SUPPLIER - CUSTOMER RELATIONSHIPS:
A STUDY OF THE APPLICATION OF QUALITY MANAGEMENT
IN THE FEDERAL GOVERNMENT

by

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(ABSTRACT)

Public administrators continuously look for ways to improve administrative support processes, including the procurement of goods and services. The system of management developed by the late Dr. W. Edwards Deming has been advanced as a candidate to accomplish such improvements. His "System of Profound Knowledge" is a robust, theoretically based framework which provides the means to analyze these processes using data and facts and advances an interdependent set of activities designed to liberate and use human capital to effect continuous improvement.

Included in Dr. Deming's framework is a theory for procuring goods and services which results in cooperation and trust between the supplier and the customer. In contrast, the Federal procurement system is perceived to rely heavily on competition and embody a lack of trust between the suppliers and the government. This research examined the relationships four Federal organizations implementing versions of continuous improvement are establishing with their suppliers in order to illuminate government's ability to apply Dr. Deming's theory.

This qualitative research used a case study methodology to collect data from Federal
contracting, contract administration, and quality assurance employees in Defense and non-
Defense organizations which was analyzed for conformance with the model posed by Dr. 
Deming.

The study concluded that the theory of supplier-customer relationships posed by Dr. 
Deming was being generally implemented in Federal organizations examined. While none of these organizations has encompassed all aspects of this theory, in aggregate they account for all its elements. Despite public perceptions to the contrary, the Federal procurement system contains the flexibility needed to permit cooperative, trust supplier-customer relationships given a motivating desire, local leadership, some relief from local restrictions, and willing participants, both government and suppliers. The research did find, however, that one aspect of the theory, the to move to a single supplier for any one item, while often a reality, was not a strong objective of the participating Federal contracting personnel nor, based upon the literature, did it appear to be for industrial purchasing agents. This compo-
nent of the theory may therefore need re-examination.
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CHAPTER I

The Research Questions

Introduction

In a book one of his colleagues referred to as "... the most important book that has ever been written about management ..." [emphasis in the original] (Neave, p. xiii) the late Dr. W. Edwards Deming (1890-1994) called for a transformation in the "style" of American management. American managers, he said, must stop their wasteful practices and their focus on short-term returns. Instead, they must concern themselves with long-term outcomes and the creation of jobs through his prescription for the continual improvement of quality (Deming, 1986, p. ix-xi).

In a later book, he asserted that this transformation "...is required in government, industry, and education... (and) will release the power of human resource contained intrinsic motivation. In place of competition... will be cooperation on problems of common interest between people, divisions, companies, competitors, governments, and countries... (e)veryone will win" (Deming, 1993, p. 126).

Since the popularization of Dr. Deming's philosophy in the United States in the early 1980's, governments at all levels have been attempting to use this style of management to improve the provision of public services to the American people. This research is intended to contribute to an understanding of the nature of this embrace and how the application of this philosophy works in practice. It does so by examining how one point
of Dr. Deming's approach is being applied at one level of government, the United States Federal government.

The particular point of Dr. Deming's philosophy which is examined in this study is but one of what he postulated in 1986 as a set of "Fourteen Points" or actions which, when implemented together, lead to the continual improvement of product quality (Deming, 1986, pp. 23-24). The particular point examined here is his recommendation for management to establish the following relationship with those who supply goods or services to a particular enterprise:


Using this point as the reference, this research examines how supplier-customer practices in selected Federal agencies compare with the model advanced by Dr. Deming. Specifically, it addresses these questions:

**The Research Questions**

1. Do Federal organizations which are using quality management practices establish the kind of supplier relationships advocated by Dr. Deming?

2. If Federal organizations are able to emulate the proposed supplier-customer relationships advanced by Dr. Deming, are they able to do so in all respects? That is, are they able to equally apply all three aspects of this "Point?" Are they able to use total cost in making purchasing decisions, and use a single supplier for each item, and base the relationship on long-term loyalty and trust? Are the three aspects of this "Point"
indivisible or is there unequal application in practice?

3. To the extent that the practice of the Federal organizations under study reflects Dr. Deming’s theory about supplier-customer relationships, what conditions, techniques or approaches have permitted them to achieve this status and are there common themes among these organizations?

**Background for the Research**

In the early 1980s, American industry, reacting to successful Japanese penetration of American automotive and consumer electronics markets, began a process of rediscovering the importance of product quality and applying the management methods of Dr. Deming and his contemporaries. Dr. Deming was not alone in seeing the advantages of managing in ways that continually improve product quality (see also Juran, 1988; Imai, 1986; Scherkenback, 1991; Neave, 1990). Nor was the application of these management methods restricted to American industry. Government at all levels was attracted to these same methods. Improving the quality of service became a Federal government objective in 1986 (Executive Order 12552, 1986) and a component of the entrepreneurial approach to state and local government as chronicled in the oft-cited text, *Reinventing Government: How the Entrepreneurial Spirit Is Transforming the Public Sector: From Schoolhouse to Statehouse, City Hall to the Pentagon* (Osborne and Gaebler, 1992).

Looking to quality management methods to improve government services is consistent with the responsibilities of public administrators who must, as part of their role
as agents of the public interest, be continuously alert to ways to improve the effectiveness of government in general and governmental administrative systems in particular (Wamsley, et al., 1987, p. 299). Administrative systems, including budgeting, personnel, and procurement "... have as their primary purpose the marshaling of resources..." (Clay, 1991, p. 7). Such resources are needed to carry out the legislative mandate assigned to the public administrators. Without these resources, political decisions have, in effect, no meaning. Thus, administrative systems have a direct bearing on governmental outcomes.

The application of Dr. Deming's philosophy of management is a candidate for improving these administrative systems and if successful, could have a significant impact on the effectiveness of government. Hence, it is important to understand whether this style of management in fact works in the governmental setting.

As the implementation of quality management practices spread in the public sector during the 1980's and early 1990's, proponents claimed that these practices were appropriate for improving governmental productivity and for assuring governmental responsiveness to citizen expectations (Gore, 1993; Hyde, 1993; Milakovich, 1991; Cohen and Brand, 1993). Indeed, success stories in government are plentiful (Walton, 1990; Kitfield, 1993; Burnstein and Sedlak, 1988; Cohen and Brand, 1993; Osborne and Gaebler, 1992).

Despite these successes, however, some observers have been skeptical about the application of quality management methods in government. Concerns included the lack of a professionally trained, long-term management workforce; the conflicting values
among the customers of government services; and, the need for public institutions to be able to assure political and legal accountability (Moe and Gilmour, 1995; Radin and Coffee, 1993; Swiss, 1992; Peters, 1990; Wilson, 1989). Implementation in fact seems to have proceeded slowly. In 1992, the General Accounting Office (GAO) published the results of a survey of some 2800 Federal "installations" which indicated that less than 2 percent claimed that they were "deeply" involved in implementation of quality principles, this after nearly six years under its directed application by the authority of a Presidential Executive Order (GAO, 1992, p. 51). While the results of the GAO survey cast some doubt on how well these principles could be adopted to the Federal Government setting and lent support to the viewpoint expressed by the skeptics, they did not indicate that these principles were being dismissed and ignored by the Federal work force. In fact, nearly 68 percent of the responding installations (N=2240) reported some level of effort aimed towards implementation (GAO, 1992, p. 10).

The ambiguity of the results of the GAO survey let to a conclusion by this investigator that additional research was needed. However, replication of the broad based GAO study was beyond the capabilities of a single researcher. Therefore, a strategy was developed to examine a single quality component. The component selected was that one which deals with the acquisition of the goods and services used by governmental entities in the fulfillment of their responsibilities, that is, the administrative process known as procurement. This selection was predicated on the belief that the quality of the goods and services that the government procurement system provides has a
direct bearing on the quality of governmental outcomes.

The quality of anything, a tangible good or a service, was understood by Dr. Deming to occur through the sum total of all the processes ("the system") involved in its production or generation. The quality of the final product can be no better than the poorest quality of any element in these processes. Thus, in purchasing items which are to be part of one's own product or service, the highest possible quality must be acquired else there will be waste, rework, or poorer quality outputs. This principle applies equally to industry and government. In order to determine whether governmental procurement processes do acquire the highest possible quality goods and services, it is necessary to understand what Dr. Deming meant by "quality" and how it is determined.

To Dr. Deming, the "quality" of a product referred to its suitability for use as determined by the customer. The customer normally wants every unit of the product to be equally useable. But Dr. Deming believed that among copies of an item (a good or a service) no two being ever exactly the same. That is, there is variability—among products and even among copies of the same product made by the same processes. To assure the highest quality (least variation) among copies being procured, Dr. Deming believed one should purchase each item from a single supplier, a single supplier being more likely to have all copies almost the same. In order for each party to know as precisely as possible what the other party needs in the purchasing arrangement, the relationship between the supplier and the customer should be cooperative in nature. It should recognize the inherent interdependence of the parties. It should consist of timely, high-
information content exchanges about each other's business processes and business aims in order to understand as exactly as possible what is really needed and what is really possible of being produced or provided. Lastly, it must consider not just the apparent purchase price of an item but any and all costs (e.g., waste, rework, dickering over price) attributable to it as it moves through one's own processes (Neave, pp. 307-318).

Governmental procurement processes then appeared to be important to the quality of government services, could be related to a distinct aspect of the management philosophy advanced by Dr. Deming, and, at least superficially, did not appear to resemble the kind of relationship contained the Dr. Deming’s model.

An examination of the literature surrounding the relationships the Federal government establishes with its suppliers revealed that Dr. Deming's cooperative, trusting model was in sharp contrast to what was being reported in practice. In fact, the Federal procurement system seemed to be based on competition and mistrust rather than cooperation and trust. Recent criticism revealed it to be seen as a system which relies on constant competition among multiple suppliers, tends to minimize information exchange, puts emphasis on rules and regulations rather than the quality of the products, precludes the development of trust among the parties, tends to restrict the discretionary judgements of the officials involved in its fulfillment, and is operated in a adversarial mode (Kelman, 1990; Gore, 1993; Gingrich, 1995; DeRose, 1989, Nagle, 1992). Specific criticisms were readily available and included press reporting of several recent $3 billion failed weapons acquisition programs which spoke to a “procurement system gone awry”
The procurement of goods and services is a substantial part of Federal government economic activity. Currently, it represents nearly 15 percent of the annual budget and involves the expenditure of nearly $200 billion. Its core work force consists of 67,000 Federal employees with another 142,000 serving in depots and other logistic functions (Gore, 1993, p. 2-3). Not only is the system large, but it is politically sensitive. The procurement function resides at the juncture of public and private interests, at the point where public money must be protected and husbanded but private profits sustained. It is judged on the multiple grounds of "efficiency," "effectiveness," "equity" and "accountability," objectives which frequently conflict.

The Federal employees responsible for acquiring goods and services for the government must moderate these conflicting values, often under Congressional and media scrutiny. While they are sometimes unable to satisfy all demands imposed upon them, in general the Federal procurement system has provided the goods and services needed for the Government to fulfill its responsibilities (Cancian, 1995). It has helped put men on the moon, provided the armaments for national security, and acquired millions and millions of other items essential for every day governmental purposes. The public policy issue surrounding it is not whether a procurement system should exist, but rather whether it could be more effective in accomplishing its objectives. Can it function so as to prevent the purchase of the oft remembered $400 hammers, $600 toilet seats (Allard, 1994) or the $3 billion airplane that will never be ordered (Wilson, 1995)? Can
the methods of managing for the continual improvement of quality advocated by Dr. Deming be used to help prevent such instances and help align the procurement system with the full range of public and administrative expectations?

The Research Project

While there are a number of models of managing for quality, that proposed by Dr. Deming is seen by some to be the most robust and theory based framework (White and Wolf, 1995, p. 209). It forms perhaps the most comprehensive, internally consistent model currently available. The underlying question addressed by this research is the extent to which it can be applied to governmental activities. The strategy for contributing to an understanding of this issue is to examine a single component of his theory as it is being applied in practice.

Dr. Deming believed that learning came from the comparison of practice with theory. Without a theory there could be no knowledge.

A theory may be complex. It may be simple. It may be only a hunch, and the hunch may be wrong. We learn by acceptance, or by modification or our theory, or even abandoning it and starting over (Deming in Neave, p. 247).

Following his advice, this study compares the supplier-customer practices of selected Federal organizations with Deming's theory of supplier-customer relationships.

