

**AN EVALUATIVE STUDY ON ATTEMPTS TO IMPROVE
THE QUALITY OF PROCESSES FOR THE U.S. SENATE
PRODUCTIVITY AND QUALITY AWARD FOR VIRGINIA**

by

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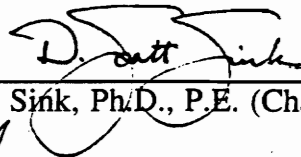
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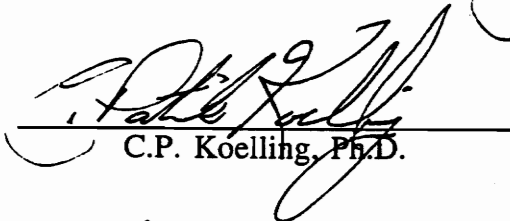
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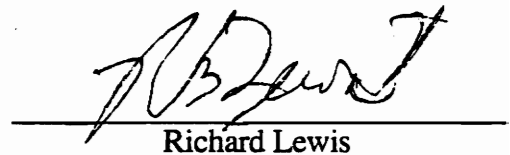
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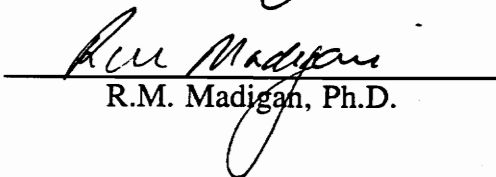
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ABSTRACT

Quality awards are formal award programs that have been established to recognize organizations (or sub-units thereof) for achieving excellence in quality and productivity. The criteria of these awards require a systematic and comprehensive program that is mature either from time or results. These awards are issued on a regular, typically annual, basis. The administrators of the awards can range from individual companies to state governments to the federal government. Recipients of these awards can be organizations or sub-units of organizations. Further, the recipients could involve specific projects and programs. The recipients are ultimately defined by the specific award process.

This thesis describes the quality award program in the State of Virginia. Overall, this thesis is a formative evaluation of the U.S. Senate Productivity and Quality Award for Virginia. This research reviews the processes used in determining winners for this award. Recommendations are made to improve the application evaluation and feedback processes, in particular.

The thesis describes the types of key performance indicators that organizations report in their applications. A set of common key performance indicators were collected to form a type of measurement system to assess the “health” of organizations in the State of Virginia. The purpose of this measurement system is to provide benchmarks to other organizations in the state. As a final output, this research compares the key performance indicators reported in applications to two measurement frameworks provided in the literature.

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While completing my thesis, I was also working part-time at the Virginia Quality and Productivity Center. I would like to thank Garry Coleman, Cindy Johnston, Dr. Marta Carter, and Dr. Tim Ludwig for providing me with professional opportunities that most students only dream about. I know I am truly a better professional thanks to these opportunities.

On a personal note, I have a number of friends who have been there for me. LeAnn Daugherty, Laurie Stevens, and Kristen Denson head the list. These friends were always there when I wanted to share a victory or cry on their shoulders. I will treasure these friendships forever. I want to thank Eileen VanAken for helping me jump the hurdles in writing my thesis. Last, but certainly not least, I want to thank the other two Musketeers, Kurt Black and Michael Groves. Thanks for your help, but, most of all, thanks for your friendship.

I would finally like to dedicate this research to Donna and George Powell, my mother and stepfather; without their support this would have been a difficult road to travel. I also would like to dedicate this research in the memory of my father, Donald Simmers. I only wish that he could see how I have been able to put my engineering education into practice.

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CHAPTER 1 - INTRODUCTION

This document describes a research project completed for partial fulfillment of a master's degree in the Management Systems Engineering concentration within the Industrial and Systems Engineering Department. This document describes the project from conception to completion. Also included are body of knowledge reviews on quality awards, measurement, benchmarking, and research.

1.1 Background of the Project

The United States Senate Productivity and Quality Award (SPQA) for Virginia was instituted ten years ago as a result of a Senate resolution. This annual award was initiated to promote awareness of productivity and quality initiatives around the state. An additional goal was to recognize those organizations within the State of Virginia that had achieved "excellence" in these areas (i.e., high performing organizations). This award currently has four categories (Private Sector Manufacturing, Private Sector Service, Public Sector - State and Federal Agencies, and Public Sector - Local Agencies) in which organizations can be awarded a medallion. There is also an Award for Continuing Excellence (ACE) reflecting the need to recognize those organizations which are continually improving with respect to quality and productivity.¹

Over the years, SPQA has continuously improved. For example, initially there were only two categories in which organizations could apply: manufacturing and non-manufacturing. Further, the application evaluation criteria have also been modified over the years. Operational definitions have changed significantly from the first award. Currently, there are eight criteria evaluated for this award (see Table 1-1).

¹ A pre-requisite for applying for the ACE is that an organization must have won the SPQA medallion a minimum of three years prior to application for the ACE.

**Table 1-1 – SPQA for Virginia 1993 Application Evaluation Criteria
(SPQA Application, 1993)**

Application Evaluation Criteria	Operational Definition
<i>Maturity of Effort</i>	Assesses the continuity of effort, depth, breadth and age of the effort, quality of methods and approaches.
<i>Employee Involvement, Development and Management of Participation</i>	Assesses the extent to which the performance improvement effort is deployed at all levels throughout the organization.
<i>Recognition and Rewards Systems</i>	Assesses the employee motivation system within the organization.
<i>Plan for Continuous Improvement</i>	Assesses the extent to which business plans, strategic plans and performance improvement plans are comprehensive and well integrated.
<i>Performance Measurement Process</i>	Assesses the extent to which measurement, data and information are used to support decision-making at all levels.
<i>Customer and Supplier Involvement</i>	Assesses the extent to which the organization is truly managing quality and productivity “totally,” by involving suppliers and customers as partners in the business.
<i>Results Over Time</i>	Assesses both qualitative and quantitative results.

Throughout the years, the Virginia Quality and Productivity Center (VQPC) has maintained a database of all data and information provided through the SPQA process. These documents provided a wealth of data that had not been explored in a systematic fashion. The goal of this research project was to review these data and identify those key performance indicators that organizations report within their applications, how SPQA applicants within the State of Virginia perform on common indicators, describe the decision-making process used to identify the best organizations, and make recommendations to improve that process.

1.2 Research Scope

I have analyzed the data available from the SPQA in the following areas: (1) information provided in applications and site visit materials; (2) information provided in conference handouts; and (3) information from the SPQA Board Members with respect to how they make decisions on medallion recipients. This research was guided by the following problem statement, research objectives, and research methodology.

1.2.1 Problem Statement

The SPQA Board has continuously tried to improve the process by which it makes decisions on the medallion winners of the SPQA. The Board relies on the information provided in applications and from site visits to make its decisions. There has not been a comprehensive analysis of the data from the applications or the decision-making process used by the SPQA Board.

As a means to continuously improve the award-making process of the SPQA for Virginia, this research identified key performance indicators reported by organizations within their applications, reviewed the decision-making process used by the SPQA Board, and made recommendations on how to improve the award and its processes.

1.2.2 Conceptual Research Model

In undertaking a research project of this magnitude, it is important to have a framework that guides decisions and actions with respect to the research. This framework delimits the domain and provides a picture of what it is the researcher is attempting to study. For the purpose of this thesis, I identified two underlying frameworks for my research: Grand Strategy System and the Management System Model.

1.2.2.1 Grand Strategy System

The mission of the Virginia SPQA is to recognize those applicant organizations within the State of Virginia that have designed, developed, and implemented an exceptional continuous improvement system that results in increased productivity and quality. With that in mind, the Grand Strategy System provides a framework that can be used to assess whether or not a system is comprehensive.

The Grand Strategy System (see Figure 1-1) consists of three components: (1) documenting the past and present; (2) major sub-systems of activity; and (3) a plan for the future. The SPQA requires applicants to provide a summary of the past and present activities within major sub-systems. Sink and Monetta (1991) have defined eight major sub-systems of activity as seen in Figure 1-1.² These sub-systems are reflected in the criteria identified within the SPQA application. Last, the SPQA application requires a summary of the organization's plan for continuous improvement. As you can see, the SPQA Board has designed its application such that it requires an organization to provide a systemic view of its continuous improvement efforts.

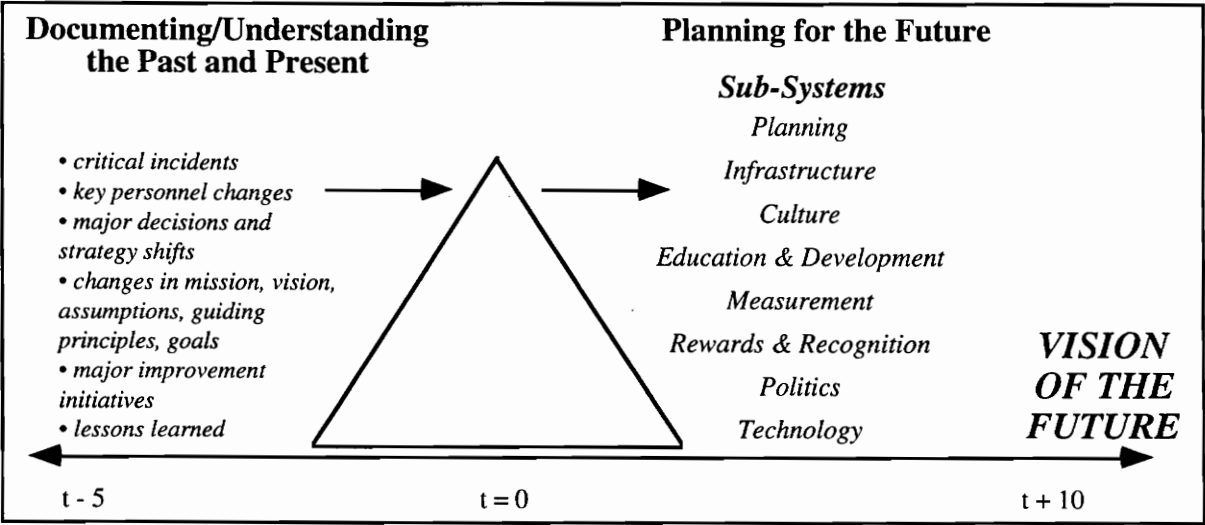


Figure 1-1 – Grand Strategy System (Sink and Monetta, 1991)

² These sub-systems are not considered to be all-encompassing but are reflective of the sub-systems identified by the research of Sink and Monetta.

1.2.2.2 Management System Model

Going from a general framework for this research (Grand Strategy System) to a more specific framework, I identified the Management System Model (see Figure 1-2) as my underlying conceptual framework for the work I completed within my thesis.³ The Management System Model (MSM) provided a simple framework for describing a management system, its components, and their relationships. This model represents the system as a closed system; therefore, no external influences (i.e., environmental influences) are included. This model represents a “snapshot of the domain at one point in time” (Kurstedt, 1992).

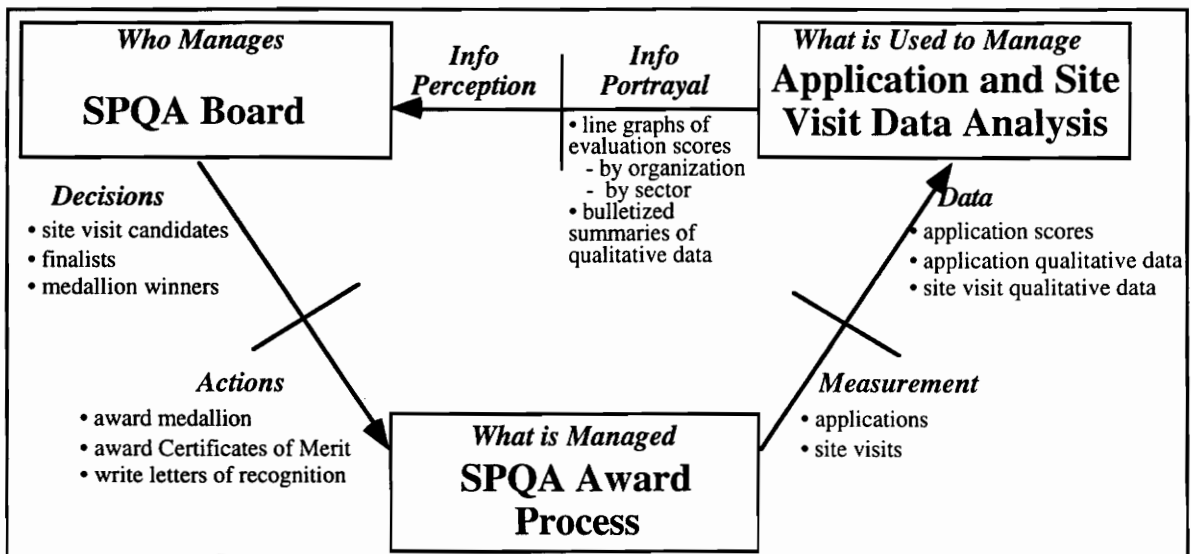


Figure 1-2 – Management System Model (adapted from Kurstedt, 1992)

There are three main components to this simple, closed system model. The “who manages” component is anyone who makes decisions that result in actions that affect “what is managed.” The “what is managed” component includes the things the manager is

³ This model has been adapted, so that it illustrates the specific content of my research.

responsible for. The “what is used to manage” component is comprised of the tools managers use (Kurstedt, 1992). This model also includes three interfaces between the main components: (1) decisions to actions; (2) measurement to data; and (3) information portrayal to information perception. These interfaces help describe how the “who manages” progresses through the system and how the components are interrelated.

Within the context of my research, I have defined the primary components of the MSM as: (1) “who manages” = SPQA Board; (2) “what is managed” = SPQA award process; and (3) “what is used to manage” = application and site visit data analyses. I have also identified the specific data, decisions, and actions that are used with respect to the SPQA award process.

The MSM helped me to identify all of the pieces used in the SPQA decision-making process. This model doesn’t reflect influences from external forces but does fairly accurately describe the general process used to award SPQA medallions.

1.2.3 Research Questions

What follows is a list of research questions I addressed within this research project:

- (1) What key performance indicators do organization(s) provide in their application(s)?
- (2) When looking at common key performance indicators across organizations within a specific sector, how do the SPQA applicants perform on these indicators?
- (3) What decision-making process is used by SPQA Board Members when selecting “best-of-the-best” organizations from the applicant pool?
- (4) How can the SPQA for Virginia be improved from a process standpoint?

1.2.4 Research Objectives

I (1) reviewed SPQA applications and identified key performance indicators that many organizations report within their applications; (2) attempted to draft a scale for some of the common indicators and a visible measurement system of the entire group of common indicators with respect to how organizations within the State of Virginia perform on these indicators; (3) described the decision-making process used by the board members; and (4) made recommendations to improve the SPQA for Virginia.

1.3 Desired Research Outputs

The main output of this research was a written thesis. Within this thesis, I developed a laundry list of performance indicators that organizations reported within their SPQA applications. Next, I attempted to identify where the “best” organizations within the State of Virginia perform on common performance indicators.⁴ I also included a description of the decision-making process used by the SPQA board members in determining medallion winners for the SPQA for Virginia as well as a detailed list of improvement recommendations to the SPQA Board.

I discovered that I had underestimated the time it would take me to complete my thesis; therefore, I was unable to complete all of the outputs as proposed in my proposal. I will provide the SPQA Board with a report of output from this research (i.e., synopsis of my thesis), as well as a presentation at a SPQA Board meeting. Last, I identified future areas of research for the SPQA for Virginia.

1.4 Desired Research Outcomes

The primary desired outcome for this research is an approved thesis by my committee. Through this research, I hope to contribute to the Body of Knowledge on quality awards and evaluation of organizational performance. More specifically, I hope to

⁴ This output was dependent on the data review/analysis portion of the methodology.

provide the SPQA Board with an analysis that it can use to improve the effectiveness of the SPQA. Next, I would like the outputs from my research to be used to improve the evaluation and feedback processes of the SPQA. Last, I hope to gain an understanding of the research process itself, so I can perform future research using a more effective and efficient process.

1.5 Measures of Success

The main measure of success for this project is the successful completion of the research outputs. An additional measure of success will be if the SPQA Board uses the information provided in this thesis to improve the SPQA process, specifically improvements to the application, feedback, and evaluation processes. A measure of effectiveness will be evaluated by determining if I have completed all of the steps of my research methodology. Efficiency will be measured by whether I completed the thesis in the proposed period of time.

1.6 Assumptions/Delimitations of this Research

I explored the data provided by the SPQA for Virginia. I did not make conclusions about the effectiveness of the award itself. Further, I did not directly examine the effectiveness of the award application. My data collection was bounded by the organizations who have applied for the SPQA within the State of Virginia. I also followed the assumption that the “best” organizations in Virginia are indeed applying for this award. I used current SPQA board members as my population from which to describe the decision-making process used within the SPQA.

1.7 Justification for This Research

In considering the justification for this research, I approached the response from three different perspectives: (1) Industrial Engineering; (2) Social/Political; and (3) Educational.

1.7.1 Industrial Engineering Aspects of the Research

Traditionally, Industrial Engineers (IEs) have often been used in organizations to develop measurement systems, so managers in organizations can make good decisions. In this research project, I identified key performance indicators for organizations (i.e., information used by the SPQA board to make decisions) through my SPQA data analysis. These indicators form a “measurement system” for organizations in Virginia. The SPQA Board could possibly use the information from this measurement system to make decisions with regard to awarding the SPQA medallion for each award category. In looking at Figure 1-3, this research project will describe how the information in the shaded area A drives the decisions/actions of the SPQA Board (depicted by the shaded area B). Therefore, this project emphasizes the need for the linkage between measurement and decision-making.

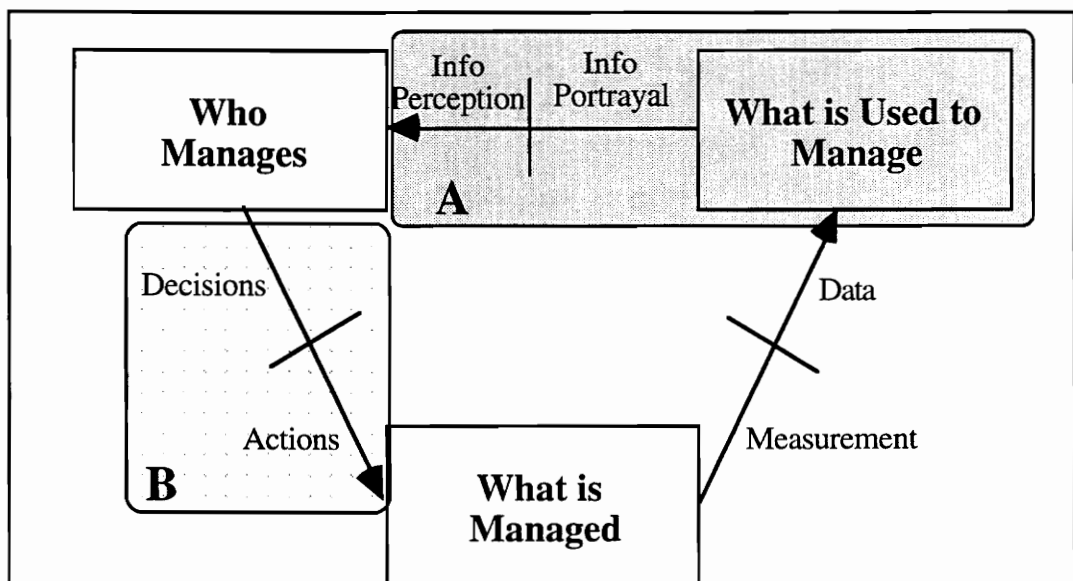


Figure 1-3 – Management System Model (adapted from Kurstedt, 1992)

1.7.2 Social/Political Contribution

The SPQA for Virginia is sponsored by the Virginia State Senators, Charles Robb and John Warner. Further, the SPQA Board is comprised of top-ranked officials in various organizations within the State of Virginia. These individuals give freely of their time to support this award. They believe (i.e., implied by their continued support) that this award is a worthy cause to pursue. Further, organizations continue to apply for this award as a means to assess whether they are the “best” or if improvement needs to occur. Any effort made to improve the decision-making process within this award to improve the quality of the output will be an effort that will help improve organizations within the State of Virginia.

1.7.3 Educational Contribution

This research project has enabled me to identify the skills required to conduct research. Further, it provided me an opportunity to hone my own skills in this area. Last, I believe that the output of my research will provide a foundation on which other students can build in future years to continue improving the SPQA for Virginia.

1.8 Researcher’s Bias

In scoping out this research project, I have identified biases that could cloud the results of my research. I feel it is important to identify these, so that the paradigms that I worked under are clear.

First, I viewed this project in direct support of my work at the VQPC. I have been trained to continuously improve the processes within the organizations, and I believe this thesis will help move the SPQA Board closer to achieving the goal of having a state award as prestigious as the Malcolm Baldrige National Quality Award.

Next, I truly believe that the SPQA for Virginia has the potential to become a forum for organizations to draw knowledge from. I believe that organizations must work together in order to improve society. My vision is for SPQA to provide such a forum to low-performing organizations, so they can take the opportunity to learn from the best.

CHAPTER 2 - REVIEW OF THE BODY OF KNOWLEDGE

This chapter is written to provide the reader with an understanding of the underlying concepts and theories that have guided this research. The Review of the Body of Knowledge includes a compilation of the knowledge I have gained through reading, writing, and practical experience in the areas of quality awards, benchmarking, measurement, and research.

2.1 Quality Awards

2.1.1 Quality Awards Defined

For the purpose of this research, quality awards are formal award programs¹ that have been established to recognize organizations (or sub-units thereof) for achieving excellence in quality and productivity. The criteria of these awards require a systematic and comprehensive program that is mature either from time or results. These awards are issued on a regular, typically annual, basis. The administrators of the awards can range from individual companies to state governments to the federal government. Recipients of these awards can be organizations or sub-units of organizations. Further, the recipients could involve specific projects and programs. The recipients are ultimately defined by the specific award process.

2.1.2 Malcolm Baldrige National Quality Award

2.1.2.1 Background

President Ronald Reagan signed the Malcolm Baldrige National Quality Improvement Act in 1987. The Malcolm Baldrige National Quality Award (MBNQA) was

¹ This Body of Knowledge Review will consider only the Senate Productivity and Quality Award for Virginia and the Malcolm Baldrige National Quality Award. The major focus will be on the SPQA.

established to accomplish two main objectives: to raise the awareness of business leaders to quality and productivity issues and to provide a framework for measuring the quality efforts undertaken by the U.S. industry (Garvin, 1991). The act didn't describe the scoring system, judging process, or criteria; these were developed by a group of individuals who were considered to be experts in the quality arena.

Currently, the MBNQA is only open for private sector applicants. There is no category for public sector applicants at this time. However, there have been suggestions that the MBNQA will open categories for education and health care applicants in the near future. The award currently has three categories in which applicants can submit packages: manufacturing, service, and small business. The MBNQA requires a significant application fee, \$4000 for manufacturing and service and \$1500 for small business. If an organization receives a site visit, then it's responsible for all costs incurred during that site visit.

There are seven criteria within the MBNQA: leadership; information and analysis; strategic quality planning; human resource development and management; management of process quality; quality and operational results; and customer focus and satisfaction. The framework has four basic elements: driver, indicated through visionary executive leadership; goal, aiming for delivery of improving product value to customers; system, the set of well-defined and well-designed processes for meeting customer requirements; and measures of progress, indicating results. Figure 2-1 shows the relationships between the criteria and the elements of the basic framework for the MBNQA.

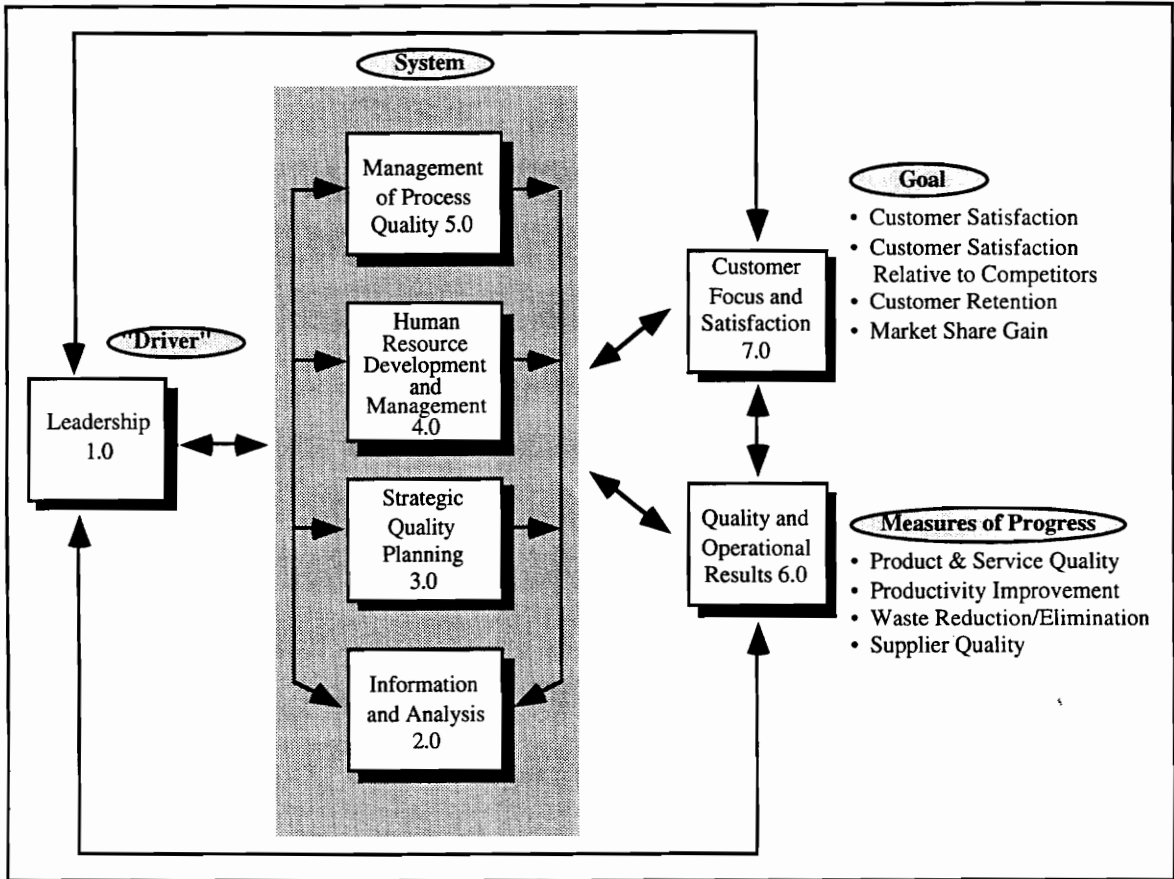


Figure 2-1 – Baldrige Award Criteria Framework – Dynamic Relationships (NIST, 1993)

The award was built on a set of core values that demonstrate understanding of the overall customer and performance requirements. *Customer-driven quality* is a strategic concept that is illustrated throughout the criteria, emphasizing not only meeting customer requirements but rather exceeding these expectations. Extending upon this concept is the need for *fast response* to growing demands in the marketplace as well as *designing quality and prevention* into processes and products. In considering *continuous improvement*, the MBNQA looks for signs that improvement is embedded in the workplace rather than existing in a superficial level, such as a “program of the month.”

The MBNQA recognizes that *leadership* is the foundation upon which any successful quality improvement effort must be built. There must be commitment from the leaders to ensure that the entire work force is enabled to participate in the process. Also, there must be a management system in place that allows leaders to *manage by fact* rather than intuition. Leaders have a *corporate responsibility* to maintain an ethical and safe environment for employees to work in. *Employee participation and development* help ensure that the other core values are met. This goes back to “happy workers are productive workers.” The MBNQA looks specifically at employee development, since the employees are the rocks with which the organization is built. Last, organizations must be taking a *long-range outlook*, so they’ll be prepared for the future.

As you look at the pieces of the MBNQA (values, criteria, framework), you’ll find exactly what Garvin (1991, p. 86) talks about in his critique about the award. The award provides an “encompassing set of categories that tells companies where, and in what ways, they must demonstrate proficiency – but not how to proceed.”

The organization that chooses to use the criteria to honestly and repeatedly examine its quality improvement efforts and how well they are working, and then uses this information to make effective choices for change will align itself with its customers’ needs, be supportive of its employees, and innovatively and continuously improve its products and services to the delight of all its customers (Ritter, 1993, p. 182).

2.1.2.2 Current Award Process

The award is currently managed by the National Institute of Standards and Technology (NIST) and administered by the American Society of Quality Control (ASQC). The Board of Overseers is the advisory organization associated with the MBNQA, specifically responsible for assessing how well the MBNQA is serving the national

interests. Further, the Board of Overseers evaluates all aspects of the Award Program. Evaluation of applications is conducted by a Board of Examiners. The Board of Examiners consists of more than 270 members, 9 of which serve as judges and 50 serve as Senior Examiners.

There are four stages of the MBNQA evaluation process: review of the written application; consensus review of the written application; site-visit review; and judges' final review (American Productivity & Quality Center, 1993). Each organization receives a detailed feedback report from the judges' assessments. This feedback report is prepared only after an organization has been eliminated from the next step in the award process.

In the first stage of the evaluation process, applications are reviewed by five or more members of the Board of Examiners. The application is graded in accordance with examination guidelines prescribed in the award process. Judges then select the top-scoring applications for further review. Next, a consensus review is conducted of the top-scoring applications by five examiners, led by a senior examiner. A consensus numerical score of each category is agreed upon in this stage of the review. This step is critical for the award process, because the consensus score is the numerical value used to determine which organizations will receive site visits.

Finalists are selected based on the consensus scores of the top-scoring applications. A site visit team, consisting of six members of the Board of Examiners including a senior examiner, visits one or more sites of the applicant to verify the information presented in the application. Following this visit, judges meet for a final review of the results and make recommendations to the Secretary of Commerce for selection.

The MBNQA allows recipients to be notified prior to their receipt of the actual award. This policy is not necessarily standard for all award programs, as we will see with respect to the SPQA for Virginia.

2.1.2.3 Problems/Concerns.

There have been several issues raised in the literature regarding whether the MBNQA is a “good thing.” Phillip Crosby, a renowned author in the subject area of quality, has some definite issues he feels need to be raised with respect to the MBNQA. They are: (1) organizations can nominate themselves, but the true measure of quality comes from the customer; (2) the criteria are old-fashioned and resemble quality control practices from years ago; (3) examiners are considered to be experts and are often used in a consultant type role; this appears to be a conflict of interest; and (4) only a few select organizations can be recognized through this process in a given year (“Does the Baldrige Award Really Work?” 1992). These comments are indicative of those raised by the MBNQA opponents.

In looking at the MBNQA, some opponents feel that the Baldrige Award focuses too much on results and not on the processes. Additionally, the criteria may be defined such that organizations can misinterpret the meaning. For example, the MBNQA does not caution against using benchmarking as simply a means to “copy” best practices. Organizations could find themselves in the same predicament that organizations were years ago when they implemented Frederick Taylor’s scientific management without keeping the model “pure.”

Another criticism of the MBNQA is that it doesn’t focus on profitability. The bottom line for success, or so some say, is whether or not you’re profitable. This criticism has been raised because some of the MBNQA winners have fallen victim to poor sales and earnings growth following receipt of the award. With this in mind, I have to go back to some of Dr. Deming’s teachings where he encourages us to focus on the process rather than the results. If you consider that you must focus on the process, then the MBNQA achieves its purpose. If you change the goal of the award, then you haven’t remained “pure” to the model.

Some critics believe that the MBNQA requires too large of an application fee for many organizations to justify applying. In fact, some individuals have been noted as writing that they believe organizations can “buy” the MBNQA through the use of examiners as consultants as well as buying a significant amount of internal labor to simply complete the application. On the other hand, though, some winners of the MBNQA have refuted this claim. Where some organizations have used significant resources, others have not. It’s important not to make generalizations based on one or two data points.

A more serious flaw that has been raised in the literature relates to whether the award promotes competition or cooperation. The award does recognize high scoring applicants. However, the judges don’t limit the award to one winner. The Board of Examiners will issue as many Baldrige Awards as there are organizations that meet the minimum level of award achievement.

Dr. Deming has been quoted as saying, “All models are flawed. Some are useful.” I believe it’s important for organizations to understand where the MBNQA is flawed as well as what it can be used for. The MBNQA is not intended to be a “cure-all” for quality and productivity improvement. Rather, it’s intended to be a roadmap to guide organizations in the right direction of achieving quality.

2.1.3 U.S. Senate Productivity and Quality Award for Virginia

2.1.3.1 Background

The United States Senate Productivity and Quality Award for Virginia² was instituted in December 1982 when the United States Senate passed Resolution 503 (see Appendix A). This annual award was initiated to promote awareness of productivity and

² The original title for the SPQA was the U.S. Senate Productivity Award for Virginia. The title was changed in the 1992 award cycle.

quality initiatives around the state. An additional goal was to recognize those organizations within the State of Virginia that had achieved “excellence” in these areas.

The Award for Continuing Excellence was established in 1989.³ This award was designed to recognize past SPQA recipients who have continued to grow and show strides in the area of quality and productivity improvement. Applicants for ACE must have received their medallion at least three years prior to applying for ACE. Further, the organizations are expected to not only have maintained their level of improvement from the previous medallion-winning site visit but to have improved since that visit.

All states are eligible to have a Senate Productivity and Quality Award, but not all states take this opportunity. Virginia’s award process is the longest continuously running award process. In fact, other states, such as Alabama and Nevada, have used Virginia’s process as a model for developing their own award program (Ingold and Johnston, 1993).

