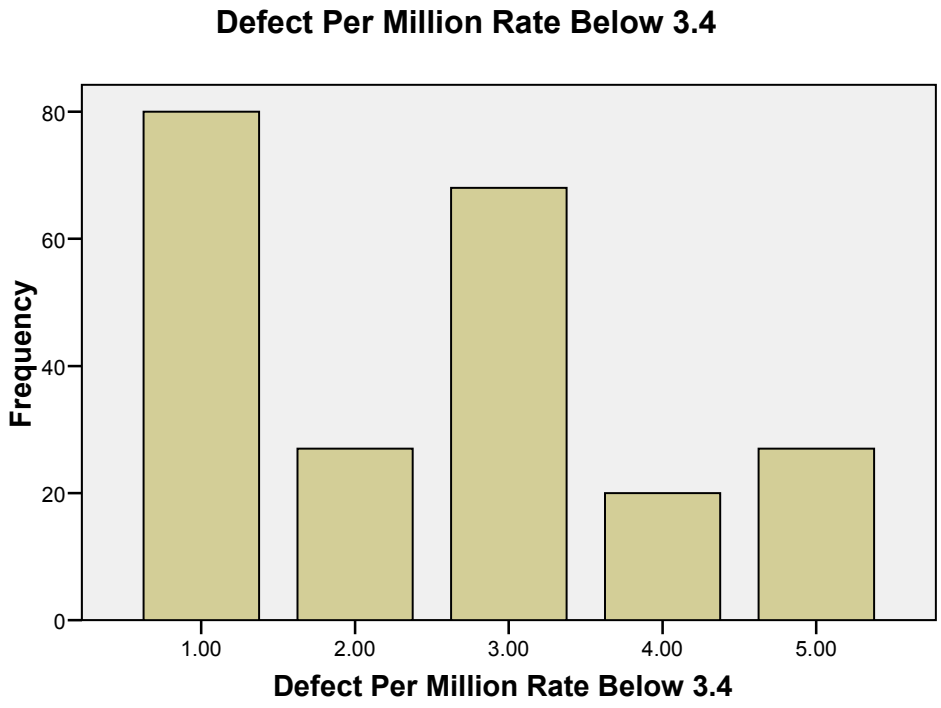

Figure 27. Defect Per Million 3.4 or Less
(1=strongly disagree, 2=mildly disagree, 3=neutral, 4=mildly agree, 5=strongly agree)

As shown in Figure 28 below, there were 31.1% or 69 respondents neutral on their defect levels being above 20 defects per million. There were 25.2% or 56 respondents who strongly disagree that their company produces defect levels above 20 defects per million. Next, 19.8% or 44 respondents mildly agree on this item.

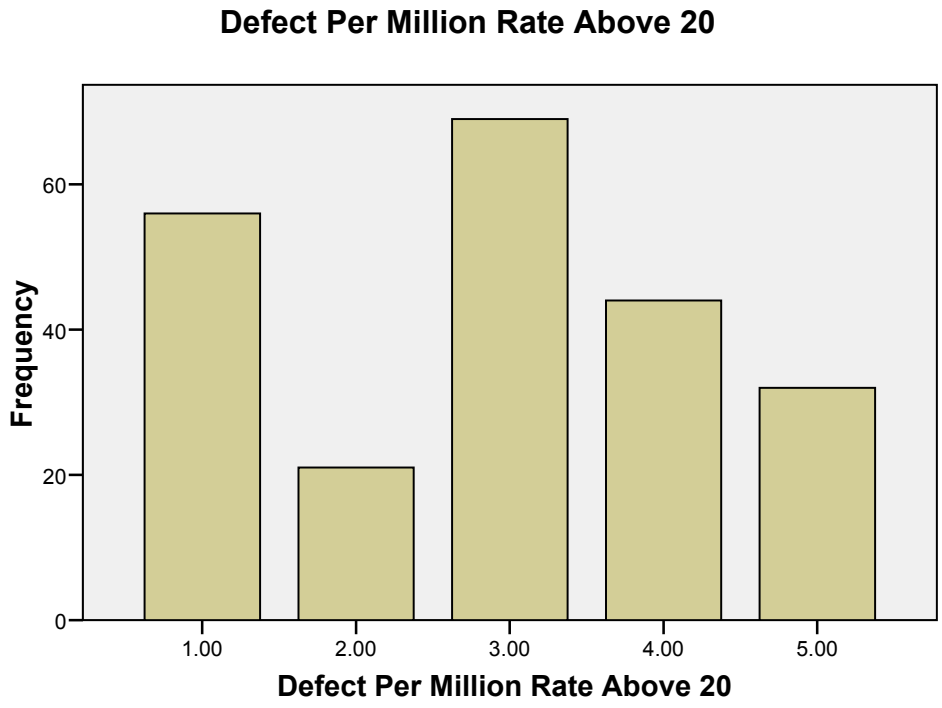

Figure 28. Defect Per Million Rate above 20
(1=strongly disagree, 2=mildly disagree, 3=neutral, 4=mildly agree, 5=strongly agree)

Figure 29 shows that 31.5% or 70 respondents strongly disagree that employees have defects per million goals. There were 31.1% or 69 respondents that were neutral on this item; 16.2% or 36 respondents mildly disagree that employees have defect goals.

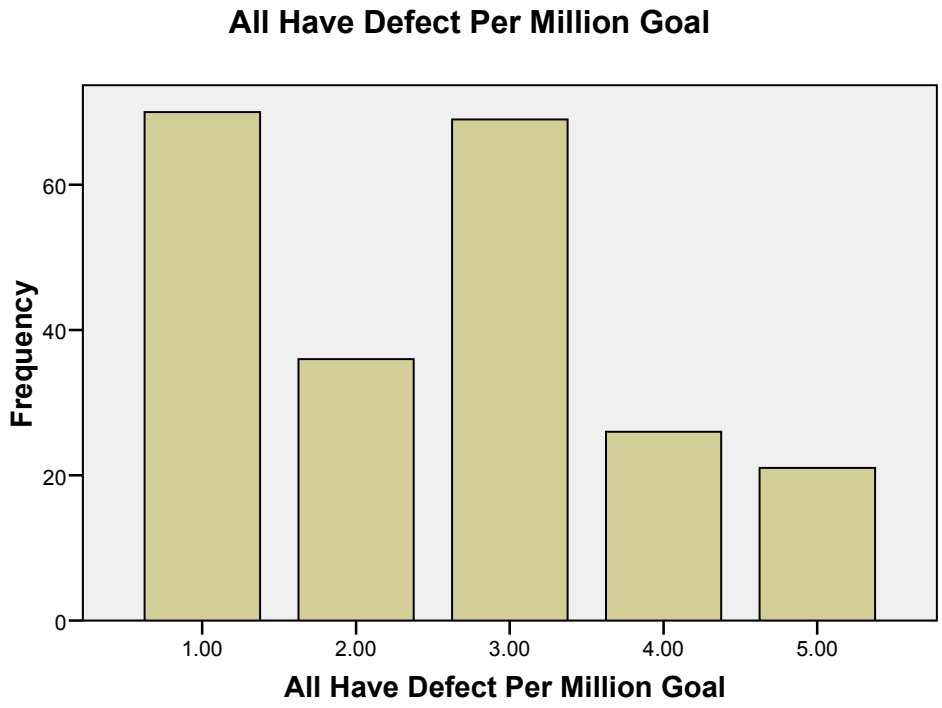

Figure 29. Employees Have Defect per Million Goals
(1=strongly disagree, 2=mildly disagree, 3=neutral, 4=mildly agree, 5=strongly agree)

Figure 30 illustrates that 27.9% or 62 respondents were neutral on whether the customer scorecard defines defects per million goals. There were 23.0% or 51 respondents who strongly disagree that the customer scorecard defines defect goals. Next, 19.8% or 44 respondents ranked this item as mildly agree.