The research started by developing an understanding of Dr. Deming's theory of supplier-customer relationships from the literature; reviewed the literature of Federal procurement and contracting policies; and reviewed empirical studies dealing with the implementation of quality management in the public sector in general or procurement in
specific. To provide a point of comparison, it also reviewed studies of private sector supplier-customer relations. As an understanding of Dr. Deming's theory and the procurement system developed, a search was made to locate suitable Federal organizations involved in the procurement of goods and services which were using, or attempting to use, management principles consistent with the theory. Since the purpose of the research is to understand how well the theory can be applied and not to determine how many organizations are applying it, the population selection process had only to locate organizations claiming to be using it and willing to discuss this use. Details of the selection process are contained in Chapter II, "Methodology."

Through the selection process, four willing organizations were identified which appeared to be actively attempting to establish supplier relationships resonating with Dr. Deming's philosophy, although not necessarily explicitly referring to them in his terms. The core of the study consisted of field work involving in-place, in-depth interviews with contracting officials in two of these organizations, telephone interviews with members of the other two, and the review of relevant documentation from all of them. The resultant data was analyzed and patterns of activity derived. In turn, these were compared to the specific theory about supplier-customer relationships, to Dr. Deming's broader philosophy of management ("A System of Profound Knowledge"), and, as appropriate, to the operations of the Federal procurement system.

The research is a qualitative study using the case study method of inquiry, the case being Dr. Deming's particular perspective on supplier-customer relations. As a qualita-
tive study it suffers from the limitations inherent in the technique in terms of replication and generalizability (Yin, 1984; Rossman and Marshall, 1995) but is believed to be internally reliable and generalizable to the theory (Yin, 1984, p. 39). Full methodological details are contained in Chapter II.

Contributions to the Literature

Public Administration and Public Sector Management

There are no copyrights on the methods of managing for the continual improvement of quality. Dr. Deming advanced one set, but others exist (Juran, 1988; Imai, 1986). Organizations undertaking these methods tend to formulate their own set and, as will be seen, attach their own labels. Regardless of the label, however, the use of these methods in the public sector is at a crossroads. There are many advocates (Harrison and Stupak, 1993; Garrity, 1993; Hyde, 1993; Cohen and Brand, 1993; Delany, 1993; Kitfield, 1993; Osborne and Gaebler, 1992) and some believe these management methods hold hope for societal transformation (White and Wolf, 1995b). But likewise, there are many skeptics (Moe and Gilmore, 1995; Peters, 1990; Swiss, 1992; Radin and Coffee, 1993) and some believe these methods have already been surpassed by other methods such as “re-engineering” (Mathews and Katel, 1992; Hammer and Champy, 1993).

A search for empirical evidence by which to resolve these contrasting viewpoints revealed a single Federal government-wide quantitative study conducted by the General Accounting Office (GAO, 1992) and six academic dissertations which form a limited set of case studies of specific organizations (Bailey, 1993; Cook, 1988; Marshall,
No longitudinal research was found that tracked a single implementation effort in the public sector. Trying to gain a comprehensive understanding of such a broad and extensive subject is a challenge of major proportions and will require research using a variety of techniques and lens. This research is intended to contribute to this growing body of knowledge about the public sector application of this philosophy.

There is a continual search by public administrators for ways to integrate the administrative necessities of governance with the political demands of the American political-economy. Dr. Deming presents to the field of public administration what is at least a theory of management (White and Wolf, 1995b) that offers of potential for achieving this integration. This theory of management pays particular attention to processes, a core concern of the public administrator. By illuminating and characterizing the ability of public institutions to implement Dr. Deming's theory, this research expands the growing base of knowledge about the practical boundaries of his theory in the public sector and provides another foundation upon which further research can build.

The Federal Procurement System

While the focus of this research is toward enriching our understanding of the application of quality management methods in the public sector, the selection of the Federal procurement system as the lens through which to view it was purposeful and this research also contributes to our understanding of that system. In the first place, the procurement system is the supplier-customer system which Dr. Deming addresses (when
the unit of analysis is the Federal government). In the second place, the Federal procurement system is itself undergoing transformation and reform, the roots of which resonate, at least in part, in these new management methods. Both in current legislation and in Executive policy, the system is being "streamlined," it is to become more customer oriented, its employees are to be "empowered," bureaucratic rules are to be diminished, officials are to be given more discretion, "red tape" is to be eliminated, cycle times reduced. In short, it is to become a system that "works better and costs less" (Gore, 1993). Since these objectives overlap with those of the quality management methods, the conclusions provide insights into the procurement reinvention effort.

**Organization of the Report**

The research is reported in succeeding chapters. Chapter II provides a detailed description of the research methodology including the selection of the target population, the selection of the data collection techniques, the interview questions and protocols, the data analysis methods, and the limitations to this research.

Chapter III reviews the literature pertinent to the research domain. It is divided into four sections which summarize the literature and present an analysis of that literature as it pertains to the research domain. The sections review:

1. The literature of Dr. Deming and his colleagues on his management methods for the continual improvement of quality (his "System of Profound Knowledge") and the relationship between this "System" and his concept of supplier-customer exchanges;

2. The literature of public procurement and contracting policy;
3. The empirical research that has been identified as pertinent to either the application of quality management methods in the public sector or the application of these methods in private sector procurement; and,

4. Analysis of the literature and development of operational definitions for the components of Dr. Deming’s theory of supplier-customer relationships.

Chapter IV provides an overview of the Federal procurement process: the major categories of acquisitions; the types of contractual vehicles that are used; the three major stages involved in administering an acquisition; and the actors involved in its execution. This chapter provides a basis for understanding the results of the information contained in the collected data.

Chapter V provides the results of the data collection effort, organized by each of the four organizations which were selected for study. Each organization is presented with a brief overview of the history of its quality effort, a summary of its procurement environment, the collected data roughly organized along the lines of the three major elements of Deming’s model of supplier-customer relationships, and a brief summary of what was learned about the application of supplier-customer relationships.

Chapter VI provides an analysis of the data, provides responses to the original research questions, presents the conclusions derived from the data, and suggests areas for further research into the application of quality management in the public sector and its application to the Federal procurement system.
CHAPTER II

Methodology

Scope of the Research

This research has been undertaken to contribute to our body of knowledge about the application of Dr. Deming's "methods of managing for quality" in the public sector. Current knowledge about its application is still diffuse and difficult to assess. Although there is anecdotal information about successful implementations, for example in the U. S. Air Force's Combat Air Command (Kitfield, 1993), the Environmental Protection Agency (Cohen and Brand, 1993), and state and local governments (Osborne and Gaebler, 1992), surprisingly little empirical research exists. The research that does exist (the 1992 GAO report and the six doctoral dissertations) tends to indicate in fact that while there is breadth of implementation across the Federal government, implementation is not deep (GAO, 1992), and that in most cases its effectiveness cannot be conclusively demonstrated (see Dissertations, various). The subject is broad, contains many variables, and will require many studies to fully comprehend its implementation and make more definite judgements how effective these methods are in a public setting.

To establish feasible boundaries for this particular research, a strategy of examining a single component of Dr. Deming's methods of managing for continual improvement of quality was adopted. His model of supplier-customer relationships was chosen because it was perceived by this investigator to present a unique challenge to the
practice of Dr. Deming's principles. The manner in which public organizations order, select and acquire the goods and service they need to perform their tasks is mandated by law and regulation and is conducted in a complex public environment at the intersection of legal, managerial, and political concerns (Rosenbloom, 1983). Thus, if public organizations are able to establish relationships with suppliers in accordance with Dr. Deming's dictums, this would markedly demonstrate the validity of his theoretical formulation. If, on the other hand, organizations which are trying to implement these principles find constraints which prevent its application, consideration must be given to the need to modify the theory or the constraints musts be dealt with if implementation is to proceed. A literature review revealed no research previously conducted in this manner using the procurement system as a lens through which to view the implementation of quality management.

Almost all levels of government maintain some kind of system to procure the goods and services they need. This study has chosen to review the Federal procurement system because it functions under the authority of a single set of statutes and has been centralized to a significant degree, thus avoiding the inherent problems of multiple sources of law and statute were state or local entities chosen for analysis. The Federal level was chosen also because of the existence of a quality award mechanism which provided a coherent vehicle for population selection and because of its accessibility to this investigator.
The Research Methodology

Since the research questions posed here deal not with “how many” but rather are aimed at a comparison with a general theory of supplier-customer relationships, quantitative approaches to this topic were not deemed appropriate. The questions lent themselves qualitative methods and to case study methods of research as outlined by Robert Yin (Yin, 1984). In his frame, a case study is an empirical inquiry that:

* investigates a contemporary phenomenon with a real live context; when
* the boundaries between phenomenon and context are not clearly evident; and
* in which
* multiple sources of evidence are used (Yin, p. 23).

In this instance, the case to be analyzed is the principle of Dr. Deming's regarding supplier-customer relationships. It will be viewed from what Yin calls “embedded case studies” (Yin, 1984, p. 44) which in this instance will be the organizations through which supplies are acquired, that is, through public organizations which contain a procurement function.

The use of surveys to acquire data for a case study is generally ineffective and is better performed through direct observation, participation, interview, documentation or some combination thereof (Yin, 1984; Marshall and Rossman, 1995; Patton, 1990). These techniques provide rich descriptions of contemporaneous events, permit the investigator to get close to events, and to bring to bear the researcher's experiences as part of the inquiry process. They provide the flexibility to adjust the inquiry as data is collected and analyzed and provide the ability to follow the phenomenon as dictated by
the situation (Patton, 1990, p. 42-43). The case under investigation lent itself to this methodology on a number of accounts. These included the fact that the nature and texture of efforts to implement quality management in the Federal government are not empirically well known; that there is a wide range of possible strategies which could be used for implementation; and that it is not well understood how the central players in this issue, the Federal contracting officials, view their role in responding to the requirements of the procurement system while attempting to achieve the supplier relationships advocated by Dr. Deming or the quality movement.

Qualitative research is a means to inductively understand human experiences in context-specific settings and presents a way of "breaking down the complexity of the real world" (Patton, 1990, p.37). While often criticized as offering a poor basis for generalizing, Yin notes that the case study is to be generalized to the theory, not some other case or some other setting (Yin, 1984, p. 39). That, of course, is exactly what is being attempted here.

Data Collection

Population Selection

Several difficulties presented themselves in defining a population for this research. Some organizations might in fact be following practices consistent with those espoused by the quality management movement but might not recognize them as such. A second possibility is that organizations might be following these principles but are unwilling to admit it (for whatever set of reasons). In neither case could these organiza-
tions be identified except by word of mouth, not a reliable selection technique. A third possibility was to identify organizations that claim to be using quality principles and that have been judged by others to be effectively implementing these principles. This was the approach that was taken.

The literature review revealed two possible sources of claimed implementation which could be used for the initial selection of a target population. The 1992 the General Accounting Office (GAO) report covered results of its survey of 2800 Federal “installations” for their use of quality management techniques (GAO, 1992). However, while it did contain one question about improving relationships with suppliers, this data held little meaning about the nature of these relationships. Since all the data in the survey was “self reported,” there was no independent judgement about whether an organization was really engaged in attempting to apply the supplier-customer relational model. The probability of “false” starts then seemed high, so this study was rejected as a means for selecting a target population.

The second source for a population was the Presidential Quality Awards, a program of Federal quality awards, administered by the Federal Quality Institute (FQI), a component of the Federal Government’s Office of Personnel Management. While organizations must first nominate themselves for these awards, winners are chosen only following a substantial audit by outside examiners. There have been forty-nine award winners since the program began in 1988, about evenly divided between the Department of Defense components and other Federal government agencies and departments. The
program includes two awards: The Presidential Award for Quality (up to two awarded annually) and the Quality Improvement Prototype (QIP)(up to six awarded annually). Awarded only to Federal organizations, the award criteria are adaptations of the Malcolm Baldrige National Quality Award used to recognize standards of excellence in the application of quality principles by private sector companies.

Within the Presidential Quality Award criteria, seven areas of assessment are involved: leadership, information and analysis, strategic planning, human resource development and management, management of process quality, quality and operational results, and customer focus and satisfaction (Presidential Quality Award Application, 1995). Within the seven assessment areas, three of sixty-eight questions address themselves specifically to the issue of supplier-customer relations:

1. Describe how the organization defines quality requirements and selects suppliers based upon these requirements; explain how requirements are communicated to suppliers and/or intermediaries . . . Include a brief summary of the principal quality requirements for key suppliers and/or intermediaries and the key indicators used to evaluate their quality.