Senators John Warner and Paul Trible initially appointed the 18-member Board of Directors for the award in 1982. Since then, the Board has established its own guidelines for re-filling seats. There are currently three permanent seats on the Board held by the Virginia Chamber of Commerce, the U.S. Small Business Administration, and the Virginia Quality and Productivity Center (administrators of the award). The remaining seats are filled by new members for a term of three years. These seats are filled by members of award winning organizations, academic institutions, and regional quality councils. The Board attempts to maintain a balance, so that large and small organizations as well as public and private sector organizations are represented.

The Board of Directors is responsible for establishing policies and procedures for the SPQA. This Board also conducts the evaluation and feedback processes in determining recipients of the SPQA. The VQPC provides administrative and technical support to the Board. This support includes coordinating all logistical arrangements regarding the award

³ This thesis will not detail the process used for awarding an ACE.

process (e.g., receiving and distributing applications, conference logistics). Additionally, the VQPC supports the Board's decision-making process by providing support in consolidating all evaluations of the applications. This technical support results in evaluation packages that are distributed to the Board, so members can use the data and information to make decisions regarding the applications. The VQPC also provides technical advice in designing the SPQA application.

The culmination of the award process is a two day conference held annually. This conference attempts to balance the concepts of sharing knowledge and information. This balance is achieved by first providing a workshop on the first day of the conference. This workshop is designed, so that participants will receive knowledge in the most current tools and techniques with respect to implementing quality and productivity improvements.

The second day of the conference allows participants to gain information from applicant organizations. Each finalist presents a fifteen minute presentation on a core competency that the Board has identified through a site visit. These presentations have become more focused in the past year, so participants will receive information that shows depth in a topic rather than breadth across topics.

There are three levels of recognition within the SPQA for Virginia. The first level of recognition is signified by a Certificate of Merit. This level recognizes those organizations who appear to have the foundation of an up and coming quality and productivity program, but the program doesn't appear to have been fully deployed throughout the organization. The Certificate of Merit may be awarded to as many organizations as the Board feels appropriate.

The U.S. Senate Productivity Award Plaque is awarded to finalists within the SPQA process. This plaque signifies that the organization has a successful quality and productivity program and deserves to be recognized as one of the "best of the best" organizations in the State of Virginia. The U.S. Senate Productivity Award Medallion is

awarded to organizations who have been identified as the “best” applicants in any given category. The 1993 award process cycle marks the first cycle that medallions were awarded to multiple organizations in any one category.

It’s important to note that any organization which receives any of the three forms of recognition from the Board of Directors is worthy of congratulations. Each year the top grading mark appears to be moving higher and higher, reflecting the improvements organizations in the State of Virginia are making.

2.1.3.2 Changes in the Award Process

Since the inception of SPQA, there have been many changes in the award process. Four of the most noteworthy changes have been in addition of categories, changes in the application criteria, changes in the evaluation process, and changes to the medallion selection process.

2.1.3.2.1 Application Categories. In 1982 when the award was established, there were only two categories under which organizations could apply, manufacturing and non-manufacturing. These categories were open for public as well as private sector organizations. In 1986, the categories were split to include private sector manufacturing, private sector service, and public sector – state and federal agencies. In 1988, the Board added a fourth category, public sector – local agencies. These categories expanded as a result of increased applications in a given sector. The Board added categories so that organizations would be compared against similar organizations, thereby increasing the face validity of the award.

2.1.3.2.2 Application Criteria. In the beginning, the SPQA focused primarily on criteria that reflected the desire for productivity improvements. Also, the award appears to

have recognized excellent productivity projects as well as programs. Through the years, the criteria have evolved such that the criteria now provide a systemic view of quality and productivity improvement in organizations. The criteria not only focus on productivity improvement but also reflect the cultural changes in focusing on quality as well. Currently, there are eight criteria evaluated for this award (see Table 2-1).

**Table 2-1 – SPQA for Virginia 1993 Application Evaluation Criteria
(SPQA Application, 1993)**

Application Evaluation Criteria	Operational Definition
<i>Maturity of Effort</i>	Assesses the continuity of effort, depth, breadth and age of the effort, quality of methods and approaches.
<i>Employee Involvement, Development and Management of Participation</i>	Assesses the extent to which the performance improvement effort is deployed at all levels throughout the organization.
<i>Recognition and Rewards Systems</i>	Assesses the employee motivation system within the organization.
<i>Plan for Continuous Improvement</i>	Assesses the extent to which business plans, strategic plans and performance improvement plans are comprehensive and well integrated.
<i>Performance Measurement Process</i>	Assesses the extent to which measurement, data and information are used to support decision-making at all levels.
<i>Customer and Supplier Involvement</i>	Assessing the extent to which the organization is truly managing quality and productivity “totally,” by involving suppliers and customers as partners in the business.
<i>Results Over Time</i>	Assesses both qualitative and quantitative results.

2.1.3.2.3 Evaluation Process. The evaluation process used by the SPQA Board has evolved over time. This process began, in 1982, as a qualitative assessment of applications. The Board members used intuition and business sense as their base upon which to draw their conclusions. Awards were distributed based on the intuitive conclusions achieved.

In the 1992 award cycle, the VQPC introduced the concept of a scorebook to the Board. This scorebook (see Appendix B) was designed based on the guidelines that the Malcolm Baldrige examiners use in their award process. The Board used this scorebook to produce quantitative scores for each application. These scores were provided to the Board in graphical form, so Board members could use this information to make decisions on award recipients.

The 1993 award cycle represented a continuous improvement effort from the previous year. The Board used the scorebooks as previously designed. However, the VQPC took the raw data and portrayed in different graphical means (see Appendix C). A graph was designed to show ratings for each organization for each criterion (see Figure 2-2). Ratings from each rater were displayed for each criterion. This graph allowed the Board members to determine if high or low scores possibly might need to be discarded to show a true score. In comparing this graph across organizations, the Board members found that most raters were consistent in all of their ratings (i.e., either high or low).

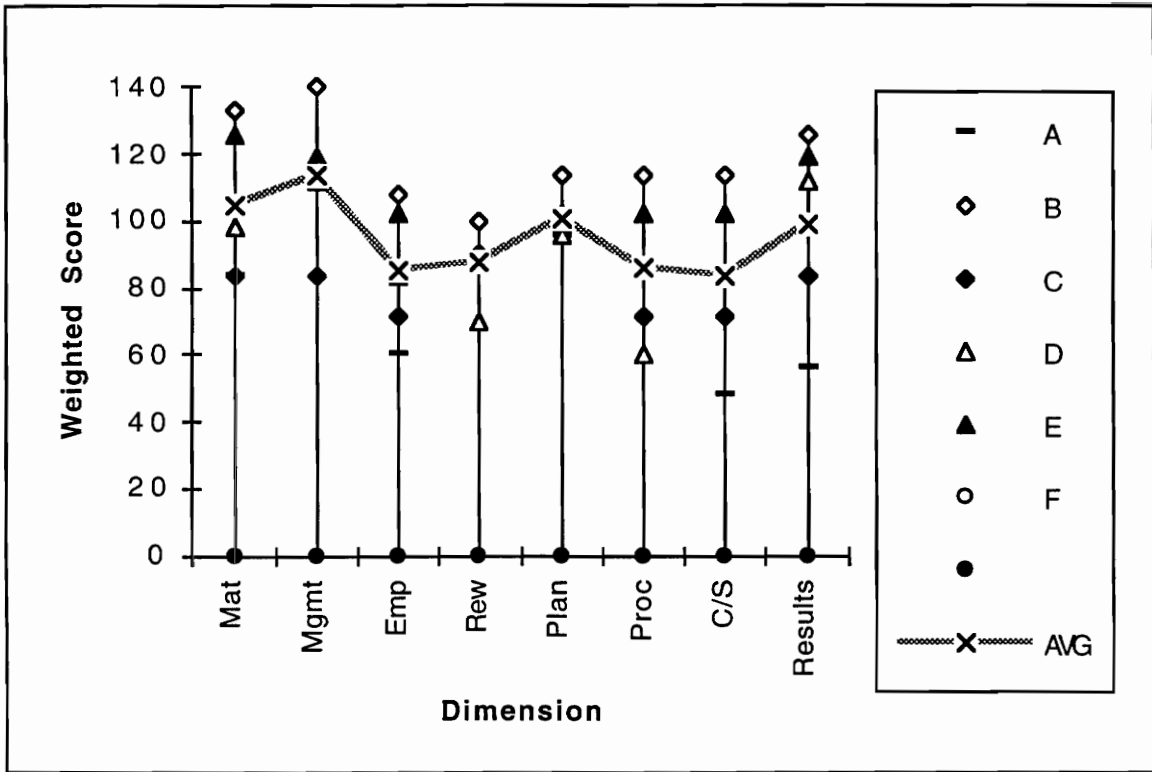


Figure 2-2 – Overall Inter-rater Differences in Rating Applications for One Organization (Sample Graph)

Then, a graph was designed to show the average ratings for all organizations within a given category for each criterion (see Figure 2-3). This graph depicted the range of scores for all organizations for each criterion. This graph helped the Board members identify potential site visit issues, particularly where a low score on a given criterion was evident.

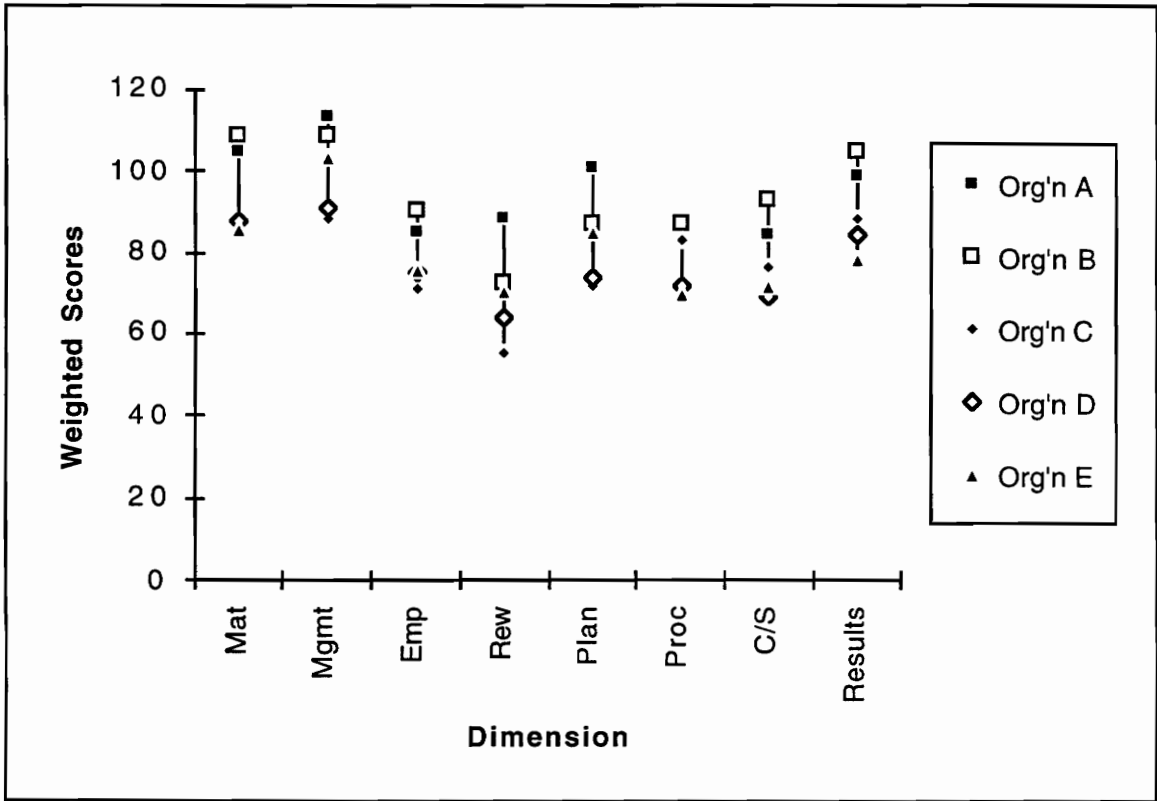


Figure 2-3 – Average Ratings for all Organizations for each Criterion (Sample Graph)

Last, an overall bar chart was developed to show average total ratings for all organizations within a given category (see Figure 2-4). This chart depicted where each organization fell in the overall rating and ranking of applications. This bar chart was used to establish a Pareto chart of which organizations should definitely be considered further.

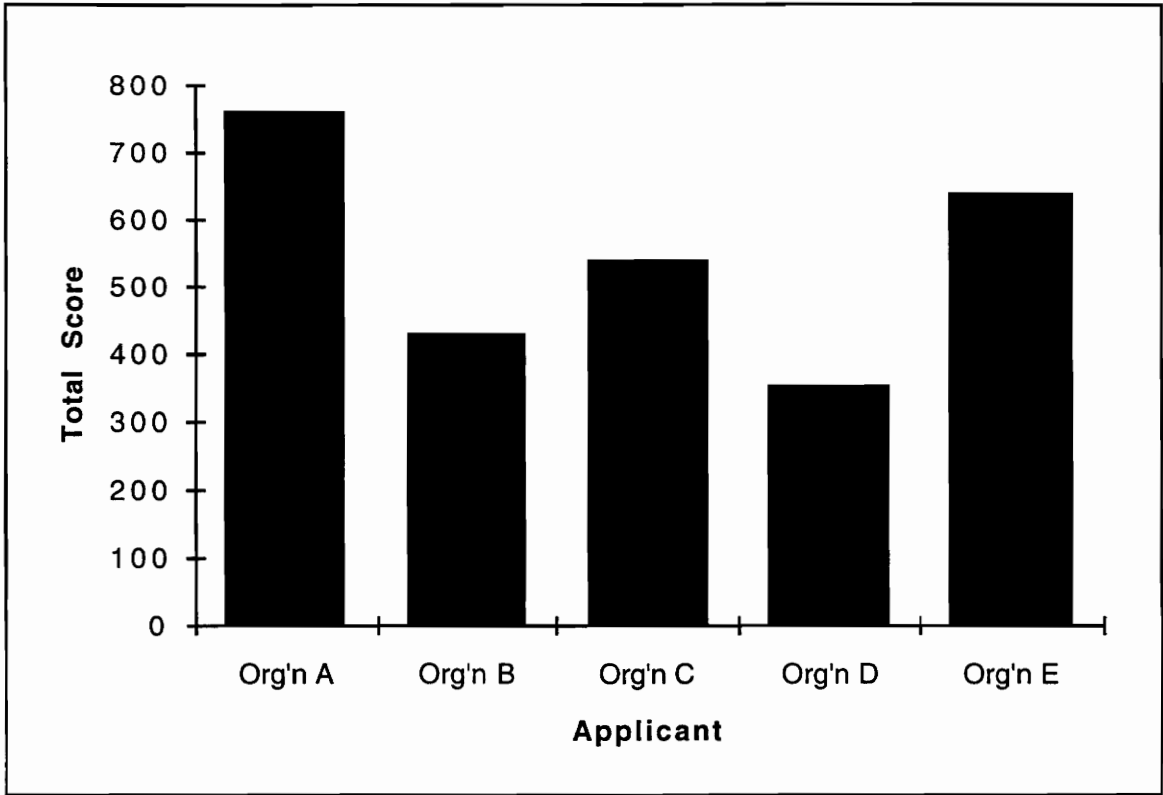


Figure 2-4 – Average Ratings for all Organizations (Sample Bar Chart)

The last portion of the new evaluation process included a compilation of all qualitative comments made in the scorebook. These comments focused on site visit issues, strengths, areas for improvement, and justification for the score. Comments were compiled for each criterion under review. If multiple reviewers made a similar comment, then a notation of (ii) = two people, (iii) = three people, etc. was used. A sample of the qualitative compilation is provided in Table 2-2.

Table 2-2 – Sample Qualitative Compilation of Reviewer Comments

Performance Dimension #4-- Rewards and Recognition

Strengths:

- Rewards/recognition now being studied by the TQI Executive Steering Committee
- 100 employees recognized for helping neighboring communities hit by a tornado
- As productivity results in savings, employees are eligible for a bonus (iii)
- Performance linked compensation since 1985
- Must generate unappropriated funds for pay out
- Recognition system identifies team and individual efforts

Areas for Improvement:

- Only 20% of people share in the bonuses from productivity gains
- Use of teams to review perf. mgt. system and rewards and recognition
- They recognize the need for improvement by establishing a charter for this in August
- Job security not addressed - could be issue in public service

Site Visit Issues:

- How are rewards publicized?
- Understanding of how bonus system works and the criteria for productivity target and payout

Justification of the score:

- Sound systematic system of motivation exists
- Employee's bonus is a direct result of productivity gains
- Motivation system is in place to generate continual improvement
- Innovative approach

2.1.3.2.4 Medallion Recipients. From the 1982 to the 1992 award cycles, a maximum of only one medallion recipient was awarded for each category. The 1993 award cycle, however, represented a major break in a ten-year paradigm. Two medallions were awarded in both the private sector manufacturing and the public sector – local agencies categories. As a result of the detailed quantitative analysis provided as well as the list of qualitative issues to review at site visits, Board members found it difficult to distinguish between first and second choices in the identified categories. This not only represents an improvement in the evaluation process but also represents an improvement in the quality of the applications and organizations.

The Board made a decision during the 1993 award cycle that it would adopt a procedure similar to the Baldrige Award. The SPQA medallion would be awarded to any

organization that reaches the upper level of achievement in quality and productivity improvement. Multiple medallion winners will be selected if the Board is unable to distinguish between upper rated applicants.

2.1.3.3 Current Award Process⁴

The award process for the SPQA for Virginia begins with the selection of new Board members at the end of an award cycle. New Board members are selected based on the current needs of the Board. That is, what sectors and types of organizations are currently represented on the Board? Who would be able to give the time commitment as well as fill an infrastructural gap within the Board?

Following the selection of new Board members, a training session is held. This training session helps familiarize new members with the application evaluation process. This evaluation process includes reading the application, quantitatively scoring the application based on scoring guidelines, and qualitatively assessing the components of an applicant's continuous improvement effort. These assessments are converted into a data evaluation package which includes line graphs of numerical scores as well as a compilation of qualitative comments.

The actual SPQA application is reviewed in parallel with the training efforts. The application is reviewed for criterion changes as well as format changes. For example, a proposed change for the 1994 application will be to include brief descriptions of the scoring guidelines used in the evaluation process. Once changes have been made and are approved by the Board, the application is printed and distributed.

Applications are distributed to a wide variety of organizations, using databases provided by the VQPC, Virginia Chamber of Commerce, as well as the *Virginia Business* magazine. Completed applications are returned to the VQPC, so they can be distributed to

⁴ A detailed process flow diagram of the award process is provided in Appendix D.

five to ten Board members each. Board members are asked to evaluate approximately five to ten applications each, depending on how many applications are submitted for review. Board members who will be leading site visits for a given category are requested to read all applications within that category.

After the applications are scored, they are forwarded to VQPC for compilation of the results. These results are put into a data evaluation package for the Board. This evaluation package is provided to the Board prior to its making final decisions on who receives recognition (i.e., certificate of merit, site visit). It's important to note at this point that applicants who receive site visits are not guaranteed any form of recognition. In the past, Board members have selected finalists for site visits, and, following the visit, determined the organization should not be a finalist. But, there was no way to correct the error. The process has changed such that finalists are chosen following the site visit.

Individuals who will be attending site visits congregate in their respective groups to discuss the evaluation results. The team leader then prepares recommendations for the Board based on that discussion. The Board meets as a total entity to discuss recommendations for applicants. A consensus is gained before a recommendation is accepted.

Once recommendations have been accepted, Site Visit Team Leaders provide specific feedback to applicants who did not receive recognition or who received Certificates of Merit. Further, they notify applicants who have been selected for site visits. Site visits are conducted within the next two to three months.

The Board reconvenes following the completion of all site visits. The purpose of this meeting is to select finalists and medallion winners. The general process used to select site visit candidates is again utilized. The site visit teams meet to discuss results of the visits. The team leader prepares recommendations from the group and presents them to the Board. Again, a consensus is gained before a recommendation is accepted. During all

decision-making sessions of the Board, all members are encouraged to voice concerns and raise issues. These meetings are not only used for decision-making but also to generate/modify SPQA procedures.

Once finalists have been chosen, Site Visit Team Leaders notify the organizations. Specifications for conference presentations are provided to the respective organizations. The decisions from this last meeting of the Board regarding medallion winners are confidential. Winners are not notified prior to the conference. Finalist plaques and medallions are presented during the banquet following the SPQA Conference. Presentation of the awards completes the SPQA cycle for a given year. Selection of new Board members and application design begin the next award cycle.

2.2 Measurement and Evaluation

Organizations apply for quality awards for various reasons. One of the reasons organizations do apply is to obtain an assessment of their overall performance. This section on measurement and evaluation concentrates on why people measure and on two specific measurement frameworks that can be used to assess organizational performance.

2.2.1 Measurement Defined

“Performance measurement describes the feedback or information on activities with respect to meeting customer expectations and strategic objectives ... The purpose of performance measurement then is to motivate behavior leading to continuous improvement in customer satisfaction, flexibility, and productivity” (Lynch and Cross, 1991, p. 1). I have chosen this definition of measurement for my research because it focuses on the role of measurement to encourage improvement. Measurement can be used for control or for improvement. Quality awards, by definition, are attempting to help organizations learn and

improve. Therefore, I feel this definition of measurement is the most appropriate for this thesis.

2.2.2 Why Do You Measure

The primary reasons some organizations measure are to control the organization or to identify those things that need improvement. Other reasons include providing a visible system for employees to pay attention to so they know when they have done a good job. Further, measures are used to gain visibility, in general. These measures often help keep management from tampering or even help managers to compete for resources.

Why do people feel threatened by measurement? Some reasons why people could potentially feel threatened are: misunderstanding of measurement; exposure of inadequate performance; additional time and reporting demands; reductions in staff; distortion of performance; and reduction of autonomy. It's important to recognize individuals do have concerns with respect to measurement. Organizations should attempt to remove the roadblocks or potentials while increasing awareness of why measurement is needed.

In considering reasons why measurement systems fail, I found there were similarities to some of the reasons why people feel threatened. Some of the reasons measurement systems fail are: failure to operationally define performance; improperly defining the boundaries of the system being measured; misunderstood measures; fear of exposing poor performance; additional time and reporting; and perceived reduction in autonomy.

While there are several issues to consider in implementing performance measurement systems, you should consider one reason why they're necessary. Dr. Deming, in his four-day seminar, frequently proclaimed, "How would they know?" Measurement systems help managers "know." These systems help predict future

performance as well as describe current performance. Trends can be tracked; problems can be stopped before they're started.

2.2.3 Using Quality Awards to Measure Organizational Performance

How are quality awards used to measure organizational performance? I believe that the award itself does not accomplish this goal. However, award applications often provide a framework by which organizations can describe total performance. Groups of criteria within applications are not typically considered to be all inclusive but they do attempt to represent the major components of organizational performance. In addition to award applications providing a framework for organizations to describe performance, it also provides a framework to define benchmarks for organizations within the given group under analysis (e.g., State of Virginia).

In this research, I have described the types of key performance indicators that organizations describe in applications for the SPQA for Virginia. I have assumed that organizations are reporting indicators they feel are indicative of their organizational performance. From this, I have compared the applicants' indicators to two key performance indicator frameworks: a framework of seven performance criteria and Kaplan's Balanced Scorecard. What follows are descriptions of these frameworks.⁵

2.2.3.1 Seven Performance Criteria

Much of the measurement literature acknowledges that performance is a multi-dimensional construct. The literature does not, however, come to a consensus on what those dimensions are. Sink (1985) proposes that performance is a function of seven performance criteria: effectiveness, efficiency, innovation, productivity, profitability,

⁵ These frameworks are simply examples of frameworks that can be used to describe performance.

quality, and quality of work life. What follows are the operational definitions of these criteria.

2.2.3.1.1 Effectiveness. Effectiveness focuses on the output side of your organization. It considers whether the organizations is completing the “right” thing. This criterion also addresses the timeliness and quality of the output being delivered. This criterion is further defined by the ratio of actual output divided by expected output.

2.2.3.1.2 Efficiency. Whereas effectiveness considers the output side of an organization, efficiency relates to the input side. Did you use the right number of resources? This criterion is further defined by the ratio of resources expected to be consumed divided by the resources actually consumed.

2.2.3.1.3 Innovation. Innovation involves several key concepts: creativity, change, and successful response. The operational definition is “the creative process of changing; what we’re doing, how we are doing things ... to successfully respond to internal and external pressures, opportunities, challenges, threats” (Sink and Tuttle, 1989, p. 183).

2.2.3.1.4 Productivity. Sink and Tuttle (1989) define productivity as simply the ratio of outputs to inputs. Although this criterion is concrete, organizations often find it difficult to measure either the outputs or the inputs. Whereas some organizations use this measure to define performance, Sink simply considers it one component.

2.2.3.1.5 Profitability/Budgetability. Profitability is a measure that relates revenues to costs (Sink and Tuttle, 1989). Sink created the term budgetability for use with

the public sector, since these organizations typically operate as a not-for-profit entity. The operational definition is any measure that describes the “relationship between budgets, stated deliverables, deadlines and actual costs, deliverables, and delivery dates” (Sink, 1989, p. 186).

2.2.3.1.6 Quality. Different authors describe quality differently. One author considers quality to be conformance to requirements Sink and Tuttle (1989) created an operational definition of quality that included the system within which an organization operates. This definition of quality is illustrated in Figure 2-5. The first component, called quality checkpoint 1 (q1), focuses on the selection and management of suppliers. Quality checkpoint 2 is considered to be traditional incoming quality assurance, reviewing materials as they come in through the door. The third checkpoint, q3, focuses on “building quality into the product or service” (Sink and Tuttle, 1989, p. 174). The next component of quality, q4, is traditional outgoing quality assurance, reviewing the output before delivery to the customer. Quality checkpoint 5 focuses on the customers, evaluating an organizational understanding of what the customer wants or needs.

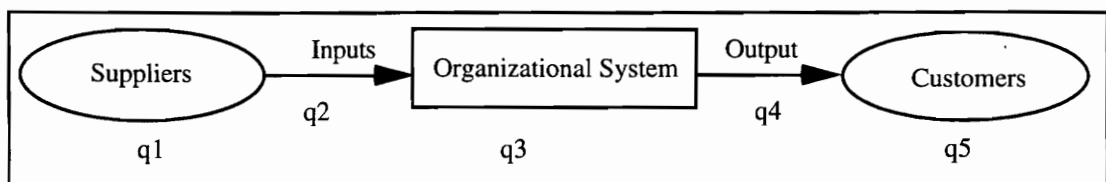


Figure 2-5: Illustration of Five Quality Checkpoints

2.2.3.1.7 Quality of Work Life. Quality of work life is operationally defined as “the affective response or reaction of the people in the organizational system to any number of factors, such as pay, working conditions, culture, leadership, coworker relations,

feedback, autonomy, skill variety, task identity, task significance, the boss, amount of involvement in planning, problem solving, and decision” (Sink and Tuttle, 1989, p. 182).

2.2.3.2 Kaplan’s Balanced Scorecard

The key to the framework suggested by Kaplan and Norton (1992) is balance. He proposes that there needs to be a balance between operational and financial measures. He describes this framework through the use of four perspectives: financial, customer, innovation and learning, and internal business.

2.2.3.2.1 Financial Perspective. Measures included in this perspective indicate whether “the company’s strategy, implementation, and execution are contributing to bottom-line improvement” (Kaplan and Norton, 1992, p. 77).

2.2.3.2.2 Customer Perspective. Kaplan and Norton (1992) recommends that this perspective review how the customers see the organization. Consideration should be given to quality, time, performance and service, and cost.

2.2.3.2.3 Innovation and Learning Perspective. This perspective is aimed at keeping an organization at the top of the market. The benchmark for any organization is constantly changing. For this reason, the innovation and learning perspective focuses on how well an organization not only improves existing products and services but also how it creates new ones.

2.2.3.2.4 Internal Business Perspective. The internal perspective, as defined by Kaplan and Norton (1992), defines what the organization wants to excel at. This is directly related to customers’ expectations in that the goals of the organization should match the

needs of customers. The focus of this perspective should be on business processes that appear to affect customer satisfaction the most.

2.3 Benchmarking

In addition to obtaining an assessment of organizational performance, organizations sometimes apply for quality awards in order to benchmark against other organizations. Since most quality awards provide an information sharing opportunity, such as a conference, organizations are provided with a prime opportunity to evaluate who has the best practices. What follows is a review of benchmarking that defines the concept, provides an outline of how you benchmark, and how quality awards and benchmarking are related.

2.3.1 Benchmarking Defined

“Benchmarking is the search for those best practices that will lead to the superior performance of a company” (Camp, 1989, p. xi). I would further like to refine this definition by suggesting that the practices mentioned in the Camp (1989) definition are actually processes. Additionally, the definition of benchmarking for this research is applicable not only for companies but for any definitive unit within a company.⁶

There are two distinctive types of benchmarking: competitive and process (American Productivity & Quality Center, 1993). Competitive benchmarking compares organizational performance against competing organizations, concentrating on a few select measures. Process benchmarking measures process performance against organizations that lead in that particular process. For the purpose of this body of knowledge review, I will focus on process benchmarking.

⁶ Although the definition applies for any definitive unit within a company, I will be using ‘company’ or ‘organization’ within my Body of Knowledge Review.

Benchmarking is a proactive process that encourages companies to cooperate with each other. As Deming (1986) states, the aim of any system should be to improve the system above itself. Therefore, companies should be working together to improve either the specific industry, state, or nation. “Benchmarking should be approached on a partnership basis in which both parties should expect to gain from the information sharing” (Camp, 1989, p. 13). Benchmarking shouldn’t be aimed solely at competitors in the same industry. The goal of benchmarking is to find the best organization practicing specific business functions. For example, Xerox used L.L. Bean as its benchmark for its distribution function. Some of the best benchmarks are illustrated in Figure 2-6.

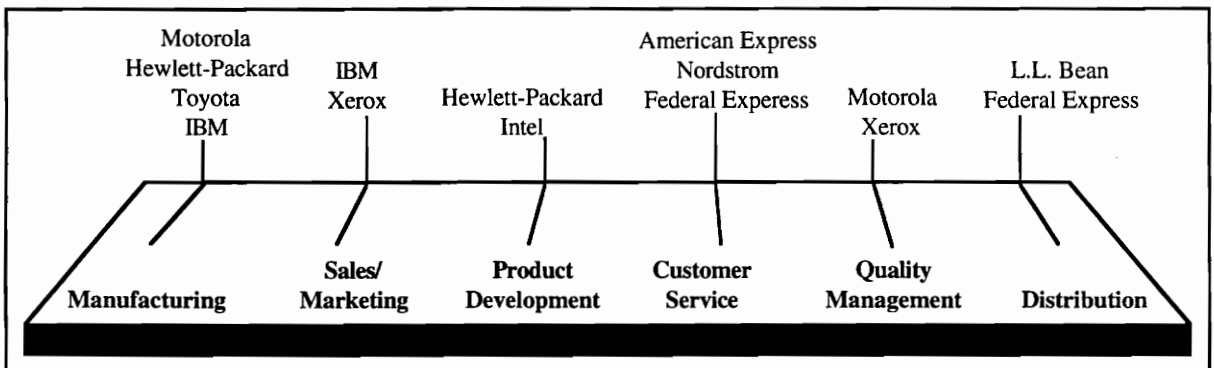


Figure 2-6 – Best of the Benchmarks (Whiting, 1991)

Benchmarking should not be used as a mechanism to identify cuts for downsizing. Although there may be reductions as a result of process improvements, this should not be the overall purpose for benchmarking. Benchmarking should be used when organizations or companies want to learn, discover, or improve. Benchmarking is not a program. It is a structured process that has flexibility to “incorporate new and innovative ways of assembling difficult-to-obtain information” (Camp, 1989, p. 14). This process should be used continuously, since industry practices change over time.

2.3.2 Why do you Benchmark

Benchmarking allows a company to eliminate the “not invented here” syndrome. By having all levels of employees in the process, benchmarking helps break down barriers that keep individuals from wanting to change. By crossing industrial lines, benchmarking also may identify technological breakthroughs that wouldn’t have been recognized in one’s own industry for some time. Benchmarking also helps individuals gain professional contacts that can help them grow in the future (Camp, 1989).

Grayson (1992) believes there are five reasons to benchmark: (1) Organizations will need to benchmark to survive global competition; (2) Organizations will need step-function improvement rather than incremental continuous improvement to survive; (3) Benchmarking will help organizations improve processes rather than continue making quick fixes to problems; (4) Benchmarking encourages organizations to work together in a partnership, establishing a win-win situation; and (5) The Malcolm Baldrige National Quality Award uses benchmarking as one of its criteria, so if an organization hopes to win this award, it will have to demonstrate that it has an active benchmarking process.

2.3.3 How do you Benchmark

Benchmarking consists of two parts: practices and metrics. “Best practices are leadership, management, or operational methods or approaches that lead to exceptional performance. Best practice is a relative term, not an absolute standard” (American Productivity & Quality Center, 1993, p. 10). It’s important to look at the practices (i.e., processes) and understand them before quantifying the effect of the practices. In fact, benchmarks may only indicate the direction that an organization should go rather than specific targets to achieve. The metrics that are chosen, however, should be true indicators of process performance.