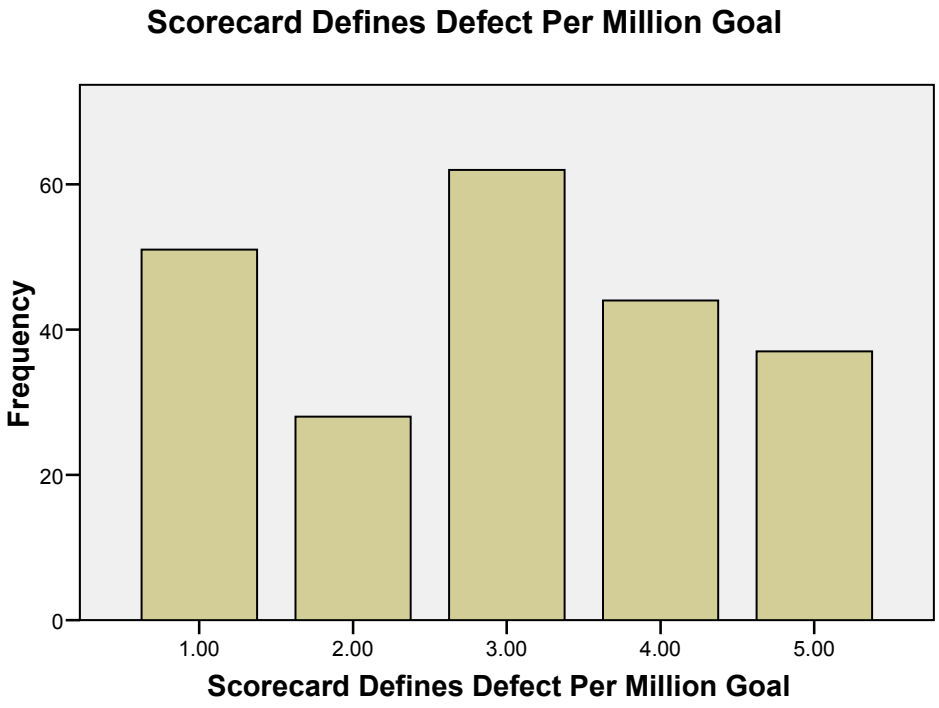

Figure 30. Customer Scorecards Includes Defect per Million Goals
(1=strongly disagree, 2=mildly disagree, 3=neutral, 4=mildly agree, 5=strongly agree)

Figure 31 displays that the majority, 29.7% or 66, of the respondents are neutral on whether the customer defines defects per million goals. Next, 24.8% or 55 of the respondents strongly disagree that the customer defines defect goals; 15.8% or 35 respondents mildly agree with this item.

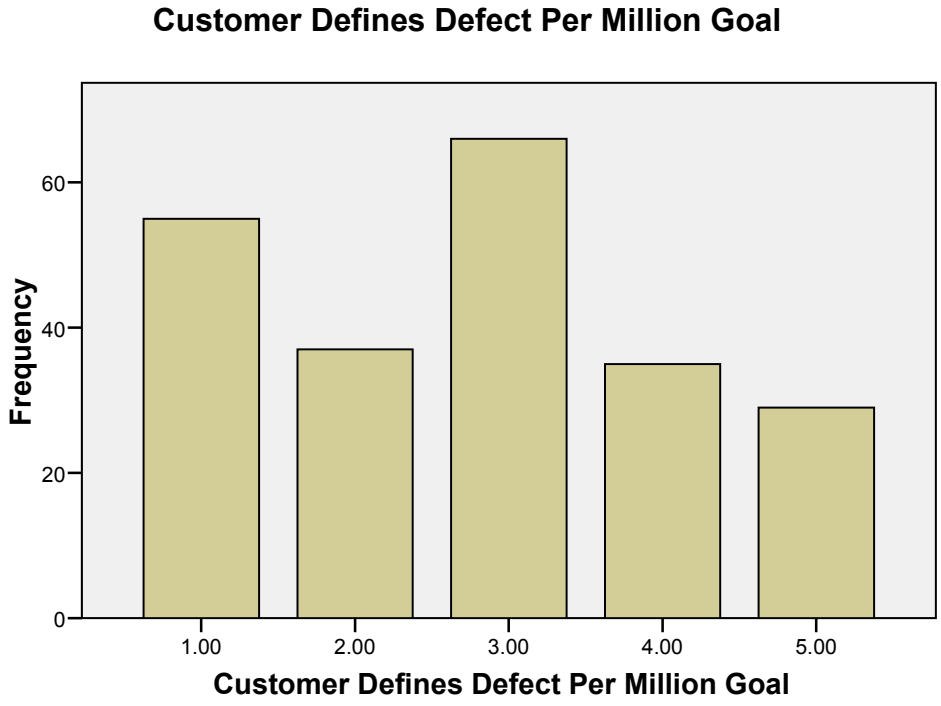

Figure 31. Customer Defines Defects per Million Goal
(1=strongly disagree, 2=mildly disagree, 3=neutral, 4=mildly agree, 5=strongly agree)

Profitability

In Figure 32 below, 32.0% or 71 of the respondents strongly agree that top management communicates and presents profitability data to employees. Next, 29.3% or 65 respondents mildly agree with this item. There were 14.0% or 31 respondents that strongly disagree that top management presents profitability data.

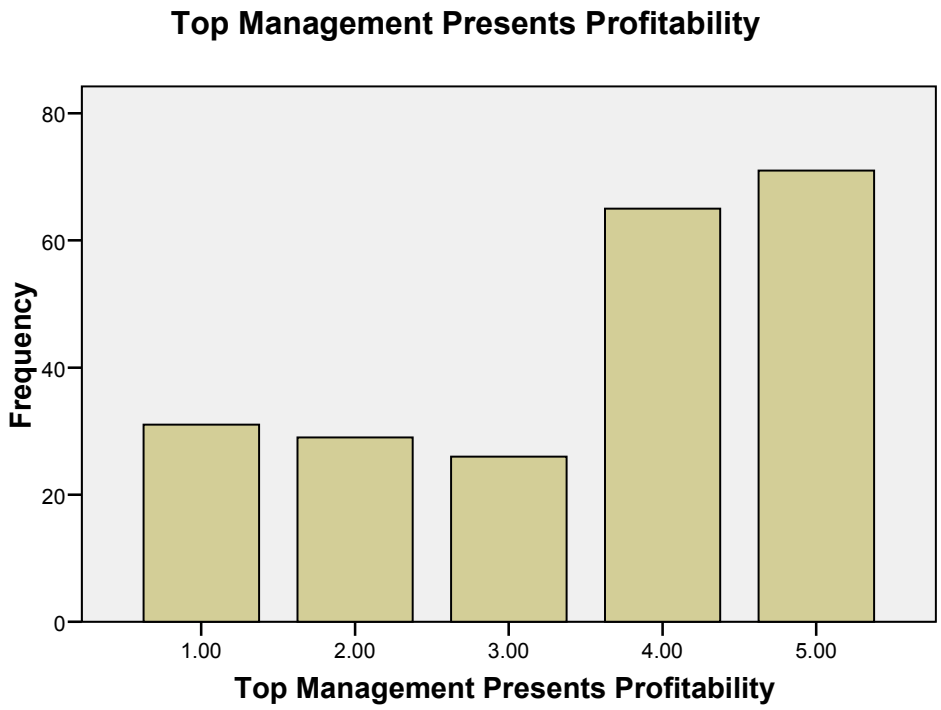

Figure 32. Top Management Communicates Profitability Data
(1=strongly disagree, 2=mildly disagree, 3=neutral, 4=mildly agree, 5=strongly agree)

Figure 33 displays that the majority, 67.6% or 150, of the respondents do not meet or exceed a profitability rate of 40%. There were 32.4% or 72 respondents that rated that their organizations meet or exceed a profitability rate of 40%.