2. Describe the methods used to assure that quality requirements are met by suppliers and/or intermediaries.

3. Provide multi-year trend data and current levels for the most important indicators of key suppliers and intermediaries (The President's Quality Award Program: 1995 Application, Federal Quality Institute, 1995, p. 17-18).

These criteria are expressed in terms of actions rather than outcomes so do not mirror Dr. Deming's construction of supplier-customer relations. They do, however, explicitly require applicants to address supplier relationships. The application process
assures that outside judges examine this particular activity. While the original award documentation was not publicly available from the program administrator for reasons of confidentiality, winners are required to prepare and publish an award booklet which documents their judgement on how well the organization is doing on the assessment criteria. Thus, if supplier-customer relations are discussed in the award booklet, a strong presumption can be made that the organization is in fact paying attention to that aspect of the quality management process.

For the purposes of this research, award winner booklets for the past four years were reviewed and four organizations were selected using the following criteria: more recent (having a higher probably of maturity); a mixture of military and civilian; and specific mention of supplier-customer relations (some contained no specific references to these relationships in the publicly available booklet). From that set of winners, four were selected, two in the Department of Defense (the Naval Air Systems Command and the U. S. Army's Tank Automotive Research, Development and Engineering Center) and two civilian agencies (Region 2 of the Federal Supply Services of the General Services Administration; and, the John F. Kennedy Space Center, part of the National Aeronautical and Space Administration). Each had won its award in the past two years. And, each made explicit reference to supplier-customer relationships in their award booklets.

Fortuitously, one of the preconditions of the quality award system is that winners be willing to share their experiences with other organizations so accessibility was assured and in fact was most generous. A total of twenty-seven interviews with quality
management officials, acquisition officials, contracting officers, contract administration officers, and quality assurance specialists were distributed as follows:

<table>
<thead>
<tr>
<th>Organization</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naval Air Systems Command</td>
<td>Nine</td>
</tr>
<tr>
<td>Federal Supply Service Region 2</td>
<td>Ten</td>
</tr>
<tr>
<td>Tank Automotive R, D,&amp; E Center</td>
<td>Four</td>
</tr>
<tr>
<td>J. F. Kennedy Space Center</td>
<td>Four</td>
</tr>
</tbody>
</table>

In order to maintain confidentiality (as is explained below) the names of the respondents are being retained only by the investigator. Results of these interviews are contained in Chapter V, “Research Results.” While initially it was intended to interview both government employees and suppliers, review of the literature indicated that the government was in a “superior” relational position (Sherman, 1985, p. 6) which meant the government decided what the supplier relationships would look like (Carlisle and Parker, 1986, p. 143). Based upon a pilot interview with a single contractor which provided no significant information from a government perspective and in light of the positional relationship, no further supplier interviews were conducted.

As a result of basing the population selection on the practice of quality management criteria rather than on procurement criteria, the full scope of the Federal procurement system was not included, a limitation in the research. However, it is believed that the major aspects of the system were represented sufficiently to make reasoned judgments. Three of six special procurement categories were included: major system acquisition, research and development, and federal supply schedule contracting. All
three major contract types were included: competitive sealed bid, competitive negotiation, and noncompetitive negotiation. All three stages of the procurement cycle were represented: planning, selection, and contract administration. And personnel representing four major procurement job classifications were interviewed: acquisition management, contracting officers, contract administration officers, and quality assurance specialists.

The Collection Effort

The study followed the methodology suggested by Miles and Huberman (1994) for collection and analysis of qualitative data. It started with the transmittal of introductory correspondence with each of the selected organizations explaining the purpose of the study, requesting the identification of knowledgeable participants and the establishment of interview schedules. For the two organizations where in-place interviews were conducted, data collection consisted of one-shot, post-test in-depth interviews. Each participant was provided an interview protocol (Appendix A) and each interview was recorded by consent. Each was asked four open-ended questions: the first asked about their quality improvements in general; the second about the nature of supplier-government relationships; the third asked about barriers to improving those relationships; and the fourth asked for suggestions for improving them (Appendix B). While the questions were not pretested for this specific data collection, they followed the form of questions which have been validated and had been used in an organizational development intervention in which this investigator has participated.

Each organization was approached through its designated office responsible for
“quality” and the quality awards process. Voluntary representatives knowledgeable about supplier-customer relationships were requested through this channel. The organization made the initial selection of personnel to be interviewed but these individuals in turn suggested others. Since the purpose of this research was to see how well (not how many) government activities approach the Deming model for supplier-customer relationships, it was the intent to talk to people who knew about the model and who had at least expressed an interest in its implementation. Therefore, this was deemed an appropriate method for selecting employees to be interviewed.

Each interviewee was apprised that the interview was voluntary, that they could withdraw at any time, and that while information they provided would be used in the final report and might be quoted, their identities would be obscured and their confidentiality maintained. Each respondent was assigned a sequential code number and will be referred to by this number (R--) in this report.

In contrast with the in-place interviews, phone interviews were not recorded nor were written interview protocols possible. The voluntary nature of the response was explained and the right to decline to answer was emphasized. The open-ended questions seemed to be less well comprehended in the telephone setting and the answers not as well articulated as during the personal interviews. Though detailed notes were used instead of recordings, this exists as a possible limitation on this aspect of the research. The phone interviews occurred following the in-place interviews and may have been influenced by the knowledge gain from those interviews, another possible limitation. Nevertheless, it is
believed that this segment of the data collection was valid and could be replicated.

One problem which was anticipated in this research was a reluctance on the part of the participants, particularly contacting officers, to reveal "deviations" from what is perceived to be the legal requirements of the procurement process. Revelation of such deviations could jeopardize the status of quality implementation efforts or put the individuals in a delicate position for having violated a procurement rule or regulation. Therefore, interviewees were assured of the anonymity of their responses.

A basic assumption in this research was that the respondents were knowledgeable about the theory of supplier-customer relations and are involved, to some extent at least, in its application. As a result, however, respondents may have described their practices in ways that made them sound like what they perceived to be the theory. It was not possible to prevent this. However, the long interview technique which was employed allowed the interviewees to respond as descriptively as they saw fit yet permitted the investigator to further address specific issues as appropriate. Nevertheless, it is possible that respondents did in fact describe their theory of what supplier-customer relationships ought to look like rather than their practice and this is another possible limitation of this research.

As a result of a suggestion made during one of the entry discussions, the initial question which addressed general quality processes in the organization was posed in terms of "streamlining" procurement processes rather than "quality management" since each organization uses a different label for its quality program. No confusion seemed to
result from this construction. Each interview lasted about an hour (as it turned out) and
the format permitted a continuous expression of interviewee perspectives. Floating
prompts were used as befitted the answer and the procurement responsibilities of the
particular respondent.

Data Analysis

The interview material was transcribed and the text that resulted was coded and
analyzed for patterns associated with the questions at hand (Miles and Huberman, 1994).
The data were searched for evidence that the relationship between the government and its
private sector suppliers reflects a cooperative, trust based relationship with high-content
communications and long duration. This data, along with the written documentation
received from the respondents and other material forms the basis of Chapter V, “Re-
search Results” which captures the perceptions of the interviewees regarding their
supplier practices and draws upon these to identify specific characteristics or themes that
may emulate or reflect Dr. Deming's theory.

Chapter VI, “Analysis,” contains the analysis that resulted from this process,
both by comparing the results with the elements of Dr. Deming's model and by respond-
ing to the original research questions. It also provides the conclusion that were drawn
from the data.

Limitations of the Research

A number of limitations on this research have been identified: the lack of in-
place interviews in two organizations and possible limitations of the telephone interviews
which were used instead; the “delicate” position of contracting officials caught between the desires for the use of quality management methods and the legalities of the existing procurement system; the decision not to interview suppliers; the decision not to pretest the four open-ended questions; the fact that not all procurement domains were covered; and the “pre-knowledge” of respondents of what quality management methods propose about supplier-customer relationships.

Another possible limitation was the strategy for the selection of the target population which may have missed organizations that are implementing these supplier-customer relations and been successful in establishing the proposed supplier-customer relationships. Finally, there are the inherent limitations of qualitative research which generates issues of replication, validity and generalizability. It is believed that the procedures described here provided sufficient discipline to assure replication and that this was a valid means to collect the data and arrive at the conclusions. It is not intended that this research be applied to other settings or other organizations. It is intended only to be generalizable to the theory of supplier-customer relations advanced by Dr. W. Edwards Deming.
CHAPTER III

Review of the Literature

The Theory of Supplier-Customer Relationships

Introduction

To understand the application of Dr. Deming's theory of supplier-customer relations in the Federal government setting, a model is needed for comparison. This model should provide "operational definitions" (Dr. Deming's term) against which judgements can be made of the practical application of the theory. For the purposes of this research, Dr. Deming's statement of supplier-customer relationships was somewhat artificially segmented into its three components: the ability to consider total cost of the item, not just the immediate price; the ability to move to a single supplier for a particular item; and, the ability to establish long-term relationships with the supplier based on loyalty and trust. Dr. Deming maintained that the parts of his theory were interdependent and inseparable so this segmentation was conducted for research purposes only. The literature review in this chapter provides conceptual frameworks around which to build this model and provides Dr. Deming's concept of this point as far as that is known.

Dr. Deming's "System of Profound Knowledge"

Sometime between the publication of Out of the Crisis in 1986 and The New Economics in 1993, Dr. Deming started referring to his management methods for the
continual improvement of quality as “A System of Profound Knowledge.”¹

It contains four parts:

- Knowledge about a system;
- Some knowledge about variation;
- Some theory of knowledge;
- Some psychology.

The various segments of Profound Knowledge cannot be separated. They interact with one another (Deming in Neave, 1990, p. viii).

These ideas have roots in four intellectual traditions: knowledge of the interaction of forces and the flow of things or ideas among players; knowledge of “variation” which has to do with the range of possible outcomes within a system and knowing when and why an event is outside that range; a theory of knowledge (to predict the future); and, motivational psychology (both for individuals and in groups) together with learning and teaching styles (Anderson, Dooley, and Misterek, 1990).² This broad framework evolved as an overview of the more specific attributes and actions that Dr. Deming codified as his Fourteen Points and which are the principal components of a process of continual improvement in quality (Deming, 1986; Neave, 1990; Scherkenbach, 1991).

¹See Neave, Henry R. The Deming Dimension. Knoxville, Tennessee. SPC Press. 1990. p. 259-260. Dr. Neave says that he first heard Dr. Deming use the term in 1987 and the first documented version was dated 3 January 1990. It is included in Dr. Deming’s forward to Dr. Neave’s publication.

**Systems thinking.** This involves "... a way of structuring and describing how the parts of processes and organizations interact to fulfill some purposeful objective" (Anderson, et al., 1991, p. 251). Deming indicates that all systems must have an **aim**, some purposeful product or service, or it simply is not a system (Neave, 1990, p. 265). This product or service is the output of a chain of events and exchanges which start with "Mother Earth" and end with some ultimate consumer (Carlisle and Parker, 1989, p. 23). The simple model of one segment of this chain is depicted below:

![Diagram of a system flow](image)

**Elements of a System Flow**

Each actor in the chain, except for the first and the last, serves both as a supplier (to someone else) and as a customer (of someone else's product or service). As a practical matter, the number of suppliers and the number of customers for any actor can be very complex and the chain of events from "Mother Earth" to the customer long and complicated. To Dr. Deming, it is the relationship between the components that is key. Since a system is a "... network of interdependent components that work together to try to accomplish the aim of the system ... the greater the interdependence between components, the greater the need for communications and cooperation between them"
To Deming, each actor in a system should be thinking about the entire system and acting so as to optimize the output of that entire system, not just that actor's own component (Deming, 1993, p. 100).

For the purposes of this research, the focus is on what is labeled "input" in the above diagram, the government being the box where "work" appears, and industry being the "supplier." In this "system" the government must be continuously alert to what its customers, that is, the taxpayers, want. Government must be alert to the aims of the social system, aims that are received through the complex political process. In turn, the "supplier" should also be alert to what the entire system wants, but must focus its attention more specifically on what the immediate next customer, in this case the government, needs. For the purposes of this research, the process for making the "input" is the Federal procurement system.

Variation. Variation, the second of the four parts to a System of Profound Knowledge, is not only inevitable, it is in everything. Henry Neave interprets Dr. Deming to say:

... we live in a world which is full of variation. In this world there has always been variation, and there will always be variation - between people, in output, in performance, in service, in product. We must learn what variation is trying to tell us. Should we try to do something about it, and if so, how (Neave, 1990, p. 270)?