There are five phases in the benchmark process (see Figure 2-7): (1) planning; (2) analysis; (3) integration; (4) action; and (5) maturity (Camp, 1989). The planning phase helps define what process will be benchmarked; who the benchmark is; and how the data will be collected. The analysis phase determines the gap between actual performance and the benchmark performance, as well as projects future performance levels. The integration phase establishes operational targets; communicates progress in the benchmarking process to employees; helps gain commitment from all employees; and defines the benchmark as operational principles that employees can subscribe to and follow. The action phase concentrates on defining implementation actions and establishing a measurement system to assess progress. The maturity phase is reached only when best industry practices are integrated into all business functions.

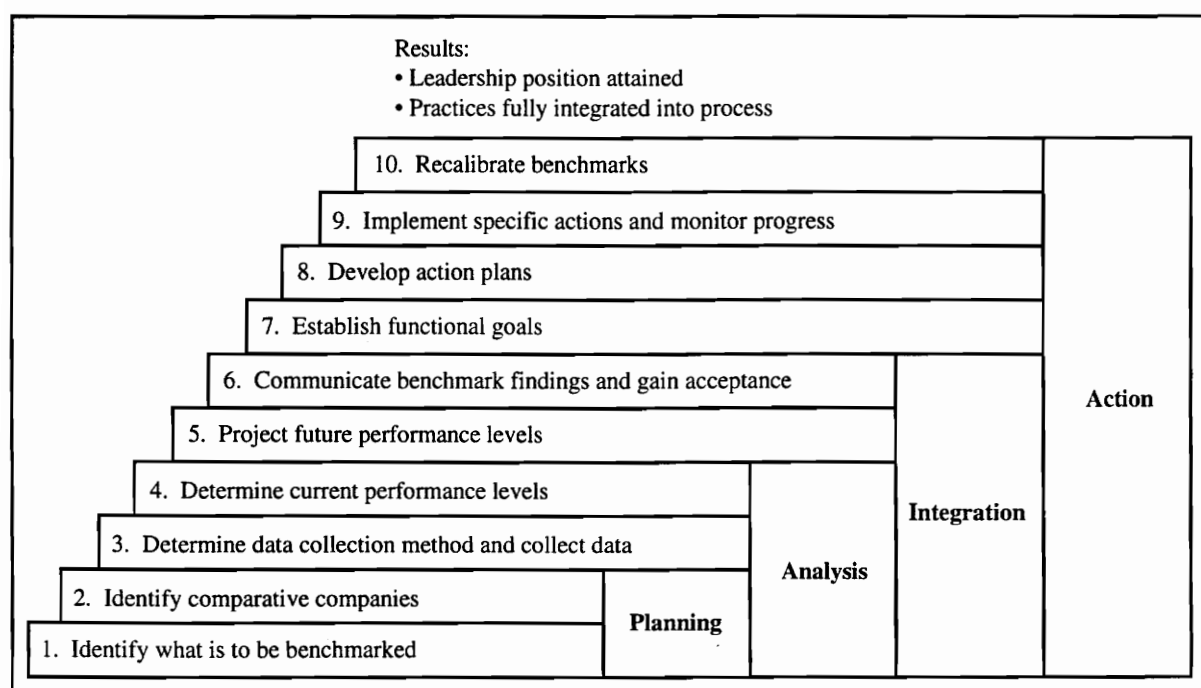


Figure 2-7 – The Benchmarking Process (Camp, 1992)

There are four direct outputs that can be created through completing a benchmarking study (American Productivity & Quality Center, 1993). First, you should have a measure that compares your process performance with that of the benchmark organization. Next, you will have defined the gap between your organization's performance and the benchmark. Third, you will have been able to identify best practices. Last, you will have performance goals which you will set as a result of this study.

There are several critical success factors that many authors have identified with respect to the benchmarking process. These factors have been summarized in Table 2-3. Of these factors, the most important one appears to be top management support. And, if you think of Dr. Deming, this is substantiated by his belief that all change should be supported by top management. Another key factor is the commitment of employees to the process. This factor relates to how institutionalized benchmarking is in the organization. Benchmarking should become part of the way to do business, not just a way to improve business.

Table 2-3 – Benchmarking Musts and Suggestions (Grayson, 1992)

<i>BENCHMARKING MUSTS AND SUGGESTIONS</i>
Senior management must support benchmarking
Benchmarking must be part of the organizational strategy
Benchmarking must be a team activity
Benchmarking must be planned, organized, and managed
You should understand your own process first before you can benchmark others
An organization should not seek to just "catch up" to competitors
Benchmark the process, not just the data
Try to locate "best," but start with "better"
Benchmarking requires "networking"
Benchmark inside your own organization, as well as outside
Benchmark internationally, as well as domestically
Benchmarking must be continuous

In looking at benchmarking from an organizational perspective, you might wonder if this tool is worth pursuing and utilizing. A survey conducted by the American Productivity & Quality Center (1993) indicates that many individuals believe that companies will have to benchmark in order to survive (79% of respondents). Few of the respondents (28%) believe that benchmarking is a fad. In fact, an additional survey provided information that 75% of the respondents' organizations had increased their efforts in benchmarking over 1992. It's predicted that over the next five years, 96% of the organizations will increase their efforts in benchmarking.

2.3.4 Using Quality Awards in Benchmarking

Many organizations use quality awards as a means to benchmark against other organizations or simply to complete a self-assessment. Organizations may find it beneficial to use quality awards to establish baseline measures for itself with respect to specific criteria. The criteria within quality awards can provide a roadmap for an organization to follow in creating a "quality" organization. "Criteria are used to encourage specifically desired behavior toward a stretch objective that drives an organization to higher levels of quality performance" (American Productivity & Quality Center, 1993). Criteria do not establish acceptable/unacceptable standards for performance.

Most organizations who have won quality awards are quite open and share their successes as well as failures to the general public. In fact, most award programs conduct annual conferences for this specific purpose. Organizations can utilize a fairly inexpensive source of data for benchmarking. The SPQA for Virginia specifically informs applicant organizations that the information provided in their applications, site visit materials, and conference handouts will be available in the administrative offices for any requesting organization to review. By including this guideline in its award process, the SPQA

emphasizes the desired outcome of organizations sharing information freely – the first step in creating an environment conducive of benchmarking.

Although quality awards provide an excellent opportunity for organizations to collect benchmark data, organizations should also be cautioned. In benchmarking, you're searching for best practices. If you simply rely on quality award recipients, then you are limiting your sample population considerably. From my readings regarding benchmarking, I believe you should simply use quality awards as **one** source of data, not **the** source of data.

2.4 What is Research?

As researchers, we must all come to an understanding of the general concept of "research." What is research? What is not research? How do you do research? Is research a process or a product? These questions must be answered in the initial phases of a research endeavor before the researcher can continue.

In that vein, this section is designed to define what research is and how research is applied as a process in this particular thesis application. This section will not define all of the types of research and the different methodologies, but rather it will focus on concepts specific to this research.

2.4.1 Defining Research

Webster's Dictionary defines research as the "investigation aimed at the discovery and interpretation of facts" (Merriam-Webster, 1985). Leedy (1989), on the other hand, simply defines research as the "method of problem-solving utilizing the principles of the scientific method." The first definition appears to focus on output (i.e., interpretation of facts) while the latter one defines by what method (i.e., scientific method). I have

attempted to develop a more holistic view of research with the following definition. Research is using science to perfect the art of discovery.

From my definition, it's easy to see there are two major components to research: science and art. Through my classes within Management Systems Engineering, I have learned that there should be a balance between art and science. In that vein, I will review research with respect to science as well as art.

2.4.1.1 Research as a Science

Contrary to many beliefs, research is not reserved for “experts.” Research methods can be employed by any individual who wishes to investigate a topic. The key, as Leedy’s definition implies, is to use the scientific method.⁷ The scientific method provides the user with a systematic process by which to examine a topic, as shown in Figure 2-8.

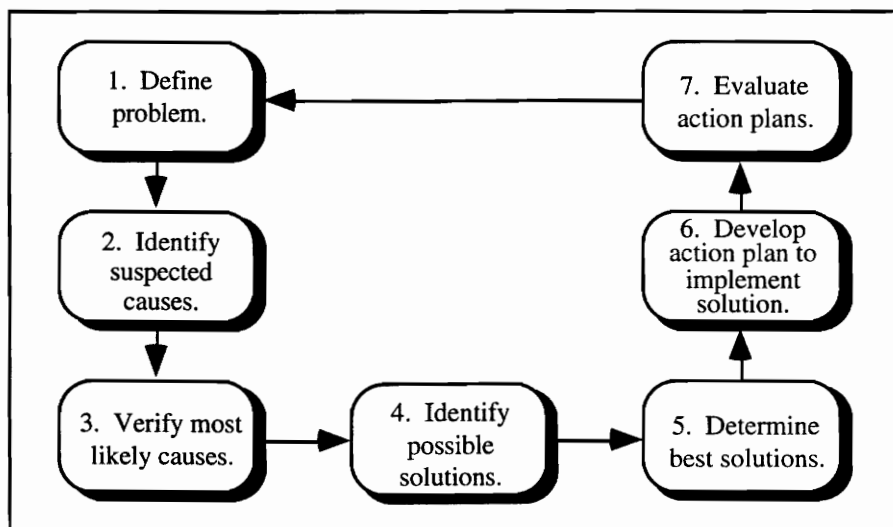


Figure 2-8 – Problem Solving Process (Lynch & Werner, 1992, p. 162)

⁷ The scientific method is particularly applicable to research projects which require inductive reasoning (Leedy, 1989, p. 79).

The scientific method is one process by which to solve problems. As Leedy (1989, p. 5) states, “Research is a procedure by which we attempt to find systematically, and with the support of demonstrable fact, the answer to a question or the resolution of a *problem*” (emphasis added). Since research often occurs so that a problem can be resolved, it would be worthwhile to examine how research characteristics fit into a problem-solving process. For further emphasis, the characteristics have been mapped to the steps of the problem-solving process. Figure 2-9 illustrates how the characteristics of research methodology relate to this process.

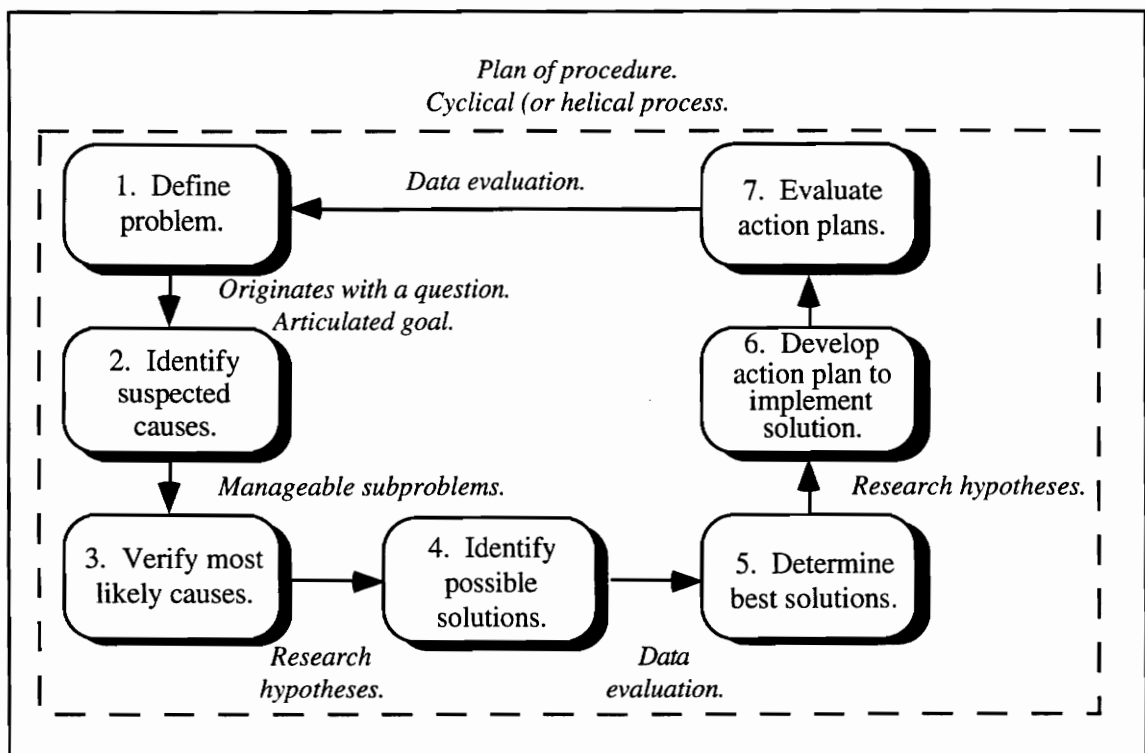


Figure 2-9 – Mapping Research Methodology Characteristics (Leedy, 1989) to a Problem-Solving Process

Another issue to be raised is where the research process begins. The scientific method implies that the process begins with a problem or issue to be resolved. Brinberg

and McGrath (1985) believe there are three domains that must be addressed within research: substantive (focus of the research), conceptual (underlying ideas about the research), and methodological (way to accomplish the research). For research to be valid, all three domains must be addressed. The interesting point that these authors put forth is that you can begin in any one of these domains; thereby, violating the initial premise from the scientific method that research happens as a result of solving a problem. A more generalist perspective, such as Brinberg and McGrath's, gives you more latitude with respect to starting points for research. In fact, Brinberg and McGrath's ideas imply that research may be a cycle, where you can enter at any point as long as you complete the entire cycle.

2.4.1.2 Research as an Art

In considering research as an art, I have considered the holistic point of view. This point of view implies that the whole is greater than the sum of its parts. This view often results from personal observations and perceptions. Further, this view calls for an emotional response from the observer. Does the research have a soul?

Research involves basic attitudes and ways of thinking. Research is a craft. Like other crafts, activities are not analyzable ... Only the formal side of the research process can be transmitted effectively through textbooks and the classrooms ... As a craft, research is interesting, exciting and satisfying. The challenge for researchers is to get beyond sheer techniques, whether quantitative or qualitative, and to interject the craft attitude into the research process (Daft, 1983, pp. 539-540).

Another consideration of research as an art is whether or not the research is significant. What constitutes significance? Daft completed a research study that formulated a set of guidelines for significant research (see Table 2-4).

Table 2-4 – Guidelines for Significant Research (Daft, 1982)

<i>GUIDELINES FOR SIGNIFICANT RESEARCH</i>
1. Significant research is an outcome of investigator involvement in the physical and social world of organizations.
2. Significant research is an outcome of investigator interest, resolve, and effort.
3. Significant research projects are chosen on the basis of intuition.
4. Significant research is an outcome of intellectual rigor.
5. Significant research reaches into the uncertain world of organizations and returns with something clear, tangible, and well understood.
6. Significant research focuses on real problems.
7. Significant research is concerned with theory, with a desire for understanding, and with explanation.

These guidelines focused on evaluation after the fact, whereas considering research as a science focuses on evaluation of the process as well as the outcomes.

Significant research is a process, an attitude, a way of thinking. Significant research is accomplished by people who are motivated to do significant research, who are willing to pay the cost in time and effort. Significant research is motivated by curiosity, by the desire to discover and understand ... To achieve significant research, we must take a chance, we must make mistakes, we must probe beyond what we already know (Daft, 1982, pp. 109-110).

In considering whether a piece of work constitutes significant research, you can compare the research to Bloom's taxonomy of cognitive educational objectives. This taxonomy provides a useful framework for thinking about the academic quality of work. There are six hierarchical levels in the taxonomy: (6) evaluation; (5) synthesis; (4) analysis; (3) application; (2) comprehension; and (1) knowledge (Easterby-Smith, Thorpe, and Lowe, 1991). I have summarized the definition of each level and where I believe I have achieved each level with my research in Table 2-5.

Table 2-5 – Comparison of Bloom’s Taxonomy to Thesis Research

Cognitive Educational Objective	Definition (Callahan, Clark, and Kellough, 1992)	Comparison to Thesis Research
Knowledge	The recognition and recall of information	Chapters 1, 2, and 3 help illustrate the researcher’s understanding of research. Further, these chapters illustrate the general theories that the researcher is able to use in developing a research proposal.
Comprehension	The understanding of the meaning of the information	In completing the research proposal (Chapters 1, 2, and 3), the researcher has attempted to explain his/her requisite knowledge to his/her committee. Further, the committee has been able to question the researcher in a proposal defense to further ensure the comprehension of basic theories and concepts.
Application	The ability to use information	Chapter 3 illustrates the ability of the researcher to apply information to a specific research project. This chapter is written by the researcher to map out the process by which the researcher will attempt to complete the research.
Analysis	The ability to dissect knowledge into component parts and see their relationships	Chapter 2 helps illustrate the researcher’s ability to identify key bodies of knowledge that are related to the research topic and relate the specific ideas, theories, concepts to the research topic.
Synthesis	The ability to put the parts together to form new ideas	Chapters 4 and 5 illustrate the researcher’s ability to bring together the requisite knowledge from Chapters 1, 2, and 3 into a comprehensible fashion to complete a data analysis and make recommendations. One of the ultimate desired outcomes of a thesis is to create new ideas and contribute to a body of knowledge. If a researcher has been successful in synthesis, then this desired outcome will have been achieved.
Evaluation	The ability to judge the worth of an idea, notion, theory, thesis, proposition, information, or belief	Chapters 5 and 6 illustrate the researcher’s ability to apply intellectual honesty to the research process. These chapters provide the researcher an opportunity to assess the success and ultimate value of the research.

2.4.1.3 Why Conduct Research

But, why would you want to conduct research? Easterby-Smith, Thorpe, and Lowe (1991) believe there are three apparent motives for researchers: (1) to learn more about a specific discipline; (2) to grow as an individual; and (3) to deal with real problems.

It appears to me that designing, developing, and implementing a research project is driven by personal motivation. There must be commitment to the area under study or a critical success factor will be missing. Research takes time and energy that could easily be siphoned into other areas of one's personal and professional life. Research must result in a commitment to yourself to discover, interpret, and report to a larger group the answers you have found to your research questions. I believe the key to research is simply a commitment to answer the questions "Why?" and "How?"

In conducting research, there are several skills, knowledge, and personal qualities that a researcher can gain or improve upon. Some of these qualities include: awareness of different assumptions about the world; knowledge of immediate subject of study; ability to plan, organize, and manage one's time; ability to structure and argue a case in writing; ability to defend and argue views orally; clarity of thought; flexibility; and creativity (Easterby-Smith, Thorpe, and Lowe, 1991). I believe that improving knowledge, skills, and abilities is one of the key roles for student researchers. Writing a thesis is a major endeavor for any individual. For students, it allows them to learn and begin to appreciate the work involved in constructing a product of any significance.

I have discovered in my journey to gain a Masters degree that one of the keys to life is learning. I told some of my colleagues not too long ago that I would never be stupid again. When I made that comment, I unknowingly was speaking of the unexplainable desire that I have to "know," a desire that had grown dormant in my previous job. I would have to say that, for me, the only noble reason to conduct research is to learn. There shouldn't necessarily be hidden agendas or even predicted outcomes. Joy in life is extended by joy in learning. Research provides the method by which you can achieve that extension.

2.4.2 Exploratory Research

In looking at the method I wished to employ as well as the data that was available, I believe this project will be exploratory research using formative evaluation. I simply want to look at the data available and determine what questions could possibly be answered by this data as well as what process improvements can be made to the SPQA process. Emory and Cooper (1991) write that exploratory studies tend to be loosely structured with an objective of learning what the major research tasks are to be. The researcher will begin with some sort of rationale and direction, but these assumptions may later be proven wrong; thereby, changing the research methodology. The immediate purpose of exploration is usually to develop hypotheses or questions for further research.

Further, exploratory studies are particularly useful when the researcher lacks a clear idea of the problems that will be met in the course of the study. Typically in exploration you are less interested in getting a representative cross sectional view than in getting information from sources that might provide insights. As a novice researcher, I believe that an exploratory study using formative evaluation of the SPQA for Virginia data will be the most appropriate. I believe that my role as a researcher will be to define the major dimensions of my research, explore the data to define future research needs, and to make recommendations for improvements to the SPQA process. With that in mind, Chapters 5 and 6 became very important when evaluating the “success” of my research.

2.4.3 Formative Evaluation

Formative evaluation requires that you focus on a specific program, policy, or product.⁸ Further, the goal of formative evaluation is to help improve the program under review. The researcher uses process studies, implementation evaluations, and case studies

⁸ For the purpose of my research, I focused on the United States Senate Productivity and Quality Award for Virginia as a program which employs different processes.

as his/her primary sources of data. For this thesis, I have used SPQA applications, site visit materials, and conference handouts as my data sources.

Formative evaluation assesses the strengths and weaknesses of the program and makes specific recommendations for improvement. The evaluation is strictly limited to the specific program being reviewed. An overriding assumption for this type of evaluation is that key stakeholders of the process will use the information provided to them by the researcher. I have incorporated this piece of the formative evaluation process into my research methodology by providing specific improvement recommendations to the SPQA Board. Further, I am assessing the success of my research on whether the outputs are used by the board to improve the SPQA.

Formative evaluation can include testing or assessing a program at a cross-section of the sites it's employed or with a small sample of target areas (Rossi and Freeman, 1993). For my thesis, however, I am looking at all pieces of the SPQA program except for the Award for Continuing Excellence. My reasoning behind avoiding evaluation of this piece of the program was that separate processes are used to award the ACE. I wanted to keep my research methodology simple, so I limited the domain of my research.

Most formative evaluations take place in the design and beginning stages of implementation for a program. These evaluations are valuable, because it allows designers to modify the program based on early feedback; thereby, eliminating the need for extensive and expensive rework. The SPQA has been in existence for 11 years; therefore, my research is not remaining true to the basic model of formative evaluation. But, I am conducting my research using similar methodology and desired outcomes of the majority of most formative evaluation processes.

Since I am evaluating a program that has been established for quite some time, I spent a considerable amount of my Body of Knowledge Review on SPQA describing the background of the award. This is important to do, so that I understand the social and

political issues that have been present as the award has evolved. While Rossi and Freeman (1993) state that evaluating long-standing programs is difficult, they also note that these evaluations can determine the future of a program (i.e., whether to stop or continue).

Most evaluations are conducted to influence key stakeholders of a program. With my research, I hope to influence the SPQA Board to make improvements based on my evaluation of the program. I am viewing the direct use of my evaluation as a measure of my research success. However, it's possible for my evaluation to be utilized conceptually, influencing thinking about issues in a general way. Or, my results could be used in persuasive utilization as arguments against political positions or the status quo (Rossi and Freeman, 1993).

Leviton and Hughes (1981) have identified five conditions that appear to affect the utilization of evaluation results. These conditions are: (1) relevance; (2) communication between researchers and users; (3) information processing by users; (4) plausibility of research results; and (5) user involvement or advocacy. Further, they believe that utilization also depends upon research quality and the conformity of the results to prior knowledge and expectations of the users. To increase the probability that evaluation results will be utilized, Rossi and Freeman (1993, p. 449) suggest the following guidelines:

- (1) Evaluators must understand the cognitive styles of decision makers.
- (2) Evaluation results must be timely and available when needed.
- (3) Evaluations must respect stakeholders' program commitments.
- (4) Utilization and dissemination plans should be part of the evaluation design.
- (5) Evaluations should include an assessment of utilization.

To close the loop with respect to evaluation, the researcher is responsible for disseminating the results of his/her research. There should be complete technical reports as well as "secondary dissemination" (Rossi and Freeman, 1993). Secondary dissemination refers to the communication of results and recommendations to stakeholders. This

communication will often not include the entire technical report (i.e., thesis), but rather include an executive summary of the points that are most important to the audience. The overall goal of secondary dissemination is to communicate the results, so anyone would be able to understand the research.

As programs become more and more expensive to support, stakeholders will be more critical of the processes employed within the program. Stakeholders will question whether resources are being spent wisely and whether the results are worth the inputs required. Therefore, formative evaluation is an important form of research not only for the researcher, but also for the stakeholders. This type of evaluation will help refine programs, so they are operating more efficiently and effectively to obtain high quality results.

CHAPTER 3 - RESEARCH METHODOLOGY

This chapter provides the reader with a description of the methods that were used in collecting and analyzing the data for this thesis. Any deviations from the original process, as outlined in the proposal are noted in this chapter.

3.1 Design Issues

In conducting a research project, there are several design issues to be addressed. What follows is a brief description of each of these issues and suggestions with respect to addressing each.

3.1.1 Data Source

The VQPC has ten years of data available for the U.S. Senate Productivity and Quality Award for Virginia. The data are all located in the offices of VQPC in Blacksburg, Virginia. The database of information for the SPQA for Virginia includes applications for all applicants, conference handouts, site visit materials, and summary sheets used for evaluation purposes by the SPQA Board. These data were quite appealing from a cost standpoint, since data collection would require no travel. Further, an analysis of these data might improve the SPQA itself and improve the visibility of quality and productivity efforts within the State of Virginia. Therefore, from a cost and benefit standpoint, I decided to use the data that were most easily accessible to me and the most interesting for the purpose of this research.

An additional data source for this research was observations of SPQA Board meetings. I attended two SPQA Board meetings where the group was engaged in decision-making with respect to the award process and communicated with current SPQA Board Members via written and oral media.

3.1.2 Research Project Plan

An updated milestone chart for the completion of this research project has been provided in Appendix E.

3.1.3 Ethical Issues

In analyzing the data for the SPQA for Virginia, there was an ethical issue to be addressed. Should the organizations be identified throughout the document? If these organizations were identified, should they be contacted prior to the publication of this document to let them know their organization was being used?

In considering this issue, it was decided that it was irrelevant to identify the organizations throughout the document. So, a detailed coding scheme was used and is recorded in the project files. This scheme will not, however, be provided for the general public.¹

Organizations that have applied to the SPQA for Virginia should be contacted and informed about this study prior to the publication of the thesis.² This should be done, so they have an opportunity to receive a copy of the results. They were not contacted to gain permission to use the available data. One of the guidelines of applying for the SPQA for Virginia is that all application and handout materials may become public knowledge, so organizations are aware their data may be reviewed by other organizations. Additionally, organizations' names were not used; thereby, increasing the confidentiality of their performance data even more than the award process itself.

¹ This coding scheme will be provided to my committee as a handout during my thesis defense only. Otherwise, it will not be available for general use.

² A sample letter to applicant organizations is provided in Appendix F.

3.2 Research Methodology

3.2.1 Operational Research Model

What follows is the Operational Research Model (see Figure 3-1) employed in this research. This model identifies the process used by the SPQA Board in its decision-making with respect to the SPQA. Within this process, there are identified steps (see shaded areas in Figure 3-1) that should be influenced through this research. Variables are further defined that are believed to moderate the performance of specific steps of the process. Last, desired outcomes of the process have been defined.

As you can see from the model, there is a focus on the evaluation of information and feedback provided to applicants. Specifically, there was a goal to influence the evaluation of SPQA applications, how evaluation scores are portrayed, site visit evaluations, and feedback provided to applicants. Moderating variables were not directly addressed, nor were the desired outcomes measured. Indirectly, I hoped to influence the design and development of the SPQA application.

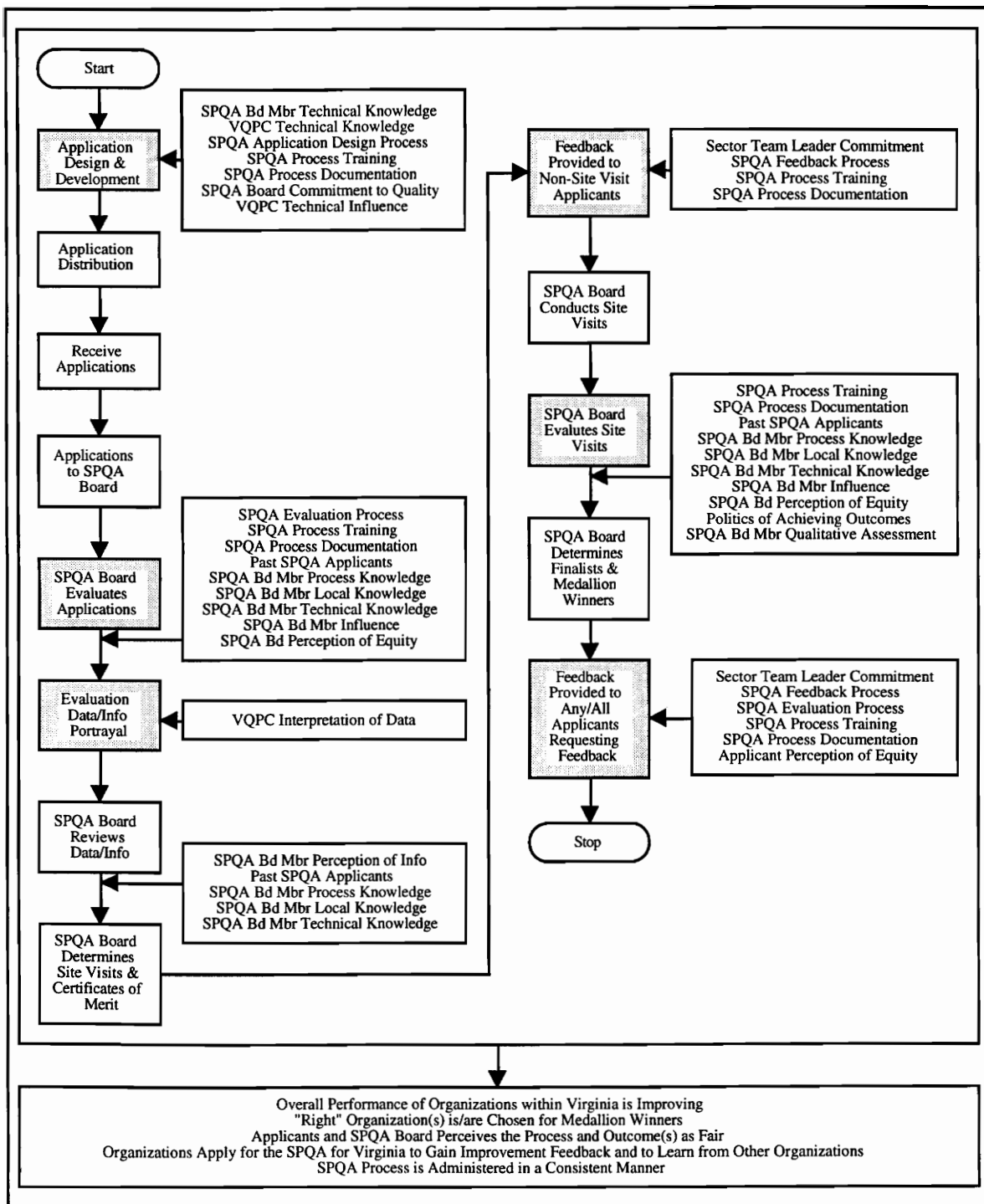


Figure 3-1 – Operational Research Model

3.2.2 Data Identification

What follows is a description of the process followed in identifying the specific data for my research from the database of data available. Data that was available through the VQPC regarding the SPQA for Virginia was used. This included SPQA applications, conference handouts, SPQA Board evaluation sheets, site visit materials, and any verbal or written communication with the SPQA Board Members were used as sources of data.

3.2.2.1 Data Review

First, the format in which the SPQA data are provided was reviewed. Potential problems with using these data were identified. This problem identification was based on a cursory review of the data available. The review considered consistency of types of data collected across years as well as consistency in the portrayal of the data across years.

3.2.2.2 Focus of Research

The domain of my data collection was delimited in the following ways in the thesis proposal: (1) use all applicants' data for the identification of key performance indicators reported by organizations in their SPQA applications and (2) use only finalists' and medallion winners' data for the assessment of where the "best" organizations in Virginia perform on these indicators. Written or verbal communication with SPQA Board Members as a way to verify my findings or clarify any results was also used.

After reviewing the data available (e.g., key performance indicators), the domain of my data analysis in assessing where the "best" organizations in Virginia perform on the common indicators was broadened. In the review of the data, there were few common key performance indicators, and those indicators may not have been used by the finalists or medallion winners. Therefore, it would have been difficult to identify potential

benchmarks for specific key performance indicators. So, all applicants were included in all phases of the data analysis.

As an additional output for this research project, the process used by SPQA Board Members to make decisions regarding the application and award process was described. The researcher also communicated with board members with respect to how they come to a final decision in the application and award process. This decision-making process included the evaluation of applications and site visits as well as the feedback provided to applicants following the evaluation portion of the decision-making process. From this step, specific recommendations for improving the SPQA decision-making process were provided.

3.2.3 Data Collection and Storage

In collecting and storing the data, a set of project files were developed. These files include copies of all data reviewed in this research project, organized by data type. A coding list was developed to complement these files. A policy has been set by the VQPC that no copies of SPQA applications may be removed from the VQPC Resource Center. Therefore, copies of the applications were made and coded according to the coding list provided in Appendix H. These applications will be filed in the VQPC Resource Center for future students to use in continuing SPQA research projects. Copies of any articles or book excerpts that were used as input to the Body of Knowledge portion of the research were collected. All of the data, except for the applications, are maintained within my office and will be kept for an indefinite period of time following the completion of this thesis.

An additional source of data used was observations of two SPQA Board meetings. Notes from these meetings were compiled and converted into a list of process observations that are included in Chapter 4.

3.2.3.1 Problems with Data Collection

In the initial collection of the data, it was found that many applicants reported measures in their applications. However, they did not provide sample data within those applications. Because of this problem, the methodology was modified such that I collected information on key performance indicators only if quantified data were presented as well. The methodology was modified in this way, because there was no way, short of contacting each organization, to collect the quantified data needed to complete the data analysis.