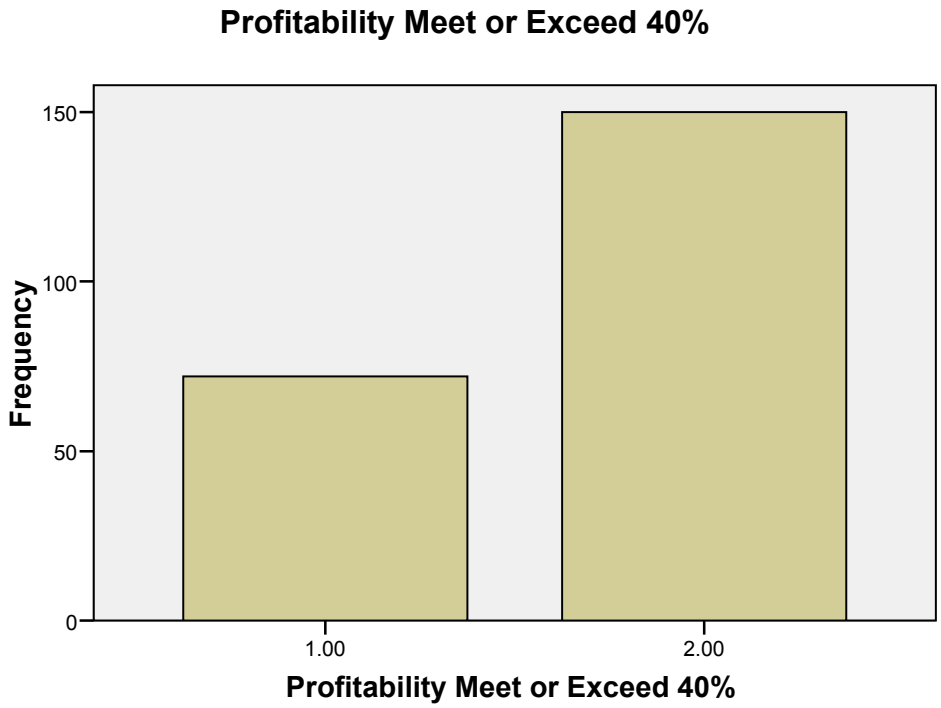

Figure 33. Profitability Rate Meets or Exceeds 40%
(1 = yes, 2 = no)

Figure 34 illustrates that 62.6% or 139 of the respondents' profitability rates were between 25% and 40%. The data indicates that 37.4% or 83 of the respondents do not meet this rate.

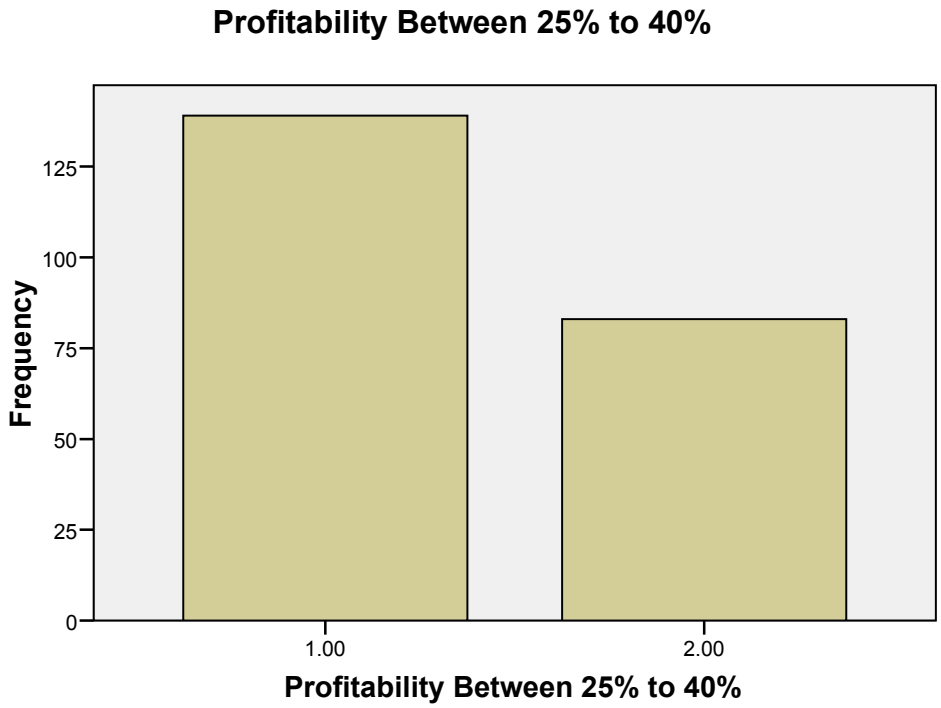

Figure 34. Profitability Rate between 25% and 40%
(1= yes, 2 = no)

Figure 35 shows that 29.3% or 65 respondents both strongly agree and mildly agree that quality goals are linked to profitability; 20.7% or 46 respondents are neutral on this item.

Figure 35. Quality Goals Linked to Profitability
(1=strongly disagree, 2=mildly disagree, 3=neutral, 4=mildly agree, 5=strongly agree)

Figure 36 illustrates that the majority, 36.5% or 81, of the respondents strongly agree that team projects improve profitability. Next, 35.1% or 78 respondents mildly agree with this item; 15.3% or 34 respondents are neutral on whether team projects improve profitability.

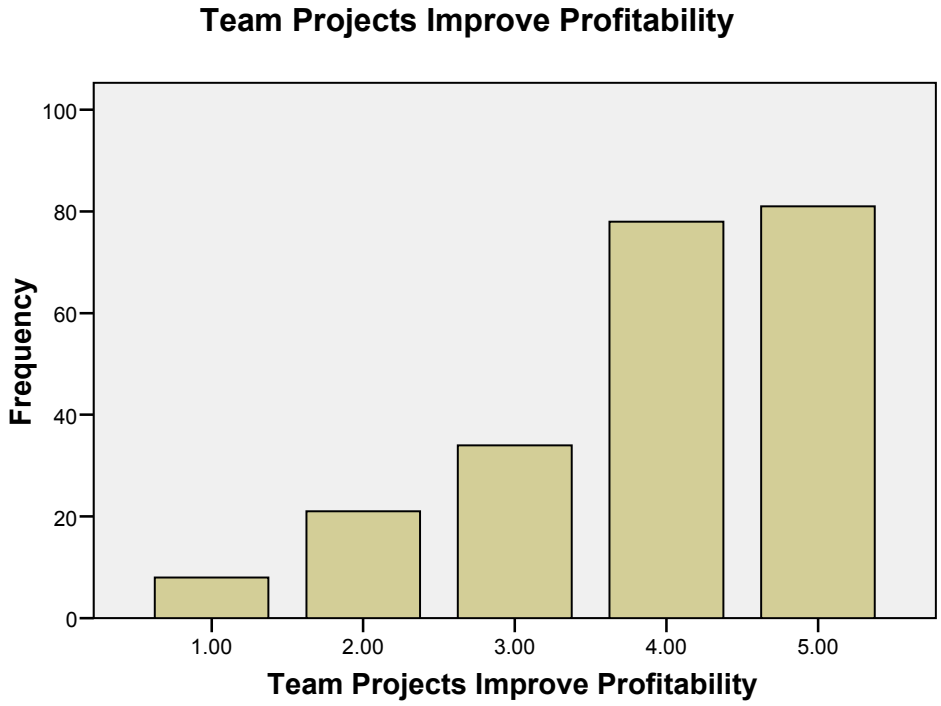

Figure 36. Profitability Rate Improved by Teams
(1=strongly disagree, 2=mildly disagree, 3=neutral, 4=mildly agree, 5=strongly agree)

As shown in Figure 37, 27.9% or 62 respondents mildly agree that team projects are measured monthly to determine impact on profitability; 27.9% or 62 respondents also are neutral on this item. There were 16.7% or 37 respondents that mildly disagree that projects are tracked monthly.

Figure 37. Improvement Teams Document Events
(1=strongly disagree, 2=mildly disagree, 3=neutral, 4=mildly agree, 5=strongly agree)

Figure 38 shows that the majority, 27.5% or 61, of respondents mildly agree that an event calendar exists that is used to define when projects will start and finish. There were 20.3% or 45 respondents that are neutral on this item; 19.8% or 44 respondents strongly agree that an event calendar exists.