Deming appears to mean that all things vary, that no two events, no two objects, no two products will be exactly the same (although it may take very sophisticated equipment to tell the difference). Variation is not an occasional attribute, it is there all the time in
everything. This is a fundamental principle underlying the System of Profound Knowledge.

In Dr. Deming’s carefully constructed reasoning, the recognition of variation permits those responsible for the operation of a system to understand what is possible or doable within that system and from this, have a means to analyze why it was different from what was expected. Given measurements of the output of any system over time, one can calculate an average. This becomes the center line in what is called a Statistical Process Control (SPC) chart which takes the general form (from Nolan and Prevost, 1990, p.72):

```
+--------------------------+
|                           |
|                           |
| statistical control limits |
|                           |
|                           |
|                           |
|                           |
|                           |
|                           |
|                           |
|                           |
+--------------------------+
  upper control limits
  center line
  lower control limits
```

*Statistical Process Control Chart*

The upper and lower control limits are statistically calculated using the normal frequency distribution. The area between these limits represents the range of variation in measurements that can be expected due to chance. When all, or most, measurements fall within the upper and lower control limits, that systems is said to be “in statistical control” or is “stable” (only rarely will a specific measurement actually fall on the center line which is
simply an average of all measurements being taken). The variations within these limits are said to be occasioned by "common causes," that is, they are common to that particular system. The only way to reduce (though never eliminate) these types of variations is to change the system. System improvements will cause succeeding measurements to narrow the range between the upper and lower control limits. System improvement may also shift the location of the center line and create a new stable system around a new average. Measurements, however, may not always fall within these limits.

When measurements frequently fall outside the limits, the system is said to be "unstable" or "out of statistical control." In these instances, there is no way to tell what is the cause of the variation. If, however, only a few incidents fall outside the control limits, these are said to be occasioned by "special causes." When there are special causes, changes to the system will not improve the outcome and may in fact make the situation worse. These cases require different analytic techniques and different solutions and every effort must be made not to mix up special causes with common causes (Neave, 1990, p. 68). In understanding variation, Dr. Deming says there are two types of mistakes: confusing the two types of causes! He adds: "Unfortunately, it is impossible to reduce both mistakes to zero" (Deming, 1993, p. 179).

To demonstrate the principles of variation, Dr. Deming frequently used what is referred to as the "Red Bead" experiment which, in brief, showed that the extraction of beads from a mixture of 3200 white and 800 red beads by the use of a "paddle" with fifty holes in it would always result in the extraction of some (and varying numbers) of red
beads, even though the instructions said that only white beads were of value. "The system" inherently resulted in the variation of the white beads extracted (Deming, 1993; Walton, 1986). Walton remarks:

As with any parable, there is a moral. The parable of the beads has several:
+ Variation is part of any process.
+ Planning requires prediction of how things and people will perform. Test and experiments of past performance will be useful, but not definitive.
+ Workers work within a system that - try as they might - is beyond their control. It is the system, not their individual skills, that determine how they perform.
+ Only management can change the system.
+ Some workers will always be above average, some below.

Having seen it once, Dr. Deming promises that you will never forget his simple 'stupid' experiment. "You will see red beads wherever you go" (Walton, 1986, p. 51).

Variation then, the use of statistical theory, "...concerns itself with how collected data can be used to analytically infer the characteristics of the system, or process, which generated the data. The purpose of analytical statistical techniques is thus not to only describe what has happened, but why it has happened and what will happen in the future" (Anderson, et al., 1991, p. 254).

Theory of knowledge. This is the third part of a System of Profound Knowledge and for which Dr. Deming acknowledged a debt to Clarence I. Lewis.

. . . (It) teaches us that a statement, if it conveys knowledge, predicts future outcomes, with the risk of being wrong, and that it fits without failure observations of the past. Rational prediction requires theory and builds knowledge through systematic revision and extension of theory based upon comparison of prediction with observation (Deming, 1993, p. 105).

By this Deming means that data about past outcomes is useful only if it can be projected
into the future and hence, help guide action. Harking back to the concept of variation, it says that if the system is stable (in statistical control) one can predict future outcomes (that is, within the control limits). But how confident is one that the system will remain within the control limits? Suppose a special cause variation occurs? To predict this possibility, one also needs a probability judgement or confidence level “. . . that the conditions under which the data plotted on the SPC (Statistical Process Control) chart were essentially the same” (Little, 1991, p. 7). Three components are required for knowledge: “. . . evidence, theory-based prediction, and probability-judgement. . . ” (Little, 1991, p. 8).

For example, I might observe (evidence) that it is cloudy. This evidence, by itself, imparts no knowledge. I might then predict, based on evidence and a theory that cloudiness brings rain, that it will rain soon. This still imparts no knowledge, it provides no basis for judging my qualifications, experience, or reliability as a weather forecaster. When I give you my evidence, my prediction, and information that will allow you to judge the probability of my prediction being valid, I have provided you with knowledge (Little, 1991, p. 9).

There must be a theory (or prediction of what may happen) against which to compare the observed measurements, for, as Dr. Deming says: “(w)ithout theory, experience has no meaning. Without theory, one has no questions to ask. Hence, without theory, there is no learning” (Deming, 1993, p. 106).

Psychology. An understanding of people is the final part of the System of Profound Knowledge. Only through such understanding can managers transform how they managed people (Deming, 1993, p. 124). Deming saw the current management style, as practiced in Western cultures, as squeezing “. . . out from an individual, over his
lifetime, his innate intrinsic motivation, self-esteem, dignity. They build into him fear, self defense, extrinsic motivation” (Deming, 1993, p. 124). The interdependence of the four parts of his System is evident again as he uses the concept of variation to show that people vary - in intellect, skills, and temperament. If they are working within the limits of a stable system, they can only perform within the limits of that system, regardless of admonitions to do better, higher goals, or extrinsic motivators. Thus, he concludes that the typical appraisal system which ranks people (on the job or in school) is counterproductive. “In place of judgement of people, ranking them, putting them in slots . . ., the aim should be to help people to optimize the system so that everyone will gain” (Deming, 1993, p. 124).

Avoiding judgements of people does not imply that all will perform within the stable system all the time. Some will fall outside the system occasionally, some frequently (Neave, 1990, p. 277). In these cases, the worker may need special help and may need to be placed in a different job (and it is management’s function to find that other job). If a person is totally unsuited, Dr. Deming sees the problem as part of the system for the recruitment and selection of personnel. He also recognizes that people learn differently, some by reading, some by listening, some by watching others (Neave, 1990, p. 278). He advocates a vigorous training program to assure that workers understand not only the mechanical aspects of their job, but the very principles of the System of Profound Knowledge so that they maintain their own individual “systems” in statistical control and continuously strive to improve them (Deming, 1986, p. 23).
The "System of Profound Knowledge" is both elegant in its simplicity yet universal in its scope. It can apply to the worker on the shop floor, seen as a management theory, and by some as a theory of organization, carrying with it "... at least implicitly, a set of generalizations about what is possible and what is desirable in social processes" (White and Wolf, 1995a, p. 208). It is in and of itself, a system with four interdependent, inseparable parts. Though it has spawned innumerable variants, White and Wolf see it as "... the 'purest', least ambiguous or equivocal statement of TQM (Total Quality Management) philosophy and practice; as such it is the most theoretically well developed" (White and Wolf, 1995a, p. 209).

Dr. Deming's View of Supplier-Customer Relationships

In an early chapter of Out of the Crisis, Dr. Deming delineates three components of the supplier-customer relationship:

1) end the practice of awarding business on the basis of price tag. Instead, minimize total cost;
2) move toward a single supplier for any one item; and,
3) establish long-term relationships based on loyalty and trust (Deming, 1986, p.23).

Later in that same chapter he expands and adds richness to this description. He adds the word "alone" after "price tag" implying that the price is important, but not the only nor necessarily the prime consideration. He points out that price "... has no meaning without a measure of the quality being purchased," that without some notion of whether the product meets his needs (a measure of quality), the purchaser has no way of knowing how much to pay for it. "The price tag is easy to read, but an understanding of quality re-
quires education.” “Education” implies an understanding of variation and the ability to derive information about total system costs. He says that a long-term relationship is necessary for “best economy”: “How can a supplier be innovative and develop economy in his production processes when he can only look forward to short-term business with the purchaser?” He asserts that a second source “... for protection... is a costly policy. There is lower investment and lower total inventory with a single vendor than with two.” One reason for a single supplier is that he knows of no manufacturer who possesses enough knowledge and manpower to work effectively with more than one vendor for any item. He even advises against the use of multiple shipping points for the same item from a single company (Deming, 1986, pp. 31-37).

On the practice of “qualifying” suppliers ahead of time, Dr. Deming recommends against it and instead, “... let suppliers present evidence of active involvement of their management with the 14 Points, especially Point 5, never-ending improvement of processes...” (Deming, 1986, pp. 39-40):

One must take into account the time spent in dickering for lower prices at every turn. In the long run, one comes out ahead by working with the single supplier, provided that he upholds his responsibility for continual improvement (Deming, 1986, p. 39).

He indicates that a company does not just buy material from another, “... it buys something far more important, namely, engineering and capability. The requirements of a supplier must be established long before he produces any material.” And finally, he says that in fact, “(A) supplier has a duty to himself and his customer to insist that he be
the sole supplier. The sole supplier needs the whole attention of his customer, not divided attention . . .” (Deming, 1986, p. 39-43).

At the conclusion of his section in Out of the Crisis dealing with buyer-supplier relationships, Dr. Deming quotes extensively from a report by an American team which visited (in 1981) a Japanese automaker. While he does not say whether he agrees with the observations, in context the implication is that he does. The team commented on the “arms around” rather than “arms length” relationships between buyer and seller; the Japanese concentration on relatively few, long-term (up to six years) suppliers; and the demanding expectations including: “(1) exceptional quality requirements; (2) reliable just-in-time delivery; (3) exact quantities - no over-or-under runs; and (4) continuously improving productivity resulting in long-term cost reductions” (Deming, 1986, p. 48). The report concludes by noting the positive working relationships in Japan which contrasts with “. . . the more adversarial relationship existing between these groups in the U.S. There is a common, unified dedication to competitive excellence throughout the Japanese industrial structure which is largely absent here . . . (t)hus they are driven to minimize waste in every form: (1) human, physical and financial resources; and (2) time” (Deming, 1986, p. 48).

One of Dr. Deming's collaborators, Dr. Henry Neave, elaborates on Point 4 (1990) as he understands Dr. Deming. By 1990, Dr. Deming identified the four parts to the System of Profound Knowledge in the forward to Dr. Neave's book The Deming Dimension and is quoted by Dr. Neave with the following version of Point 4 (Dr. Deming
was continuously learning and improving):

End the practice of awarding business solely on the basis of price tag. Instead, require meaningful measures of quality along with price. Reduce the number of suppliers for the same item by eliminating those that do not qualify with statistical and other evidence of quality. The aim is to minimize total cost, not merely initial cost, by minimizing variation. This may be achievable by moving toward a single supplier for any one item, on a long-term relationship of loyalty and trust. Purchasing managers have a new job, and they must learn it (Neave, 1990, p. 307).

Here, Deming more explicitly links the issue of price and quality and becomes less insistent on the issue of a single supplier. Neave reports that someone asked Dr. Deming in a seminar whether he should always opt for a single supplier to which Deming replied: “No. You have to be practical” (Neave, 1990, p. 311). Neave claims that Dr. Deming was not calling for reduction to a single supplier as a dogmatic principle: “(i)t must be a relationship of trust and action . . . a partnership . . . dedicated to continual improvement” (Neave, 1990, p. 312). The reason for a using single supplier was to reduce variation, the fundamental requirement for improving quality (Neave, 1990, p. 312). “(I)f a supplier is running into some kind of trouble, the last thing he will do in the traditional environment is to let his customer know about it. In the partnership culture, that will be one of the earliest steps. Maybe the customer can help; or, if not, at least he will have been given fair warning” (Neave, 1990, p. 314).

On this issue of partnership, Dr. Neave goes on to explain that the relationship is about helping each other, about sharing knowledge, of watching out for each others’ interests, an obvious application of cooperation and a “win-win” philosophy. The
security of the long-term relationship permits innovation and "... the supplier must be enthusiastic to develop specialist-knowledge about the needs of the customer beyond those which either of them currently understand, in order to improve production and services" (Neave, 1990, p. 312).³

What Makes for Effective Supplier-Customer Relationships?