An additional problem encountered was that applications were missing from the archive files at VQPC. Some of the applications were incomplete in that appendices were not attached. Further, site visit materials and conference handouts weren't provided for all applicants. Because all data from the award program was used, it didn't appear that this was an issue that had direct consequences on the results of the research. Therefore, the information that was missing or incomplete was simply omitted.

3.2.4 Data Analysis³

In the initial stages of data analysis, a coding scheme to identify all organizations used in this project was developed.⁴ This coding scheme was developed to protect the identity of the organizations that were included in this research. Additional codes were developed to sort through the information in the SPQA applications. Since the research focused on identifying key performance indicators, the remaining codes represent abbreviations for the criteria that were found within the applications.

Further, a categorization scheme by which to compare the data (e.g., across organizations, sectors) was designed.⁵ This categorization scheme simply defined the tables that would be used in the results section of the thesis. These tables were designed to

³ A detailed process flow diagram is provided in Appendix G.

⁴ A coding list is provided in Appendix H.

⁵ A categorization scheme is provided in Appendix I.

display the laundry lists of key performance indicators, lists of common key performance indicators, and benchmarks for each of the sectors. Additional tables were designed to collect additional information as needed throughout the research.

Once the coding scheme was defined, key performance indicators were identified within the applications provided by organizations to the SPQA as well as site visit materials and conference handouts. Next, common indicators that are used by different organizations within a specific category (e.g., across organizations, sectors) were identified. For example, different organizations may have all reported the indicator of training hours per employee. This indicator was common for these organizations and was provided in this section of the results.

In some instances, indicators were similar but there was not enough information to make the units of analysis similar. For example, one organization reported training hours per employee while another organization reported total training hours. In many instances, the number of total employees within the organization was not provided in the application. Therefore, a similar unit of analysis could not be obtained for this key performance indicator and it was omitted from the common key performance indicators for that sector.

After the common key performance indicators were identified, the all applicants' data was reviewed to determine where the organizations measured on these indicators. This information was included in the common key performance indicator tables. A pilot study to test the data analysis methodology was completed.⁶ Because the number of data used in the pilot study were a small percentage of the data available, it was difficult to predict all of the issues/problems that were faced in the total data analysis.

In the data collection, all quantified data for all key performance indicators were collected. For the purpose of data analysis, however, the "best" data given for any time

⁶ I used the 1993 applications from the Manufacturing Sector as a pilot study for the data analysis. See Appendix J for the documentation on this pilot study.

period (most often the most recent application) was used in the tables for common key performance indicators. The remaining data is displayed in Appendix K.

Once all of the common key performance indicators were identified, the best performance on each individual indicator was reported as a benchmark. Benchmarks represent best performance on a given indicator within a process. These benchmarks, as stated in Chapter 4, should be recognized as the best performance **reported** by an organization that applied for the SPQA. These data should not be used as the sole source of input for a benchmark study. They are provided simply to give organizations a frame of reference for choosing organizations they might find useful to benchmark against.

The observations made at SPQA Board meetings were processed as indicators of how the SPQA processes are functioning. Direct observations of written or verbal communication are converted into subjective evaluations. These evaluations provide the information required to make recommendations to improve the SPQA processes. A description of a generic decision-making process used by the board has also been included. The process has been provided in a flow chart format (see Appendix D).

3.2.5 Conclusions and Interpretations

The main output from this section of the research was recommendations for improvements in the SPQA decision-making process. These recommendations were based on the data collected as well as knowledge gained of the decision-making and administrative processes.

Interpretations of the key performance indicators were limited. The purpose of that portion of the research was to describe what is being reported by organizations rather than prescribing what they should be reporting as key performance indicators. A matrix has been provided in Chapter 5 as a potential means by which to collect information that the

SPQA Board could use in comparing organizations across sectors or individual organizations across years.

An attempt was made to describe the system of key performance indicators that each sector has reported through its applications over the history of SPQA. A comparison of these key performance indicators to what the measurement literature describes as good indicators has also been included. The comparison included the total group of indicators provided from each sector against Sink's seven performance criteria and Kaplan's Balanced Scorecard, as described in Section 2.2.3.

CHAPTER 4 - RESULTS

This chapter provides the reader with the data that were collected in this thesis. The data has been compiled according to the research methodology presented in Chapter 3. Conclusions and recommendations will be presented in Chapter 5.

4.1 Application Information

In the data collection phase of the research methodology, the number of organizations that applied for the SPQA, how many of these organizations applied more than once, how many total applications were received, and how many of the first-time applicants won the SPQA were identified. What follows is a table portraying the data collected in this step.

Table 4-1 – Application Information for the U.S. SPQA for Virginia

SPQA Category	# of Applicant Organizations	Total # of Applications	# of Repeat Applicant Organizations	# of First Time Applicant Winners
Private Sector - Manufacturing	106	181	43	3
Private Sector - Service	83	104	15	6
Public Sector - Local	31	47	11	3
Public Sector - State and Federal	41	60	9	4
Total	261	392	78	16

The data shows that the percentage of repeat applicant organizations ranges from a low of 18% for the Private Sector Service category to a high of 41% for the Private Sector Manufacturing category. Overall, approximately 30% of the SPQA's applicants re-apply for the award.

The data also show that only 6% of the applying organizations win a medallion the first year they apply. The range for the categories goes from a low of 3% for the Private Sector Manufacturing category to a high of 10% for both the Public Sector Local and the Public Sector - State and Federal categories.

Table 4-2 displays additional information regarding applicants to the SPQA. This table depicts how many applicants there were for each category for each year as well as how many first time applicants for each year.

Table 4-2 – Number of Applicants for SPQA for Each Year

YEAR	Private Sector - Manufacturing		Private Sector - Service		Public Sector - Local		Public Sector - State and Federal	
	#	1st Time Applicants	#	1st Time Applicants	#	1st Time Applicants	#	1st Time Applicants
1983	15	15	14	14	5	5	2	2
1984	17	9	17	13	3	1	1	1
1985	15	13	11	10	0	0	3	3
1986	15	9	6	4	2	2	4	2
1987	22	11	8	6	8	5	4	2
1988	8	4	9	6	4	2	5	4
1989	16	10	11	6	2	1	10	5
1990	22	10	5	5	4	4	7	3
1991	19	11	9	7	8	8	13	11
1992	19	7	7	7	6	3	9	6
1993	13	5	7	5	5	0	4	2

From this table you can see that the total number of applications for any given year have ranged from a low of 26 in 1988 to a high of 49 in 1991. The percentage of first time applicants for each category also varies over the years.

4.2 Key Performance Indicators

For the purpose of this research, key performance indicators are defined as those measures organizations use to operationalize the construct of performance.¹ These indicators may be qualitative or quantitative in nature; however, this research identifies only quantitative key performance indicators.

4.2.1 Laundry Lists of Key Performance Indicators Reported by Organizations

What follows are tables listing the key performance indicators reported within SPQA applications.² There appear to be duplicate listings, some organizations used similar measures. These are the indicators that were pulled out as common key performance indicators across organizations, depicted in the second set of tables within this section.

4.2.1.1 Private Sector Manufacturing Agencies

What follows is a table listing key performance indicators identified in SPQA for Virginia private sector manufacturing applications from the 1982 to 1993 award cycles. These indicators are effectiveness, efficiency, environmental, infrastructure, innovation, motivation, productivity, profitability, incoming quality, outgoing quality, overall quality, process quality, quality of work life, safety, and training.

¹ Definitions of specific key performance indicators (e.g., efficiency, effectiveness) can be found in Appendix H.

² The raw data from this portion of my data analysis distinguished by coded organization can be found in Appendix K.

Table 4-3 Private Sector – Manufacturing Agencies Key Performance Indicators

EFFECTIVENESS KEY PERFORMANCE INDICATORS	
	% labor effectiveness - average pounds per case - complete assemblies manufactured in-house - image intensifier deliveries - improvement in merchandise fulfillment - increase in production - number of skids produced - production capacity - production increase - production of fuel injectors - production volume - units produced
EFFICIENCY KEY PERFORMANCE INDICATORS	
	% reduction in energy - average design cycle - average hours per factory order - average manufacturing interval - cost per ton - decrease in manufacturing floor space - decrease in unit cycle time - downtime - improved factory efficiency - improvement in product cost - increase in demand - increase in labor efficiency - increase in ship loading rate - increase in total number of shipments to external customers - inventory levels of raw materials - lead time - lot size - machine downtime - machine utilization - maintenance of overall inventory - manhours per msf manufactured - manufacturing supply and maintenance cost/unit - order cycle time - processing cost - production hours paid per unit produced - quantity per week of printed circuit boards completed - reduction in cost of dozen t-shirts - reduction in downtime - reduction in floor space - reduction in inventory - reduction in in-process inventory

Table 4-3 – Private Sector Manufacturing Agencies Key Performance Indicators cont.

EFFICIENCY KEY PERFORMANCE INDICATORS cont.
reduction in production costs reduction in production cycle time reduction in scrap reduction in total plant cycle time reduction in work in-process reduction of finished product inventory repair hours per unit response time sack unloading time setup time supervision manhours per project tank turnover rate total plant cycle time work in-process
ENVIRONMENTAL KEY PERFORMANCE INDICATORS
landfill waste recycled refuse recycling of waste
INFRASTRUCTURE KEY PERFORMANCE INDICATORS
% of employees participating in quality circles employee participation number of employees participating in Employee Development Program number of employees participating in quality circles
INNOVATION KEY PERFORMANCE INDICATORS
% of employees submitting improvement suggestions % of employees submitting improvement suggestions % of ideas implemented acceptance rate of employee suggestions cost savings of employee suggestions employee participation in making improvement suggestions implemented recommendations number of employee suggestions implemented number of ideas submitted number of improvement ideas submitted number of suggestions implemented number of suggestions submitted per month research and development spending
MOTIVATION KEY PERFORMANCE INDICATORS
\$ awarded to employees number of employees receiving awards number of employees receiving plant-wide recognition

**Table 4-3 – Private Sector Manufacturing Agencies Key Performance Indicators
cont.**

PRODUCTIVITY KEY PERFORMANCE INDICATORS
cases per machine hour direct labor productivity employee productivity index (parts per labor hour) improvement in productivity increase in machine cycles per hour increase in output per employee inventory turns per year output per machine hour plant productivity pounds per case pounds per manhour pounds produced per employee production of tons per hour repair hours per unit supervision manhours per project
PROFITABILITY KEY PERFORMANCE INDICATORS
\$ sales per manhour increase in sales per employee manufacturing cost as a % of sales net sales per employee reduction in overall manufacturing cost reduction of working capital investment sales dollar output per factory employee sales per employee
INCOMING QUALITY KEY PERFORMANCE INDICATORS
quality of vendor material as % of lots rejected
OUTGOING QUALITY KEY PERFORMANCE INDICATORS
% of on-time deliveries average % of seconds average defect points per 100 yards average defects per unit complaint rate per million units cost of scrap and rework customer complaints customer complaints per 10 million units customer product acceptance rate customer returns defects in delivered injectors defects per unit extra rework hours

**Table 4-3 – Private Sector Manufacturing Agencies Key Performance Indicators
cont.**

OUTGOING QUALITY KEY PERFORMANCE INDICATORS cont.	
	failures per month improvement in customer returns improvement merchandise returns machined components defect rate number of customer calls per month on quality issues number of customer complaints number of quality deficiency records issued on-time deliveries on-time delivery performance order backlog out-of-box failures percent of on-time shipments percent waste pretest yield process losses promised date adherence quality defect level quality failure reduction in rework reduction of waste rework hours per 100 hours of production rework manhours per project sampling rate of finished product scrap scrap and rework costs as a % of product sales scrap as a % of total units produced in extrusion scrap as a % of total units produced in printing scrap as a % of total units produced in thermoforming scrap cost/unit scrap dollars per unloaded shop hour scrap levels scrap rate percent shipping error rate as a percentage of items shipped solder joint defect rate time lost to error rework trade problem reports per mm pounds shipped waste percentage
OVERALL QUALITY KEY PERFORMANCE INDICATORS	
	cost of quality improvement in quality manufacturing cost of quality as a percent of sales quality costs as a percent of sales quality rate

**Table 4-3 – Private Sector Manufacturing Agencies Key Performance Indicators
cont.**

PROCESS QUALITY KEY PERFORMANCE INDICATORS
A-grade product adipic acid nitrate level first pass yield rates of printed circuit boards through the testing process improved gyro yield improvement in coefficient of variation increase in first time yield rates process time variation product stiffness reduction in ammonium sulfate and ammonium nitrate emissions reduction in permanganate number reduction in variation of process parameters system test yields for the PLC products thickness swell
QUALITY OF WORK LIFE KEY PERFORMANCE INDICATORS
% of supervisors discussing performance with employees absenteeism attendance number of grievances turnover turnover rate
SAFETY KEY PERFORMANCE INDICATORS
average number of recordable injuries incidence rate lost time accidents lost time index number of lost time accidents recordable injuries safety-OSHA index time since last lost time accident time without a recordable injury
TRAINING KEY PERFORMANCE INDICATORS
\$ reimbursed to employees for education % of employees completing quality training % of workforce trained in problem solving average number of training hours average number of training hours per employee number of employees receiving team facilitator training number of quality training hours total hours of problem solving training total number of training hours training hours per employee

4.2.1.2 Private Sector Service Agencies

What follows is a table listing key performance indicators identified in SPQA for Virginia Private Sector Service applications from the 1982 to 1993 award cycles. These indicators are effectiveness, efficiency, infrastructure, innovation, motivation, productivity, profitability, outgoing quality, overall quality, process quality, quality of work life, safety, and training.

Table 4-4 – Private Sector Service Agencies Key Performance Indicators

EFFECTIVENESS KEY PERFORMANCE INDICATORS
total customer service team requests
EFFICIENCY KEY PERFORMANCE INDICATORS
average preadmission testing turnaround time average savings per total loss claim average service time breakfast delivery cycle time busy phone signal received days sales outstanding days to bill improvement in route efficiency lunch delivery cycle time number of plans waiting to be processed overtime (as % of regular hours) overtime reduction quote response time reduction in average processing time reduction in energy costs reduction in oil usage time to review plan turnaround time for sending out bound policies turnaround time of urgent lab results warranty costs
INFRASTRUCTURE KEY PERFORMANCE INDICATORS
average reduction in number of full-time equivalent employees employee participation number of employees number of employees serving on corporate committees
INNOVATION KEY PERFORMANCE INDICATORS
% of ideas evaluated number of ideas submitted

Table 4-4 – Private Sector Service Agencies Key Performance Indicators cont.

MOTIVATION KEY PERFORMANCE INDICATORS
number of employees receiving awards number of teams qualifying for team awards
PRODUCTIVITY
average number of service requests per person number of policies typed per hour number of submissions per project for site plans reduction in manhour per meter transactions per month
PROFITABILITY KEY PERFORMANCE INDICATORS
aggregate charge reduction annual sales gross sales increase in annual revenues profit sales sales increase
OUTGOING QUALITY KEY PERFORMANCE INDICATORS
complaints per thousand policies customer satisfaction index customer satisfaction rating overall customer satisfaction
OVERALL QUALITY KEY PERFORMANCE INDICATORS
overall service rating
PROCESS QUALITY KEY PERFORMANCE INDICATORS
advanced customer training index approval rate of plans average length of stay percentage of clients completing treatment quality of sales instructors index quality of sales training index quality of technical instructors index quality of technical training index repeat guests per month
QUALITY OF WORK LIFE KEY PERFORMANCE INDICATORS
% employees having 15 or more years of service average number of sick days taken per year per employee employee satisfaction index employee survey rating employee turnover employee turnover rate number of sick hours taken by employees reduction in sick leave usage

Table 4-4 – Private Sector Service Agencies Key Performance Indicators cont.

SAFETY KEY PERFORMANCE INDICATORS
reduction in reportable injuries workers compensation claims
TRAINING KEY PERFORMANCE INDICATORS
% managers attending team leader/facilitator training % of employees attending quality awareness training % of employees receiving quality awareness training average new skills learned average training hours for professional staff average training hours per employee hours of training in past three years number of employees training in quality training training expenditures

4.2.1.3 Public Sector Local Agencies

What follows is a table listing key performance indicators identified in SPQA for Virginia Public Sector Local applications from the 1982 to 1993 award cycles. These indicators are effectiveness, efficiency, productivity, outgoing quality, overall quality, process quality, quality of work life, and training.

Table 4-5 – Public Sector Local Agencies Key Performance Indicators

EFFECTIVENESS KEY PERFORMANCE INDICATORS
library books circulated per thousands population penetration rate
EFFICIENCY KEY PERFORMANCE INDICATORS
ambulance response time emergency medical services delivery instructional program efficiency total energy costs
PRODUCTIVITY KEY PERFORMANCE INDICATORS
county employees per 1000 population expenditures per capita

Table 4-5 – Public Sector Local Agencies Key Performance Indicators cont.

OUTGOING QUALITY KEY PERFORMANCE INDICATORS
% passing Literacy Passport Test grade four composite achievement levels (in percentiles) grade eight composite achievement levels (in percentiles)
OVERALL QUALITY KEY PERFORMANCE INDICATORS
parents grading the school parents' satisfaction rating
PROCESS QUALITY KEY PERFORMANCE INDICATORS
% increase in number of student activities % of high school students taking AP courses dropout rate elementary school retention rates increase in full-time equivalency enrollment increase in head count enrollment increase in number of off-campus offerings increase in number of student activities increase in number of students participating in advanced level classes in grades 5-7 increase in student retention rate number of students enrolled in algebra I number of students enrolled in foreign languages rate of rejection for requested inspections school division retention rates student dropout rate student participation rates in algebra and foreign language unresolved construction code complaints
QUALITY OF WORK LIFE KEY PERFORMANCE INDICATORS
full-time turnover quality of life ratings
TRAINING KEY PERFORMANCE INDICATORS
% of staff with Master's degree

4.2.1.4 Public Sector State and Federal Agencies

What follows is a table listing key performance indicators identified in SPQA for Virginia Public Sector State and Federal applications from the 1982 to 1993 award cycles. These indicators are effectiveness, efficiency, infrastructure, innovation, motivation, outgoing quality, overall quality, process quality, quality of work life, and training.

Table 4-6 – Public Sector State and Federal Agencies Key Performance Indicators

EFFECTIVENESS KEY PERFORMANCE INDICATORS
of receipts processed daily # of repairable components processed immediately reduction in paper output
EFFICIENCY KEY PERFORMANCE INDICATORS
monthly supply requisitions filled by on-hand inventories % reduction in travel reimbursement processing time amount of excess material procurement computer response time dollar amount of travel advances over 90 days evaluation time for suggestions process time for a purchase order reduction in time lag between receipt of federal cash and expenditure of funds reduction in time to complete an assignment reduction in time to publish an assignment return on investment travel pay waiting time turnaround time to prepare military family housing for new occupancy
INFRASTRUCTURE KEY PERFORMANCE INDICATORS
of process action teams within organization % of clerical employees involved in Performance Action Groups and Performance Action Teams % of employees involved in process action teams % of employees serving on process action teams % of line management/line employees involved in Performance Action Groups and Performance Action Teams % of top/middle management employees involved in Performance Action Groups and Performance Action Teams
INNOVATION KEY PERFORMANCE INDICATORS
of improvement suggestions accepted by clerical employees # of improvement suggestions accepted by line management/line employees # of improvement suggestions accepted by top/middle management % suggestions approved
MOTIVATION KEY PERFORMANCE INDICATORS
of awards given to employees % employees receiving monetary awards % of employees receiving awards total amount of awards given to employees

**Table 4-6 – Public Sector State and Federal Agencies Key Performance Indicators
cont.**

OUTGOING QUALITY KEY PERFORMANCE INDICATORS
defect free aircraft engine rerun rate error rate food service quality in the base dining halls inprocess defects/1000 facility manhours potential monetary benefits resulting from audit activities QDRs/Products produced reprocess defects/1000 facility manhours
OVERALL QUALITY KEY PERFORMANCE INDICATORS
average flights to sell aircrafts change in audit quality index
PROCESS QUALITY KEY PERFORMANCE INDICATORS
% compliance with Prompt Payment Act Prompt Payment Act penalties reduction in outstanding accounts receivable
QUALITY OF WORK LIFE KEY PERFORMANCE INDICATORS
% participation in direct deposit of payroll attrition rates
TRAINING KEY PERFORMANCE INDICATORS
of continuing education and training hours for every two years # of employees having earned higher level degrees # of employees having earned their associate degree # of employees trained in TQL awareness # of quality training courses completed per employee # of training hours received % of top management completing quality training % of total population completing quality awareness training

4.2.2 Common KPIs Across Organizations

What follows are tables listing the common key performance indicators reported within SPQA applications. Indicators were considered to be common across organizations if the unit of analysis was similar (e.g., \$ per unit, %). If information was available within the application (e.g., number of employees) to make the units of analysis similar, then I completed the computations necessary to do this.

4.2.2.1 Private Sector Manufacturing Agencies

What follows is a table listing key performance indicators identified in SPQA for Virginia Private Sector Manufacturing applications from the 1982 to 1993 award cycles. These indicators are effectiveness, efficiency, infrastructure, innovation, motivation, productivity, profitability, outgoing quality, overall quality, process quality, quality of work life, safety, and training.

Table 4-7 – Private Sector Manufacturing Agencies Common Key Performance Indicators

EFFECTIVENESS KEY PERFORMANCE INDICATORS		
KEY PERFORMANCE INDICATOR	ORGANIZATION	MEASURE
increase in production	MFG39-87	22%
	MFG87-91F/92/93W	163%
EFFICIENCY KEY PERFORMANCE INDICATORS		
KEY PERFORMANCE INDICATOR	ORGANIZATION	MEASURE
efficiency	MFG23-89C/92F/93W	82.5%
	MFG63-86W	94.9%
reduction in floor space	MFG31-91F/92W	75%
	MFG62-83/87/90F/91W	20%
reduction of inventory	MFG36-91C	32%
	MFG37-91/92	90%
	MFG68-84/90/91C/92C	42%
INFRASTRUCTURE KEY PERFORMANCE INDICATORS		
KEY PERFORMANCE INDICATOR	ORGANIZATION	MEASURE
employee participation	MFG58-89/90C	73.5%
	MFG63-86W	40%
INNOVATION KEY PERFORMANCE INDICATORS		
KEY PERFORMANCE INDICATOR	ORGANIZATION	MEASURE
% of employee suggestions implemented	MFG33-88	73%
	MFG54-90/91/92C/93C	50%
number of employee suggestions submitted	MFG33-88	424
	MFG54-90/91/92C/93C	1740
	MFG86-86/87/88C/89F/90	1582

Table 4-7 – Private Sector Manufacturing Agencies Common Key Performance Indicators cont.

INNOVATION KEY PERFORMANCE INDICATORS		
KEY PERFORMANCE INDICATOR	ORGANIZATION	MEASURE
number of employee suggestions implemented	MFG23-89C/92F/93W	24.5K
	MFG37-91/92	80
	MFG62-83/87/90F/91W	3161
	MFG102-93	227
MOTIVATION KEY PERFORMANCE INDICATORS		
KEY PERFORMANCE INDICATOR	ORGANIZATION	MEASURE
number of employees receiving awards	MFG37-91/92	153
	MFG54-90/91/92C/93C	1400
PRODUCTIVITY KEY PERFORMANCE INDICATORS		
KEY PERFORMANCE INDICATOR	ORGANIZATION	MEASURE
inventory turns per year	MFG07-89/90/91	5.75
	MFG46-90C/91C/92F/93F	6.2
PROFITABILITY KEY PERFORMANCE INDICATORS		
KEY PERFORMANCE INDICATOR	ORGANIZATION	MEASURE
sales per employee	MFG59-89C/90	\$170K
	MFG75--93	\$171K
OUTGOING QUALITY KEY PERFORMANCE INDICATORS		
KEY PERFORMANCE INDICATOR	ORGANIZATION	MEASURE
customer complaints	MFG07-89/90/91	0.03%
	MFG57-88	0.04%
	MFG61-90	1.9%
on-time deliveries	MFG10-86/87/89F/90F/91C	90%
	MFG23-89C/92F/93F	88%
	MFG37-91/92	94%
	MFG46-90C/91C/92F/93F	93%
	MFG59-89C/90	98%
OVERALL QUALITY KEY PERFORMANCE INDICATORS		
KEY PERFORMANCE INDICATOR	ORGANIZATION	MEASURE
cost of quality	MFG46-90C/91C/92F/93F	1.2%
	MFG47-87/90/92	5.7%
	MFG54-90/91/92C/93C	15%
	MFG59-89C/90	1.36%
	MFG63-86W	3.33%
	MFG79-91C/92F	1.1%

Table 4-7 – Private Sector Manufacturing Agencies Common Key Performance Indicators cont.

QUALITY OF WORK LIFE KEY PERFORMANCE INDICATORS		
<i>KEY PERFORMANCE INDICATOR</i>	<i>ORGANIZATION</i>	<i>MEASURE</i>
absenteeism	MFG05-88F/89/90	1.7%
	MFG13-92	1.9%
	MFG48-91F/92C/93F	1%
	MFG63-86W	1.69%
turnover	MFG05-88F/88/90	6.4%
	MFG13-92	0.4%
	MFG48-91F/92C/93F	6%
	MFG55-86/87	0.02%
SAFETY KEY PERFORMANCE INDICATORS		
<i>KEY PERFORMANCE INDICATOR</i>	<i>ORGANIZATION</i>	<i>MEASURE</i>
number of lost time accidents	MFG13-92	2
	MFG48-91F/92C/93F	2
	MFG65-92F	14
	MFG99-93	1
	MFG104-83/84/86	6
time without a lost time accident	MFG65-92F	1 yr
	MFG70-85/86	6.5 yrs
TRAINING KEY PERFORMANCE INDICATORS		
<i>KEY PERFORMANCE INDICATOR</i>	<i>ORGANIZATION</i>	<i>MEASURE</i>
number of training hours per year	MFG10-86/87/89F/90F/91C	55,000
	MFG102-93	3500

4.2.2.2 Private Sector Service Agencies

What follows is a table listing key performance indicators identified in SPQA for Virginia Private Sector Service applications from the 1982 to 1993 award cycles. These indicators are profitability, outgoing quality, quality of work life, and training.

Table 4-8 – Private Sector Service Agencies Common Key Performance Indicators

PROFITABILITY KEY PERFORMANCE INDICATORS		
KEY PERFORMANCE INDICATOR	ORGANIZATION	MEASURE
sales	SVC16-93	\$5M
	SVC40-90F/91/93C	\$27M
increase in annual revenues	SVC68-90F	14%
	SVC70-92	15%
OUTGOING QUALITY KEY PERFORMANCE INDICATORS		
KEY PERFORMANCE INDICATOR	ORGANIZATION	MEASURE
customer satisfaction rating	SVC60-92C	95%
	SVC83-92F	95%
QUALITY OF WORK LIFE KEY PERFORMANCE INDICATORS		
KEY PERFORMANCE INDICATOR	ORGANIZATION	MEASURE
employee turnover	SVC16-93	2%
	SVC47-92	14%
	SVC60-92C	42.8%
	SVC77-93F	7%
TRAINING KEY PERFORMANCE INDICATORS		
KEY PERFORMANCE INDICATOR	ORGANIZATION	MEASURE
% of employees attending quality awareness training	SVC63-92W	60%
	SVC83-92F	100%

4.2.2.3 Public Sector Local Agencies

What follows is a table listing key performance indicators identified in SPQA for Virginia Public Sector Local applications from the 1982 to 1993 award cycles. These indicators are efficiency and process quality.

Table 4-9 – Public Sector Local Agencies Common Key Performance Indicators

EFFICIENCY KEY PERFORMANCE INDICATORS		
KEY PERFORMANCE INDICATOR	ORGANIZATION	MEASURE
emergency services response time	LOC31-83/84/87/92/93F	6.93 min
	LOC15-92	6.9 min

**Table 4-9 – Public Sector Local Agencies Common Key Performance Indicators
cont.**

PROCESS QUALITY KEY PERFORMANCE INDICATORS		
KEY PERFORMANCE INDICATOR	ORGANIZATION	MEASURE
student dropout rate	LOC02-91C/92W	1%
	LOC03-91F/93W	5.6%
% increase in number of student activities	LOC11-91F	50%
	LOC16-90W	25%

4.2.2.4 Public Sector State and Federal Agencies

What follows is a table listing key performance indicators identified in SPQA for Virginia Public Sector State and Federal applications from the 1982 to 1993 award cycles. These indicators are infrastructure, motivation, and process quality.

Table 4-10 – Public Sector State and Federal Agencies Common Key Performance Indicators

INFRASTRUCTURE KEY PERFORMANCE INDICATORS		
KEY PERFORMANCE INDICATOR	ORGANIZATION	MEASURE
% of employees serving on process action teams	S/F10-91C/92C	46%
	S/F21-91F/92W	29%
MOTIVATION KEY PERFORMANCE INDICATORS		
KEY PERFORMANCE INDICATOR	ORGANIZATION	MEASURE
% of employees receiving awards	S/F10-91C/92C	40%
	S/F27-91W	90%
PROCESS QUALITY KEY PERFORMANCE INDICATORS		
KEY PERFORMANCE INDICATOR	ORGANIZATION	MEASURE
% of improvement suggestions accepted	S/F19-88C/89F/90W	33%
	S/F39-88F/89F/90F	10%

4.2.3 General KPIs Reported by Organizations in the SPQA Process

One of the main outputs of this research was a description of the types of key performance indicators organizations provide in applications for the SPQA for Virginia.

What follows is an analysis of what types of indicators organizations in the different categories focus on.

In reviewing the data, I found that no one organization provided data on all of the indicators which I was collecting. These indicators were identified in the Coding List provided in Appendix H. Many of the organizations claimed to have indicators within their organizations; however, they didn't provide quantitative data on these indicators. Therefore, I disregarded these indicators in my review.

Another interesting point is that each category (i.e., sector) provided different indicators in applications. For example, Private Sector Manufacturing organizations included profitability measures but public sector local agencies didn't. Just as this example indicates, each category shows a definite focus on different types of indicators. To illustrate this fact, Figure 4-1 provides a graph which illustrates how many measures were collected for each type of indicator for each category. It can be inferred from this graph that there is a different focus on performance within each category.

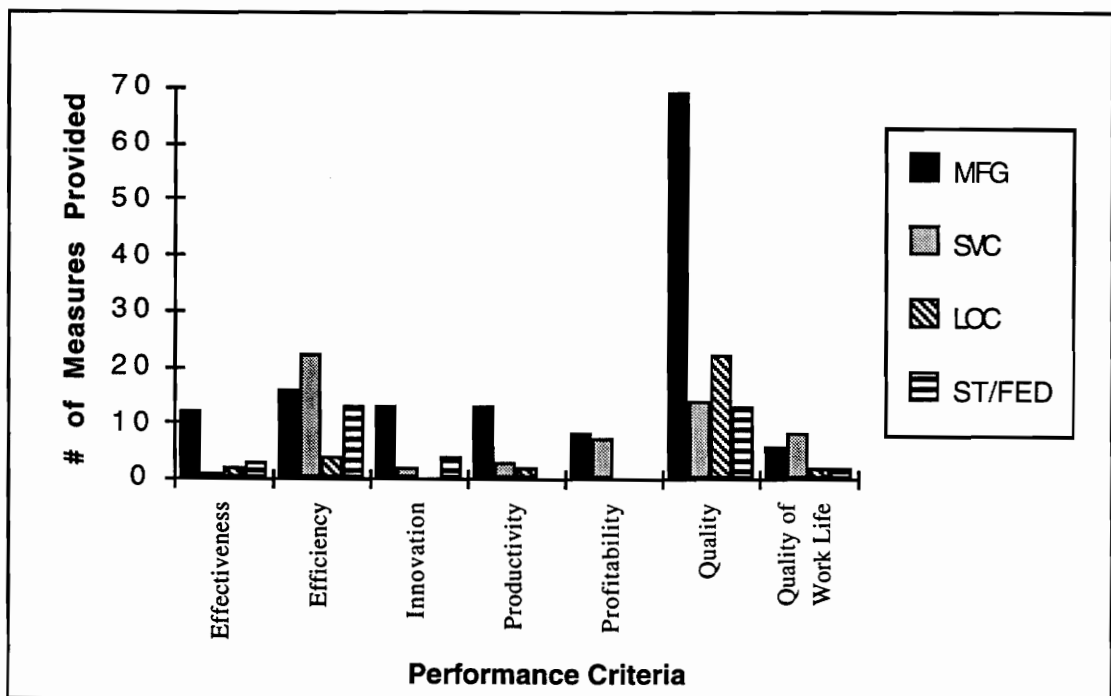


Figure 4-1 - Types of Measures Collected for Each Category

This graph illustrates that many organizations don't report measures of productivity within their applications. And, the productivity measures reported are often related to labor productivity only.

4.2.4 Comparison of KPIs Reported in the SPOA Process to Related Literature

What follows is a table which compares the results of the data analysis to Sink's seven performance criteria and Kaplan's Balanced Scorecard. A check was placed in a box if a given category's (i.e., sector) applications provided quantified data for key performance indicators in a given element of a measurement framework. A qualitative judgement was made to determine if the key performance indicators adequately fit the operational definitions of Kaplan's perspectives.