Figure 38. Project Event Calendar Exist
(1=strongly disagree, 2=mildly disagree, 3=neutral, 4=mildly agree, 5=strongly agree)

Figure 39 displays that 26.6% or 59 respondents strongly agree that all employees understand profitability. Next, 26.1% or 58 respondents mildly agree with this item, and 20.7% or 46 of the respondents are neutral.

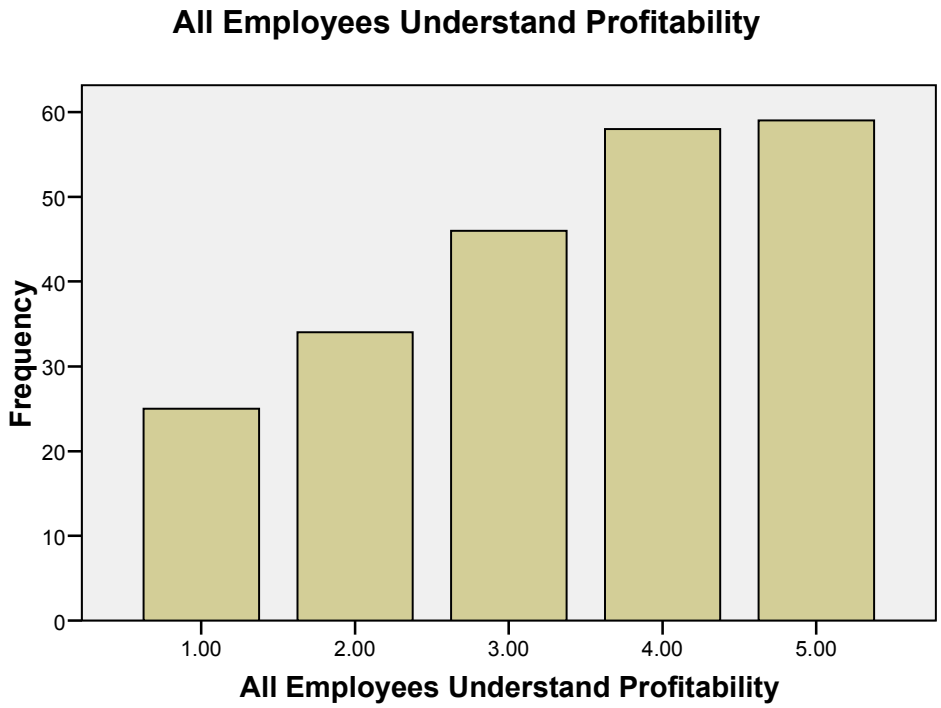

Figure 39. Employees Understand Profitability
(1=strongly disagree, 2=mildly disagree, 3=neutral, 4=mildly agree, 5=strongly agree)

Figure 40 shows the results of the Kaiser-Meyer-Olkin (KMO) and Bartlett's Test. The overall KMO is .890. Since this value is close to 1.000, it is reasonable to complete the factor analysis.

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.890
Bartlett's Test of Sphericity	Approx. Chi-Square	4266.773
	df	703
	Sig.	.000

Figure 40. KMO and Bartlett's Test

Table 3 shows that five factors explain over 50% of the variance. The principle components option was used in this analysis.

Table 3

Eigenvalues for Extracted Factors

N= 224

Factor	Eigenvalues	%Variance	Cumulative Variance%
1	11.090	29.185	29.185
2	3.134	8.247	37.432
3	2.400	6.316	43.747
4	1.448	3.809	47.557
5	1.385	3.646	51.202

A Scree Plot is shown in Figure 41. This Scree Plot helps narrow the factors that should be considered in the analysis. The Scree Plot agrees with the Eigenvalue analysis. The slope on the Scree Plot drops off after points four and five. The first four factors will be evaluated.

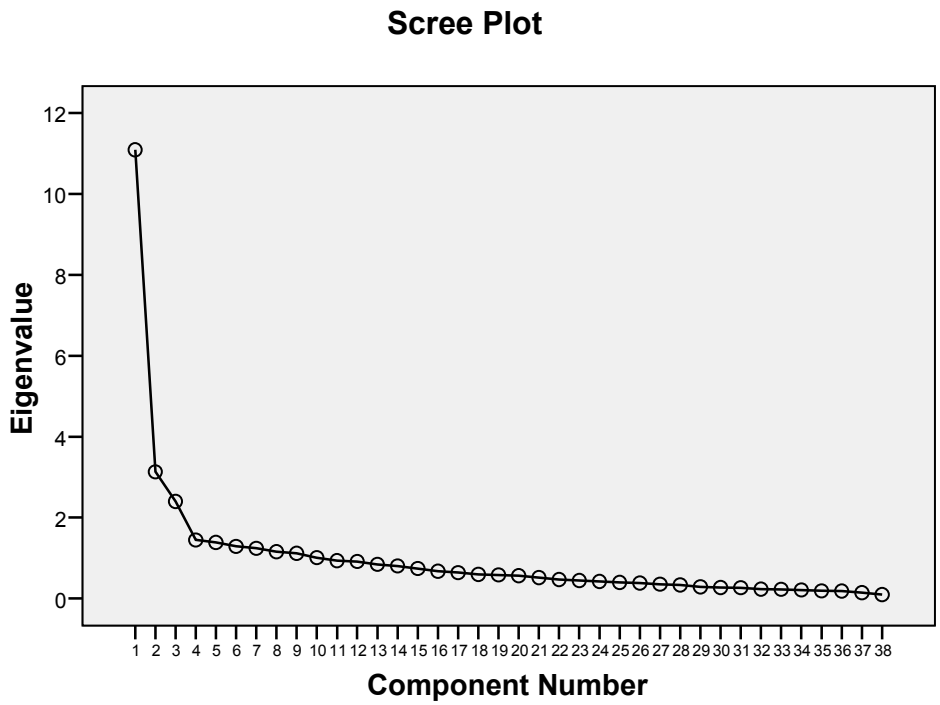

Figure 41. Scree Plot

Factor Analysis

The factor solution that was identified includes four factors. These four factors were determined through a factor analysis. The factors and details for each factor are listed below:

1. Factor 1 – Commitment by all employees
   i. Top management makes it known that producing quality product is everyone's job.
   ii. Top management's commitment to quality is evident by its involvement each day.
   iii. Top management's involvement with the quality efforts is visible.
   iv. Top management acts as coaches.

v. Top management provides the required resources such as money, people, and training.

vi. Top management has set clear goals for quality.

vii. Top management encourages work groups to work together and not to compete with one another.

viii. Top management is involved with decisions that affect quality throughout the organization.

ix. Top management includes middle management and non-management in setting quality goals.

x. Top management performance is linked to performance goals related to quality.

2. Factor 2 – Profitability is a strategic objective.

i. All employees understand what profitability means.

ii. Quality goals are linked to profitability.

iii. Improvement team projects raise profitability of the organization.

iv. Profitability rates meet or exceed 40% adjusted gross profit.

v. Profitability levels are between 25% to 40% adjusted gross profit.

3. Factor 3 – Defects per million rate is a strategic objective

i. Defects per million rate is above 20.

ii. Defects per million is at an acceptable level.

iii. Defects per million rate is 3.4 or less.

iv. Defects per million rate is below 20.

4. Factor 4 – Common defect per million goal

i. Defects per million goal is defined by the customer.

ii. Customer scorecard information includes defects per million.

iii. All employees have defects per million goals.

The final communalities have been completed and are shown in Table 4. The extraction values have been computed, and they link up with the four factors that were previously reviewed. This table shows how the four-factor model describes the variables, and the proportion of the variance of each variable is explained by the four common factors. The Principal Components analysis shows the same number of components as there are variables, and it describes the observed variability of each of the variables (Norusis, 2006). The Principle Components method generated the variables for this model. R-square will also be processed on this model.