Effective supplier-customer relationships contain, in Deming's view, high degrees of cooperation and trust. An understanding of both these concepts is essential for analyzing data collected for this research. While no operational definitions by Dr. Deming could be found, it is possible to derive such definitions from his philosophy.

Trust and Mistrust. "Trust" is, by one definition, a firm belief in the honesty, integrity and reliability of another person or collectivity (Webster's, 1990, p. 633). Its foundations rest in four schools of thought that are not mutually exclusive: individual expectations, interpersonal relations, economic transactions, and the social structure (Hosmer, 1995, p. 381-391). As an individual expectation, trust represents a personal confidence that desirable events will take place, and in that sense, it is anticipatory in nature. An interpersonal relations sense derives from a willingness to increase one's vulnerability to the actions of others over whom one has no control. A third perspective on trust (usually seen as "mistrust") derives from economic transaction theory which accounts for the possibility of opportunistic behavior on the part of one or both parties.

In this sense, when the chance of opportunistic behavior is high, the parties engage in
detailed written contracts to protect against such behavior. The last school sees trust as
an element in establishing background expectations for a social group and could be as
complex as a legal system or a taxation system (Hosmer, 1995, p. 381-389).

Another dimension to trust has been advanced which provides a moral or ethical
overtone and moves the definition beyond that of self-interest to include concerns for
community, “right behavior,” or a vision of the future (Hosmer, 1995, p. 399). Dr.
Deming, however, as a pragmatist, would probably base a definition in the business
sense, one that has been advanced perhaps best by Mari Sako. Sako sees three kinds of
trust: contractual (to do what the contract, written or oral, calls for); competency (to be
able to do the task); and third, goodwill (a commitment to the relationship) (Sako, 1992,
p. 37). He goes on to say:

Trust is a state of mind, an expectation held by one trading partner about
another, that the other behaves or responds in predictable and mutually accept
able manner. Predictability in behavior exists, however, for different reasons,
and this allows us to distinguish between (the) types of trust (Sako, 1992, p. 37).

But Deming would probably add another dimension because of his attention to data and
facts, derived from statistical procedures. If predictability is important in developing
trust, there is no better way to predict than through the use of a theory of knowledge and
the use of statistical process control techniques. Predictability then is derived from the
system itself, conformance to commitments can be seen with some precision by all
parties and does not rely on hunches or personal judgements, and statistical procedures
provide a fact-based foundation for trust.

It is not clear whether trust develops before data is available or only afterwards, but it is clear that some risk is involved in the first instance of putting some degree of reliance on someone else. Sometimes we have no choice. Sometimes there is trust even among thieves (Whitney, 1994, p. 15). And, trust can be misplaced: “There are those who would cheerfully cut our throats. In addition, there are those who would like to cooperate but don’t know how . . . (and) there are many with excellent intentions but whose goals are incongruent with ours or those of the enterprise” (Whitney, 1994, p. 6). Dr. Deming would probably put his trust in data.

**Competition and Cooperation.** Without defining them, Dr. Deming is quite fervent in his view on competition and cooperation: “We must throw overboard the idea that competition is a necessary way of life. In place of competition, we need cooperation.” (Deming, 1993, p. 124). In introducing the “system” concept he says:

Failure of adversarial competition. If economists understood the theory of a system, and the role of cooperation in optimization, they would no longer teach and preach salvation through adversarial competition. They would, instead, lead us into optimization of a system, in which everyone would come out ahead (Deming, 1993, p. 25).

In his view, the highest quality is best assured when there is cooperation, when the people involved in the transaction know intimately what each other needs, not only in terms of the product or service, but even at the psychological level of human relations.

Competition is seen as preventing optimization of the system. To one observer, it is a pervasive component of the American culture (Kohn, 1992, p. 1). Competitive
struggles are at the core of the attention paid to athletic events, political contests, and on-the-job relationships. But to compete means that one is working toward a goal in such a way as to prevent others from reaching their goals (Kohn, 1992, p. 46). It is a strategy of interpersonal relations that stems from a "Scarcity Mentality" (Covey, 1989, p. 219) in which one sees only a limited resource and attempts to "win" that resource. Competitive behavior is operative only when related to the behavior of others and has no necessary relationship to best performance, continuous improvement, or personal development of the individual. Competition is seen as a learned behavior and it tends to focus attention on the contest itself (winning it) rather than performing at the maximum level, thus detracting from what really needs to be done (Kohn, 1992, p. 18).

The quality management literature is replete with advocates of the need for increased establishment of cooperative relationships, between buyers and sellers, between management and employees, and even between "competing" firms (Deming, 1986; Neave, 1990; Whitney, 1994; Aguayo, 1991; Sako, 1992). The belief is that cooperative relationships improve overall system outcomes and that in fact, competition "... precludes the more efficient allocation of resources than competition allows" (Kohn, 1992, p. 61). Yet, even Dr. Deming "... is not preaching an end to competition but more cooperation -- competition in the framework of cooperation" (Aguayo, 1991, p. 85. Also see: White and Wolf, 1995b, p. 309).

Competition comes into play primarily when there is a scarce resource. The problem is that the scarcity may be real, only perceived, or artificially created. Kohn
argues that we artificially create it all too often, in sports, in grading in school, and in the work place between employees, a view that echoes that of Dr. Deming. In a slightly different construction, Aguayo differentiates between competing against and competing with. The objective of competing against is to win, pure and simple. The objective of competing with is to have fun and improve. “In ‘competing with,’ cooperation is implied. It’s an integral part of the process” (Aguayo, 1991, p. 227).

If Aguayo is correct that there can be “competition with” and “competition against” and if, as Dr. Deming indicates, we can have competition within a framework of cooperation, then these two elements of interpersonal relations may be related in a way not normally understood. Competition and cooperation, often seen as mutually exclusive, may not be at the opposite ends of a continuum, but are much more intertwined than usually admitted. The literature reviewed here does not provide a definitive answer to this issue but there may be some clues.

We may speculate that the “unit of analysis” or, in Dr. Deming’s terms, “the system” under consideration, may be central to how cooperation and competition may be interrelated at a point in time, remembering that individuals and organizations operate in many “systems” concurrently. The proper question concerning the presence of cooperation and competition may be: what is best for this place, these actors, and this moment in history? It is also possible that some combination may be optimum. For example, when considering the application of cooperation and competition within a formal organization, say an automobile manufacturer, Deming would say that cooperation is always the mode.
Between automobile manufacturers, however, they both could be operative: cooperation in the design of a new battery (a system for propulsion) for electric cars, but competition on the cars (a system of transportation) that each company might design and build using that battery. Or, the United States can cooperate with Japan on understanding processes (A System of Profound Knowledge?) for continuous improvement but compete on the products that result from these processes. Dr. Neave says:

Now I doubt whether Deming, however forward-looking he may be, conceives of a world without competition. Yes, we are faced with competition, on a national or global scale, and are likely to remain so as far as we can see. But our aim cannot be merely to meet the competition, else we shall always be behind. Our competition does not stand still. How can we reach ahead? Not by creating yet more competition internally (within the company, or within the country or on whatever scale we are thinking) with all its consequent waste, but instead by more genuine cooperation aimed at having everybody win (Neave, 1990, p. 217).

Establishing Cooperative, Trusting Relationships. It is clear from the literature covering cooperative and competition and from experience that they are not “all or nothing” arrangements. Relationships can seem to be of one type and quickly shift to the other. And, relationships can seem to possess characteristics of each simultaneously. The interest to this research is whether some hypothetical boundary can be crossed and that now a relationship is judged trusting when yesterday the participants say it was not. Therefore, it is necessary to identify some behavior patterns that could provide clues about the nature of the relationships absent an objective measurement system.

One type of behavior that might be observed is an effort to collect statistically reliable data about the processes undertaken by the supplier. If the interpretation here is
correct, statistical data provides a means to agree on the performance of a process, as long as there is an agreed operational definition of what and how to measure. Trusting behavior may be seen in the willingness to agree to the criteria and to accept their results.

Another behavior might be the type of dialogue between the government and the supplier. Each participant in this dialogue ideally should be aware of the existence, relatedness and growth needs of the other participants (Carlisle and Parker, p. 17-18). If, as this theory holds, people respond in kind to the need by which they are being treated (that is, if one treats a supplier as if all he wanted was more money, that is the way in fact he will respond) then it is essential to treat them in a way that will result in the positive behavior desired (Carlisle and Parker, 1989, p. 18). For example, during the dialogue between the government and the contractor, one would not want to challenge the self-worth of either party for to do so “... tends to interject adversarial conditions into so much of the negotiating done by Western individuals and Western companies” (Carlisle and Parker, 1989, p. 19). If there is a distinction between types of competition, it is adversarial competition that Dr. Deming so condemns (Deming, 1993, p.25).

In analyzing the data collected for this research, it might be expected to see efforts to get out of an adversarial rut, if in fact one exists. Under such circumstances, for negotiations to proceed, there must be:

1. A scarce resource or perceived need which creates an interdependence between two parties, although some conflict over objectives.
2. An intention on both sides to achieve an agreement on win-win terms so that both parties can see why it is in their own interest to insure implementation of each component precisely as agreed.

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3. The ability to vary the terms (Carlisle and Parker, 1989, p. 36).

Since relationships do not exist in a vacuum but are influenced by other internal and external relations, each has specific stages it moves through, and each has a time dimension. The negotiations themselves are seen as part of a development dimension, a key phase in an evolving relationship which sets the tone for the remainder of that relationship (Carlisle and Parker, 1989, p. 36).

To assist the negotiator, Carlisle and Parker recommend the establishment of a "Mandate Team" composed of key people with knowledge of the specific uses (implementation) of the product plus members from the planning element. This team should fully resolve any internal issues before negotiations begin and the team may provide actual support (in the room if you will) during the negotiations (Carlisle and Parker, 1989, p. 107). Secondly, they recommend a technique they call "Touch-point Management" which is a way, they claim, "... for managing the relationship process not totally unlike statistical process control for manufacturing operations" (Carlisle and Parker, 1989, p. 112). Finally, because the customer has both leverage and power in the relationship, it is the customer who should initiate the changes needed to establish one in which "... both sides vigorously pursue their own interest, but in a mutually supportive way which at times make two plus two equal more than four" (Carlisle and Parker, 1989, p. 136).

Key to the relationship is an understanding that perceptions of each other's interests are the basis of the relationship and that their identification, exposure, and
discussion are keys to moving the relationship toward the interdependent model which seems to be the most productive. Once established, trust must be maintained through continued commitment to the relationship (Carlisle and Parker, 1989, p. 148-149). Cooperation "... grows only from anticipated reciprocal cooperation" (Carlisle and Parker, 1989, p. 169).

In short, Carlisle and Parker recommend developing a team with the requisite competencies to resolve all internal issues including implementation issues before negotiating with a supplier; identifying, revealing, and discussing real interests with the other party; treating the other party as you would like to be treated; and, faithfully executing that which you promise.
Federal Procurement and Governmental Contracting Policy

Historical Setting

The history of Federal Procurement predates the Revolutionary War. In those early days, contracts were broad in nature, with virtually carte blanche authority to provide the Continental Army whatever it needed. Who you knew was as important to getting a contract as what it was you were to provide (Nagle, 1992, p. 14). But the need for quality was not ignored:

To his credit, (William) Alexander (in 1755 during the Niagara campaign) did not strive only for the lowest price and the fastest delivery. He wanted quality. He urged his buyers to buy nothing but the best and to have it packed with all possible care. Every barrel, he wrote, should be full, well pinned or nailed, and packed for the toughest handling and worst weather imaginable (Nagle, 1992, p.15).

Problems of cash flow, theft and fraud, profiteering and privateering, however, during the War caused continual consternation on the part of the Continental Congress and the Army. By 1781, Robert Morris, newly appointed superintendent of finance, was able to implement a contracting system, mainly because he believed that such a system would be the cheapest. “Sealed, competitive bids would keep the price per ration down to a minimum while allowing him to cut personnel costs, shut down expensive military posts, and keep from paying for wastage and spoilage” (Nagle, 1992, p. 50).

Criticism of the Procurement System

Consternation with the Federal procurement system continues. It operates at “... a
vortex of politics, economics, technological advances, and personality" (Nagle, p. 3).

Designing the legislation controlling this process has been referred to by one Senator as the "grunt work of government" (Barr, 1994, p. A27). Yet Congress, both through the hearing process (Clay, 1991) and through legislation sets the overall policy for the system and it is very much aware of the confluence of interests that have to be balanced.