Table 4-11 – Comparison of Results to Measurement Frameworks

MEASUREMENT FRAMEWORK	PRIVATE SECTOR MANUFACTURING	PRIVATE SECTOR SERVICE	PUBLIC SECTOR LOCAL	PUBLIC SECTOR STATE AND FEDERAL
SINK'S SEVEN PERFORMANCE CRITERIA				
Effectiveness	√	√	√	√
Efficiency	√	√	√	√
Innovation	√	√		√
Productivity	√	√	√	
Profitability	√	√		
Quality	√	√	√	√
Quality of Work Life	√	√	√	√
KAPLAN'S BALANCED SCORECARD				
Financial Perspective	√	√		
Customer Perspective	√	√	√	√
Innovation and Learning Perspective	√	√		
Internal Business Perspective	√	√	√	√

Again, as shown in Figure 4-1, it can be inferred there is a different focus on performance for each category. From this table, it appears that the manufacturing and service sectors, taken as wholes, provide a more complete description of performance within its applications. Whereas, the public sector categories focus on efficiency, effectiveness, and quality. All of the categories consider the customer perspective and measures that support this perspective. They also look at process measures that fall within the internal business perspective.

4.3 Visible Measurement System of Virginia Organizational Benchmarks

4.3.1 General Overview

One of the bricks upon which this research was built was the attempt by an SPQA Board member to identify benchmarks within the State of Virginia using SPQA applications. This section is an attempt to add benchmarks to the list. It should be noted at this time that these benchmarks are based solely on the best performance reported on indicators provided in SPQA applications. Organizations are cautioned to use these benchmarks as simply one source of data in a benchmarking study. Anyone using this section as data for benchmarking should consult Section 2.3 for more information regarding the process of benchmarking.

The benchmarks provided in this section were taken from the common key performance indicators identified through the data analysis. These actual data was collected from applications provided to the SPQA program from 1982 to 1993. Current performance levels of any organization on these data were not verified. Benchmark indicators were included only if the unit of analysis for the measure could be compared across organizations.

4.3.1.1 Private Sector Manufacturing

What follows are the benchmarks collected from the Private Sector Manufacturing SPQA applications from 1982 to 1993.

Table 4-12 – Private Sector Manufacturing Benchmarks

KEY PERFORMANCE INDICATOR	MEASURE
% of employee suggestions implemented per year	73%
absenteeism per year	1%
cost of quality	1.1%
customer complaints	0.03 per million parts
increase in production	163%
inventory turns per year	6.2
on-time deliveries per year	98%
reduction in floor space per year	75%
reduction of inventory per year	90%
sales per employee per year	\$171000
time without a lost time accident	6.5 yrs
turnover per year	0.02%

4.3.1.2 Private Sector Service

What follows are the benchmarks collected from the Private Sector Service SPQA applications from 1982 to 1993.

Table 4-13 – Private Sector Service Benchmarks

KEY PERFORMANCE INDICATOR	MEASURE
customer satisfaction rating	95%
employee turnover per year	2%
% of employees attending quality awareness training	100%

4.3.1.3 Public Sector Local

What follows are the benchmarks collected from the Public Sector Local SPQA applications from 1982 to 1993.

Table 4-14 – Public Sector Local Benchmarks

KEY PERFORMANCE INDICATOR	MEASURE
emergency services response time	6.9 min
student dropout rate per year	1%

4.3.1.4 Public Sector State and Federal

What follows are the benchmarks collected from the Public Sector State and Federal SPQA applications from 1982 to 1993.

Table 4-15 – Public Sector State and Federal Benchmarks

KEY PERFORMANCE INDICATOR	MEASURE
% of employees serving receiving awards	90%

4.4 SPQA Process Observations

Throughout this research, I have been informally collecting observations of the administration and execution of the SPQA Award Process. I have attended two SPQA Board meetings. I have spoken informally with various SPQA Board members as well as SPQA applicants. I attended the SPQA Pre-Conference Workshop and Conference as well as the Post-Conference Feedback Session for the Public Sector - State and Federal Agencies. From these forms of data collection, I have made the following observations.

4.4.1 Application Evaluation Process Observations

I attended the Board meeting where the members received the application evaluation packages. Board members commented that it would have been preferable to have received the package prior to the Board meeting. This would have allowed them time to review the data. Further, no process was given to the Board members, so they could use the data provided to them.

The Board members also commented that the evaluation packages made the evaluation process easier this year. The portrayal helped them identify outliers in the rating of applications, so they could obtain better scores for the applicants. The qualitative data helped Board members provide specific feedback to applicants who were not selected for site visits. This data also provided the Site Visit Team Leader with specific information to provide to site visit candidates as site visit issues to be addressed.

Another observation made was that Board members commented that the application review process was quite time-consuming. Since each application had to be scored using the scoring guidelines, it took a number of hours to complete all of the application reviews. One Board member commented that he used a multiple stage review process. He would read through each application once taking note of issues. Then, he would re-read the applications and assign scores to the appropriate sections of the application.

In reviewing the scores different Board members provided for each application, a question was raised as to why there was such a wide range in some of the scores for individual criteria. One Board member commented that he could have given two different scores for one criterion based on the anchors that were given. He felt that the anchors were not mutually exclusive; therefore, it led to confusion in choosing an absolute score.

4.4.2 Feedback Process Observations

I did not have firsthand observation of the feedback process conducted with applicants who weren't considered for site visits. This portion of the feedback process is conducted primarily through written communication. Sample letters provided to applicants are given in Appendix L.

Following the conference, site visit team members conducted group feedback sessions with any applicant desiring feedback. I attended the Public Sector – State and Federal Agencies session. There were three organizations that attended this session – an ACE winner, a medallion winner, and a finalist. There were four applicants for the 1993 award cycle.

The Board members conducting the session provided detailed verbal feedback on observations made during the site visits as well as comments provided through the application evaluation process. In this feedback session, the Site Visit Team Leader chose to share the actual application scores with each attending organization. He also provided the organizational representatives with the compilation of the qualitative comments made on each application.

The organizations were allowed to ask any questions. Further, each organization was given an opportunity to meet one-on-one with a site visit team member. At the end of the feedback session, each organization was given an opportunity to provide feedback to the Board members regarding the feedback session. The comments were quite positive; the organizations said that they felt the session was beneficial to them understanding why they did or didn't win a medallion.

CHAPTER 5 - CONCLUSIONS

The previous chapter provided the reader with the data collected in this research. Chapter 4 provided the laundry lists of performance indicators organizations provide in their SPQA applications. An additional output included in the previous chapter were lists of common performance indicators compiled across organizations within a given category. This chapter attempts to convert data, as provided in Chapter 4, into information and, subsequently recommended decisions and actions. Recommendations will not only be made for the SPQA Board of Directors but also for the VQPC, the SPQA administrators. Answers to the research questions defined in Chapter 1 are also included in this chapter. One of the desired outputs for this thesis was a list of recommendations to improve the SPQA process. This chapter provides these recommendations in a narrative form for the reader.

5.1 Research Questions

What follows is a compilation of the answers, or summaries of the answers, to the research questions provided in Chapter 1. In some instances this narrative will provide the reader the direct answer to the question while, in other instances, the answers will be summarized to avoid repeating tables and information provided in Chapter 4.

5.1.1 Research Question #1 – What Key Performance Indicators do Organization(s) Provide in Their Application(s)?

The lists of key performance indicators that organizations provide in their applications are provided in Tables 4-3 through 4-11. These tables not only provide specific indicators that organizations report, but they summarize the indicators under criteria that describe the types of indicators. For example, an organization might report

an indicator of “# of widgets produced.” This indicator is provided under the general heading of effectiveness. Definitions for the general headings (i.e., criteria) are found in Appendix H.

In identifying criteria that organizations report in their SPQA applications, it was found that different sectors report different criteria. Table 5-1 provides the breakdown of what types of criteria applicants within each sector report.

**Table 5-1 – Summary of Types of Criteria and Key Performance Indicators
Provided by Applicants of the SPQA**

PRIVATE SECTOR MANUFACTURING AGENCIES	PRIVATE SECTOR SERVICE AGENCIES
Effectiveness Efficiency Environmental Infrastructure Innovation Motivation Productivity Profitability Incoming Quality Outgoing Quality Overall Quality Process Quality Quality of Work Life Safety Training	Effectiveness Efficiency Infrastructure Innovation Motivation Productivity Profitability Outgoing Quality Overall Quality Process Quality Quality of Work Life Safety Training
PUBLIC SECTOR LOCAL AGENCIES	PUBLIC SECTOR STATE AND FEDERAL AGENCIES
Effectiveness Efficiency Productivity Outgoing Quality Overall Quality Process Quality Quality of Work Life Training	Effectiveness Efficiency Infrastructure Innovation Motivation Outgoing Quality Overall Quality Process Quality Quality of Work Life Training

5.1.2 Research Question #2 – When Looking at Common Key Performance Indicators Across Organizations Within a Specific Sector, How do the SPQA Applicants Perform on These Indicators

Tables 4-7 through 4-11 provide an analysis of what common key performance indicators are reported as well as how organizations perform on those specific indicators. Table 5-2 provides a summary of the indicators that are common within each sector.

Table 5-2 – Summary of Common Key Performance Indicators Reported Within SPQA Applications

PRIVATE SECTOR MANUFACTURING AGENCIES	PRIVATE SECTOR SERVICE AGENCIES
# of Employees Receiving Awards # of Employee Suggestions Implemented # of Employee Suggestions Submitted # of Lost Time Accidents # of Training Hours Per Year % of Employee Suggestions Implemented Absenteeism Cost of Quality Customer Complaints Efficiency Employee Participation Increase in Production Inventory Turns Per Year On-Time Deliveries Reduction in Floor Space Reduction of Inventory Sales Per Employee Time Without a Lost Time Accident Turnover	% of Employees Attending Quality Awareness Training Customer Satisfaction Rating Employee Turnover Increase in Annual Revenues Sales
PUBLIC SECTOR LOCAL AGENCIES	PUBLIC SECTOR STATE AND FEDERAL AGENCIES
% Increase in Number of Student Activities Emergency Services Response Time Student Dropout Rate	% of Employees Receiving Awards % of Employees Serving on Process Action Teams % of Improvement Suggestions Accepted

5.1.3 Research Question #3 – What Decision-Making Process is Used by SPQA Board Members When Selecting “Best-of-the-Best” Organizations from the Applicant Pool?

What follows is a brief description of the decision-making process used by SPQA Board Members when selecting site visit candidates, medallion recipients, and finalists. A detailed process flow diagram of the entire award process is provided in Appendix D.

The process begins as applications are distributed to numerous organizations and individuals in August. Applications are returned to the administrators of the award, VQPC, in November. Following the return of these applications, copies are provided to Board Members for review and scoring in November and December. Approximately seven Board Members are asked to evaluate each application. These Board Members then provide the VQPC with their scoring packages for compilation.

In December, VQPC completes the data evaluation of the scoring packages. This data evaluation includes illustrating the scores by criteria, rater, and organization. Samples of these graphs can be found in Appendix C. Qualitative data written within the scoring packages are also compiled, thereby eliminating redundant comments and providing grouping for common comments. The data evaluation packages are provided to the SPQA Board Members in January. From these analyses, the SPQA Board identifies those candidates for site visits and certificates of merit.

Detailed written feedback is then provided to the organizations that did not receive recommendations for site visits. Separate letters are prepared for the organizations receiving site visits. These letters indicate when the site visits will be and what issues should be addressed through the site visit.

Site visits are conducted in January and February, and a qualitative analysis of the results of those visits is provided to the SPQA Board in March. At this point, the Board decides who will be finalists and medallion recipients for that award year. The award cycle is concluded by the SPQA Workshop and Conference held in April.

5.1.4 Research Question #4 – How can the SPQA for Virginia be Improved from a Process Standpoint?

In reviewing the results provided in Chapter 4, there are seven main recommendations that would affect the SPQA processes. The processes that would be affected include application design, application evaluation, and data evaluation. The general recommendations are as follows:

- (1) Applicants should provide operational definitions of all performance indicators included in applications;
- (2) Applicants should be requested to provide a synopsis of organizational strategic goals and objectives; a measurement breakdown structure for their measurement systems; and a description of how measures are used in the organization to make decisions and actions;
- (3) Applicants should be required to complete a matrix of specific key performance indicators;
- (4) Anchors on the scoring guidelines should be reviewed and modified;
- (5) Data evaluation packages should be provided to the SPQA Board at least one week prior to the Board meeting in which they would use them;
- (6) Training on how to use the data evaluation packages should be conducted annually; and
- (7) Process documentation of the use of the data evaluation packages should be included in the SPQA process notebook.

Specific information regarding these recommendations is provided in the following sections.

5.1.4.1 Operational Definitions

In reviewing the laundry lists of key performance indicators (see Tables 4-3 through 4-6), the following observation was made. Some organizations provided similar key performance indicators, but operational definitions were different. For example, one organization provided an indicator of number of quality awareness training hours per year in the organization, while another organization simply provided an indicator of training hours per year. These indicators are similar, but because the operational definition is unknown (i.e., does the second organization mean only quality awareness training), there would be little information gathered by comparing the two indicators.

Dr. Deming (1993, p. 108) states that an operational definition “is a procedure agreed upon for translation of a concept into measurement of some kind.” Operational definitions help individuals communicate with one another. If a decision is to be made, then it’s important for communication to occur or assumptions will be made. For example, if operational definitions are not provided in applications, SPQA Board members could either make an assumption of what the definition is or they would have to eliminate that indicator from consideration.

5.1.4.1.1 Application Design. In reviewing the application criteria as well as the laundry lists of key performance indicators, it was found that the application does not request operational definitions of key performance indicators. The application simply asks for the organization to provide a minimum of three years’ worth of data to help substantiate or document trends for any organization. Descriptions of qualitative and quantitative results are requested from the application.

It’s recommended that VQPC, in its review of the application for the 1994 Award Cycle, consider placing an additional request from applicants that they provide operational definitions of all key performance indicators that are placed in applications,

specifically quantitative indicators. The VQPC should state that an operational definition is a definition an organization can do business with. Further, a specific example of an indicator with its operational definition should be provided within the application.

5.1.4.2 Converting Measurement to Data to Information to Decisions and Actions

While reading the narratives attached with the indicators, it appeared that organizations provided indicators haphazardly (see Tables 4-3 through 4-6). A logical flow or systematic procedure was missing. This observation is further substantiated by Figure 4-1 and Table 4-11. Organizations (i.e., individually) did not provide listings of indicators that mapped to any one particular framework.

An additional observation was that organizations did not provide an explanation of how any of the indicators helped them make decisions and take actions. In looking at the MSM (see Figure 1-3), these organizations don't appear to be using the information gained from shaded area A to make decisions and actions as illustrated in shaded area B. Dixon, Nanni, and Vollman (1990) believe you must balance strategy (as described in an organizational strategic plan) with actions and measures. They're interconnected and dynamic. It's recommended that the SPQA for Virginia begin to request information on these three components.

5.1.4.2.1 Application Design. Dixon, Nanni, and Vollman (1990, p. 165) suggest five attributes of good measurement systems: "(1) be mutually supportive and consistent with the business's operating goals, objectives, critical success factors, and programs; (2) convey information through as few and as simple a set of measures as possible; (3) reveal how effectively customers' needs and expectations are satisfied; (4) provide a set of measurements for each organizational component that allows all members of the

organization to understand how their decisions and activities affect the entire business; and (5) support organizational learning and continuous improvement.”

Based on these five attributes, the following additions are recommended for the SPQA application. Organizations should be requested to provide a synopsis of organizational strategic goals and objectives. Organizations should provide a measurement breakdown structure for their measurement systems. This structure would indicate how measures can be broken down into smaller components as well as rolled up into more global measures for top management to review. Third, organizations should be asked to describe how a sample of the measures provided are used in the organization to make decisions and take actions.

Lynch and Cross (1991, p. 1) state that the “purpose of performance measurement is to motivate behavior leading to continuous improvement in customer satisfaction, flexibility, and productivity.” But, employees can use measures only if they have been trained. Therefore, a final recommendation for the application design is that it should include a request for information on how employees are trained in using the measurement system within the organization.

A possible method by which to collect the aforementioned information would be to ask each applicant to provide a copy of its strategic plan, measurement system or breakdown structure, a one-page summary of how individuals within the organization use the provided measures to make decisions and actions, and a one-page summary on how employees are training in using the measurement system. These documents would be attached as appendices to the application. If this suggestion is implemented, the Board would need to review the number of pages that it allows for applications to determine if the current number of pages are needed if these appendices are provided.

5.1.4.3 Matrix of Key Performance Indicators

As indicated by Table 4-11, organizations, taken as a whole category, do not provide key performance indicators such that they map to a measurement framework. Further, as indicated in Tables 4-7 through 4-10, there are few currently reported indicators that are common across organizations in any given category. What Tables 4-7 through 4-10 do indicate, however, is that there are indicators that can be compared across organizations.

As the SPQA Board considers who should be considered for a site visit, it becomes important to have indicators that can be compared across organizations. Some practitioners have stated that it's easy to pick between the highest and lowest ranked object. But, it becomes more difficult to distinguish between the objects that are ranked in the middle. By having common key performance indicators, Board members will be able to review longitudinal data to make a more informed decision on how organizations should be ranked and rated.

5.1.4.3.1 Application Design. In support of the above comments, it's recommended that a matrix of key performance indicators be developed to include in the SPQA application. Organizations will be requested to provide information on each indicator, such that Board members will be able to compare these data across organizations to make award decisions.

In designing a matrix of key performance indicators, it's important to specify a measurement framework upon which the matrix will be built. For the purpose of the SPQA application, a matrix of key performance indicators¹ based on Sink's seven performance criteria has been selected (see Table 5-3). Sink's seven performance criteria were chosen as the foundation of this matrix, because they appear to have face validity

¹ This matrix has been designed as if it were going to be used in the 1994 award cycle.

with organizations. Additional indicators were chosen, as appropriate. Some criteria do not have specific key performance indicators listed. Organizations should be asked to provide a minimum of one indicator for each of the criteria. Operational definitions of all criteria listed in the matrix should be provided in the application as well.²

Table 5-3 – Key Performance Indicator Matrix

KEY PERFORMANCE INDICATOR MATRIX			
<i>GENERAL ORGANIZATIONAL CHARACTERISTICS</i>			
# of employees			
starting date of organization's improvement effort			
# of all hands meetings per year			
% of employees involved in the 'B' infrastructure			
<i>EFFECTIVENESS</i>	<i>1991</i>	<i>1992</i>	<i>1993</i>
<i>EFFICIENCY</i>	<i>1991</i>	<i>1992</i>	<i>1993</i>
<i>EMPLOYEE DEVELOPMENT</i>	<i>1991</i>	<i>1992</i>	<i>1993</i>
# of training hours per employee per year			
# of quality training hours per employee per year			
<i>INNOVATION</i>	<i>1991</i>	<i>1992</i>	<i>1993</i>
# of employee suggestions submitted per year			
# of employee suggestions accepted per year			
# of employee suggestions implemented per year			
average cycle time to evaluate and approve employee suggestions			
% of employees participating in employee suggestion program			
<i>PRODUCTIVITY</i>	<i>1991</i>	<i>1992</i>	<i>1993</i>

² Sample operational definitions of the criteria can be found in Appendix H.

Table 5-3 – Key Performance Indicator Matrix cont.

KEY PERFORMANCE INDICATOR MATRIX cont.			
<i>PROFITABILITY</i>	<i>1991</i>	<i>1992</i>	<i>1993</i>
budgeted revenues			
actual revenues			
budgeted expenses			
actual expenses			
<i>QUALITY</i>	<i>1991</i>	<i>1992</i>	<i>1993</i>
cost of quality			
<i>QUALITY OF WORK LIFE</i>	<i>1991</i>	<i>1992</i>	<i>1993</i>
% employee turnover per year			
% absenteeism per year			
# of employee grievances per year			
<i>REWARDS AND RECOGNITION</i>	<i>1991</i>	<i>1992</i>	<i>1993</i>
% of employees receiving monetary awards per year			
% of employees receiving any form of formal recognition per year			
<i>SAFETY</i>	<i>1991</i>	<i>1992</i>	<i>1993</i>
# of lost time accidents per year			

This matrix does not provide indicators for efficiency, effectiveness, productivity, or quality. Through the review of the laundry lists of key performance indicators, it appeared that these indicators were very much organization-specific (see Tables 4-3 through 4-6). Therefore, I have left blanks for these indicators.

5.1.4.4 Application Evaluation

The evaluation process for SPQA applications has evolved considerably over the years from a strictly qualitative and intuitive judgment to a more quantitative scoring system. I believe the changes in the process will enable the Board to decrease process variability in that specific criteria and scoring guidelines are used.

5.1.4.4.1 Scoring Guidelines. Concern has been expressed though, as indicated in Section 4.4.1, regarding the anchors used within the scoring guidelines. It was suggested that the anchors were not mutually exclusive; therefore, a Board member could choose multiple scores for any one given dimension.

VQPC should review the scoring guidelines provided to the SPQA Board for application evaluation. The anchors on the scales should be scrutinized. Significant time should be spent operationally defining these anchors, so they become more mutually exclusive (i.e., only one anchor could be chosen for a given dimension). VQPC should get technical assistance from specialists in the area of scale design.

5.1.4.4.2 Data Evaluation Package. A comment made by a Board member was that it would have been helpful if the data evaluation packages had been delivered to the Board prior to the meeting in which decisions were to be made. VQPC should provide the data evaluation packages to the Board members one week prior to the Board meeting at which they will be used.

A further recommendation is for VQPC to expand the new Board member training to include analysis of the data evaluation packages. VQPC should develop a module, similar to its model applications, to help walk new Board members through the use of the graphs and tables within the evaluation packages. The packages used in the 1993 award cycle could be used for the 1994 training session. Additionally, process

documentation should be created on the use of the evaluation packages to include in the SPQA process notebook that all SPQA Board members receive.

5.2 Additional Discussion on Findings

What follows is a discussion on findings that were not considered to be direct responses to the research questions for this thesis.

5.2.1 Repeat Applicant Organizations

In reviewing the data provided regarding the statistics of applicant organizations for the SPQA, an interesting piece of data appeared. The percentage of repeat applicants within the different categories within the SPQA differ significantly across categories (see Table 4-1). The range of repeat applicants is from 18% to 41% with the average being 30%. Data was not collected to explain this anomaly. Therefore, the following recommendation is provided.

5.2.1.1 Survey Investigation of Organizational Desired Outcomes and Opinions of SPQA

As administrators of the SPQA and technical support for the SPQA Board, VQPC should develop a plan to investigate why organizations within the given categories do or do not re-apply for the SPQA for Virginia. It's recommended that a survey be designed to evaluate applicants' satisfaction with the application, application evaluation process, award feedback process, and the VQPC support provided for the award.

An additional area to explore with this survey is why the respondent organizations apply for the SPQA in the first place. The quality awards literature indicates that organizations apply for awards for different reasons. Three of the most popular reasons for applying are (1) to gain feedback on organizational performance; (2) to benchmark against other organizations; and (3) to gain recognition for organizational efforts. This

phenomenon could explain why organizations continue to or not to re-apply for the award.

5.2.1.1.1 Survey Design, Administration, Analysis, and Feedback Process. The survey questions should use a Likert scale format with specific anchors provided. Further, the survey should provide open-ended questions to the respondents to gather specific data on why they choose to or not to re-apply for the award. VQPC should consider getting assistance from the Center for Survey Research at Virginia Tech or other technical support to ensure that the survey will not only gather the information required but also will be statistically sound.

Once the survey has been designed, VQPC should distribute the survey to applicants from the time that a program manager had been assigned to help administer the SPQA to the most recent award cycle. VQPC should target the person within the applicant organization that was the contact during the organization's experience with SPQA. This person should be contacted prior to sending the survey out, so VQPC is certain that he/she is still with the organization. Further, the individual should be provided with a brief synopsis of why this survey is being sent out. If the contact person is unable to complete the survey, an alternate individual should be identified in the initial contact with the applicant organization.

Each person should be allowed two weeks from the time the survey reaches him/her to complete the survey. VQPC should then monitor the return of the surveys to guarantee that all have been returned. If an individual has not returned the survey within the allotted timeframe, a phone call should be placed to determine if the individual plans to complete the survey and when VQPC can expect the reply. Once all surveys have been returned, they should be given to the Center for Survey Research, or an appropriate technical support function at Virginia Tech, for analysis.

VQPC should provide the SPQA Board with an executive summary of the results of this survey. This summary should address two main topics: (1) why organizations apply and, subsequently, re-apply for SPQA and (2) how satisfied the applicants are with the process itself as well as the support provided by VQPC. A discussion should be facilitated to determine if the Board wishes to take actions on the given results. If actions are recommended, VQPC should implement them within the next award cycle. Last, VQPC should provide all survey respondents with a thank you letter and a one page summary of the survey results as well as a list of intended actions.

CHAPTER 6 - REVIEW OF THESIS

This chapter represents the conclusion of the research cycle, where the success of the project, or thesis in this case, is assessed. This chapter includes a self-assessment of the research, a review of the measures of success, and future research areas that could be explored.

6.1 Evaluation of This Research

6.1.1 Self-Assessment

In looking back at my research, I have decided to assess the quality (in the holistic sense) by focusing on the end-product as well as the execution of the process. I am truly proud of my thesis. I feel that it is a document that the SPQA Board can use to help improve the decision-making process for the award. I also feel that it looks at an area that hasn't been addressed before, specifically for the State of Virginia. In this vein, I would say the output is a quality document.

Now, in reviewing the execution of the research process, I am less willing to say I'm proud. I feel that I was inefficient in that I spent too much time on details when I should have focused on the broader picture. I also believe that I waited too long to begin. I waited for my advisor to push me to work instead of being self-motivated. However, I became self-motivated following the defense of my proposal. I do think that I completed my research in a timely fashion (seven months from starting my proposal to thesis defense), once I was jump started.

I believe I did a better job of working with my committee members than I did in completing my writing. I met with my members only when I felt it was necessary and I needed input. I didn't waste their time; I always tried to have specific questions to be

answered or issues to be addressed. I would say that my execution of this portion of the research process was very good.

6.1.2 Review of the Measures of Success

In reviewing my thesis, I want to review the measures of success I proposed in my proposal defense. From this review, I will make an additional judgment on the success of my research.

Table 6-1 – Review of Measures of Success

Measure of Success	Completion?
An approved thesis	Hopefully
Laundry list of key performance indicators that organizations report within their SPQA applications	Yes
Identification of where organizations in the State of Virginia measure on common performance indicators	Yes
Description of the decision-making process used by the SPQA Board in determining medallion winners	Yes
List of recommendations to the SPQA Board	Yes
Will the Board use the thesis output to make improvements to the SPQA process	Hopefully
Did I complete all of the steps of my research methodology	Yes
Does the SPQA Board want to share the results of this research	Hopefully

Although three of my measures of success can't be evaluated at this time, I believe this research was successful. The remaining three measures will determine to what extent the research was successful.

6.2 Next Steps

I am currently scheduled to present an executive summary of my findings in my thesis to the SPQA Board on July 20. This presentation will focus primarily on my recommendations for improvements in the evaluation and feedback processes. The

SPQA Board Chairman will also be presented with a complete copy of my thesis to be used at his personal discretion.

6.3 Areas for Future Research

In considering how my thesis can be used as a springboard, I feel the following topic areas would be natural extensions of my research. I have described the topic areas by writing down potential research questions that could be used.

6.3.1 Measurement Issues

What specific measures, if any, should the SPQA application request data on from each applicant organization? Is there a “balanced scorecard” that can be developed to compare organizations within sectors?

Do the seven performance criteria, taken as a set, accurately describe organizational performance? Are they valid? How do these criteria relate to other measurement frameworks, such as Kaplan’s balanced scorecard?

6.3.2 Benchmarking Issues

How do the “best” organizations in the State of Virginia compare to international organizations on specific key performance indicators?

How do SPQA medallion recipients compare to non-applicant organizations in the State of Virginia on specific key performance indicators?

6.3.3 SPQA Process Issues

In considering the results of my research, I found that different organizations use very different key performance indicators. But, there appear to be a small number of indicators that are similar. Are there similar characteristics that medallion-winning

organizations in each sector possess? Are they similar across sectors? Further, what do experts in the SPQA process, experts in other quality awards, and organizations not applying for quality awards feel are the characteristics for award-winning organizations? In taking these results, how can the SPQA application be designed such that the Board receives information on the characteristics, so the application evaluation process takes less time?

Are there any common root causes as to why organizations do not re-apply for the SPQA? Are there any common desired outcomes for organizations who do apply for the SPQA? Are the desired outcomes and root causes common across categories?

In considering the effectiveness of the award (i.e., was the right organization chosen), how are past winners currently performing? For example, are they still in business, are they facing downsizing? If past winners aren't performing well now, does that mean SPQA is ineffective? Or, does it simply mean that the award is a snapshot in time and that it doesn't predict future performance?

6.4 Lessons Learned

In this section of my thesis, I will share lessons that I have learned in working through the research process. I believe this section can be invaluable to future students who undertake a thesis or dissertation. In writing this section, I considered things I did well in addition to things I didn't do well.

6.4.1 Planning the Thesis

Strategic planning includes a step called "preparing to plan." I believe that each student must prepare himself/herself for the research process. It's important to not only be technically ready but also emotionally ready for the trials that will be faced. I believe

this stage of the research process should occur during the first and second semester of a student's career.

6.4.1.1 Choosing a Topic

In selecting a topic, a student can take one of two roads: selecting a personal favorite or choosing a topic recommended by the advisor. I chose the latter route which actually turned out to be a personal favorite. I believe the lesson I learned here was that you can never start too soon thinking about a topic. You need to spend a considerable amount of time brainstorming ideas as well as reading. Read! Read! Read! From your readings, you can often narrow the topical areas down to one or two. Then, work with your advisor to narrow the scope. Choose your topic early, so you can move along. You need to have a topic selected before continuing in the process. This is a precondition of success.

6.4.1.2 Choosing a Committee

When you choose your committee, you need to consider that this group will have to work together as well as work with you as an individual. You should strive to have a synergistic group, a group whose educational advice is more valuable than the individuals put together. The committee members should have knowledge in your content area, but, more importantly, you should feel comfortable with each person as a mentor, coach, and guide.

In approaching potential committee members, write a one-page document describing your topic area. Give each individual an opportunity to read the document and then set up a face-to-face meeting. In your meeting you should discuss your expectations of your committee as well as the individual's expectations of you. Make sure you form

closure on what next steps are before you leave the meeting (e.g., agreement on being a committee member, come back when you have section one done).

6.4.1.3 Developing a Project Plan

Once you have a topic and a committee, plan your research. **MANAGE THIS AS A PROJECT!!!!** I'm not sure how many times I heard this from my advisor, but I am now a believer. If you set milestones for yourself, share them with your committee. Make yourself commit to completing things on time. It wasn't until I did do this that I really began to make progress. I had nothing to measure myself against with respect to progress. Days slipped by without doing anything on my research, but how would I know if I was off-schedule. I never had a schedule. From one student to another, this is an important lesson that I learned and mistake that I made. Please learn from my mistake!!!

6.4.2 Designing the Research

Designing your research, in my viewpoint, is completing Chapter 1 and Chapter 3 of your proposal (thesis). These chapters are the backbone of your entire research. This is the most difficult part of the research process. You are narrowing your focus, describing what your research is, and how you will accomplish it.

In my research experience, I feel you will be able to do this when your mind feels you're ready. I know that I have advocated using a project plan, but I believe you should allow the most time in your process for this particular step. I found it difficult to focus and actually articulate what I wanted to do. But, once I was mentally prepared, I was able to work through the sections fairly quickly.

6.4.2.1 Working with Your Advisor

Your advisor can be your best friend in this step of the research process. Work with him/her. Ask advice. Set up meetings to brainstorm. But, always have an agenda before meeting with your advisor. Have specific questions or concerns you need addressed. Determine what your desired outcomes and outputs are for the meeting. Your advisor is a busy person, so don't waste his/her time. If you simply want to brainstorm or have a discussion, then simply state that in your agenda. The more considerate you are of your advisor's time, the more willing he/she will be in meeting with you in the future.

6.4.2.2 Using Available Resources

I found it extremely beneficial to bounce ideas off other graduate students, especially those who were ahead of me in the research process. This gave me an opportunity to throw out a lot of the trash in my writing before approaching my advisor. Further, other students brought new insights into my topic area.

Although I found it valuable to talk with other students, you must remember that your committee is the deciding vote with respect to your research. Don't let conversations with others influence you to diverge from your original topic. Use them simply as sounding boards and throw out the "trash" from those meetings.

6.4.3 Writing the Thesis Proposal

I personally found this part of the research process fairly easy. Once I formed closure on my topic and began to develop my research questions, problem statement, etc., I didn't have much trouble in writing the actual proposal (Chapters 1 through 3 of your thesis). I would recommend, however, that you try to have these chapters as polished as possible, so you can avoid rework when writing your thesis.

6.4.3.1 Working with Your Committee

When I chose my committee members, I understood that each one (other than my advisor) would not be able to spend a lot of time with me on my thesis. With that in mind, I didn't approach my committee members with the first few drafts of my proposal. Instead, I waited until I felt I was forming closure. Then, I met one-on-one with each member and discussed concerns, changes, additions, etc. I made the changes and met with each one again to verify I had done what they wanted.

After these meetings, I felt much more comfortable with my proposal; thereby, increasing my comfort level for my defense. I truly believe that these meetings are why I was successful at my proposal defense.

6.4.4 Defending the Thesis Proposal

Defending your proposal can be a nightmare or a challenge. That choice is yours. I identified two critical success factors to defending my proposal: logistics and preparation.

6.4.4.1 Logistics

Logistics include scheduling your defense, choosing a room, notifying your committee, etc. Although these items seem like minute details, your defense can be disastrous if any one of these things aren't considered.

In scheduling your defense, work with your advisor to determine when you'll be ready to defend. Rely on your advisor to be honest with you regarding the quality of your proposal. He/She is the expert. Never challenge his/her decision to either let you defend or encourage you to wait.