Table 4

Final Communalities

N= 224

Item	Initial	Extraction
Quality is Everyone's Job	1.000	.716
Top Management Involvement	1.000	.751

(Continued on next page)

Table 4 Continued

Item	Initial	Extraction
Top Management Visible	1.000	.785
Top Management Coaches	1.000	.756
Resources Provided	1.000	.748
Clear Goals Set	1.000	.699
All Work on Goals Not Competing	1.000	.693
Top Management Involved with Quality	1.000	.642
All Included in Setting Goals	1.000	.682
Top Management Linked to Quality	1.000	.602
All Understand Profitability	1.000	.663
Quality Linked to Profitability	1.000	.640
Team Projects Improve Profitability	1.000	.549
Defects Per Million Rate above 20	1.000	.661
Acceptable Defect Level	1.000	.589

(Continued on next page)

Table 4 Continued

Item	Initial	Extraction
Defects Per Million Rate below 3.4	1.000	.769
Defects Per Million Rate below 20	1.000	.854
Customer Defines Defects Per Million Goal	1.000	.719
Scorecard Defines Defects Per Million Goal	1.000	.762
Employees have Defects Per Million Goal	1.000	.614

In Table 5, R-square data is defined that provides the basis that the model used in this study is predictive, and variation is seen between the variables. The variables listed will be analyzed later in Chapter 5 to determine a link to management commitment. The independent variables for this data are top management commitment, defect levels, and profitability.

Table 5

R-Square

N= 224

Top Management Commitment Level	R-Square
Top Management Visible	.569
Quality is Everyone's Job	.556
Clear Goals Set	.535
Resources Provided	.524
Top Management Coaches	.501
All Work on Goals and Not Competing	.420
Top Management Involvement with Quality	.416
Employees held Accountable	.364
Defects Per Million Rate below 20	.351
Top Management Linked to Quality	.328
Suppliers Included in TQM	.331
Scorecard Defines Defects Per Million Goal	.299
All Included in Setting Goals	.289
Defect Per Million Rate below 3.4	.233
Teams Solve Problems	.213

(Continued on next page)

Table 5 Continued

Top Management Commitment Level	R-Square
Top Management Turnover	.213
Customer Defines Defect Per Million Goal	.201
Quality Goals Linked to Profitability	.191
Suggestion Program in Place	.187
Defects Per Million Rate above 20	.1625
Team Projects Improve Profitability	.157
Projects Measured Monthly	.161
All Understand Profit	.134
Top Management Presents Profitability	.121
Project Event Calendar Exist	.122

Chapter Summary

The Cronbach's alpha for the study was .875. This is acceptable, and the results are considered reliable. The results have been computed, and four factors that can contribute to the success of a TQM program have been generated. These results will be discussed and analyzed in more detail in Chapter 5.

CHAPTER 5. DISCUSSION, IMPLICATIONS, RECOMMENDATIONS

The purpose of this study is to determine the commitment level required by top management in order to achieve lower defect and higher profitability rates. Three independent variables are extracted from this study. The three independent variables are defect and profitability rates, and management commitment. There are 30 responses to the survey that are the dependent variables. There are 15 responses that show the level of commitment from top management. There are seven responses that show the level of defects and eight responses that show the level of profitability.

The objective of the study was to use quantitative data to determine if companies with top management commitment produce better quality products or services and make higher profits. SME members from the Southeast region of the United States were given this survey with 30 items representing 30 outcomes to draw a conclusion about top management commitment and how it relates to defects and profitability in a TQM environment.

Seven experts in the quality field with 138 total years of experience stated that this survey was able to measure a link between top management commitment to defects and profitability rates in a TQM environment. The survey questions extract details for each category and relate the survey to how businesses are managed in today's economic environment. This environment utilizes the TQM philosophy.

This study addresses the TQM philosophy used by manufacturing and service companies. TQM with top management commitment may lead a company to success. The following research questions and hypotheses were addressed in this study:

Research Questions

Have TQM implementations that had a strong top management commitment resulted in lower defect rates among members of SME in the United States of America?

Have TQM implementations that had a strong top management commitment resulted in higher profit rates among members of SME in the United States of America?

Hypotheses

(W – With, WO – Without)

H1 Null: A strong top management commitment when implementing TQM does not positively affect profitability levels.

$H1_0$ $Profit_W <= Profit_{WO}$

H1 Alternative: A strong top management commitment when implementing TQM positively affects profitability levels.

$H1_A$ $Profit_W > Profit_{WO}$

H2 Null: A strong top management commitment does not result in an increased output quality level.

$H1_0$ $Quality\ Level_W <= Quality\ Level_{WO}$

H2 Alternative: A strong top management commitment results in an increased output quality level.

$H1_A$ $Quality\ Level_W > Quality\ Level_{WO}$

Research was necessary in the area of TQM to help demonstrate to companies the link that exists with top management commitment in a TQM program to defect and profitability levels. The three independent variables, management commitment, defect levels, and profitability levels are reviewed against the dependent variables of this study, which are the responses to questions that fall into each category.

Findings and Interpretations

Background Information about Respondents

The survey indicates that the two largest groups that responded to the survey work for companies with fewer than 100 employees and greater than 800. This information will be pertinent to many managers and researchers for all size companies because both the small and large companies are represented heavily in this study. The majority of the respondents, 79.7%, work in the manufacturing sector, so information may apply more to manufacturing than the service sector. There were 34.2% of the respondents of this survey that work in industries that support a combination of industries from the Automotive, Aerospace, or Industrial sectors. This study will be useful to many companies across America since it has a multiple industry base. The majority of the respondents to the survey were managers at 59% and engineers were next at 25.7%. The rest of the respondents were represented by operatives, production control, quality assurance, clerical, accounting, information technology, human resources, manufacturing, and maintenance. The diverse group gives the study strength because it obtained a variety of perspectives.

Commitment by All Employees (Factor 1)

The majority of the respondents, 57.7%, mildly agree that quality is everyone's job, and 24.8% strongly agree. This equals 82.5% of the respondents that either mildly agree or strongly agree. This is a key concept to grasp because if everyone understands this, then quality will be built into the product as it is being manufactured or while the service is being delivered. This is a preventive approach and reduces a company's need to inspect for quality. The largest group, 45.5%, responded that top management's commitment is evident for quality by its involvement each day. Another 31.5% responded that they mildly agree. The total for both these groups is 77%. This means that top management is seen as a daily participant in the quality effort. A total of 67.5% responded that they mildly agree and strongly agree that top management's involvement with the quality efforts is visible. The majority responded that they mildly agree at 35.1%, and 32.4% responded that they strongly agree. This agrees with Dr. Deming's philosophy that top management involvement and visibility are necessary to produce a quality service or product (Deming, 1986).

In the study, a total of 60.4% of the respondents either mildly agree or strongly agree that top management acts as coaches. There were 34.7% responded that they mildly agree, and 25.7% responded that they strongly agree. A manager that acts as a coach will help employees become better contributors. According to Chang (2005), being a coach by facilitating communications and fostering teamwork are critical to TQM. A total of 48.2% of the respondents of the survey strongly agree with top management setting clear goals for quality, and 32.9% mildly agree. This is a total of 81.1% that see clear goals for

quality in their organizations. Managers can benefit from this information to lead them towards improvements.

Employees in the same company should always work together and not compete with each other because this becomes counter-productive for the complete organization (Deming, 1986). The respondents, 67.6%, strongly agree or mildly agree that top management encourages work groups to work together and not to compete with one another. There were 36.5% that strongly agree, and 31.1% mildly agree. This builds teamwork amongst the employees and all work towards the same goal. In any quality program, the support of top management helps define how others react to quality, and people react to deeds as well as words (Davison & Al-Shaghana, 2007). The majority of the respondents, 45.5%, strongly agree that top management is involved with decisions that affect quality throughout the organization, and 31.5% responded that they mildly agree. A total of 77% responded that they either strongly agree or mildly agree. Next, 67.1% of the respondents said that they strongly agree or mildly agree that top management includes middle management and non-management in setting quality goals. There were 36% that mildly agree, and 31.1% that strongly agree. Companies that include all employees in setting quality goals are building a foundation of inclusion (Davison & Al-Shaghana, 2007).