Congressman Conyers, in a statement made during hearings for what became the Federal Acquisition Streamlining Act of 1994 indicated:

I am confident that a thorough and balanced approach to reform will allow us to make improvements without neglecting principles which have served the taxpayers well. The challenge, in my view, is to simplify the process without abandoning provisions that ensure fairness, competition, and integrity (Hearings, May 25, 1993, p. 3).

Likewise, at the same hearings, Congressman McCandless said:

Procurement reform, like many other things we do, is often difficult to achieve because of the multiple goals, multiple agendas, and the competing political interests of people involved (Hearings, May 25, 1993, p. 66).

Concerns about the effectiveness of the system which have led both to reform legislation and reform in the context of the National Performance Review have come from academia, the Administration, Congress, and industry. Dr. Steven Kelman, then at Harvard, concluded in 1990 that "(t)he procurement system . . . is in trouble" (Kelman, 1990, p. 1). It has been one of the target processes examined by Vice President Gore's National Performance Review which concluded in 1993 that the system's " . . . excessive rules and regulations place a heavy burden on the government's successful delivery of services . . . " (Gore, 1993, p. 2.). The Speaker of the House of Representatives, Newt
Gingrich, declared in April, 1995, that "(o)ur purchasing rules are so complicated and so wasteful that our government has not been able in seven years to figure out how to replace vacuum tubes with . . . a microchip . . ." (Washington Post, April 8, 1995, p. 12.). And Louis J. DeRose, writing in Purchasing World, a procurement trade publication, complains that the "problem" with government procurement is that it is based on social, political, and pseudo-economic factors that have little or nothing to do with the acquisition of weapon systems (DeRose, 1989, p. 35).

Even some of the "successes" of the procurement system occur only after long delays and at costs far above what critics believe should have been. And sometimes not at all. For example, in April, 1995, the Department of Defense announced the cancellation of a weapon system known as the Tri-Service Standard Attack Missile after spending $3.9 billion which provides a tale, in the words of press reporting on the cancellation, "... about Pentagon procurement gone awry" (Graham, 1995, p. A1).

Problems in the procurement system are not confined to defense procurement. In current proposals to turn the Federal Aviation Administration into a government corporation, Secretary of Transportation Pena is quoted as saying:

... (T)he billions of dollars of waste that we have seen over the last 10 years in an inefficient procurement system will be eliminated. The corporation will be able to use the same kind of procurement rules that any private company can use, and bring on that technology much more cheaply [and] efficiently (Linsley, 1995, p. 38).

The perceived ills of the system tend to fall into two broad categories: the degree of reliance placed on competition to assure lowest price (in conjunction with
acceptable quality) and, secondly, the "inefficiency" of the system as caused by too many rules and regulations and too little discretion afforded the officials charged with its implementation.

On the issue of competition, the conventional wisdom is that "more is better." The prime exception to this view is Dr. Kelman, now the Director of the Office of Federal Procurement Policy, a legislatively mandated component of the Office of Management and Budget, who disagrees with the competitive prescription. While most see the lack of competition in awarding contracts as the problem, he believes that "... the system of competition as it is typically envisioned and the controls against favoritism and corruption as they typically occur are more often the cause of the problem than the solution to it" [emphasis added] (Kelman, 1990, p. 1). His solution is to give the contracting officials more discretion, discretion based on good judgement (Kelman, 1990, p. 2).

Congress, however, tends to put reliance on competition and despite some recent legislation (see below) still relies on the "Competition in Procurement Act of 1984" (Public Law 98-369, Title VII) which was designed to increase competition and rely on noncompetitive procedures only in special cases and only when explicitly justified by senior Department officials.

On the issue of being too rule bound, the National Performance Review attributes problems with the system to its size and consequential complexity. While lauding the roots of the system in the Progressive Reforms of the early 20th century,
which installed “bureaucratic” tools, including procurement procedures, “... to control the excesses of then-prevalent political machines ...” it laments the degree to which these procedures have become ingrained (Gore, 1993, p. 2). It points out that during the past several decades the number of procurement regulations has grown enormously so that there are now more than 4,500 pages of Federal and agency rules and that the procurement workforce has grown from 42,000 federal employees in 1980 to 67,000 by 1992. Moreover, it complains, the productivity (value of contracts per contract specialist) has fallen from $9.4 million in 1980 (in 1992 dollars) to only $6.3 million in 1992 (Gore, 1993, p. 3). The proposed solution is to encourage innovation, get bureaucracy out of the way, ensure customer focus, and center authority and accountability with line managers (Gore, 1993)

Many members of Congress have agreed with Executive Branch concerns about the procurement system. Congress passed, and the President signed, the “Federal Acquisition Streamlining Act of 1994” (P.L. 103-355) with the intent of improving “efficiency” by speeding up the process for many small purchases which make up the majority of transactions; by raising the small purchase threshold from $25,000 to $100,000; by buying more off-the-shelf items rather than using government specifications; and through the use of credit cards for purchases less than $2,500 (Barr, 1994, A21).

A Balancing Act

Fundamentally, there are at least three competing perspectives which must be balanced in the procurement system: managerial, political, and legal (Dudley, 1990;
Rosenbloom, 1983). The values of the managerial approach include effectiveness, efficiency, and economy and stem from a "like business" view of public administration. The political approach values "... representativeness, political responsiveness, and accountability through elected officials to the citizen" (Dudley, 1990, p. 12). The legal approach values due process, individual rights, and equity (fairness in cases of conflicts between private parties and government) (Dudley, 1990, p. 13). Dudley notes:

Some of the obvious conflicts include a natural tension between pluralism's demands for inclusion for representativeness and managerial demands for exclusion for efficiency. Additionally, a tension exists between the legal insistence on adversative proceedings and the picture of a smooth, well-oiled effective process found in the managerial framework (Dudley, 1990, p. 13).

Within the procurement community, Congress sees itself as the protector of the taxpayer, seeing to it that "... public moneys are seen to be used in ways consistent with national purposes ... and that to Congress, the means must stand on their own"[emphasis in the original] (Cancian, 1995, p. 192). The Executive Branch, obviously, sees itself in the managerial role, trying to get a job done efficiently and economically. Industry, the private party in this relationship, looks both for equity of access to the system and fairness in its treatment through all phases of the process. Each actor must be, or at least be perceived to be, interested in each other's interests. So Congress must be mindful of efficiency and economy values, the Executive must be mindful of the issue of equity and fairness, and Industry must be mindful that they are providing a public good with a national purpose.

According to one source, "... more than 4,000 separate provisions have been
passed affecting procurement . . ." since Congress passed the first law in 1792 (Callahan, 1987, p. 70). Current procurement policy resides in many statutes, but key among them are: the Armed Services Procurement Act of 1947 (which established the basic rules for procurement in the Department of Defense); the Federal Property and Administration Act of 1949 (which set procurement rules for non-Defense Departments); the Competition in Contracting Act of 1984 (which established competitive bidding as the norm for federal contracts); the Truth in Negotiation Act of 1962 (which requires firms to attest that they have been truthful in the pricing associated with a contract); and the Small Business Act (which provides preferential treatment for small businesses when competing for Federal contracts (Callahan). The most recent addition was the Federal Acquisition Streamlining Act of 1994 which was designed to reduce the paperwork required for some smaller procurement actions, make it easier for the government to complete contracts for larger (up to $100,000) efforts, and to provide quicker access to solicitation information by potential bidders.

Not only are there many major statutes, but the procurement system is subject to requirements in other legislation. One source indicates that there are at least forty-six other statutes which require the procurement system to respond to "socioeconomic" programs (Sherman, 1985, pp. 367-375). These programs include support to small businesses, to minority and women owned business, provision for certain levels of wages to be paid, and even to "Buy American." To execute these laws, in 1983 the Executive Branch instituted the Federal Acquisition Regulation (FAR) which is updated annually
and now consists of some 1,600 pages and has generated another 2,900 pages of agency specific regulations (Gore, 1993, p. 3). These provide the basis for decision-making in the daily execution of the procurement system. The outcomes of the resultant process are not always to the liking of some observers.

In his study of Federal computer acquisition decisions, Dr. Kelman identified three goals for the Federal procurement system:

Equity - to provide fair access to bidders in competing for government business. Integrity - to reduce the chances for corruption in the procurement process. Economy and efficiency - to procure at the lowest possible price for goods and services of the quality desired (Kelman, 1990, p. 11).

He asserts that nowhere is "... excellence in the performance of the organization's substantive tasks ..." accounted for among these goals nor in the public administration tradition from which they derive (Kelman, 1990, p. 11). He may overstate his case however. He assembled nine case studies of computer system acquisition and concluded that: "In only three cases ... were government officials largely satisfied with the performance of the contractors. In four cases they were dissatisfied, and in two cases their judgements were mixed" (Kelman, 1990, p. 4). Were performance never a goal of the Federal procurement system, no government officials could ever be "satisfied" (since satisfaction can only exist within the context of some notion of performance) with the results as in fact was the situation in three of the nine cases.

In contrast to this academic view, however, a member of the Defense procurement community recently identified nine goals which are instructive to review for both
their explicit and implicit statements of value:

1. Performance (faster, higher, farther) - pushing the envelop of technology.
2. Cost Minimization: the less something costs, the more you can buy.
3. Schedule: anything worth doing is worth doing immediately.
4. Risk: minimizing the possibility that something goes wrong.
5. Control: allow officials adequate warning of possible problems and the means to intervene to correct them.
6. Jointness and interoperability: able to be used by more than one military service.
7. Industrial base: ensuring that the defense industry stays in business and can produce needed equipment in the future.
8. Fairness and Propriety: treating all participants properly. "Because this is a public, very open process, all decisions and procedures must be justified, not only to the few involved, but to the public and their representatives... Seemingly arbitrary decisions that may be acceptable in a private context are not acceptable for a public enterprise."
9. Socioeconomic: Advancing certain national goals such as encouraging small businesses, promoting minority and women owned businesses, strengthening unions, and buying U.S. products (Cancian, p. 191).

In this set of objectives, performance is very much at the center of concern. It is, however, placed in the context of the other social values placed on the procurement system and seems to reflect a more accurate balance among these values as understood and practiced by Federal contracting officials. Dr. Kelman's version may be more reflective of the end users of goods and services who understandably are more interested in accomplishing their missions than with achieving social equity. By design, there is a sharing of power in the procurement system and it must allow for the conduct of a balancing act.

The Nature of Contracting for Goods and Services

All managers face a fundamental decision of whether to "make-or-buy" the
goods and services they need to fulfill their aims. This research assumes that the public managers being studied, those in the Federal Government, have decided to buy the product or service rather than make it or provide it using Federal employees. The decision to buy is influenced by many considerations, not the least of which is the very nature of the contracting process used to acquire the good or service.

Federal contracting processes center around the amount of dialogue that is either permitted or expected between the government and the supplier. While the Federal model of contracting asserts that "competition" provides the best assurance of obtaining the lowest price, it recognizes that competition is not always possible, such as in cases of urgency, national defense, and the existence of only one supplier (FAR, Section 6.302). The Federal Acquisition Regulation, which has the force of law (Keyes, 1990, p. 6) recognizes only two forms of contracting: sealed bid and negotiated. Seal bids are always competitive, negotiated may be competitive or "other-than-competitive."

In the case of a sealed bid contract, the government's specific needs are advertized in some fashion and potential suppliers respond in writing by the required date in a "sealed" manner. All bids are opened at the same time and the lowest responsible bidder is normally declared the winner. No dialogue is expected between the supplier and the government, the presumption being that the statement of need has been clearly and unambiguously made and that the proposed product or service can be specifically and sufficiently described.

The second type of contract rests on the presumption that dialogue must occur,
that the need is not perfectly understood or easily definable before the fact and that the potential solutions may not yet be known. By definition, at the Federal level, any contract awarded without using sealed bid procedures is a negotiated contract. It involves bargaining in the sense of discussion, persuasion, alteration of initial assumptions and positions, and give-and-take, and it may apply to price, schedule, technical requirements, type of contract, or to other terms of a proposed contract (Federal Acquisition Regulation, Sections 15.101 and 15.102). This bargaining can occur with a group of potential bidders or with a single bidder if only one source is deemed available and occurs before contract award and does not include the dialogue that may occur after the award.