You need to schedule your defense about six weeks prior to when you think you'll be ready. As you increase the number of people you need to meet with, the windows of

opportunity decrease. You need to try to accommodate all committee members' schedules if possible. If you can't, then you need to work out a compromise with your committee (e.g., conference call, written feedback only).

6.4.4.2 Preparation for the Defense

As you prepare for your defense, find out what your committee expects. Will you be required to deliver a brief presentation on your research? Will the members start asking questions? If you know the format, then you can save time in preparation.

You need to go through your proposal piece by piece and brainstorm potential questions from your committee. This will help you determine what types of handouts or overheads you need to bring with you. I had a colleague read my proposal and role-play as a committee member and brainstorm all kinds of potential questions. This really helped me focus on what I needed to be prepared for.

Put your overheads in sheet protectors and in a notebook with sections identified. This will help you pick out the right overhead at the right time. Also, even if you have overheads for all questions asked, use different media to communicate your answer. Use the flipchart some. Answer some questions without visual media. You want to appear confident, not cocky.

6.4.5 Completing the Research Methodology

I underestimated the time it would take me to complete the steps of my methodology. Be realistic in project planning, not optimistic. By doing this, you will prevent a lot of potential stress from occurring if you're behind schedule.

6.4.5.1 Maintaining Momentum from Proposal Defense

I didn't do well with respect to maintaining momentum. I got lazy after my proposal defense. I was advised to do "something" on my research every single day. I didn't do this, so it took me longer to finish than it should have. Keep your mind in the game after the proposal defense. Remember. You've only gotten through the first half of the game. You need to complete the second half to win. Discover your personal biorhythm with respect to writing. Although my advisor encouraged me to write every day, I found it difficult to maintain the quality of my writing if I wrote every day. Discover your personal preference and stick with it.

6.4.6 Writing the Thesis

Once you've completed your proposal, you already have Chapters 1 to 3 completed. The next step that I found quite helpful was to sit down and write a detailed Table of Contents for the remaining chapters of my thesis. This helped organize my thoughts. Further, it helped me focus on issues while completing my data analysis. I was able to filter out the noise and concentrate on the beneficial information I needed for writing my thesis.

As you complete a portion of your data analysis, fill in the pieces in your thesis. This allows you to write things down while they're fresh in your mind. It's easy to forget details if you wait until you complete everything to start writing. It's also quite gratifying to see the pieces in your thesis being filled in. It helps keep you motivated. Instead of seeing blank pages, you start to see the beginning of a finished document.

My last suggestion with respect to writing your thesis is not to expect your first draft to be perfect. Write things down first. Then, write things up. It takes a considerable amount of time to get a final version of your thesis. Don't let your ideas of

perfection hinder your ability to write down all of the details you want to include. Remember. You won't remember everything unless it's written down.

6.4.7 Overall Comments

In looking back at my research experience, I would highly recommend all students to take the opportunity to complete a research project of some kind. It will give you a different outlook on life. It forces you to complete the Plan-Do-Study-Act cycle. Even if you don't feel a research project will further your career, I can honestly say that I believe it's personally rewarding. It was definitely worth the pain.

APPENDIX A - SENATE RESOLUTION 503

97TH CONGRESS
2D SESSION

S. RES. 503

To establish the United States Senate Productivity Award

IN THE SENATE OF THE UNITED STATES

DECEMBER 7 (legislative day, NOVEMBER 30), 1982

Mr. STEVENS (for himself, Mr. BAKER, Mr. Robert C. BYRD, Mr. CRANSTON, Mr. PACKWOOD, Mr. CANNON, Mr. MATHIAS, Mr. FORD, and Mr. INOUE) submitted the following resolution; which was referred jointly to the Committees on Commerce, Science and Transportation and Rules and Administration by unanimous consent

DECEMBER 14 (legislative day, NOVEMBER 30), 1982
Reported by Mr. PACKWOOD, without amendment

DECEMBER 21 (legislative day, DECEMBER 20), 1982
Considered and agreed to

RESOLUTION

To establish the United States Senate Productivity Award.

Whereas the economic productivity of the United States has drastically fallen from its traditional rate;

Whereas the economic productivity rates of other nations in economic competition with the United States are higher than the traditional productivity rate of the United States;

Whereas the American people suffer from the national decline in productivity which contributes to high unemployment as foreign industries with greater productivity capture many markets which were once served by American industries;

Whereas the average household of the American worker would have received over \$5,000 more in 1982 if the traditional productivity rate of the Nation had been maintained;

Whereas economic preeminence of the United States will continue to fall, industry by industry, unless the productivity rate is increased;

Whereas an essential first step to the restoration of the productivity rate is an understanding by the public of the seriousness of the problem and the specific practices needed for a solution; and

Whereas a cost effective way to facilitate such an understanding is for each United States Senator to present an annual United States Senate Productivity Award in his State and for the news media to utilize the event to communicate information to the public regarding productivity improvement:

Now, therefore, be it

- 1 *Resolved*, That (a) the United States Senate
- 2 Productivity Award is established.
- 3 (b) Beginning with calendar year 1983 and each
- 4 year thereafter, each Senator may by participation in the
- 5 award program select a recipient of the award pursuant
- 6 to the guidelines established by the Committee on
- 7 Commerce, Science, and Transportation of the Senate.
- 8 SEC. 2. The Committee on Commerce, Science and
- 9 Transportation of the Senate shall-
- 10 a) establish guidelines for the selection of
- 11 recipients and the awarding of medallions to such
- 12 recipients; and
- 13 (b) enter into a contract for the design and
- 14 striking of suitable medallions for the purposes of this
- 15 resolution.
- 16 SEC. 3. Expenses necessary and not in excess of
- 17 \$100,000 per year to carry out the provisions of this
- 18 resolution shall be paid from the contingent fund of the
- 19 Senate upon vouchers approved by the chairman of the
- 20 Committee on Commerce, Science, and Transportation of
- 21 the Senate.

U.S. Senate Productivity and Quality Award for Virginia

SCORING GUIDELINES

Maturity and Quality of Effort: This dimension assesses the continuity of effort, depth, breadth and age of the effort, quality of methods and approaches. The Board is searching for evidence that there is a constancy of purpose and that the effort is not a project or quick fix.

SCORE	APPROACH/DEPLOYMENT
0%	• anecdotal information; no indication that effort is strategically thought through, comprehensive, well-integrated; no evidence that there is constancy of purpose and method; random-walk effort; no indication that present and future plans are based upon lessons of past both within organization and based upon external benchmarks; no evidence that this is a learning organization. • effort is immature • the word deployment is not used or understood • do not understand the philosophy and concepts of total quality
10% to 30%	• beginning evidence that there is a systematic approach to their overall effort. • effort is not past "false learning curve". • significant gaps still exist in deployment • early stages of transition from reacting to problems to preventing problems • plan, do, study, act at all levels is beginning to take on meaning • benchmarking is used but not completely understood • requirements are understood
40% to 60%	• a sound, systematic approach is emerging • a fact-based improvement process is in place in key areas • there are clear signs that they are in or past "false learning curve" • benchmarking of tools and methods and overall approach is increasing • increasing emphasis on "fixing process" not just "fixing problems" • no major gaps in deployment, though some areas may be in early stages of deployment • requirements are being met and expectations are being understood
70% to 90%	• a sound, systematic approach exists • effort is past false learning curve, evidence that organization is well on way to becoming a learning organization • approach is well deployed; no significant gaps; integration may still be a problem, fine tuning still going on • most, if not all of the "key components of Total Performance" (see attachment) are in existence. • rate of improvement is significant • requirements and expectations are being met or exceeded and "latent quality--delighting customers" is being addressed

SCORE

APPROACH/DEPLOYMENT

100%

- effort is "fully mature", full evidence of learning organization
- exceeding requirements and expectations, and frequently delighting customers
- effort is not subject to turnover in leadership, process/system is owned by the management team not one leader
- very strong refinement and integration
- approach is fully deployed vertically and horizontally without any gaps or weaknesses
- organization is proactive throughout

Top Management and Leadership, Commitment and Involvement: This dimension assesses the level of enlightenment and involvement of top management and leadership in your organization with respect to the quality and productivity improvement system. The Board is searching for evidence that top management is doing more than exhorting or blessing the efforts, as well as to confirm that the effort is not overdriven by top management and that it is, in fact, deployed and a way of doing business.

SCORE	APPROACH/DEPLOYMENT
0%	• the application appears to be a delegated assignment • no anecdotal evidence of top management involvement
10% to 30%	• top management may be too strongly involved, they may be the sole champions at this point. • top management is blessing the effort only; they are committed at a superficial level; they are delegating the effort
40% to 60%	• top management is committed and involved, they are prominent in effort documentation but not oppressive/dominant • top management enlightenment goes beyond the top leader or top several leaders and is improving in a critical mass of top management and leaders • top management is beginning to be involved in benchmarking and are becoming learners • talking and walking are beginning to be integrated
70% to 90%	• there is an active quality council or equivalent exists • leadership and management for quality and productivity are expanding to all levels of the organization • the top leaders are much less visible as a champion; championing for efforts is occurring at all levels.
100%	• the leadership are learners • the system and processes are not subject to turnover of key leaders • distributed leadership exists • information, knowledge, power and rewards are shared at all levels

Employee Involvement, Education/Training/Development, Management of Participation: This dimension assesses the extent to which the performance improvement effort is deployed at all levels throughout your organization. The Board is searching for evidence that the appropriate level of information, knowledge, and power is shared at all levels and that employee ideas and suggestions are treated with respect and acted upon.

SCORE	APPROACH/DEPLOYMENT	RESULTS
0%	• anecdotal information; no system evident developing all employees	• no data reported for involving and • data does not support this category
10% to 30%	• early stages of involvement and development percent of involvement (ad hoc or formal and ongoing) is low (e.g. 10% involved) • traditional methods of development and involvement (e.g. suggestion systems) • little benchmarking in this area • recognition this is important but approach is weak • training is provider focused	• relatively few people involved • low implementation rates; low acceptance rates • training and development as percent of total hours is increasing (e.g. <40)
40% to 60%	• involvement in planning, problem-solving; opportunity capturing is beginning to be pervasive • involvement is maturing (e.g. self-managing teams) • training and development is moving toward a customer orientation and is needs based • employees are encouraged to have development plans • employees are encouraged to have development more focus on teams	• $\geq 70\%$ of employees are involved • active suggestions system 40-60 per employee per year • $\geq 75\%$ implementation rate • feedback on improvement ideas almost instantaneous • benchmarking in this area is pervasive and systematic
70% to 90%	• organization is well on way to being a learning organization • information, knowledge, power is widely and appropriately shared • training and development are customer driven • training and development are "continuous" • team based approach to improvement supplemented by individual inputs • infrastructure is geared to success, reorganizing seen as a quick fix	• training and development for all individuals (80 hours per year) • suggestions come predominantly from teams • very active suggestion system & process implementation rate $\geq 90\%$ rate $\geq 95\%$
100%	• learning organization • information, knowledge, power sharing pervasive and systematic • benchmarking in these areas is ongoing • team spirit throughout	• 100% employee involvement in improvement • personal and professional development is ongoing • decision rules for empowerment are clear and well understood

Rewards and Recognition: This dimension assesses the employee motivation system within your organization. The Board is searching for evidence that the measurement and reward systems are congruent with quality driven strategies and actions .

SCORE	APPROACH/DEPLOYMENT
0%	• anecdotal information; no system of rewards and recognition beyond standard compensation management system • congruence between desired results, quality policy, what is measured and what is rewarded is non-existent • fear exists because improvement would lead to loss of jobs
10% to 30%	• beginnings of a systematic approach to motivation that is based on total quality philosophy is evident • significant gaps in deployment of motivation systems still exist • measurement to reward system linkages are beginning to be recognized • the job security issue is beginning to be addressed
40% to 60%	• a sound, systematic system of motivation is under development that is based on solid theory of psychology, theory of variation, and appreciation for systems • information, knowledge and power sharing has preceded reward sharing • employees at all levels understand their role, how their performance, influences performance at higher levels in the organization; deployment is improving • integration between this dimension and the education, training, development dimension is improving • consequences, both positive and negative, of improvement are dealt with openly and explicitly
70% to 90%	• a sound, systematic system of motivation exists • refinement and integration to other dimensions as a result of continuous improvement cycles is clear • as the organization "wins" as a result of continuous improvement, the employees share gains • the issue of improvement as it effects job security is fully addressed; consequences of improvement are positive and well managed
100%	• a sound, systematic, continually improving system of motivation exists • the learning organization is enhancing the motivation system • continual improvement and integration are well developed, rate of improvement is "best of best" • motivation system is fully deployed; positive consequences of improvement are well understood at all levels and are motivating total involvement in improvement

Plan for Continuous Improvement: This dimension assesses the extent to which business plans, strategic plans and performance improvement plans are comprehensive and well integrated. The Board is searching for evidence of a systematic performance improvement planning process that is well integrated with strategic and business planning.

SCORE	APPROACH/DEPLOYMENT
0%	• anecdotal information, no system evident • limited evidence of planning
10% to 30%	• beginning of a systematic approach to planning for improvement • significant gaps exist in deployment of planning and there is little evidence that various types of planning are integrated with improvement planning • the process for improvement planning is not well documented • the plan, do, study, act cycle is not well understood and not well executed
40% to 60%	• a sound, systematic approach to planning for improvement is emerging • planning for improvement is fact and data based • deployment of planning at all levels (vertical and horizontal) is beginning, and a systematic plan for completing deployment exists • the balance between planning and action/results is understood • the plan, do, study, act cycle is beginning to be well understood and executed at all levels • step function (business process re-engineering) versus continuous improvement (incremental) is well understood and good balance exists • plans at various levels of the organization are beginning to be integrated
70% to 90%	• strategic planning, business planning, budget planning, program planning, project planning, and performance improvement planning are well integrated in a planning system that is driven by quality policy • measurement, culture, infrastructure, motivation, education/training/development, the components of total quality are well integrated and are driven by the planning system. • customers and vendors are involved in planning for improvement • plans are results oriented • plans for continuous improvement build on lessons learned, they are comprehensive, strategically thought through and well integrated
100%	• planning for performance improvement - the plan, do, study, act cycle - is a way of doing business • planning is fully deployed throughout the organization

Performance Measurement Process: This dimension assesses the extent to which measurement, data, and information are used to support decision making at all levels. The Board is searching for evidence that your organization utilizes facts and data and think statistically when solving problems and making decisions. It is recommended that a minimum of 3 years of data be presented to document or substantiate trends.

SCORE	APPROACH/DEPLOYMENT
0%	• anecdotal information; no system of measurement other than financial is evident
10% to 30%	• beginning a systematic approach to measurement • significant gaps exist in design and development and in deployment • design and development concepts and philosophy exist, but development of systems is just beginning • measurement system design team exists • beginning to evolve from measurement for control only to measurement to support improvement
40% to 60%	• a sound, systematic approach to measurement is clearly evolving • measurement systems development and utilization are driven by appreciation for systems and theory of variation • the measurement-to-data to information-to-decision and action sequence is well understood • use of facts, data, measurement, at all levels, to solve problems and improve processes is evident • measurement is used to establish control and maintain; prevent problems rather than fixing problems
70% to 90%	• a sound, systematic approach to developing and using measurement systems exists • strategies, actions and measures are well integrated and congruent • fear of consequences of exposing good or bad performance with measurement is addressed • measurement linkages (individual, group, organizational) are understood and dealt with • statistical thinking is predominant • the study portion of plan, do, study, act cycle is clearly understood and deployed • measurement is used at all levels of organization; highly visible as a way of solving-problems and making decisions
100%	• measurement fully deployed, well refined, integrated, backed by excellent analysis • balance between control and improvement is clearly understood • balance between qualitative and quantitative, objective and subjective, hard and soft, intuitive and explicit is practiced in making decisions; the unknown and unknowable are considered; cost of quality is measured and tracked

Customer and Supplier Involvement: The Board is searching for evidence that your organization is truly managing quality and productivity "totally," by involving suppliers (all upstream systems) as partners in your business and by being customer driven. The Board is also searching to ensure your organization is proactive and innovative in it's approaches to customers and suppliers.

SCORE

APPROACH/DEPLOYMENT

0%

- anecdotal information; no system of including customers and suppliers in management systems
- provider driven orientation
- no recognition of internal customer issues.
- inspection is only means to achieve quality

10% to 30%

- beginning of a systematic approach to addressing and involving customers and suppliers
- significant gaps exist in deployment
- understanding of customer requirements, expectations is limited but improving
- early stages of moving from reacting to customer complaints to anticipating in response to customer needs and expectations
- arguments over balance between customer versus provider orientation persist
- inspection is primary means of achieving quality

40% to 60%

- a sound, systematic approach to customer and supplier involvement is evident
- customer needs and expectations are determined with fact-based methods; e.g. focus groups, surveys, direct communication
- partnerships with suppliers are developing
- no major gaps in deployment, though some areas are in early stages of development
- organization is beginning to study how its suppliers manage quality rather than just inspect
- inspection is not the primary means of achieving quality

70% to 90%

- sound, systematic approach exists
- customer knowledge is good and improving
- supplier relationships are well developed
- approach is well deployed with no significant gaps; integration of these efforts with other dimensions is beginning

100%

- approach is stable and continually improving
- approach is fully deployed
- very strong refinement and integration backed by excellent analysis
- innovation in product and service is balanced with customer driven and market driven

Results Over Time: This dimension assesses both qualitative and quantitative results. The Board is searching for evidence that your organization's quality and productivity efforts are achieving results over time. (Note: It is recommended that a minimum of 3 years of data be presented to document or substantiate trends. Please describe results from both quantitative and qualitative perspectives.)

SCORE	RESULTS
0%	• no data reported or anecdotal data only • data not responsive to proving results over time
10% to 30%	• early stages of developing trend data • some improvement trend data or early good performance reported but ratio comparisons are limited to two points, or insufficient data to support trends • little evidence of statistical thinking • data are not reported for many to most areas of importance; measurement and evaluation is incomplete, they are measuring the easy • balanced scoreboards of performance do not exist
40% to 60%	• improvement or good performance trends reported in key areas, development of a more balanced scoreboard is evident • statistical thinking is beginning to creep into discussion • some trends and/or current performance can be evaluated against relevant comparisons, benchmarks, or levels • no significant adverse trends or poor current performance in key areas of importance • a good understanding of the organizations' model of success/requirements of success is clear and the key performance related business factors are measured over time
70% to 90%	• good to excellent improvement trends in most key areas of importance • sustained good to excellent performance in key areas of importance • many to most trends and current performance are evaluated against relevant comparisons, benchmarks or levels • current performance is measured comprehensively over time and is good to excellent in most areas • statistical thinking is clear in the measurement systems used to evaluate results

SCORE	RESULTS
100%	• excellent improvement trends in most to all key areas of importance • most to all trends and current performance is evaluated against relevant comparisons, benchmarks, or levels • current performance is excellent in most areas of importance • strong evidence of industry and benchmark leadership demonstrated • step function improvement is well integrated with continuous improvement (e.g. results from re-engineering are apparent in appropriate areas) • excellent performance has been sustained in many key performance dimensions over time • the scoreboard of results is well balanced

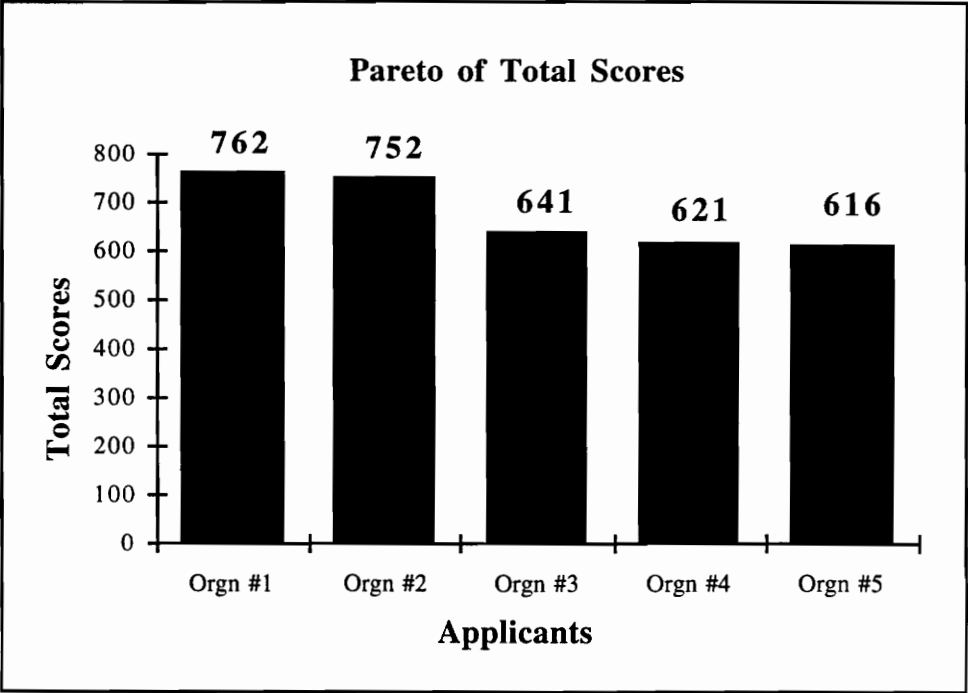
APPENDIX C - 1993 SAMPLE DATA EVALUATION PACKAGE

Appendix C provides a cross section sample of graphs, tables, and qualitative data included in data evaluation packages from all sectors for the SPQA. The applicant organizations and rating Board Members have been disguised.

Sample Table of Contents for Data Evaluation Package for all Categories

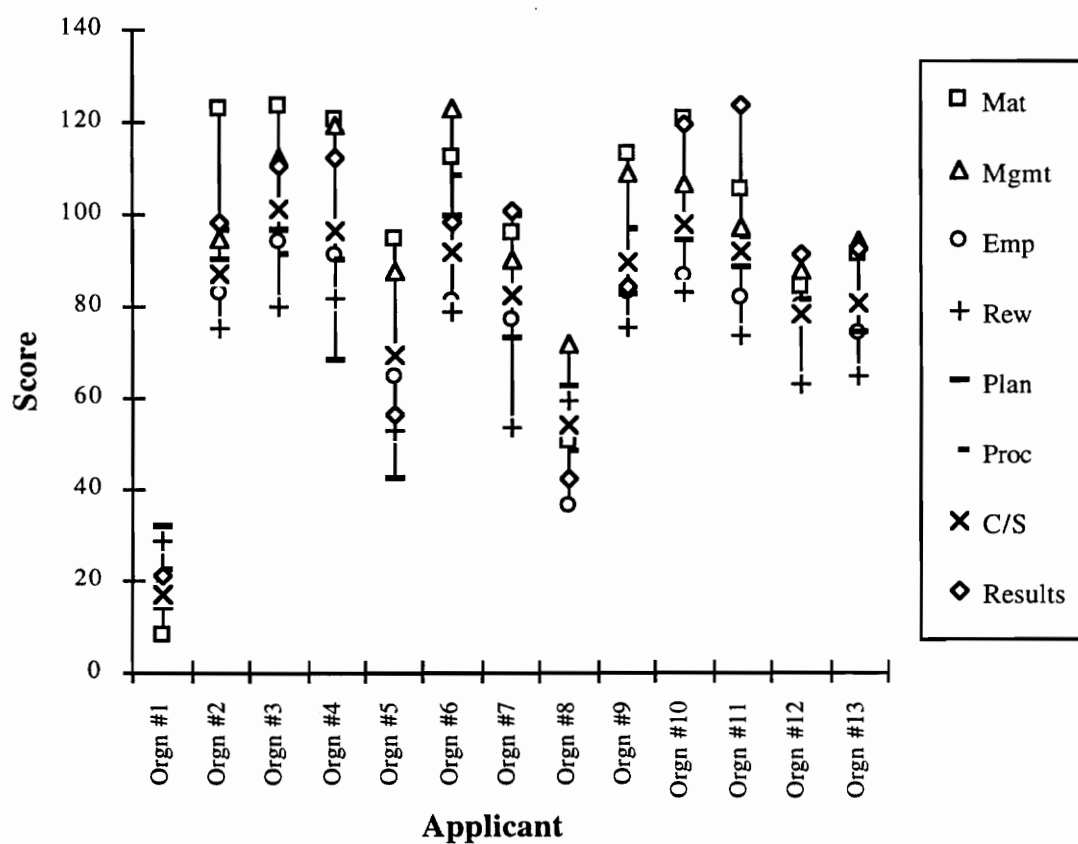
- I. Summary Data
 - Pareto - Average Total Scores of All Applications in Category
 - Graph - Application Criteria Score Variation Across All Applicants
- II. Score Variation by Rater of Each Application (in alphabetical order)
 - Organization #1
 - Organization #2
 - Organization #3
- III. Strengths, Areas for Improvement, and Site Visit Issues by Applicant (in alphabetical order)
 - Organization #1
 - Organization #2
 - Organization #3

Sample Summary Bar Chart for Public Sector Local Agencies

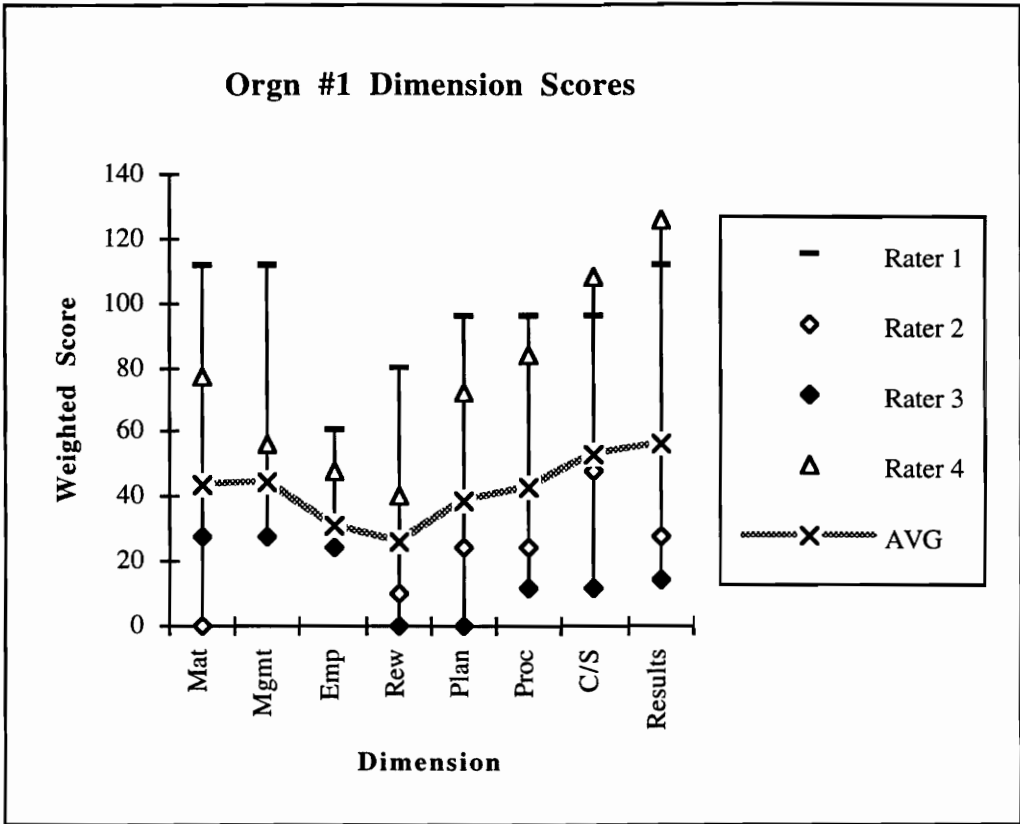


Sample Average Criteria Score Variation Across Applicants for Private Sector Manufacturing Agencies

Average Organizational Score by Dimension



**Sample Criteria Score Variation Across Raters for a Single Applicant for
Public Sector State and Federal Agencies**



Sample Tables of Criteria Score Variation Across Raters for a Single Applicant for Private Sector Manufacturing Agencies

%Scores for Orgn #1								
Mat	Mgmt	Emp	Rew	Plan	Proc	C/S	Results	Rater
60	10	30	30	30	50	60	30	1
70	70	70	60	75	70	70	60	2
85	85	85	85	80	80	50	85	3
70	75	65	75	65	90	90	85	4
80	90	90	90	90	80	90	90	5
40	70	60	80	60	60	70	80	6
50	70	30	30	30	50	40	30	7
65	67	61	64	61	69	67	66	AVG
16	26	24	25	24	16	19	26	STD
70	70	30	30	30	50	70	30	MODE
70	70	65	75	65	70	70	80	MEDIAN
45	80	60	60	60	40	50	60	RANGE

Weighted Scores for Orgn #1									
Mat	Mgmt	Emp	Rew	Plan	Proc	C/S	Results	SUM	Rater
84	14	36	30	36	60	72	42	374	1
98	98	84	60	90	84	84	84	682	2
119	119	102	85	96	96	60	119	796	3
98	105	78	75	78	108	108	119	769	4
112	126	108	90	108	96	108	126	874	5
56	98	72	80	72	72	84	112	646	6
70	98	36	30	36	60	48	42	420	7
91	94	74	64	74	82	81	92	652	AVG
23	37	29	25	28	19	23	37	190	STD
98	98	36	30	36	60	84	42	#N/A	MODE
98	98	78	75	78	84	84	112	682	MEDIAN
63	112	72	60	72	48	60	84	500	RANGE

Sample Qualitative Data for one Criteria for one Applicant for Private Sector Service Agencies

ORGANIZATION #1

Performance Dimension #1-- Maturity and Quality of Effort

Strengths:

Trained by outsider (consultant).
83% of employees on teams.
Relatively mature effort (since 1986).
Broad use of employee Achievement teams since 1990.
Team approach
Specific TQM implementation goals.
Focus is on unique needs of the company.
Sound systematic approach.
Beyond false learning curve.
Initiated by senior management, but involves all levels.

Areas for Improvement:

Appears to be relatively confined in approach to teams, with some emphasis on individual suggestion.
Not yet fully deployed.
Still in development stages.
Continued improvement.
Implement benchmarking.
Seek gains from experience to develop as a learning organization.
Need defined implementation plan.