The majority of the respondents, 31.1%, strongly agree that top management performance is linked to performance goals related to quality, and 35.1% mildly agree. The performance system of many companies helps to define the important measures that employees focus on; employees appraised on improvement projects related to quality and cost improvements have a higher perception of a quality culture (Davison & Al-

Shaghana, 2007). A total of 66.2% of the respondents either strongly agree or mildly agree that top management performance is linked to quality goals. Managers will consider the quality goals as important since they are being measured on them as part of their performance.

Profitability is a Strategic Objective (Factor 2)

In the survey, a total of 52.7% of the respondents either said that they mildly agree or strongly agree that all employees understand what profitability means. Out of the 52.7%, there were 26.6% that mildly agree, and 26.1% that strongly agree. This means that the majority of the employees understand what items can impact or change profit levels. There were 58.6% that responded strongly agree or mildly agree that quality goals are linked to profitability. From the 58.6%, 29.3% each responded that they strongly agree and mildly agree. This means that quality goals must be achieved to obtain profitability levels. The majority of the respondents, 36.5%, said that improvement team projects improve profitability of the organization, and 35.1% mildly agree. Overall, 71.6% either strongly agree or mildly agree with this item.

There were 32.4% of the respondents that responded that profitability rates meet or exceed 40% adjusted gross profit. From the survey, 62.6% responded that profitability rates were between 25% to 40%. This means that these companies are being highly profitable. The data from this study will be crucial for companies to use to help improve profitability.

Defects Per Million Rate is a Strategic Objective (Factor 3)

As a company gets close to its quality targets, the more quality costs are reduced, and process improvements are realized (Jeffery, 2003/2004). A total of 14.4% of the

respondents to the survey said they strongly agree that their defect per million rate is above 20. There were 43.5% that responded mildly agree or strongly agree that their defect level is at an acceptable level. There were 23.9% that responded mildly agree, and 19.8% that strongly agree. A total of 35.2% responded they either strongly agree or mildly agree that their defects per million rate is below 20. From the survey, 21.2% of the respondents said that they mildly agree or strongly agree their defects per million rate is 3.4 or less. The 3.4 per million level is at the Six Sigma level and considered world class quality (Davison & Al-Shaghana, 2007).

Common Defect Per Million Goal (Factor 4)

The source of the defect per million goal was not well known by the respondents. There were 29.7% of the respondents that were neutral on whether the defect per million goal was defined by the customer. A total of 27.9% of the respondents were neutral on whether the customer scorecard information include defects per million. The majority of the respondents, 31.5%, strongly disagree that all employees have defects per million goals. This means that the management team has not clearly defined quality goals for all employees. This may be the basis for why the companies are not all achieving over 40% adjusted gross profits or defect levels less than 3.4.

The relationship between the first research question, "Have TQM implementations that had a strong top management commitment resulted in lower defect rates among members of SME in the United States of America?", and the second research question, "Have TQM implementations that had a strong top management commitment resulted in higher profit rates among members of SME in the United States of America?", can be answered by looking at Table 6. This table shows the degree of variation that each

of the measures of commitment is responsible for in TQM. These measurements explain the impact that top management commitment has on defect and profitability levels. The four factors accounted for more than 50% of the variation. The four factors are commitment by all employees (Factor 1), profitability is a strategic objective (Factor 2), defects per million rate is a strategic direction (Factor 3), and common defect per million goals from customer and employer (Factor 4).

There is a significant strength relationship between top management commitment and top management being visible of 57%. Quality being everyone's job has a 56% variation explanation to top management commitment. Next with a strong relationship to top management commitment is the setting of clear goals at 53%. The fourth item that also has a powerful relationship with top management commitment is providing the appropriate resources to employees at 52%. Top management acting as a coach to employees has a 50% relationship. The next strong relationship is encouraging work groups to work together and not compete with one another at 42%. Equally with a strong relationship to top management commitment is top management being involved with decisions that affect quality. The next six items also have a significant relationship to top management commitment, and they are holding all employees accountable (36%), defect rates below 20 per million (35%), top management performance goals linked to performance goals related to quality (33%), suppliers are included in the TQM process (33%), and the customer scorecard defines defects per million goals (29%).

The items that have a weak relationship are having an event calendar for projects and presenting profitability data. Both of these items are still significant with a 12% relationship. These findings mean that there is a strong relationship with top management

commitment to TQM and the level of defect and profitability that a company achieves. This research shows companies that had a strong commitment level to TQM produced defect rates of less than 20, and it also showed that these same companies produced profit levels of 25% or higher. Based on this data, it is reasonable for a company, small or large, to embrace TQM from a management level. This process can help a company become more competitive and become a leader in the market it serves regardless whether it is an automotive, aerospace, or industrial market.

Quality is the basis for improvements in many areas. Quality improvements can help achieve better on time delivery, higher productivity, lower costs, and higher profits (Jeffery, 2003/2004). TQM helps build a foundation for an organization that helps it achieve improvements as described above. If an organization would implement TQM and focus on the top seven items (top management visible, quality is everyone's job, set clear goals, provide resources, top management acts as coaches, employees work together, and top management involved with quality), that show an extremely strong relationship with management's commitment in this study, then an organization could achieve success.

Table 6

Variation Explained by this Study on Top Management Commitment

N= 224

Top Management Commitment Level	Factor(s)	Variation Explained
Top Management Visible	1, 3	57%
Quality is Everyone's Job	1	56%
Clear Goals Set	1, 4	53%
Resources Provided	1, 3	52%
Top Management Coaches	1, 4	50%
All Work on Goals and Not Competing	2	42%
Top Management Involvement with Quality	1	42%
Employees held Accountable	1, 4	36%
Defects Per Million Rate below 20	3	35%
Top Management Linked to Quality	1, 3	33%
Suppliers Included in TQM	1	33%
Scorecard Defines Defects Per Million Goal	3.4	30%
All Included in Setting Goals	1	29%
Defects Per Million Rate below 3.4	3, 4	23%
Teams Solve Problems	1, 4	21%
Top Management Turnover	1, 4	21%

(Continued on next page)

Table 6 Continued

Top Management Commitment Level	Factor(s)	Variation Explained
Customer Defines Defect Per Million Goal	3, 4	20%
Quality Goals Linked to Profitability	1, 4	19%
Suggestion Program in Place	1, 4	19%
Defects Per Million Rate above 20	1, 3, 4	16%
Team Projects Improve Profitability	1, 3	16%
Projects Measured Monthly	1, 3, 4	16%
All Understand Profit	1, 2, 4	13%
Top Management Presents Profitability	1, 2, 4	12%
Project Event Calendar Exist	1, 2, 4	12%

The Hypotheses for this study were evaluated using the average score of the survey. The average score of the survey will be reviewed two ways: one as a percent, and than as an average number. The higher the percent means the higher the average score. The number score will be reviewed differently for the independent variable. An average score above three on management commitment and defect levels indicate a high average score. There were two questions scored in reverse for profitability. An average score below two for profitability indicates a high average score. HO1 will be tested first.

(W – With, WO – Without)

H1 Null: A strong top management commitment when implementing TQM does not positively affect profitability levels.

$H1_0$ $Profit_W <= Profit_{WO}$

H1 Alternative: A strong top management commitment when implementing TQM positively affects profitability levels.

$H1_A$ $Profit_W > Profit_{WO}$

The results from the survey show that the management commitment score has a high average score, and 82.9% (4.081) of the respondents strongly agree or mildly agree that top management is committed. There were 62.6% (1.6) of the respondents who strongly agree that profitability is between 25% to 40%, and 32.4% (1.3) strongly agreed that profitability meet or exceed 40%. This represents a high average profitability score, and H1 Null is rejected at a .05 level of significance.

H02 will be tested next. The same criteria for management commitment will be used, and the defect scoring noted above will apply.

(W – With, WO – Without)

H2 Null: A strong top management commitment does not result in an increased output quality level.

$H1_0$ $Quality\ Level_W <= Quality\ Level_{WO}$

H2 Alternative: A strong top management commitment results in an increased output quality level.