As the table below indicates, both in terms of transactions and in terms of dollars expended, despite the standard of "full and open competition," negotiated contracts (which includes both negotiated competition and other than full and open competition) predominate the Federal acquisition process (if one excludes small purchases less than $25,000):
A second component of the Federal contracting process is the type of contract being employed. Seal bid contracts are for a fixed price which is agreed upon. But negotiated contracts can be fixed priced or may have a variety of reimbursement schemes, the most common of which involves some form of “cost plus” arrangement in which the government agrees to reimburse the firm for any costs incurred plus some form of an incentive fee (fixed or variable). These “cost plus” contracts are normally the type of contract used when the degree of uncertainty, either in the statement of the need or in the identification of a solution, is high. It represents a means by which the risk of the undertaking is shared by the two parties and the terms of the contract indicate how that risk is to be shared, if at all.

While “competition” is asserted in the FAR to be the foundation of the Federal acquisition process and the key discriminator between types of contracting, in fact the

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*Solicited Contract Awards, 1994*

<table>
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<tr>
<th>Procedures</th>
<th>Actions</th>
<th>Dollars (000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full and Open Competition</td>
<td>58,725</td>
<td>14,485,399</td>
</tr>
<tr>
<td>(Sealed bid)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negotiated Competition</td>
<td>142,245</td>
<td>60,644,863</td>
</tr>
<tr>
<td>Other than Full and Open Competition</td>
<td>108,796</td>
<td>62,450,881</td>
</tr>
</tbody>
</table>

(Source: Federal Procurement Report, 1994, pp. 74-75. Does not include small purchases less than $25,000).
major discriminator seems to be the nature and extent of the dialogue that is permitted between the government and potential or selected contractors. DeHoog (1990) contrasts three models: competition, negotiation, and cooperation. The competitive model is perceived to be effective when there are multiple responsible bidders, when both the supplier and the government have the resources to conduct the contracting process, and “... where the government's funding levels, client or service needs, and service technology are relatively straightforward and certain” (DeHoog, 1990, p. 321).

As is often the case, however, conditions of high certainty cannot always be met, in which instances negotiated or cooperative models are appropriate. The negotiated model “... occurs after the contractors have been selected, (and) focuses on general limits of service activities, administrative control procedures, and per-unit or total amounts that the government will pay” (DeHoog, 1990, p. 326). This model is seen as more amicable than the competitive model with a tacit understanding of mutual interdependence and a negotiated agreement based upon ground rules of fairness, truthfulness, and reason (DeHoog, 1990, p. 327). This model is perceived to permit greater degrees of flexibility under circumstances that involve higher degrees of uncertainty.

The third model posed by DeHoog is the “cooperative” one which is seen as a viable alternative when:

(a) there are low resources of time, funding, or existing suppliers prepared to produce the service;
(b) little government expertise and/or experience in delivering a service; and
(c) rapid rate of change and/or a high level of uncertainty and complexity about future events, funding, technology, or successful service.
This model is seen as applicable when there is only one potential supplier and tends toward the establishment of long-term relationships with a high probability of future contracts. The contract instrument emphasizes flexibility and in place of tight contractually established controls, "... common professional standards ... act to limit opportunistic behavior" (DeHoog, 1990, p. 331). The advantages of this model are seen to be its adaptiveness to change, fuller use of the supplier's knowledge, and the avoidance of transaction costs for follow-on contracts (DeHoog, 1990, p. 333). Disadvantages include the possibility of collusion and cooptation (DeHoog, 1990, p. 335).

Another set of models is provided by Raymond G. Hunt who posits what he calls a "Formal" model ("F-model") and "Joint" model ("J-model") (Hunt, 1984, 1985). The F-model is conceived as an arms-length, impersonal relationship between the contractor and the government, characterized by "transitory task-specific conjunctions of structurally and operationally independent parties" (Hunt, 1984, p. 248). The J-model is seen as a collaborative arrangement which stresses the need for contract administration as a joint interorganizational undertaking intimately involving the government and the contractor (Hunt, 1985, p. 587). This latter model is seen as particularly relevant in complex Defense research and development contracts where uncertainty is high and flexibility is needed.

While the terminology varies among these models, ultimately each deals with what might be called "dialogue" and risk sharing. In this context dialogue refers to the
amount and quality of the discussion between representatives of the government and the contractor. Are they permitted to talk? Do they share interests in the undertaking or only positions?4 What is the level of uncertainty? Can it be admitted to? What are the risk sharing arrangements? What are each party's perceived interests in the enterprise? Can they be articulated and discussed? While this research did not attempt to directly address each of these conditions, the general nature of dialogue was an identifiable element and is reflected in the contractual arrangements selected.

This research also had to consider the political framework in which the contracting process functions. While all contracts serve to establish mutual expectations, public contracts (speaking here to Federal contracting) involve legal, political and economic considerations different from private contracting in terms of status of the contracting parties, their accountability, and process complexity (Sherman, 1985, p. 6). In private industry, there is an equality of the supplier and the customer as legal entities whereas in the public domain, the state is sovereign and can make rules and has the ability to change its mind. Private industry is accountable to “general standards, compliance with law and precedent, and ethical conventions,” whereas public accountability includes “public oversight of funds, compliance with political standards, legal procedures, and public information policies.” And while private contracting is “relatively simple and practical,” public contracting is characterized by “detailed procedural

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guidance dictated by public oversight, concern for 'equity' in public decisions, and social policy issues" (Sherman, 1985, p. 6). From these differences flow the practical reality that while private industry inherently possesses the discretion to directly apply the principles advanced by Dr. Deming, parties to public sector contracts do not have that natural discretionary authority.

Summary

Federal contracting policy has a long history and concerns about getting as much as possible for the taxpayers' money were as prevalent in the early days of the Republic as they are today (Nagle, 1992, p. 5), though obviously the magnitude is much greater and the technology available much more complex. The present procurement system reflects the need to balance competing claims of equity, fairness, efficiency, and accountability. To meet these demands a great deal of flexibility has been built into procurement policy and procedures. It can handle high degrees of uncertainty when needed and it can share risks when that is needed. Nevertheless, the system has come under severe criticism. Criticism of the system tends to focus on events which reflect inefficiencies or wasted resources and on events which reflect on the lack of discretion which stem from voluminous and detailed rules and regulations.

Continual improvement in the functioning of the Federal procurement system is a common political theme. Some proposals would provide more discretion for the participants, others would change the nature of the contracting agreements to make them less rigid, and some would change the thresholds to permit quicker and easier contracts.
In the political arena, however, the most common improvement is seen to be more reliance on competition. Competition continues to be perceived as the best way to assure that the lowest price will be paid and increased discretion is perceived to be the way to speed up the procurement system.

As an alternative to these commonly perceived "fixes" to the procurement system, Dr. Deming theory provides other means to achieve the desired outcomes. He advocates cooperation not competition. He advances the application of statistical process control as a way to use data and facts to understand whether a product is meeting the needs of the customer and as a way to improve dialogue between the supplier and customer. Yet a review of the procurement literature did not reveal any discussions about the application of "A System of Profound Knowledge" to the procurement system. If his theory can be effectively applied in the procurement function somewhere in the Federal government, then it is more likely that it will be attempted elsewhere in the Federal government and provide a substitute means to effectively allocate the resources devoted to the acquisition of goods and services for the governmental purposes.
Relevant Empirical Research

Overview

No empirical studies relating directly to the application of Dr. Deming's supplier-customer relationships in the public sector were identified during this research. Six studies relating it to private sector, industrial experiences were identified and are summarized here. Two Federal government-wide surveys, one of which included questions on supplier relationships, were identified and four dissertations were identified which addressed the implementation of quality management in the Federal government. Three dissertations were identified which dealt with procurement issues, two of which related directly to supplier relationships or the use of quality criteria for source selection, and one with contracting issues. All studies were identified through the use of UMI Dissertation Publications Services; PROQUEST Research Services; the Library Catalogues at Virginia Polytechnic Institute and State University, George Mason University, and George Washington University; and as referenced works in other publications.

Federal Government Quality Management Studies

The most extensive quantitative research on the application of quality management in the Federal government was conducted by the General Accounting Office (GAO) and reported in June, 1992 (GAO, 1992). A follow-on report was released by the GAO in April, 1995 which dealt only with human resource management strategies used by the Federal organizations judged to be the most successful in implementing these principles (GAO, 1995). In the earlier report, the GAO referred to quality management as “Total
Quality Management (TQM).” The later report removed the word “total” and referred to these principles as “Quality Management” (GAO, 1995). In 1992, TQM was defined as: “...a management approach that strives to achieve continuous improvement of quality through organization-wide efforts based on facts and data” (GAO, 1992, p. 1). The 1995 report changed the definition and the emphasis: “...a management approach that emphasizes improving product quality while decreasing production costs by increasing efficiency of work processes...” (GAO, 1995, p. 1). The 1992 definition included the use of “facts and data,” key to the application of Dr. Deming's concepts of variation, but the 1995 report did not. The 1995 definition emphasizes cost reduction and efficiency through, apparently, whatever techniques may be available. Thus, it seems that the GAO may have moved away from the Deming-like definition of quality management reflected in its earlier publication.

In the 1992 publication, the GAO reported the results of a survey of 2,800 Federal Defense and civilian “installations.” The response rate was 80 percent and follow-up in-depth interviews were conducted with 30 installations. For the purposes of the survey, the implementation of TQM was divided into five phases, the first phase being where the respondent was just deciding whether to implement TQM to the fifth phase where high involvement with TQM was reported. Sixty-eight percent of the respondents reported some TQM involvement (all phases) and forty installations judged themselves to be in the fifth phase (1.8%). Thus, a majority of the respondents were either implementing or considering implementation. Employee involvement, however,
was relatively low, with only 13% “...actively involved in such TQM activities as teams, councils, and teaching.” GAO concluded that while the implementation was fairly broad, it was not deep in terms of numbers of employees engaged (GAO, 1992, p. 16).

The GAO survey instrument contained twenty-two major questions, some with a number of subordinate questions. A single subordinate question dealt with the supplier-customer issue and appeared under Question Number 8 (“In regard to TQM, please indicate which one of the following activities has ever been undertaken to any degree at your installation?”) [emphasis in the original] (GAO, 1992, p. 54). Fifty-five percent of the respondents (N=1575) indicated that the installation “...works with suppliers to improve quality.” Twenty-three percent said they did not but plan to, 14 percent said they did not and did not plan to, and 7 percent did not know (GAO, 1992, p 54). The follow-on report was designed to see what the strategies were of those organizations with the highest employee involvement rate and did not deal with supplier relationships.

Four dissertations were identified that dealt explicitly with quality management in the public sector. Each was reviewed in its entirety but none addressed the issue of supplier-customer relationships in the quality management context. One looked at specific logistical decisions in the Department of Defense, hypothesizing that “...TQM (Total Quality Management) increased efficiency ...” That hypothesis was not supported by correlation measures (Bailey, 1993, “Abstract”). Another, which looked at the implementation of quality management in Air Force Logistical units, concluded that perceived change in the quality culture was statistically significant among non-senior
managers but not so for senior managers (Marshall, 1993, p. v). A third, which analyzed why agencies adopt quality management practices, concluded that “… agencies seem unlikely to adopt TQM in its pure form” (Nichols, 1993, p. 193). The fourth, a study of employee involvement (a key component of quality management) approaches in the Federal government, demonstrated a positive correlation between involvement and improved productivity (Wroblewski, pp. 248-249).

Federal Government Procurement Studies

Three dissertations which dealt with procurement or contracting in the Federal government were identified. One (Crowley, 1992) proposed a technique for risk assessment for competitive procurement in public agencies. It addressed the special case of construction services contracts in which true costs are unknowable at award time and a bidder, known as a “phantom bidder” submits unusually low bids in hopes of recouping through later cost growth. While this has to do with the ability of the bidder to, in the words of the author, establish a “relationship” with the government, the research posits a statistical methodology to identify bids that are too low. While perhaps a useful tool in a contracting officer’s repertoire, it does not have direct application to this research. The remaining procurement dissertations, however, are applicable.

In A Study of Decision-Making Processes in the Practice of Federal Contract

5 Nichols goes on to say: “Sometimes TQM-related labels are about the only things adopted. Among TQM adopters, several elements may be underway at various stages of maturity (with or without the TQM label), but some TQM behaviors and practices are never adopted fully, never successfully, or never attempted” (Nichols, 1993, p. 193).
Management, Curtis R. Cook, (1988) reports the results of survey research designed to test the hypothesis that problems in the Defense acquisition system were caused by problems other than the training, pay, and experience of contracting officers. Among the variables tested was the degree of "bureaucratization of the procurement process itself" (Cook, 1988, p. 2). Bureaucratization was defined as:

... the degree to which performance is governed by law, regulation, clerical routines, standard operating procedures, policy letters, or political factors (Cook, 1988, p. 40).