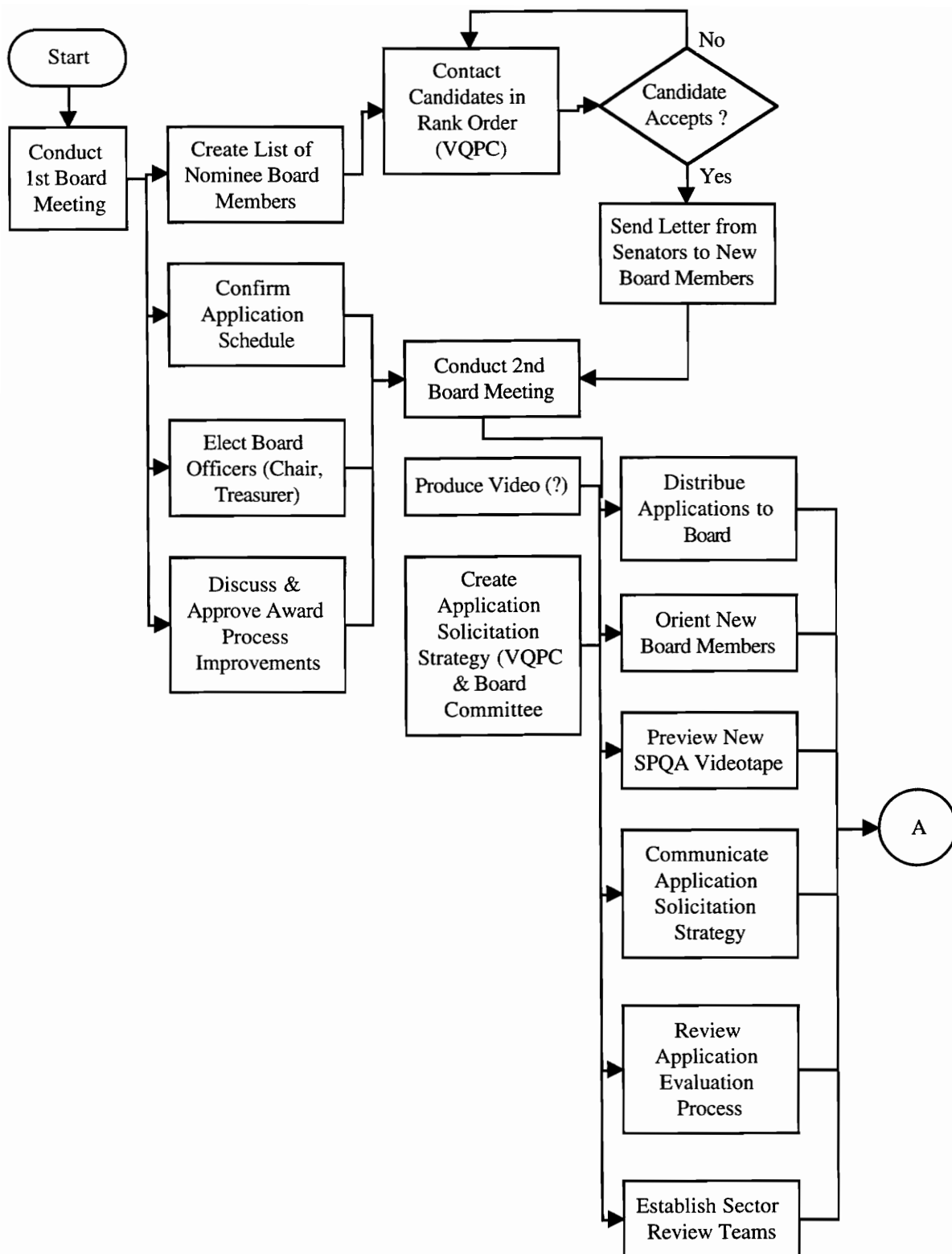
Site Visit Issues:

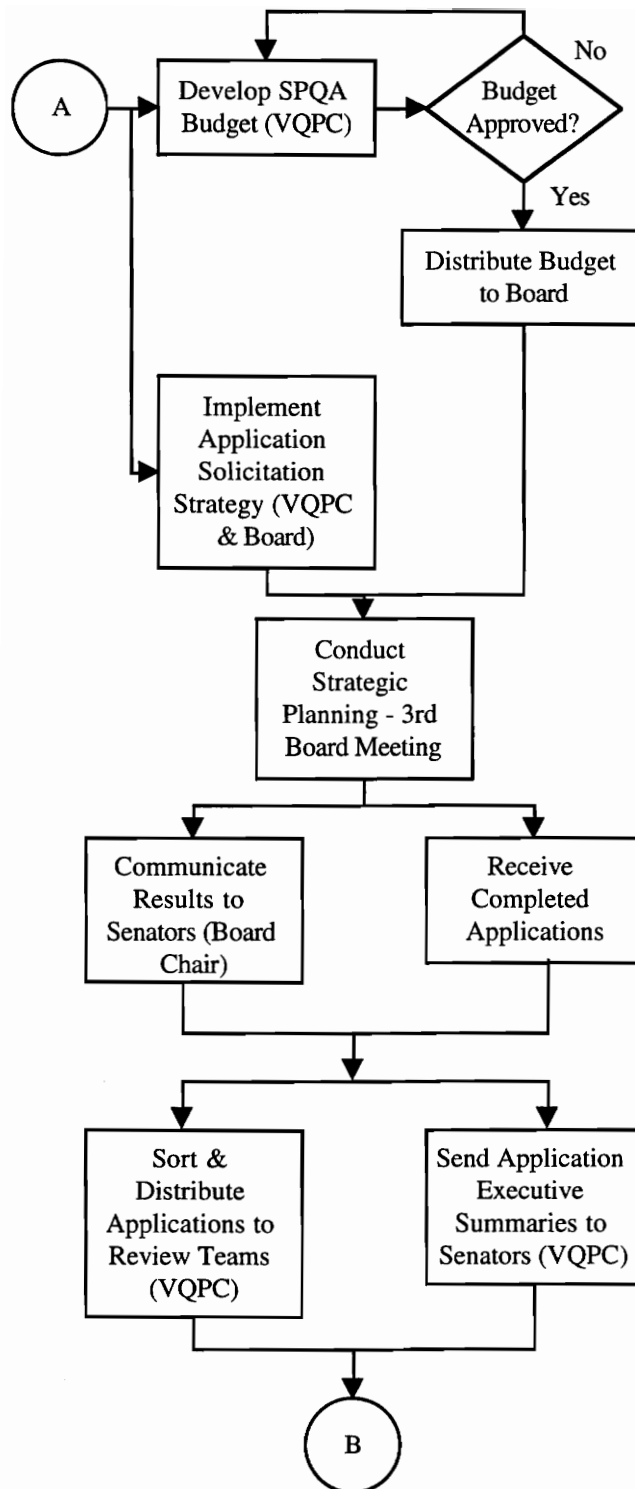
How many employees?
What % participation on teams?
Records on program implementation; training, etc.
Review how they are tracking relative to the 10 key goals.

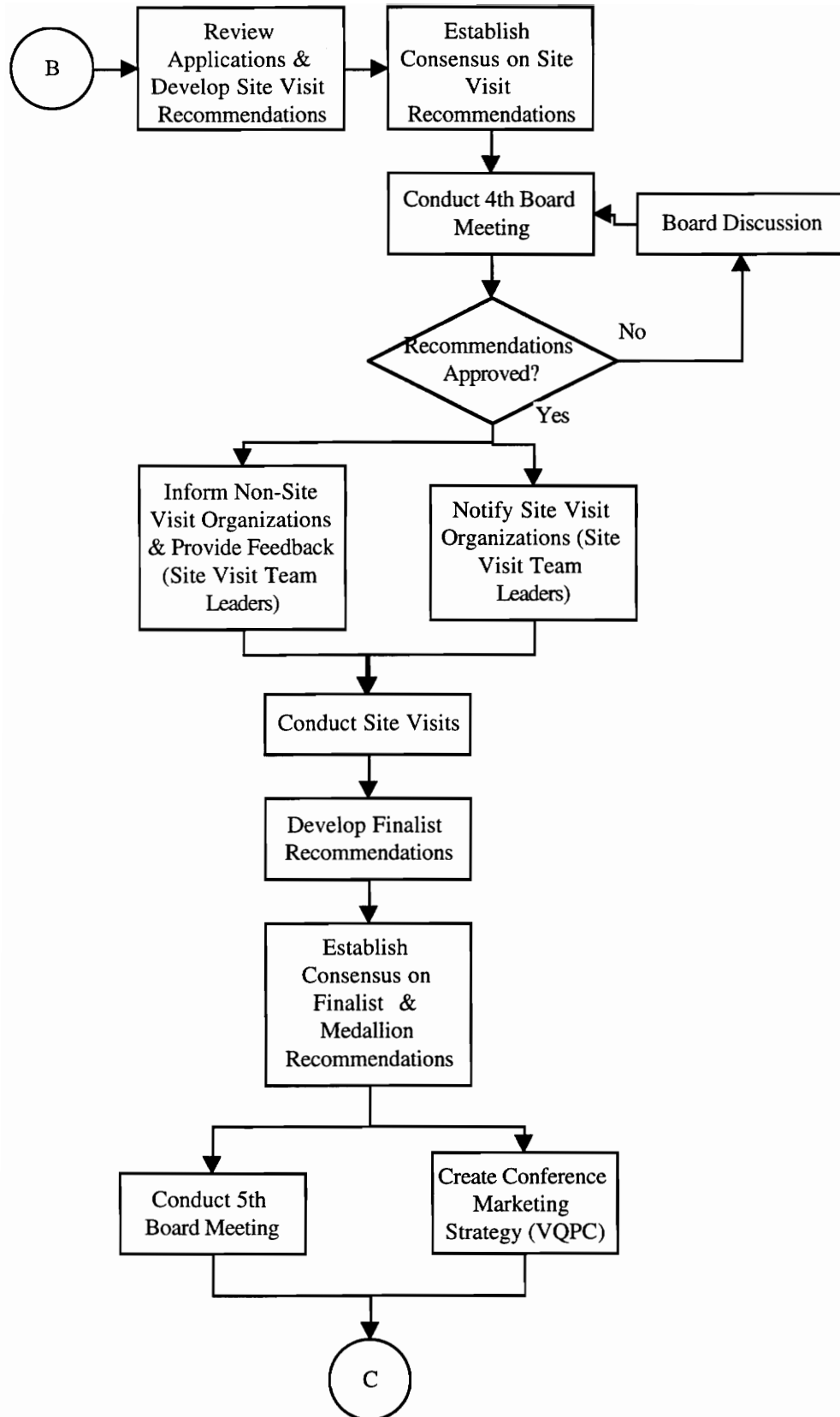
Justification of the score:

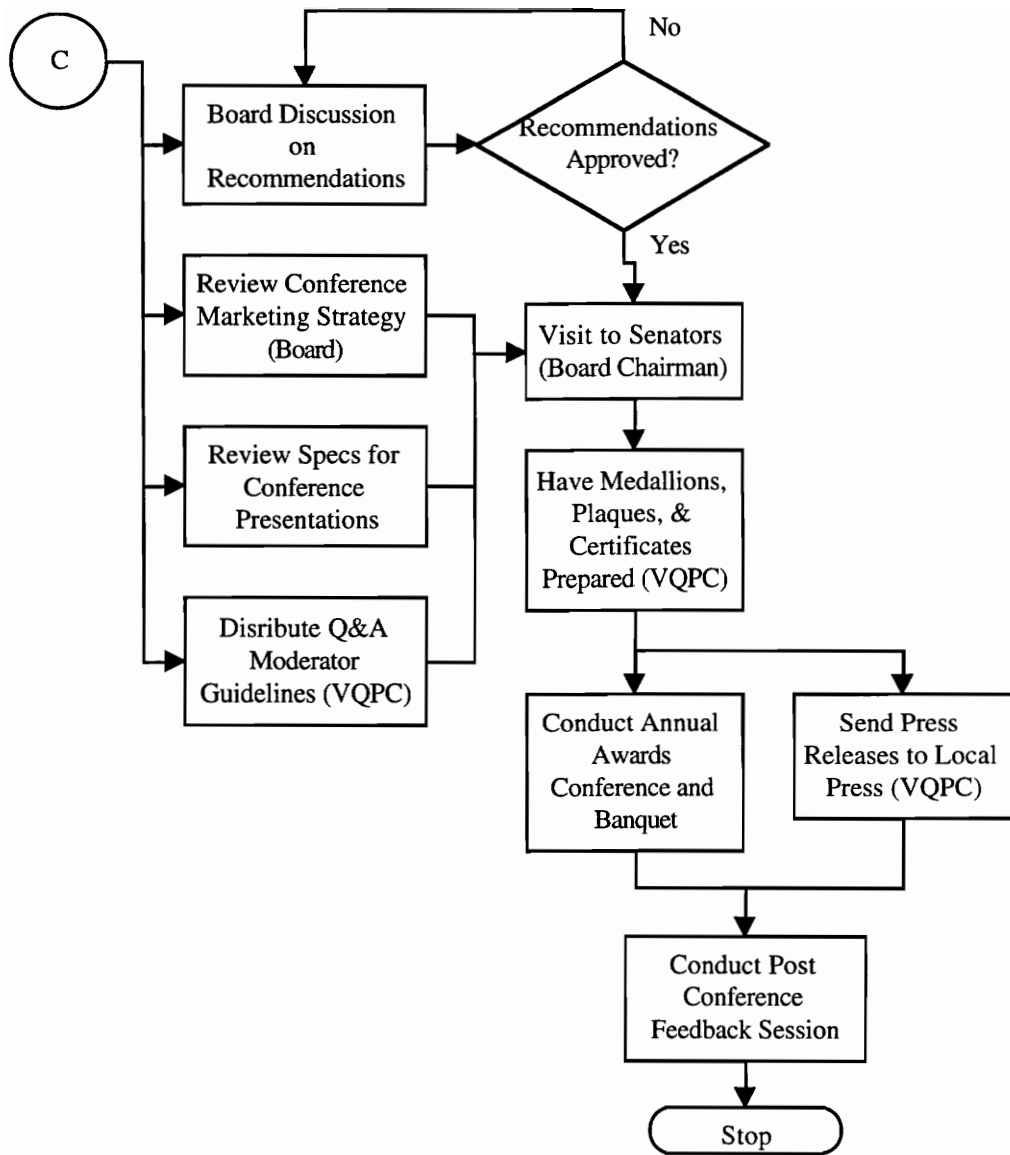
Strong constancy of purpose.
Well thought out, not a quick fix.
Sound, systematic approach is emerging.
Too many of the concepts are not fully deployed and cannot be consolidated as anything more than experimental.
Approach is adequate (particularly team approach) but not fully deployed.
Deployment with new top management since 1990 raises concern that it may be too much top driven.
Management provides necessary resources.
Effort shows continual improvement.

APPENDIX D - U.S. SPQA FOR VIRGINIA AWARD PROCESS









APPENDIX E - THESIS PROJECT PLAN

Activity Name	Feb '94			Mar '94			Apr '94				May '94				Jun '94						
	13	20	27	6	13	20	27	3	10	17	24	1	8	15	22	29	5	12	19	26	
Complete "What is Research" BOK Review																					
Complete Measurement BOK Review																					
Complete Benchmarking BOK Review																					
Complete Quality Awards BOK Review																					
Review data																					
Design coding list & categorization scheme																					
Identify potential problems w/ data																					
Review SPQA applications																					
Identify key performance indicators (KPIs)																					
Identify common KPIs																					
Design scales for KPIs																					
Map KPIs to scales																					
Describe SPQA process(es)																					
Summarize data analysis																					
Summarize recommendations for improvement																					
Summarize conclusions from research																					
Summarize future research areas																					
Summarize a review of the thesis																					
Summarize lessons learned																					
Thesis v. 1.0																					
Thesis v. 2.0																					
Thesis to committee																					
Thesis defense																					

APPENDIX F - LETTER TO ORGANIZATIONS REGARDING RESEARCH

Date

Applicant Organization
Address
City, State 00000

Dear Sir:

I am currently a Masters student within the Industrial and Systems Engineering Department at Virginia Tech. I have focused my studies in the Management Systems Engineering Option within the ISE Department. In addition to my studies, I have been a part-time employee at the Virginia Quality and Productivity Center (VQPC).

As an employee of VQPC, I have been afforded the opportunity to be involved with the U.S. Senate Productivity and Quality Award for Virginia (SPQA). Additionally, I chose SPQA as the main topic of my Masters thesis.

I felt obligated to inform you that this research had taken place. However, I wanted to further reassure you that organizations maintained anonymity. Further, I did not use any information that had been identified as proprietary information by organizations. If you have any concerns, please contact me. I will be happy to provide you with any further information you need.

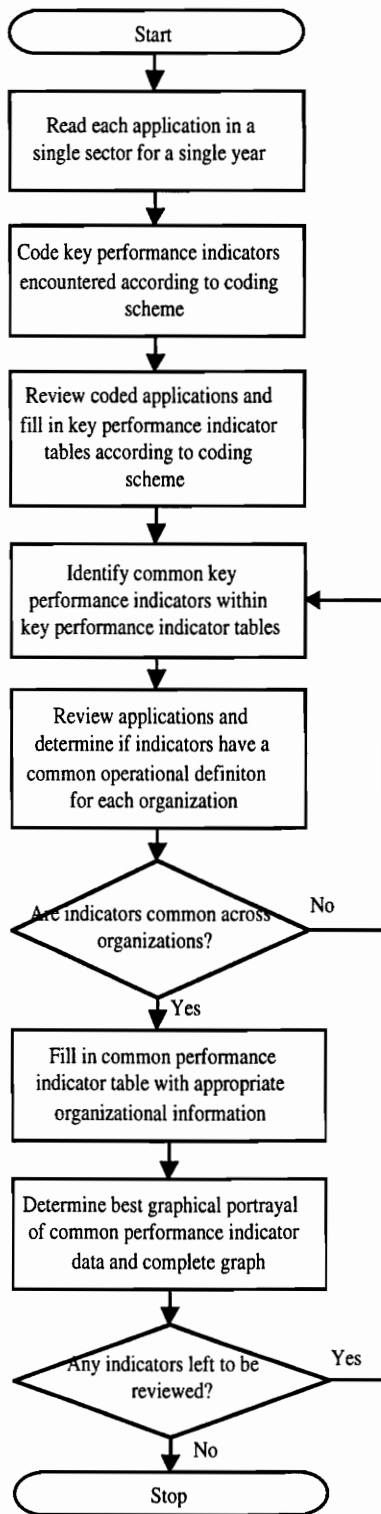
My Masters thesis involved reviewing all applications for the SPQA of Virginia from 1982 to 1993. Then, I compiled lists of key performance indicators that organizations reported within their applications. These organizations' names were coded, so readers would be unable to identify them. From these laundry lists, I then identified common key performance indicators across a given sector. These indicators were used to define current and past performance benchmarks of organizations within the State of Virginia.

If you are interested in the results of my study, please feel free to contact me at VQPC at 703-231-4568. My thesis will be available for purchase or review.

Sincerely,

Cheryl L. Simmers

APPENDIX G - DATA ANALYSIS PROCESS FLOW DIAGRAM



APPENDIX H - CODING LIST

What follows is a coding list that I used in the data collection phase of my research. This list was modified as necessary to reflect new knowledge that I gained throughout the research process.

Sector

Public Sector - Federal and State Agencies
Public Sector - Local Agencies
Private Sector - Manufacturing
Private Sector - Service

Code

F/S
LOC
MFG
SVC

Application Year

Years were coded by the last two digits of the year. For example, 1989 will be coded as 89. Organizations that have applications in multiple years were coded by the years being separated by a "slash." These organizations were numbered similarly throughout each application year. For example, organization #3 has applied for the SPQA for Virginia in 1986, 1987, 1989, and 1993. Therefore, its code was SVC03-86/87/89/93. An additional code was added for any year the organization won a certificate of merit (C), finalist plaque (F), or medallion (W).

Key Performance Indicator Categories

Effectiveness

EFFECT

Effectiveness is a measure of whether you have accomplished what you intended to do. It is an "output side" issue: actual output/expected output.

Efficiency

EFFIC

Efficiency measures relate the inputs that were planned to be used to the inputs actually used to produce the output. It is an "input side" issue: resources planned or expected to be used/resources actually used.

Environmental

ENVIRON

Environmental measures include any measure designed to evaluate an organization's effort to maintain environmental compliance or to increase recycling efforts.

Infrastructure

INFRA

Infrastructure measures include any measure that an organization uses to describe employees or groups of employees within an organization.

Innovation

INNOV

Innovation is the proactive or reactive, creative, successful response to changes in the internal and external environment. Innovation is "the consistent organizational effort to implement new, creative, original, problem-solving ideas" (Kanter, 1984).

Motivation

MOTIV

Motivation measures include any measure that is related to the motivation of employees or reward systems in organizations.

Productivity

PROD

Productivity measures include any measure designed to analyze output relative to the inputs. These measures may be developed for each input (labor, capital, energy, material, and data/information) or in combinations of inputs.

Profitability/Budgetability

PROF/BUDG

Profitability measures include any measure that describes the relationship between revenues and costs. Budgetability measures explain the relationship between what you said you would do and what it would cost, and what you actually did and what it actually cost.

Quality

QUAL

Overall Quality

QUAL-over

Overall quality measures include any measure that is designed to assess the overall quality of a process, product, service, or practice.

Incoming Quality

QUAL-in

Incoming quality measures include measures of supplier quality or incoming resource quality.

Outgoing Quality

QUAL-out

Outgoing quality measures include measures of customer satisfaction or outgoing resource quality.

Process Quality

QUAL-proc

Process quality measures include measures that assess the quality of the output of a process or improvement of a process.

Quality of Work Life

QWL

Quality measures measure the affective response of human beings to the overall work environment, including the work, or workers, pay, boss, etc.

Safety

SAFE

Safety measures include any measure an organization uses to evaluate the safe environment of the said environment

Training

TRNG

Training measures include any measure an organization uses to assess success of training efforts or the extent to which training programs have been deployed throughout the organization.

APPENDIX I - CATEGORIZATION SCHEME¹

ORGANIZATION TABLE

Organizations will be coded by sector and the year of application(s). A table will be designed, as illustrated below, to identify specific organizations with their appropriate codes. This table will only be made available to my Thesis Committee and the SPQA Board. No external individuals will have access to this table without prior permission from the SPQA Board.

<i>SPQA APPLICANT ORGANIZATIONS</i>	
PUBLIC SECTOR- STATE AND FEDERAL AGENCIES	
Organization	Code
PUBLIC SECTOR - LOCAL AGENCIES	
Organization	Code
PRIVATE SECTOR - MANUFACTURING	
Organization	Code
PRIVATE SECTOR - SERVICE	
Organization	Code

¹ These tables, as proposed in my proposal, have been modified. Actual tables are provided in Chapter 4.

KEY PERFORMANCE INDICATOR TABLES

I will complete a table for each broad category of key performance indicators, as shown below for “productivity.” For each broad category, I will then list specific indicators that organizations within each sector report in their applications, site visit materials, or conference handouts.

<i>PRODUCTIVITY</i>	
PUBLIC SECTOR - STATE AND FEDERAL AGENCIES	
PUBLIC SECTOR - LOCAL AGENCIES	
PRIVATE SECTOR - MANUFACTURING	
PRIVATE SECTOR - SERVICE	

ORGANIZATIONAL PERFORMANCE ON COMMON KEY PERFORMANCE INDICATORS

I will complete a table, as illustrated for any common key performance indicators identified through my data collection and analysis. Within this table, as illustrated in the example below, I will display any organization within a specific sector that has reported that indicator and what their performance is on that indicator. This data will also be displayed in graphical format, as shown in the pilot study in Appendix D.

<i># OF LOST TIME ACCIDENTS</i>	
S/F89-1	No accidents in last five years
S/F89-3	One accident in last five years
S/F91-5	No accidents in last five years
S/F93-10	Five accidents in last five years

**APPENDIX J - PILOT STUDY
(1993 MANUFACTURING APPLICATIONS)**

KEY PERFORMANCE INDICATOR TABLES

PRIVATE SECTOR - MANUFACTURING	
<i>EFFICIENCY</i>	
MFG93-2	• Overall Efficiency • Inventory Supply • # Temporary Employees

PRIVATE SECTOR - MANUFACTURING	
<i>ENVIRONMENTAL</i>	
MFG93-1	• Plant Emission Rate
MFG93-2	• Percentage of Refuse Recycled
MFG93-7	• Landfill Pounds/Year

PRIVATE SECTOR - MANUFACTURING	
<i>INNOVATION</i>	
MFG93-2	• # Employee Suggestions Implemented
MFG93-3	• Investment in Factory Automation • Investment in Product Development
MFG93-5	• Research and Development Spending
MFG93-6	• # Suggestions Submitted Monthly • # Workforce Submitting Suggestions • Acceptance Rate of Employee Suggestions • Savings Due to Employee Suggestions
MFG93-13	• Savings Due to Employee Suggestions • # Suggestions Implemented

PRIVATE SECTOR - MANUFACTURING	
<i>MOTIVATION</i>	
MFG93-3	• Bonus Pay Outs (Equivalent Day's Pay) • # Awards Given to Employees • Dollar Amount of Awards Given to Employees
MFG93-4	• Attendance Rate Percentage • Turnover Percentage
MFG93-10	• Percentage of Employees Covered by Bonus Plan
MFG93-13	• # Grievances Per Year • Quality Bonus Payout Percentage

PRIVATE SECTOR - MANUFACTURING	
<i>PRODUCTIVITY</i>	
MFG93-1	• Sack Unloading Time • Ship Loading Rate • Cycle Time Reduction
MFG93-3	• Total Cost Productivity • # Printed Circuit Boards Completed Per Week • Inventory Turns Per Year • Sales Dollar Output Per Factor Employee
MFG93-4	• Production Volume
MFG93-5	• Average Design Cycle
MFG93-7	• Productivity Percentage Increase • # Hours to Complete Raw Material Purification • Inventory Turnover Rate
MFG93-9	• Pounds Processed/Manhour
MFG93-11	• Production Rate Per Employee Per Year
MFG93-12	• Production Downtime Reduction • Average Tubes Produced Per Employee
MFG93-13	• # Units Produced Per Year • Production History Line Rates • Repair Hours Per Truck

PRIVATE SECTOR - MANUFACTURING	
<i>PROFITABILITY/BUDGETABILITY</i>	
MFG93-2	• Projected Sales
MFG93-5	• Production Cost Decrease Percentage
MFG93-8	• Sales Per Employee
MFG93-10	• Manufacturing Cost Decrease Percentage

PRIVATE SECTOR - MANUFACTURING	
<i>OVERALL QUALITY</i>	
MFG93-3	• Quality Cost as Percentage of Net Sales Billed
MFG93-8	• Percentage Quality Rate

PRIVATE SECTOR - MANUFACTURING	
<i>INCOMING QUALITY</i>	
MFG93-2	• Supplier On-Time Delivery Percentage
MFG93-13	• Receiving Rejects Percentage of Lots Received

PRIVATE SECTOR - MANUFACTURING	
<i>OUTGOING QUALITY</i>	
MFG93-1	• Total # Shipments to External Customers
MFG93-3	• In-Warranty Return Rates Per Million Hours of Operation • Shipping Error Rate as Percentage of Items Shipped
MFG93-4	• Customer Claims Costs • Percentage of Thickness Swell • Product Stiffness
MFG93-5	• Out-of-Box Failures Percentage • # Customer Complaints • On-Time Delivery Percentage
MFG93-6	• Quality Failure Percentage of Production Cost
MFG93-7	• # Raw Material Purification Failures Per Month
MFG93-9	• Percentage of A-Grade Product
MFG93-10	• Defect Level Percentage • Coefficient of Variation Percentage Improvement • Number of Garments Returned
MFG93-11	• Defects in Parts Per Million
MFG93-12	• Customer Rejections by Month • Scrap Percentage by Month
MFG93-13	• Defects Per Truck Per Year • 3500 Mile Warranty Dollars/Unit Paid Per Year

PRIVATE SECTOR - MANUFACTURING	
<i>PROCESS QUALITY</i>	
MFG93-1	• Adipic Acid Nitrate Level
MFG93-2	• Improvement Activity Savings • Rework Hours
MFG93-3	• First Pass Yield Rates of Circuit Boards • System Test Yields for the PLC Products
MFG93-5	• Process Yield Percentage
MFG93-6	• Product Failure Cost Percentage Decrease • Process Improvement Initiatives Cost Savings
MFG93-7	• Variation of Process Parameters

PRIVATE SECTOR - MANUFACTURING	
<i>SAFETY</i>	
MFG93-4	• # Recordable Injuries
MFG93-12	• # Lost Time Accidents

PRIVATE SECTOR - MANUFACTURING

TRAINING

MFG93-1	• # Employees Receiving Facilitator Training
MFG93-5	• Average # Hours Training Per Employee
MFG93-10	• Percentage Employees Trained in Quality Awareness
MFG93-13	• Employee Training Hours Per Month

COMMON KEY PERFORMANCE INDICATOR TABLES

# EMPLOYEE SUGGESTIONS IMPLEMENTED FOR 1993	
MFG93-2	24,500
MFG93-6	900
MFG93-13	1451

SAVINGS DUE TO EMPLOYEE SUGGESTIONS FOR 1993	
MFG93-6	\$4 million
MFG93-13	\$6 million

IMPROVEMENT INITIATIVES COST SAVINGS FOR 1991-1993	
MFG93-2	\$1.5 million
MFG93-6	\$20.8 million

**APPENDIX K - KEY PERFORMANCE INDICATORS LAUNDRY LISTS
RAW DATA**

What follows are tables of key performance indicators that I pulled from SPQA applications. These tables have been separated into the four different application categories: private sector – service, private sector – manufacturing, public sector – local, and public sector – state and federal. Compilation of this raw data was provided in Chapter 4.

PUBLIC SECTOR - STATE/FEDERAL KEY PERFORMANCE INDICATORS AND ASSOCIATED MEASURES

ORGANIZATION	MEASURE	VALUE
S/F04-89	% of top management completing quality training	100%
	% of total population completing quality awareness training	92.5%
S/F06-85	# of employees having earned their associate degree	110
	# of employees having earned higher level degrees	70
S/F10-91C/92C	# of process action teams within organization	39
	% of employees involved in process action teams	46%
	# of quality training courses completed per employee	1.5
	# of awards given to employees	400
	% of employees receiving awards	40%
S/F08-92F	% reduction in travel reimbursement processing time	43%
	% participation in direct deposit of payroll	87%
	% compliance with Prompt Payment Act	99%
	reduction in outstanding accounts receivable	from \$7.4M to \$450K
	reduction in time lag between receipt of federal cash and expenditure of funds	4 days to 24 hours
S/F32-90	reduction in time to complete an assignment	11.4 mo to 7.2 mo
	reduction in time to publish an assignment	17.8 mo to 13.2 mo
S/F16-86	defect free aircraft	66.6% to 75%
	QDRs/Products produced	.37% to .12%
	engine rerun rate	23.4% to 9.3%
	average flights to sell aircrafts	2.3 to 1.8
	inprocess defects/1000 facility manhours	.82 to .53
	reprocess defects/1000 facility manhours	.73 to .54
S/F17-88F/89/90F/91C/92F/93W	potential monetary benefits resulting from audit activities	\$6M to \$1B to \$5.7B to \$8B to \$11B
	return on investment	\$10 for every dollar to \$43 for every dollar to \$73 to \$175 to \$231
	attrition rates	19% to 5%
	# of continuing education and training hours for every two years	80 per employee
	change in audit quality index	62 to 84

ORGANIZATION	MEASURE	VALUE
S/F19-88C/89F/90W	% of clerical employees involved in Performance Action Groups and Performance Action Teams	43%
	% of line management/line employees involved in Performance Action Groups and Performance Action Teams	52%
S/F19-88C/89F/90W cont.	% of top/middle management employees involved in Performance Action Groups and Performance Action Teams	100%
	# of improvement suggestions accepted by clerical employees	2 out of 8
	# of improvement suggestions accepted by line management/line employees	64 out of 192
	# of improvement suggestions accepted by top/middle management	17 out of 53
S/F20-83/86/87/89/91F	# of receipts processed daily	800 to 4000
	# of repairable components processed immediately	17000 to 24000 to 36000 per month
	reduction in paper output	5M sheets to 1.8M
	computer response time	5 seconds
S/F14-86W	total amount of awards given to employees	\$74000
S/F21-91F/92W	% of employees serving on process action teams	25% to 29%
	# of employees trained in TQL awareness	850 (100%)
S/F28-91	error rate	36% to 6%
S/F26-92C	amount of excess material procurement	\$3M to \$620K
	# monthly supply requisitions filled by on-hand inventories	300 to 1000
	process time for a purchase order	5 days to 3 days
S/F27-91W	# of training hours received	366 hours
	% employees receiving monetary awards	90%
S/F30-89W	travel pay waiting time	4.7 min per customer
	turnaround time to prepare military family housing for new occupancy	6.5 days to 4.8 days
	evaluation time for suggestions	76 days to 4 days
	food service quality in the base dining halls	75.1% to 90%
S/F31-93F	dollar amount of travel advances over 90 days	\$950K to \$230K to \$20K
	Prompt Payment Act penalties	\$1500K to \$1600K to \$900K
S/F39-88F/89F/90F	% suggestions approved	10%

PUBLIC SECTOR - LOCAL KEY PERFORMANCE INDICATORS AND ASSOCIATED MEASURES

ORGANIZATION	MEASURE	VALUE
LOC01-91F/93W	full-time turnover	13.5% to 6.2% to 5.2% to 5.2%
	quality of life ratings	83.6% to 84.1% to 87.7% to 88.1% to 95%
LOC31-83/84/87/92/93F	ambulance response time	10.2 min to 6.93 min
	expenditures per capita	441 compared to other localities' 599
	county employees per 1000 population	8.5 compared to other localities' 10.7
	library books circulated per thousands	14,748 to 32,847
LOC02-91C/92W	parents grading the school	58% of As and Bs to 95% As and Bs
	satisfaction rate	79% to 92%
	% passing Literacy Passport	55% to 75%
	student dropout rate	6% to 1%
	% of staff with Master's degree	23% to 45%
	student participation rates in algebra and foreign language	20% to 90%
	parents' satisfaction rating	79.4% to 95%
LOC03-91F/93W	increase in number of students participating in advanced level classes in grades 5-7	347%
	drop out rate	7.4% to 5.6%
	elementary school retention rates	6.7% to 0.8%
	school division retention rates	8.6% to 3.1%
LOC04-91C	unresolved construction code complaints	200 to 60
	rate of rejection for requested inspections	24% to 18%
	% inspections completed on the day requested	93.5% to 97%
LOC11-91F	% increase in number of student activities	50%
	instructional program efficiency	89% to 124%
	population penetration rate	1.26% to 1.55%
LOC15-92	emergency medical services delivery	13.2 min to 6.9 min
LOC16-90W	increase in full-time equivalency enrollment	30.8%
	increase in head count enrollment	40.4%
	increase in student retention rate	13%
	increase in number of student activities	25%

ORGANIZATION	MEASURE	VALUE
LOC16-90W cont.	institutional productivity	.88% to .92%
	increase in number of off-campus credit offerings	36% to 53%
LOC17-91C/92F/93F	grade four composite achievement levels (in percentiles)	41 to 45 to 53 to 55
LOC17-91C/92F/93F cont.	grade eight composite achievement levels (in percentiles)	37 to 39 to 40 to 43
	# of students enrolled in algebra I	213 to 234 to 382
	# of students enrolled in foreign language	259 to 394 to 458
	% of high school students taking AP courses	6% to 9% to 11%
	total energy costs	\$2.1M to \$1.7M to \$1.5M to \$1.4M

PRIVATE SECTOR - SERVICE KEY PERFORMANCE INDICATORS AND ASSOCIATED MEASURES

ORGANIZATION	MEASURE	VALUE
SVC04-86	aggregate charge reduction	5%
	average reduction in number of full-time equivalent employees	8%
SVC07-88C/93C	hours of training in past three years	14000
SVC10-91F	quote response time	21 days to 16 days to 3.3 days
SVC15-93C	overall service rating	9.31 to 9.48 to 9.61 to 9.46 to 9.7
	transactions per month	1400 to 1750 to 1800 to 1550 to 1600 to 1500 to 1825 to 1800
SVC16-93	sales	\$4M to \$4.8M to \$5M
	profit	\$0.8M to \$1.1M to \$1.2M
	productivity increase	1% to 8% to 0.5%
	days to bill	11 to 10.5 to 9
	days sales outstanding	45 to 43 to 41
	customer satisfaction index	8.8 to 8.8 to 8.8 to 9 to 8.2 to 8.8 to 9
	employee satisfaction index	50 to 55 to 50 to 55 to 60 to 70 to 65 to 60
	training expenditures	\$6K to \$6K to \$12K
	warranty costs	\$100K to \$120K to \$60K
	workers compensation claims	\$60K to \$30K
	employee turnover	12% to 2% to 2%
SVC25-90W	time to review plan	70 days to 50 days
	approval rate of plans	30% to 50%
	number of submissions per project for site plans	3 to 2.5
	number of plans waiting to be processed	260 to 90
SVC33-85W	employee participation	6% to 13% to 26% to 50% to 75%
SVC35-88C	number of employees training in quality training	600
SVC36-83/89	overtime (as % of regular hours)	2.7% to 0.7%
SVC40-90F/91/93C	gross sales	\$15M to \$19M to \$17M to \$18M to \$27
SVC41-85	reduction in energy costs	15%
	improvement in route efficiency	20%
	overtime reduction	38%
	annual sales	\$27M