$H1_A$ $Quality\ Level_W > Quality\ Level_{WO}$

As noted above, the strong management commitment average score was high at 82.9% (4.081) for this study. The average score for having an acceptable defect level was also modest at 47.8% (3.207) of the respondents ranking this item as either "strongly agree" or "mildly agree". The score for defects per million below 20 was also high with a score of 66.6% (3.2) of the respondents that ranked the item as either "strongly agree" or "mildly agree". There was an additional 24% that responded that they either "strongly agree" or "mildly agree" the defect per million rate was 3.4 or less. Based on these findings, H2 Null is rejected also at a .05 level of significance.

The research questions can be answered that top management commitment level has an impact on the measures. The defect level is below 20 when top management commitment is strong. The profitability rate is greater than 25% when top management commitment is strong. The results of this study should be used to help management understand the level of commitment necessary in a TQM effort to achieve acceptable results.

Recommendations

It is recommended that companies utilize the findings in this study to help improve their defect and profitability levels. Companies can build a strong foundation by implementing TQM. TQM with top management commitment leads to success, and TQM is defined as using the following processes: continuous improvement, lean manufacturing, Six Sigma, HPO, use of theory of constraint, restructuring, and reengineering. A company can put these processes in place with the commitment of top management and reap benefits. This study demonstrates to managers, operatives,

engineers, production control associates, quality assurance associates, clerical associates, accounting associates, human resource associates, manufacturing associates, maintenance associates, and SME members that a committed top management team can support a TQM program and reduce defects and increase profits. The results of this study will be shared with the SME corporate headquarters to allow all SME members to have access to this information.

Top management commitment to TQM allows the program to flourish. This study has identified many key areas that define management commitment. The areas are as follows:

1. Top Management Visible
2. Quality is Everyone's Job
3. Clear Goals Set
4. Resources Provided
5. Top Management Coaches
6. All Work on Goals and Not Competing
7. Top Management Involvement with Quality
8. Employees held Accountable
9. Defect Per Million Rate below 20
10. Top Management Linked to Quality
11. Suppliers Included in TQM
12. Scorecard Defines Defect Per Million Goal
13. All Included in Setting Goals
14. Defect Per Million Rate below 3.4

15. Teams Solve Problems
16. Top Management Turnover
17. Customer Defines Defect Per Million Goal
18. Quality Goals Linked to Profitability
19. Suggestion Program in Place
20. Team Projects Improve Profitability
21. Projects Measured Monthly
22. All Understand Profit
23. Top Management Presents Profitability
24. Project Event Calendar Exist

A TQM program should work to have the majority of these 24 points in place. It is recommended that an organization focus on the first seven items at the start. These will help encourage the management team to be committed to the TQM effort. According to Davison and Al-Shaghana (2007), leaders have a large influence on how others in the organization approach quality, so when the leaders support the effort, improvements are an output.

Suggestions for Future Research

Future research should include a larger population. Since we are in a global economy, the research should include a population that is worldwide, with the hopes of obtaining samples from every continent in the world. Future research could also be performed on one of the 24 points to understand reasons that commitment from

management may not exist, or other ways to improve defect or profitability levels. The future research is recommended to focus more in depth on one of the four factors. This will give the study more clarity. Another proposed effort in future research would be to reach out to get a 50/50 ratio of service to manufacturing companies. Each of these suggestions can expand on the research that has been conducted in this dissertation. The results presented in this study may not work for every company; therefore, future research may be necessary to close any gaps.

Summary and Conclusion

This study was developed with the goal of providing evidence that TQM with top management support can reduce defect levels and raise profitability. This study contains a review of literature from seminal leaders in the quality field. The literature review identified a gap in knowledge on this subject. This gap leads to the need for performing research to understand what items determine if top management commitment is evident.

The study provided the important ways to demonstrate top management commitment. The top seven significant methods should be focused on to obtain top management commitment. The most significant way to demonstrate commitment is having top management visibly involved with the quality efforts. The next most significant way to demonstrate top management commitment is having top management make known that producing quality product is everyone's job. The third most significant way is having top management set clear goals. The fourth significant way is having top management provide the required resources such as money, people, time, and training. The fifth most significant way is having top management coach employees through

situations. The sixth most significant way is having top management encourage work groups to work together and not to compete with each other. All employees of an organization are on the same team and should pull in the same direction. The seventh way is having top management involved with decisions that affect quality throughout the organization.

There are 17 other points that can also help improve the level of commitment. In any improvement effort, a team must select the most significant areas to work on, and once those are stable, the team should move to the next significant item. This same approach should be used with these 24 points.

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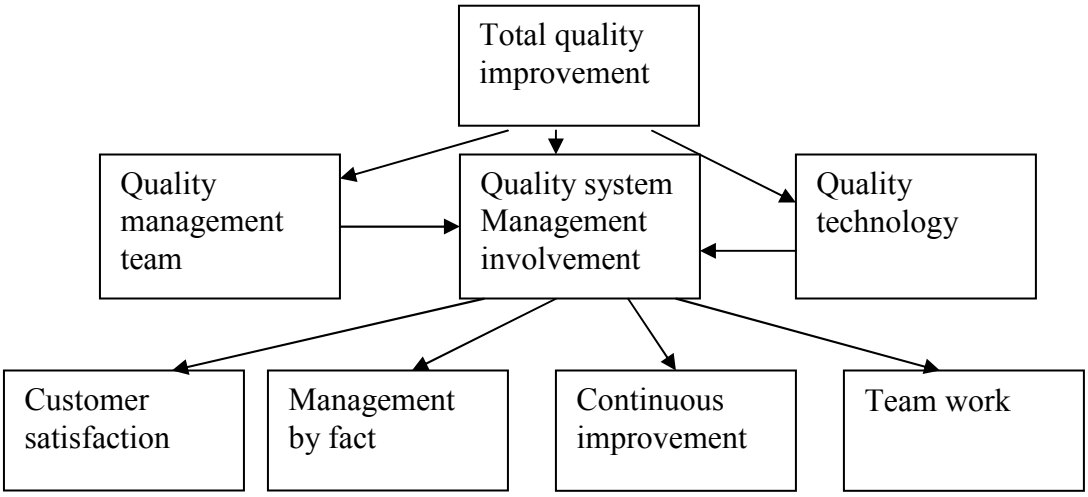
APPENDIX A. TOTAL QUALITY IMPROVEMENT CONCEPTUAL FRAMEWORK



APPENDIX B. SURVEY INSTRUMENT

Background data

Please circle the appropriate answer(s)

What is the size of your organization?

- Less than 100 employees
- 100 to 200 employees
- 200 to 300 employees
- 300 to 400 employees
- 400 to 800 employees
- Greater than 800 employees

Which type organization do you work for?

- Service
- Manufacturing

What industry does your company support?

- Automotive
- Industrial
- Aerospace
- Other

What is your ethnicity?

- African American

- Asian
- Caucasian
- Hispanic
- Other (please specify)

What is the highest level of education that you have completed?

- High School graduate/GED
- Technical college
- Associate degree
- Bachelor's degree
- Masters degree
- Doctoral degree

What is your job function?

- Management
- Operative
- Engineering
- Production control
- Quality Assurance
- Clerical
- Accounting
- Information technology

- Human resources
- Manufacturing
- Maintenance

Your job type is considered as which one of the following:

- Associate or non-management
- Middle Management
- Top Management

Gender

- Male
- Female

Evaluate the items below and choose the answer that most closely relates to your company by circling the number as follows or circle the appropriate answer:

1	**2**	**3**	**4**	**5**
Strongly Disagree	**Mildly Disagree**	**Neutral**	**Mildly Agree**	**Strongly Agree**

Top management

1. Top management's commitment is evident for quality by its involvement each day.

   1 2 3 4 5

2. Top management has set clear goals for quality.

1 2 3 4 5

3. Top management provides the required resources such as money, people and training to implement total quality management.

1 2 3 4 5

4. Top management act as coaches.

1 2 3 4 5

5. Top management's involvement with the quality efforts is visible.

1 2 3 4 5

6. Top management's performance is linked to performance goals related to quality.

1 2 3 4 5

7. The top management team is stable with little turnover amongst the management team.

1 2 3 4 5

8. Top management includes middle management and non-management in setting quality goals.

1 2 3 4 5

9. Top management makes it known that producing quality product is everyone's job.

1 2 3 4 5

10. Top management includes suppliers in the total quality management process.

1 2 3 4 5

11. Top management encourages work groups to work together and not to compete with one another.

1 2 3 4 5

12. Top management is involved with decisions that affect quality throughout the organization.

1 2 3 4 5

13. An employee suggestion program is in place, and employee suggestions are being used.

1 2 3 4 5

14. Teams of employees are used to solve problems.

1 2 3 4 5

15. Employees are held accountable for their jobs and quality.

1 2 3 4 5

Defect level

16. Defects per million is at an acceptable level.

1 2 3 4 5

17. Defect per million rate is below 20.

1 2 3 4 5

18. Defect per million rate is 3.4 or less.

1 2 3 4 5

19. Defect per million rate is above 20.

1 2 3 4 5

20. All employees have defect level per million goals.

1 2 3 4 5

21. Customer scorecard information include defect per million data.

1 2 3 4 5

22. Defect per million goal is defined by the customer.

1 2 3 4 5

Profitability

23. Top management presents profitability data on a regular basis to the employees.

1 2 3 4 5

24. Profitability rates meet or exceed 40% adjusted gross profit.

Yes No

25. Profitability levels are between 25% to 40% adjusted gross profit.

Yes No

26. Quality goals are linked to profitability.

1 2 3 4 5

27. Improvement team projects improve profitability of the organization.

1 2 3 4 5

28. Team improvement projects are measured monthly to display how they impact profitability.

1 2 3 4 5

29. Continuous improvement, Kaizen and other teams have an event calendar to define when they will implement improvement projects.

1 2 3 4 5

30. All employees understand what profitability means.

1 2 3 4 5

APPENDIX C. INSTRUMENT EVALUATION FORMS

Expert review of Survey and Questionnaire

Survey and Questionnaire Evaluation

I am an experienced quality management associate with 34 (fill in blank) years in the quality management field. My knowledge on quality management is at a level that allows me to review the survey and questionnaire for Johnny Maddox's dissertation to determine if they accurately measure top management involvement in Total Quality Management and link to defect and profitability levels.

- After reading Johnny Maddox's survey, it is my opinion that it **does / does not (circle one)** accurately measure this concept.
- After reading Johnny Maddox's questionnaire, it is my opinion that it **does / does not (circle one)** accurately measure this concept.

Name Debbie Williams

Address _____

Home Phone _____

Work Phone _____

Education level
(Degree and Major)
BS Business Administration

_____

Job Position Supplier Quality Engineer

Signature/Date 9-10-08

Expert review of Survey and Questionnaire

Survey and Questionnaire Evaluation

I am an experienced quality management associate with 25 (fill in blank) years in the quality management field. My knowledge on quality management is at a level that allows me to review the survey and questionnaire for Johnny Maddox's dissertation to determine if they accurately measure top management involvement in Total Quality Management and link to defect and profitability levels.

- After reading Johnny Maddox's survey, it is my opinion that it **does** accurately measure this concept.
- After reading Johnny Maddox's questionnaire, it is my opinion that it **does** accurately measure this concept.

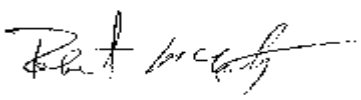
Name Robert McCarty
Address _____

Home Phone _____

Work Phone _____

Education level
(Degree and Major)
2 years / Science

Job Position Certified ISO/TS Auditor



Signature/Date 1 Sept 08

Expert review of Survey and Questionnaire

Survey and Questionnaire Evaluation

I am an experienced quality management associate with ___15___ (fill in blank) years in the quality management field. My knowledge on quality management is at a level that allows me to review the survey and questionnaire for Johnny Maddox's dissertation to determine if they accurately measure top management involvement in Total Quality Management and link to defect and profitability levels.

- After reading Johnny Maddox's survey, it is my opinion that it **does / does not (circle one)** accurately measure this concept. (**DOES**, based on the slight changes we discussed by phone on 9/8/08, i.e. Baldrige information, and strengthening some words in the topic, etc.)

- After reading Johnny Maddox's questionnaire, it is my opinion that it **does / does not (circle one)** accurately measure this concept. (**DOES**, based on the slight changes we discussed by phone on 9/8/08, i.e. Baldrige information, and strengthening some words in the topic, etc.)

Name Dr. Ron Snyder

Address _____

Home Phone _____

Work Phone _____

Education level
(Degree and Major)
Doctorate of Business Administration (DBA)

_____

_____

Job Position Associate Professor, Southern Wesleyan University, Central, SC 29630

Signature/Date Dr. Ron Snyder

Expert review of Survey and Questionnaire

Survey and Questionnaire Evaluation

I am an experienced quality management associate with 17 (fill in blank) years in the quality management field. My knowledge on quality management is at a level that allows me to review the survey and questionnaire for Johnny Maddox's dissertation to determine if they accurately measure top management involvement in Total Quality Management and link to defect and profitability levels.

- After reading Johnny Maddox's survey, it is my opinion that it **does / does not (circle one)** accurately measure this concept.
- After reading Johnny Maddox's questionnaire, it is my opinion that it **does / does not (circle one)** accurately measure this concept.

Name DENNIS E. DIEFFENBAUGHER

Address [redacted]

Home Phone [redacted]

Work Phone [redacted]

Education level
(Degree and Major) BSET UNIV. OF AKRON
EMBA KENT STATE UNIVERSITY

Job Position MANAGER - GLOBAL QUALITY - THE TIMKEN COMPANY

Signature/Date [signature] SEPT. 4, 2008

Expert review of Survey and Questionnaire

Survey and Questionnaire Evaluation

I am an experienced quality management associate with 20 (fill in blank) years in the quality management field. My knowledge on quality management is at a level that allows me to review the survey and questionnaire for Johnny Maddox's dissertation to determine if they accurately measure top management involvement in Total Quality Management and link to defect and profitability levels.

- After reading Johnny Maddox's survey, it is my opinion that it **does / does not (circle one)** accurately measure this concept.
- After reading Johnny Maddox's questionnaire, it is my opinion that it **does / does not (circle one)** accurately measure this concept.

Name Troy Collins

Address [redacted]

Home Phone [redacted]

Work Phone [redacted]

Education level
(Degree and Major)
B.S. – Business Administration/ Industrial Mgmt.

Credits toward my MBA

Job Position CEO- Frontline Management

Signature/Date 9-2-08

Expert review of Survey and Questionnaire

Survey and Questionnaire Evaluation

I am an experienced quality management associate with 5 (fill in blank) years in the quality management field. My knowledge on quality management is at a level that allows me to review the survey and questionnaire for Johnny Maddox's dissertation to determine if they accurately measure top management involvement in Total Quality Management and link to defect and profitability levels.

- After reading Johnny Maddox's survey, it is my opinion that it **does / does not (circle one)** accurately measure this concept.
- After reading Johnny Maddox's questionnaire, it is my opinion that it **does / does not (circle one)** accurately measure this concept.

Name Kanika Richardson

Address [redacted]

Home Phone [redacted]

Work Phone [redacted]

Education level
(Degree and Major)
MBA

Job Position Office Manager

Signature/Date Kanika Richardson 9/8/08

Expert review of Survey and Questionnaire

Survey and Questionnaire Evaluation

I am an experienced quality management associate with 22 (fill in blank) years in the quality management field. My knowledge on quality management is at a level that allows me to review the survey and questionnaire for Johnny Maddox's dissertation to determine if they accurately measure top management involvement in Total Quality Management and link to defect and profitability levels.

- After reading Johnny Maddox's survey, it is my opinion that it **does** accurately measure this concept.
- After reading Johnny Maddox's questionnaire, it is my opinion that it **does** accurately measure this concept.

Name Chris W. Trimble

Address [redacted]

Home Phone [redacted]

Work Phone [redacted]

Education level
(Degree and Major)
BA – Management Sangamon State University (Now the University of Illinois Springfield campus)

Job Position Supplier Development Engineer

Signature/Date Chris W. Trimble 02 September 2008