ORGANIZATION	MEASURE	VALUE
SVC43-89C	productivity	2.88 tons per manhour to 5.58 tons per manhour
SVC45-88/89C	turnaround time for sending out bound policies	9.43 days to 3.35 days
SVC45-88/89C cont.	number of policies typed per hour	1.6 to 3.3
SVC47-92	reduction in average processing time	35%
	busy phone signal received	19.45% to 4.86%
	employee turnover rate	35% to 14%
SVC49-91	revenues	\$1M to \$6M
	number of employees	13 to 50
SVC50-84	number of ideas submitted	184
	% of ideas evaluated	58%
SVC51-91C	reduction in reportable injuries	34%
SVC60-92C	breakfast delivery cycle time	1 hr to 30 min
	lunch delivery cycle time	1 hr to 45 min
	customer satisfaction rating	95%
	repeat guests per month	800
	employee turnover	42.8%
SVC63-92W	% managers attending team leader/facilitator training	90%
	% of employees attending quality awareness training	60%
	average preadmission testing turnaround time	90 min to 22 min
	average length of stay	5.1 days
	turnaround time of urgent lab results	123 min to 79 min
SVC65-87/88W	supervisor to employee ratio	1:7 to 1:35 to 1:38
	average new skills learned	23.4 wks to 42.3 wks
	total customer service team requests	101570 to 130479
	average # service requests per person	3386 to 4833
	average service time	4.97 days to 3.65 days
SVC68-90F	average training hours	160 hrs
	average training hours for professional staff	455 hrs to 639 hrs
	increase in annual revenues	12% to 14%
SVC70-92	sales increase	15%

ORGANIZATION	MEASURE	VALUE
SVC75-93	percentage of clients completing treatment	68%
SVC77-93F	# employees serving on corporate committees	46
	# employees receiving awards	289
	employee turnover rate	7%
	% employees having 15 or more years of service	16%
	average savings per total loss claim	\$235 to \$261 to \$321
SVC77-93F cont.	complaints per thousand policies	1.46 to 1.38 to 1.36 to 0.96
	average number of sick days taken per year per employee	4 days to 3.5 days to 2.8 days
	employee survey rating	83.7% to 87%
SVC78-83/84/85/86/87W	reduction in oil usage	19% to 8% to 4% to 3%
	reduction in manhour per meter	16.2%
SVC82-84	reduction in sick leave usage	66.3%
	# of sick hours taken by employees	37232
SVC83-92F	% of employees receiving quality awareness training	100%
	# of teams qualifying for team awards	14
	quality of sales training index	95%
	quality of sales instructors index	96%
	quality of technical training index	96%
	quality of technical instructors index	97%
	advanced customer training index	98.5%
	overall customer satisfaction	95%

PRIVATE SECTOR - MANUFACTURING KEY PERFORMANCE INDICATORS AND ASSOCIATED MEASURES

ORGANIZATION	MEASURE	VALUE
MFG02-93	# of employees receiving team facilitator training	45
	adipic acid nitrate level	23 ppm to 10 ppm
	sack unloading time	5 min to 30 sec
	increase in ship loading rate	10%
	reduction in ammonium sulfate and ammonium nitrate emissions	75%
MFG03-91	reduction in permanganate number	50%
	increase in total number of shipments to external customers	20%
	time lost to error rework	1.8% to 1%
MFG04-83	output per machine hour	25000 to 82400
MFG05-88F/89/90	increase in machine cycles per hour	5.88% to 5.88% to 5.2% to 10.8% to 19.7% to 23%
	\$ sales per manhour	\$72 to \$97 to \$97 to \$86 to \$95 to \$104 to \$106
	safety-OSHA index	7.68% to 11.26% to 5.91% to 6.08% to 6.83% to 6.25% to 7.14%
	lost time index	2.51% to 1.41% to .88% to 0% to .32% to .41% to 0%
	absenteeism	3% to 3.1% to 2.2% to 1.7% to 2.1% to 1.9% to 1.7%
	turnover rate	12.9% to 15.6% to 8.7% to 6% to 4.4% to 6.4% to 7.6%
	average pounds per case	10.3 to 9.5 to 9.5 to 9.3 to 8.9 to 8.2
	# of skids produced	5363 to 7928 to 10457 to 11443 to 15281 to 17568
	cases per machine hour	41 to 47 to 47 to 47 to 47 to 54
	pounds per case	10.3 to 9.5 to 9.5 to 9.3 to 8.2
MFG07-89/90/91	rework hours per 100 hours of production	2 hrs
	scrap dollars per unloaded shop hour	\$1.12 to \$0.81
	machined components defect rate	3.62% to 2.68%
	customer complaints	1.28% to 0.03%

ORGANIZATION	MEASURE	VALUE
MFG07-89/90/91 cont.	inventory turns	2.77 to 5.75
	complete assemblies manufactured in-house	8 to 464
	average hours per factory order	29 to 19.8
MFG09-92	lead time	6 wks to 5 days
	recycling of waste	96%
	lot size	180 panels to 48 panels
MFG10-86/87/89F/90F/91C	setup time	40 min to 20 min
	machine downtime	55 hrs/line/wk to 25 hrs/line/wk
	work-in-process	173000 panels to 84000 panels
	average manufacturing interval	25 days to 14 days
	on-time deliveries	50% to 90%
	# of training hours	55000
	response time	8.5 days to 3.5 days
MFG11-87/88W	cost of scrap and rework	\$2.03/manhr to \$0.75/manhr
MFG13-92	absenteeism	5.4% to 1.9%
	turnover	8% to 0.4%
	scrap	7% to 2%
	customer returns	1% to 0.2%
	# lost time accidents	7 to 2
MFG17-87W	direct labor productivity	67.3% to 78% to 89% to 94% to 99%
	manufacturing supply and maintenance cost/unit	\$10.18 to \$9.86 to \$8.77 to \$8.06 to \$6.98
	scrap cost/unit	\$1.5 to \$0.91 to \$0.65 to \$0.33 to \$0.32
MFG22-90F	scrap rate percent	8.7% to 7.5% to 7% to 5.1%
	pounds produced per employee	54195 to 60000 to 70000 to 84416
MFG23-89C/92F/93W	landfill waste	590 tons to 400 tons to 300 tons to 160 tons to 130 tons to 150 tons to 135 tons
	recycled solid waste	260 tons to 450 tons to 440 tons to 330 tons to 450 tons to 720 tons to 620 tons
	implemented recommendations	1200 to 3500 to 5900 to 10500 to 16300 to 24500

ORGANIZATION	MEASURE	VALUE
MFG23-89C/92F/93W cont.	overall efficiency	81.1% to 82.5% to 82.5% to 92.1% to 93.4% to 94.9% to 92.4% to 93.2% to 89.1% to 94.9%
	maintenance of overall inventory	4 days
	on-time delivery performance	48% to 67% to 81% to 88%
	reduction in production cycle time	14%
	extra rework hours	3756 to 5272 to 6102 to 5990 to 5329 to 3912 to 3045 to 1737 to 873
	recycled refuse	90%
MFG24-87	manhours/msf manufactured	0.58 to 0.35
	% waste	13.49% to 10.38%
	gross sales	\$489900 to \$1602000
MFG27-83/84W	solder joint defect rate	2% to 0.05%
MFG30-84/87	average % of seconds	15% to 6%
	average defect points/100 yards	30 to 13
MFG31-91F/92W	reduction in floor space	75%
MFG33-88	# of ideas submitted	207 to 424
	% ideas implemented	73% to 60%
MFG36-91C	reduction of working capital investment	23%
	reduction of finish product inventory	32%
	increase in demand	27%
	reduction in total plant cycle time	18%
	total plant cycle time	90 days to 74 days
MFG37-91/92	reduction in average order cycle time	75%
	promised date adherence	5% to 94%
	order backlog	202 to 40
	order cycle time	26 wks to 6 wks
	yield	8% to 94%
	reduction in in-process inventory	90%
	# suggestions implemented	80
	# of employees receiving awards	153

ORGANIZATION	MEASURE	VALUE
MFG38-85/86	\$ awarded to employees	\$115000 to \$124000
MFG39-87	production increase	4% to 14% to 17% to 23% to 22%
	trade problem reports/mm pounds shipped	0.44 to 0.5 to 0.31 to 0.37
MFG41-87	% of workforce trained in problem solving	20%
	total hours of problem solving training	5000
MFG46-90C/91C/92F/93F	in-warranty return rates per million hours of operation PLC products	11.1 to 6.8 to 6.2 to 5.7
	quality costs as a percent of sales	3.12% to 1.5% to 1.25% to 1.2%
	shipping error rate as a percentage of items shipped	1% to 0.5% to 0.29% to 0.54%
	percent of on-time shipments	70% to 93%
	# of customer calls per month on quality issues	90 to 80
	first pass yield rates of printed circuit boards through the testing process	81% to 87% to 88% to 88%
	system test yields for the PLC products	83.9% to 91.2% to 92% to 94%
	scrap and rework costs as a % of product sales	0.81% to 0.6%
	quantity per week of printed circuit boards completed	3710 to 4945 to 6664 to 8431 to 12835
	inventory turns per year	3.5 to 4.0 to 4.5 to 5.8 to 6.2
MFG47-87/90/92	sales dollar output per factory employee	\$468K to \$611K to \$582K to \$593K
	quality costs as a percent of sales	14% to 5.7%
	quality of vendor material as % of lots rejected	3.6% to 2%
MFG48-91F/92C/93F	recordable injuries	20 to 13 to 11 to 7 to 14 to 2
	turnover	25% to 15% to 14% to 10% to 8% to 6%
	sampling rate of finished product	1 in 14000
	attendance	99%
	production volume	275M sq ft to 291M sq ft to 305M sq ft to 326M sq ft to 307M sq ft to 335M sq ft to 330M sq ft
	thickness swell	13% to 15% to 17% to 15% to 13%
	product stiffness	70K to 78K to 80K to 77K
MFG51-92/93	reduction in production costs	15%
	increase in first time yield rates	20% to 25%
	average # of training hours per employee	100 hrs

ORGANIZATION	MEASURE	VALUE
MFG51-92/93 cont.	average design cycle	25 mo to 20 mo to 17 mo to 14 mo
	out-of-box failures	12% to 10% to 5%
	research and development spending	\$83581 to \$166454 to \$265175
	# of customer complaints	25 to 17 to 12
	increase in on-time delivery	15%
MFG54-90/91/92C/93C	employee participation in making improvement suggestions	2% to 6% to 15% to 25% to 33%
	# of employees receiving plant-wide recognition	1400
	quality failure	9% to 7% to 4% to 4% to 2%
	% of employees submitting improvement suggestions	35%
	# of suggestions submitted per month	20 to 145
	acceptance rate of employee suggestions	50%
	cost savings of employee suggestions	\$2.2M
	cost of quality	60% to 15%
MFG55-86/87	turnover	0.03% to 0.02% to 0.02%
MFG56-83/86	bonus as % of employees' six months pay paid out	3.65%
MFG57-88	customer returns	0.18% to 0.04%
MFG58-89/90C	employee participation	55.8% to 63% to 70.6% to 73.5%
MFG59-89C/90	manufacturing cost as a % of sales	16% to 15% to 13% to 12%
	% of on-time shipments	78% to 86% to 88% to 94% to 98%
	net sales per employee	\$100K to \$115K to \$150K to \$160K to \$170K
	manufacturing cost of quality as a percent of sales	1.56% to 1.36%
	\$ reimbursed to employees for education	\$16K to \$20K to \$19K to \$21K to \$21K to \$22K
MFG61-90	damages	12% to 4%
	customer complaints	5.6% to 1.9%
	meeting quality requirements	83% to 95%
MFG62-83/87/90F/91W	decrease in unit cycle time	40%
	decrease in manufacturing floor space	20%
	# of quality deficiency records issued	120 to 110 to 20 to 1
	average defects per unit	3 to 0.012

ORGANIZATION	MEASURE	VALUE
MFG62-83/87/90F/91W cont.	# of employee suggestions implemented	3161
MFG63-86W	# of employees participating in quality circles	15 to 112 to 215
	% of employees participating in quality circles	40%
	efficiency	70.5% to 83.2% to 94.9%
	cost of quality	7.48% to 7.29% to 4.71% to 4.7% to 4.45% to 3.33%
	absenteeism	2.47% to 2.08% to 1.69%
MFG63-86W cont.	% of supervisors discussing performance with employees	63% to 91%
MFG64-87/89C/90W	image intensifier deliveries	5K to 15K to 25K to 30K
	production capacity	10K to 25K to 40K to 40K
	pretest yield	35% to 45% to 45% to 55% to 75% to 80%
MFG65-92F	customer complaints per 10 million units	0.3
	customer product acceptance rate	96% to 99.5%
	scrap as a % of total units produced in extrusion	15.7% to 9.5%
	scrap as a % of total units produced in thermofforming	4.6% to 2.3%
	scrap as a % of total units produced in printing	8.4% to 2.2%
	average number of recordable injuries	14
	time without a recordable injury	one yr
MFG67-85	increase in labor efficiency	8%
	% increase in total employment	12%
MFG68-84/90/91C/92C	# of employees participating in Employee Development program	300
	# of quality training hours	17306
	reduction in inventory	42%
	reduction in work in process	47%
	reduction in scrap	57%
	increase in output per employee	31%
MFG70-85/86	increase in machine productivity	29%
	reduction of waste	19%
	time since last lost time accident	6.5 yrs
	production of tons per hour	4.5 to 5.2 to 5.5 to 5.8 to 6.1

ORGANIZATION	MEASURE	VALUE
MFG70-85/86 cont.	production of feet per hour	8300 to 8350 to 8850 to 9500 to 9750
	waste percentage	10.3% to 8.1% to 9.4% to 8% to 8.9%
	process losses	14% to 6%
MFG71-91/93	plant productivity	10% to 80%
	landfill waste	5.5M lbs to 0.4M lbs
	reduction in variation of process parameters	90%
	failures per month	4 to 0
	process time variation	0.1%
	tank turnover rate	1.7 to 2.7
MFG73-83/86/88	quality defect level	7% to 4% to 0.35%
	% of employees submitting improvement suggestions	45% to 65% to 81%
	training hours per employee	2.8 to 4.1 to 4.7
MFG74-90	productivity	37 pcs/hr to 52 pcs/hr
	scrap levels	5% to 2.5%
	quality rate	99.9%
MFG75-93	sales per employee	\$22.2K to \$100.5K to \$44K to \$78K to \$163K to \$166K to \$171K
	improvement in merchandise fulfillment	20%
	improvement merchandise returns	31%
MFG78-84	supervision manhrs per project	13% to 8%
	rework manhrs per project	12% to 5%
	cost of quality	4% to 2.5% to 2% to 2% to 1% to 1.1% to 1.5% to 1.5% to 2% to 1.9% to 2%
MFG79-91C/92F	employee productivity index (parts per labor hr)	9 to 10 to 9 to 10 to 10 to 10 to 11
	% employees completing quality training	70%
	A-Grade product	0.6% to 5.33% to 5.37%
MFG80-93C	pounds per manhour	38.69 to 53.76
	processing cost	0.45% to 1.84% to 2.6%
	# of improvement ideas submitted	712 to 1582
MFG86-86/87/88C/89F/90	inventory levels of raw materials	5.94 days on hand to 5.4 days on hand
	complaint rate per million units	0.67 to 0.58 to 0.39 to 0.37

ORGANIZATION	MEASURE	VALUE
MFG86-86/87/88C/89F/90 cont.	% labor effectiveness	103.6% to 110.4% to 104.2% to 104.2%
	% reduction in energy	1.2% to 1.5% to 1.5% to 6.5%
MFG87-91F/92/93W	improvement in productivity	74%
	improvement in customer returns	31%
	improvement in quality	87%
	improvement in product cost	31%
	increase in production	163%
	improvement in coefficient of variation	16%
	reduction overall manufacturing cost	31%
	reduction in cost of dozen t-shirts	5.7%
MFG89-89/92/93F	increase in sales per employee	78% to 86%
	defects in delivered injectors	20 ppm to 10 ppm
	production of fuel injectors	1.7M to 9.8M
	employment	660 to 1000
MFG92-83/84	reduction in rework	26.82%
	reduction in scrap	38.59%
	improved factory efficiency	16.84%
	improved gyro yield	35%
MFG95-83/84/89	downtime	12%
	machine utilization	83.5% to 89.2%
	production hours paid per unit produced	3.06 to 2.21 to 2.26 to 1.98 to 1.69 to 1.70
MFG99-93	lost time accidents	12 to 5 to 1
	reduction in downtime	50%
MFG102-93	units produced	13K to 13.5K to 9.5K to 7K to 10.5K to 13.5K
	number of grievances	217 to 59 to 26 to 5
	number of suggestions implemented	63 to 227 to 175 to 174 to 173
	average number of training hours	3500
	repair hours per unit	14.4 to 12 to 9.2 to 7.5
	defects per unit	50.1 to 22 to 22.3
MFG104-83/84/86	cost per ton	\$100 to \$94.13 to \$92.86 to \$92.51 to \$89.74 to \$77.44
	incidence rate	13.1 to 8.91 to 9.11 to 8.76 to 6

APPENDIX L - SAMPLE FEEDBACK LETTERS

GUIDELINES FOR "MANUFACTURING" NON-SITE VISIT FEEDBACK LETTER

January ??, 1994

Sam P. Able
SPQA Contact
XYZ Corporation
123 Quality Drive
Utopia, VA 00000

Dear Mr. Able:

Thank you for applying for the 11th Annual U.S. Senate Productivity and Quality Award. The U.S. Senate Productivity and Quality Award Board met on January 13th, 1994, to select applicants who will receive a site visit for the 1993 award. Finalist status will be determined from organizations receiving site visits. Competition was stiff this year and unfortunately we did not select your organization as one of those to receive a site visit.

We strongly encourage you to apply again next year, and to help you in preparing we are enclosing a summary of the comments from the Board members who reviewed your application. **(INSERT SPECIFIC COMMENTS ABOUT APPLICATION DEFICIENCIES HERE, OR ATTACH AS A SEPARATE PAGE.)** Please feel free to call me at 703-367-2075 if you have questions concerning your application.

Another useful tool in preparing for next year is the U.S. Senate Productivity and Quality Award Conference, which will be held April 14, 1994, at the Radisson Mark Plaza Hotel in Alexandria, Virginia. During this day-long event you can hear presentations from each of the finalists, and you'll have an opportunity to ask them specific questions about their quality and productivity improvement efforts. You will receive a brochure about the conference through the mail in about six weeks. If for some reason you don't receive one, please call Elizabeth Holmes, Program Manager, at 703-231-3128 or LaVonda Matherly, Information Assistant, at 703-231-6100.

Thank you again for applying and we hope to see you in April.

Sincerely,

Name
Team Leader - Private Sector Manufacturing
U.S. Senate Productivity and Quality Award Board

Encl
cc: Elizabeth Holmes, Program Manager

GUIDELINES FOR
"MANUFACTURING" CERTIFICATE OF MERIT
FEEDBACK LETTER

January ??, 1994

Sam P. Able
SPQA Contact
XYZ Corporation
123 Quality Drive
Utopia, VA 00000

Dear Mr. Able:

Thank you for applying for the 11th Annual U.S. Senate Productivity and Quality Award. The U.S. Senate Productivity and Quality Award Board met on January 13th, 1994, to select applicants who will receive a site visit for the 1993 award. Finalist status will be determined from organizations receiving site visits. Competition was stiff this year. We felt your application had merit, and although we did not select your organization as one of those to receive a site visit in the **Private Sector Manufacturing** category, you will be receiving a Certificate of Merit at the Conference.

We strongly encourage you to apply again next year, and to help you in preparing we are enclosing a summary of the comments from the Board members who reviewed your application. **(INSERT SPECIFIC COMMENTS ABOUT APPLICATION DEFICIENCIES HERE, OR ATTACH AS A SEPARATE PAGE.)** Please feel free to call me at 703-367-2075 if you have questions concerning your application.

Another useful tool in preparing for next year is the U.S. Senate Productivity and Quality Award Conference, which will be held April 14, 1994, at the Radisson Mark Plaza Hotel in Alexandria, Virginia. During this day-long event you can hear presentations from each of the finalists, and you'll have an opportunity to ask them specific questions about their quality and productivity improvement efforts. You will receive a brochure about the conference through the mail in about six weeks. If for some reason you don't receive one, please call Elizabeth Holmes, Program Manager, at 703-231-3128 or LaVonda Matherly, Information Assistant, at 703-231-6100.

Thank you again for applying and we hope to see you in April.

Sincerely,

Name
Team Leader - Private Sector Manufacturing
U.S. Senate Productivity and Quality Award Board

Encl
cc: Elizabeth Holmes, Program Manager

GUIDELINES FOR
"MANUFACTURING" SITE VISIT
FEEDBACK LETTER

January ??, 1994

Sam P. Able
SPQA Contact
XYZ Corporation
123 Quality Drive
Utopia, VA 00000

Dear Mr. Able:

Thank you for applying for the 11th Annual U.S. Senate Productivity and Quality Award. The U.S. Senate Productivity and Quality Award Board met on January 13th, 1994, to select applicants who will receive a site visit for the 1993 award. Congratulations on being selected one of the **(INSERT NUMBER HERE)** organizations to receive a site visit in the **Private Sector Manufacturing** category. Competition was stiff, and you can be proud of this achievement.

You will be contacted, if you haven't been already, by a Board representative who will schedule a visit of approximately four to six hours in length. During the visit you will be expected to make a presentation elaborating on your application and process, and permit Board members to tour your facility. To assist you in preparing for the visit we are enclosing a summary of the comments made by the Board members who reviewed your application. **(INSERT SPECIFIC COMMENTS HERE; ISSUES ON WHICH YOU WOULD LIKE ELABORATION AT THE SITE VISIT, ETC.)** Once all site visits in your category are conducted, the Board team will determine which organizations will move on to finalist status.

If your organization is selected as a finalist you will be expected to make a presentation at the U.S. Senate Productivity and Quality Award Conference on April 14, 1994, at the Radisson Mark Plaza Hotel in Alexandria, Virginia. You will receive a brochure about the conference through the mail in about six weeks. If for some reason you don't receive one, please call Elizabeth Holmes, program Manager, at 703-231-3128 or LaVonda Matherly, Information Assistant, at 703-231-6100.

Please feel free to call me at 703-367-2075 if you have any questions about the site visit, or Elizabeth Holmes at 703-231-3128 if you have any questions about the Conference.

We look forward to meeting you soon.

Sincerely,

Name
Team Leader - Private Sector Manufacturing
U.S. Senate Productivity and Quality Award Board

Encl
cc: Elizabeth Holmes, Program Manager

APPENDIX M - REFERENCES

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Yin, R.K., (1993), *Applications of Case Study Research*, Newbury Park, CA: Sage Publications.

APPENDIX O - RESUME

CHERYL L. SIMMERS

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EDUCATION

Virginia Polytechnic Institute and State University, Blacksburg, Virginia

M.S. in Industrial and Systems Engineering (concentration in Management Systems Engineering),
January 1992 - June 1994

Virginia Polytechnic Institute and State University, Blacksburg, Virginia

B.S. in Industrial Engineering and Operations Research, September 1985 - May 1989

WORK EXPERIENCE

VIRGINIA QUALITY AND PRODUCTIVITY CENTER, Blacksburg, Virginia

Graduate Research Associate, January 1992 - present

Perform various duties as a GRA including developing proposals for requests for quotes from private- and public-sector organizations, designing presentations to be delivered to audiences of up to 500 people, and formulating strategies for improving performance within specified processes. Additional responsibilities include acting as project manager for small to mid-size business development projects (less than \$80,000), coordinating logistics for short course offerings as well as on-site meetings with clients, technical editing, and convening/facilitating meetings. Increasing responsibility is being delegated in the area of presentation delivery. Details regarding specific job responsibilities follow.

NAVAL EOD TECHNOLOGY DIVISION PROJECT MANAGER

- Work with TQL Coordinator to develop in-house training on measurement topics. Training to include reading assignments, exercises, and hands-on assignments. Work with the Strategic Planning Group to further the organization's planning efforts. Facilitate small group discussions at off-site planning sessions. Develop presentations and notebooks for strategic planning sessions. Generate reports of output for these planning sessions. Coordinate logistics for meetings, including hotel reservations, catering, and support materials. Provide research on various topics of interest to NEODTD TQL Coordinator. Research included information on alternative work schedules, integrating TQL into Quality Assurance manuals, and detailed job descriptions of TQL Coordinators.

AEGIS TOTAL QUALITY LEADERSHIP COURSE CONSOLIDATION

- Work with TQL Coordinator and sub-contractors to consolidate the U.S. Navy TQL courses for the AEGIS program. Consolidation includes reviewing materials, shortening presentations, and improving lecture content.

NORFOLK NAVAL SHIPYARD SHOP SUPERINTENDENTS' TRAINING

- Worked with the project manager in development of training agendas and training materials. Work with client to develop training implementation plan and exercises. Also worked with client facilitator to design delivery of training exercises. Coordinated logistical arrangements with the client. Develop presentations and notebooks for training sessions. Generated reports of output for these sessions.

COLLEGE OF ENGINEERING PROJECT MANAGER

- Developed a process by which the College of Engineering at Virginia Tech is able to prioritize classroom improvement ideas. This process encompassed input from the College of Engineering as well as other supporting functions, such as Physical Plant and Housekeeping. This project was conducted under the auspices of the Continuous Quality Improvement effort within the College. Future efforts will be concentrated on improving this process and incorporating ideas on developing a vision for the "Classroom of the Future."

ENVIRONMENTAL PROTECTION AGENCY STRATEGIC PLANNING PROJECT

- Co-authored proposal for \$25,000 project with the Principal Investigator. Assisted in conducting a situation appraisal of the Environmental Protection Agency Region III Strategic Planning Process. Co-authored the situation appraisal report and assisted in the development of the recommended Strategic Planning Process for Region III. Additional assistance was provided in developing a measurement presentation for leaders of EPA Region III's improvement team. Technical support was provided on as needed basis.

EXPRESS CHECK-IN MEASUREMENT PROJECT MANAGER

- Worked with the administrative manager for Express Check-in to ensure that all processes are in control. Provide the administrative manager with input for ideas for continuous improvement. Helped the administrative manager bring Total Quality concepts into the Express Check-in process by providing tools to use. Delivered presentations to the Express Check-in Team, as needed, on topics related to Total Quality (e.g., measurement). Presentations will include detailed visual aids, as well as handouts. Facilitation skills were utilized in small and large group meetings (10-30 people).

NAVSEA 071 PROJECT MANAGER

- Provided administrative and logistical support to the Principal Investigator. Developed presentations and notebooks for strategic planning sessions. Generated reports of output for these sessions.

NATIONAL GROCERS PROJECT

- Assisted in developing presentations and educational modules, including detailed visual aids and educational materials.

"PERFORMANCE IMPROVEMENT ENGINEERS" SHORT COURSE PROJECT MANAGER

- Coordinated logistics to ensure proper supplies were present, refreshments were provided as requested, and performed various clerical duties as necessary. Other responsibilities included writing and sending invitations to potential participants, coordinating disbursement of pre-work assignments, and coordinating consolidation of pre-work assignments' results. Developed educational modules to include detailed visual aids as

well as workbooks. Worked closely with the primary deliverers to ensure that technical materials were available.

U.S. SENATE PRODUCTIVITY AWARD FOR VIRGINIA WORKSHOP PROJECT MANAGER

- Designed modules for presentation to an audience of 75-100 participants. Coordinated logistics to ensure proper supplies are present and meeting facilities are appropriate. Presentation materials included detailed visual aids as well as workbooks for participants.

"EIGHT KEYS ..." SHORT COURSE PROJECT MANAGER

- Designed modules for presentation to an audience of 15-20 Industrial Engineers. Coordinated logistics to ensure proper supplies were present and meeting facilities were appropriate. Presentation materials included detailed visual aids as well as workbooks for participants.

"BECOMING A CHANGEMASTER ..." SHORT COURSE PROJECT MANAGER

- Designed modules for presentation to an audience of 15-20 Industrial Engineers. Coordinated logistics to ensure proper supplies were present and meeting facilities were appropriate. Presentation included detailed visual aids as well as workbooks for participants.

QUALITY AND PRODUCTIVITY MANAGEMENT JOURNAL

- Performed technical editing and other duties for issues, as needed.

RESEARCH AND DEVELOPMENT TEAM

- Former convener of the Research and Development Team. Responsibilities included setting agendas, scheduling outside speakers, and coordinating action items of the team. Served as liaison between the team and the Director of the Center.

PROPOSAL AND PRESENTATION DEVELOPMENT

- Develop proposals for business development projects ranging from \$2,000 to \$150,000. Proposals included technical proposals as well as detailed budgets.
- Develop presentations on topics such as Total Quality Management, Performance Measurement, and Team Dynamics for audiences up to 500 people. Presentations included detailed visual aids as well as workbooks.

NAVAL WEAPONS STATION, Yorktown, Virginia

Industrial Engineer, Station Resources and Planning Department, May 1989 - January 1992

Acted as project manager for various projects within the organization. These projects included methods improvement studies, plant and office layout analyses, and productivity/process improvement projects. Recommendations for these projects included cost savings from \$10,000 to \$350,000. Coordinated the administration of the Station Productivity Improvement Program and served on various task teams to investigate implementation of productivity improvement initiatives within the Station. Details regarding specific job responsibilities follow.

STATION PRODUCTIVITY IMPROVEMENT PROGRAM

- As coordinator of the Station Productivity Improvement Program (PIP), initiated major changes to increase participation. Wrote an instruction to provide guidelines for the

program, conducted a workshop to increase awareness of the benefits of productive organizations, and notified participants of the program changes.

- Verified reported savings and compiled Station quarterly status reports, assisted participants in cost analysis, provided ideas to participants for productivity improvement initiatives and solutions to productivity problems, and provided pertinent data to the Business Improvement Program (BIP) Coordinator. Presented annual results of the PIP to top management of NWS Yorktown, as well as NAVSEA officials.

PASS AND ID OPERATION ANALYSIS

- Performed an analysis of the Pass and ID operation within the Security Department. Used computer simulation to determine the optimum manpower for the Pass and ID office. Identified areas for improvement in office layout, workload utilization, automation, information networking, and security policies regarding Station entry of official visitors. Recommended additional studies to make more detailed analyses of specific problems identified.

Methods Improvement of Security Procedure for Station Entry of Visitors

- Analyzed current procedures to allow Station entry of visitors and determine optimal procedure. Recommended needed changes in security guidelines and operation.

Human Factors Analysis of Current and New Pass and ID Office

- Conducted an analysis of the equipment and layout in the current Pass and ID building and identified associated problems. Recommended alternatives for equipment and layout for the newly constructed Pass and ID building.

RAIL OPERATION ANALYSIS

- Conducted an analysis to improve the rail operation based in Public Works. Determined the optimum number of locomotives, rail cars, and rail crews. Identified problems with the current system regarding scheduling, facilities, equipment, or general rail operation. Coordinated analysis, so recommendations included the Public Works and Ordnance Departments.

COMPTROLLER DEPARTMENT SPACE LAYOUT

- Determined the maximum space required by the Comptroller Department. Reassigned office space based on space requirements. Developed office layouts, so space was more efficiently utilized.

SYSTEMS ENGINEERING DEPARTMENT SPACE EVALUATION

- Reviewed the current layout of the space occupied by the Systems Engineering Department. Estimated utilization of space and made recommendations to the Space Allocation representatives. Recommendations included ideas on improving space utilization as well as suggested layout changes.

PRESENTATIONS AND PUBLICATIONS CO-AUTHORED

Johnston, C.S. and Simmers, C.L. "Performance Improvement Engineers: Educating Leaders of Profound Knowledge." (Presented at the 1993 International Institute of Industrial Engineers Conference and 1993 Association of Management Conference)

EDITED PUBLICATIONS

Quality and Productivity Management, Volume 10, Number 4: Senate Productivity and Quality Award published January 1994.

Quality and Productivity Management, Volume 10, Number 3: Measurement, published July 1993.

Quality and Productivity Management, Volume 10, Number 2: TQM in Higher Education, published March 1993.

Quality and Productivity Management, Volume 10, Number 1: World Academy of Science, published September 1992.

PROFESSIONAL SOCIETIES

Institute of Industrial Engineers, 1987 - present

American Society for Quality Control (ASQC), 1992 - present

PROFESSIONAL TRAINING

- Quality, Productivity, and Competitive Position (Dr. W. Edwards Deming's 4-day short course)
- Introduction to ... and Programming with dBase III Plus
- Introduction to ... and Advanced Lotus 1-2-3
- Harvard Graphics
- Introduction to Simulation with SIMAN
- Financial Management in the Navy

ADDITIONAL SKILLS

- Extensive technical editing, technical writing, and public speaking experience
- Working knowledge of various programming languages for the IBM Computer System
- Working knowledge of numerous software packages in the IBM and Apple Computer Systems