As a variable, bureaucratization was further divided into sub-variables "...measuring the exercise of judgement, whether the existence of regulations affect the negotiation for fair prices, and the extent to which regulation allows contract managers to perform their duties in a timely manner" (Cook, 1988, p. 40). The survey used a random sample of 1209 contract managers (government and non-government) taken from a population of 20,000 members of a professional contract managers association. About 50 percent of the respondents (N=775) believed that laws, regulations, and policies that they worked under contributed to fair and reasonable prices while about 50 percent felt they hindered such activity. And, 72.7 percent felt that laws and regulations kept them from doing their jobs in a timely manner (Cook, 1988, p. 155). The author concluded that the majority of the respondents "... felt the procurement process was highly bureaucratized" (Cook, 1988, p. 165). Since rule boundedness is a common criticism of the procurement system, Cook's research is important in revealing that about half the sample population agreed that rules and regulations tend to hinder their performance.
In the third relevant procurement dissertation, Identifying, Ranking, and Evaluating Quality Factors for Potential Use by Navy Contracting Officers in Selecting Sources for Navy Contracts, Charles Perkins (1989) reports the results a survey of Navy contracting officers and program managers to determine whether factors other than price could be used to help make better source selections. Specifically, he used a framework of seven quality attributes identified by David Garvin (1984 and 1987). Perkins concluded:

The effectiveness of the Navy purchase process in obtaining quality products is inadequate resulting from the over-emphasis on price and the poor feedback of accurate and timely information to the Navy contracting officer. Quality measures based upon the dimensions of a quality framework provide an approach to balance price with other important aspects of the purchase decision (Perkins, 1989, p. 140).

The report was valuable not only in pointing to the work by Garvin which identified the seven “quality” attributes as seen by the customer (performance, schedule, reliability, durability, maintainability, reputation and past performance, and warranties) to help in source selection, but also in demonstrating that government purchasing agents were slower than commercial counterparts in adopting quality measures in making source selections and that at that time (1989) Navy contracting officers were not using alternates (such as partnerships and reducing the number of suppliers) to price based selections.

Federal procurement, specifically Federal procurement of automatic data processing equipment, was the subject of a qualitative research effort in the late 1980s. In Procurement and Public Management: The Fear of Discretion and the Quality of Government Performance, Dr. Steven Kelman, through extensive interviews with
computer and procurement officials (government and non-government), existing surveys, and available documentation, developed a picture of Federal procurement policy. He concluded that the Federal procurement system, as practiced, discourages open communication between those with the need and those with possible solutions; that there is too much emphasis on specifications which, in high technology arenas such as computers, can't be realistically foreseen; that the system is too rule bound; and that the lack of flexibility on the part of the participants limits the suitability of the end product (Kelman, 1990, p. 86-90). The surveys used in the report indicated that only 21 percent of the government computer managers (N=36) felt that the procurement system was all right as it is (Kelman, 1990, p. 10).

Kelman's fundamental suggestion for improving the procurement system was to "...increase dramatically the freedom we give public officials to use their judgement in the procurement process" (Kelman, 1990, p. 90). Such freedom, however, should not be unconditional but should be limited to the means to achieve agreed upon ends and that the individuals should then be held responsible for how well he does (Kelman, 1990, p. 91). This grant of discretion should be, he says, accompanied by an effort to raise the quality of the computer workforce; the use of multi-member evaluation panels (although this could dilute the accountability of individuals he notes); and, permit the use of contractor past performance in making selections (Kelman, 1990, p. 91-94). In evaluating past performance, governmental officials "...should be allowed to use their judgement..." (and) not be arbitrarily constrained nor should they have to state their criteria in
advance" (Kelman, 1990, p. 94).

Kelman anticipates objections to these changes and responds in terms of what he had identified as the three goals of the procurement system: equity, integrity, and economy and efficiency. To the issue of potential exclusion from competition (the issue of equity of access for potential bidders) he says he is not suggesting that vendors be arbitrarily excluded and indicates:

Arbitrary exclusion is exclusion for no good reason, so if there is a good reason not to choose a vendor, the exclusion is not arbitrary. I suggest only that public officials be given more room for judgement in deciding not to give work to a vendor. No defender of the current system would suggest that vendors have a right to receive government business, only that they not be arbitrarily excluded (Kelman, 1990, p. 95).

On the issue of integrity Dr. Kelman indicates that the current system of keeping corruption down through regulation exacts "an enormous toll," is of "dubious effectiveness," and it unjustly punishes many for the crimes of a few. In its place he would put more reliance on modern investigative techniques which, he claims, are how scandals are currently being uncovered. He would also establish rules that any contact between elected officials or their staffs and the contracting officials regarding a procurement action be a matter of public record (Kelman, 1990, pp. 94-99).

To the issue of economy and efficiency he is less clear in his proposals. He seems to say that with more discretion this will automatically be taken care of. He is concerned about how the federal managers will react to this new freedom in light of their perceived reliance on, and adherence to, bureaucratic rules. He agrees with Robert
Merton's "Bureaucratic Structure and Personality" that:

... bureaucracies become rule-bound from devotion to rules by the bureaucrats themselves. To be successful ... a bureaucracy must obtain a high level of reliability and must undertake routine activities methodically; these means ... then become the goals of the organization ... Indeed, if the worst features of the procurement system stem from the procurement culture and not from the regulations themselves, don't the bad features of the system go deeper than rules imposed on unwilling official victims (Kelman, 1990, p. 100)?

In fact, the "rule-boundedness" model did seem to fit the contracting officials encountered in his research. They

... gain standing through their status as experts on the rules. Since they lack any substantive responsibility for the missions furthered by the products or services being acquired, they also lack any countervailing pressures against sticking to the rules. Contracting offices thus fall victim to all the forces favoring rule veneration and become the source of the negative features of the procurement culture, which they present to the unsuspecting technical or program people as if they were the law (Kelman, 1990, p. 100-101).

His evidence indicated that the people responsible for mission accomplishment chafe under the current rules and hence are more susceptible to the "results-based performance standards" he seeks to infuse into the system. One way to do that is that is to advertise the successes of those who have used modified procedures. "Surprisingly many bad practices grow out of procurement custom rather than the requirements of law or regulation ... Positive results from a few organizations that have departed from custom can inspire others to do likewise" (Kelman, 1990, p. 103).

Since publication of his book, Dr. Kelman has become the Administrator of the Office of Federal Procurement Policy, an office within the Executive Office of the President (specifically within the Office of Management and Budget) and his ideas have influ-
enced the Federal Acquisition Streamlining Act of 1994 as well as the report on Federal Procurement Reform developed in conjunction with the National Performance Review. His overall assessment is that the procurement system is in trouble but that contrary to the conventional wisdom that increased competition is the solution, he sees the problem with the current system is that "...public officials cannot use common sense and good judgement in ways that would promote better vendor performance" (Kelman, 1990, p. 1). He would deregulate the system and allow greater discretion. Such steps are being encouraged in law and regulation.

Dr. Kelman's research is important to the current study effort and provides invaluable insights into the problems of the procurement system as well as the role of custom and culture in placing it where it is. As a reformer, however, his solutions echo fairly standard changes: change the structure and give the participants more discretion. It is not clear, however, who's standards would apply when exercising this discretion. In fact, Tom Peters, co-author of In Search of Excellence, argues that Dr. Kelman may have it wrong. Peters points out that the role of government is often to assure equity, that often what is important is the process the government uses in making decisions, not the specific outcome despite what Kelman claims (Peters, 1990). Dr. Deming might argue that the use of "A System of Profound Knowledge" would provide the fact based knowledge needed to make equitable and effective decisions.

Finally, a single empirical study specifically directed at public sector supplier-customer relationships was identified (Williams, 1982). Conducted by the U. S. Army,
surveys were sent to industrial suppliers and government procurement personnel to find out the nature of contractual relationships and the motivations behind the sellers' behavior. Comparisons of responses revealed very different perceptions. Government personnel perceived industry to be most interested in profits and company survival. Industry personnel perceived themselves to be most interested in a good product and the establishment of long term relationships. After an award, government employees felt the event with the highest impact was the contractor's inability to solve technical problems while industry personnel rated excessive government interference the highest. These contrasting perceptions, interests, objectives, and "... mutual finger-pointing does express the lack of trust in today's commonly alleged adversarial relationship between DOD and their contractors" (Williams, 1982, p. 70).

According to this author, if these basic differences are to be resolved, both the government and the suppliers have to want to resolve them. He asserts that the desire by government employees not to resolve them stems from a desire to avoid the threat of enhancing the "military - industrial complex." Interestingly, the data showed that both sides said that relationships should be more cooperative. The author concluded that relationships must to be improved in order to get better hardware (Williams, 1982, p. 70).
Supplier-Customer Relationships in Industry

In *Price, Quality and Trust*, Mari Sako (1992) studied three British and Japanese company supplier-customer relations and 36 supplier companies in the two countries. He positions these relationships along a spectrum which at one end has what he calls “Arms-Length Contractual Relations” (ACR) and at the other extreme “Obligational Contractual Relations” (OCR). Firms engaging in ACR:

... wish to retain full control over their destiny. Independence is the guiding light... (which) often requires not disclosing much information... The arms-length nature of contracts enables firms to engage in a hard commercial bargain to obtain competitive prices, although an excessive use of threats and bluffs may make some firms wary of too much antagonism (Sako, 1992, p. 2).

At the other extreme, companies engaged in OCR:

... prefer high trust cooperativeness with a commitment to trade over the long run. This commitment may come at the expense of taking on rather a lot of some times onerous obligations and requests... (b)ut the benefits of accepting mutual obligations lie in good quality and service, growing or stable orders, and other non-price aspects of trading born out of a tacit understanding over time (Sako, 1992, p. 2).

Not surprisingly, the author found more obligational relationships in the Japanese companies than in the British. Interestingly, the author never mentions Dr. Deming though his concept of competition and cooperation parallel Deming in many respects. Most important and relevant is his characterization of three types of trust: contractual (fulfill the contract), competence (be able to fulfill the contract), and goodwill (attend to the relationship), and, the conditions which make obligational relationships efficient:

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(i) convergent expectations of trading partners, concerning acceptable levels of
competence, intensity of communications, etc.;
(ii) a clear perception of dependence, mutual or unilateral;
(iii) a shared sense of fairness concerning the conduct of the stronger partner
towards the weaker in hierarchical contracts;
(iv) rivalry of customer companies in the final product market, to give a percep-
tion of shared interest in increasing efficiency; and
(v) ranking hierarchy and/or rank-order tournament among core suppliers
(Sako, 1992, p. 240).

While many of these conditions echo Dr. Deming's philosophy, a major
difference is apparent. Sako, at the product line level of analysis, sees the need for
competition to spur on the individual participants. He sees competition as a motivating
force in contrast to Dr. Deming who saw it as a inhibiting force. But this research con-
firms much of what Dr. Deming postulates and provides empirical evidence of what are
usually anecdotal stories.

In a later study, the same author, in collaboration with an American researcher,
uses another framework for looking at supplier relationships among Japanese and Ameri-
can firms (Helper and Sako, 1995). This framework is referred to as “exit-voice” and is
used to classify supplier relations “... according to ways problems between parties are
resolved. In an exit relationship, a customer that has a problem with a supplier finds a
new supplier. In a voice relationship, the customer works with the original supplier to
resolve the problem” (Helper and Sako, 1995, p. 78). Indications of stronger “voice”
relationships included customer provision of detailed breakdowns of steps in production
processes, the length of contracts, and an orientation towards joint problem solving.

The research compared the results of a prior (1989) survey with one the
researchers conducted (1993) of 675 American and 472 automobile suppliers. It showed that while more American companies reported using "voice" relationships in 1993 than in 1989, still only 29 percent of the American respondents "... met even the minimal voice relationship criteria" (Helper and Sako, 1995, p. 80). And, according to the survey data, only 32 percent of the Japanese companies met these criteria.

Other somewhat surprising results indicated that while U.S. companies were moving slowly toward longer contracts, were sharing more information, were more serious about product quality, and have defect prevention systems in place, American supplier firms did not believe "... their customers are more trustworthy ... , do not receive much assistance from them in reducing costs or adopting new techniques, and are not convinced of the efficacy of JIT (Just-in-Time delivery)" (Helper and Sako, 1995, p. 83). As a result, the research concluded that a voice model of relationships was not firmly in place in the United States.

In a single case study by F. Ian Stuart and P. Mueller, Jr., the authors explicitly use the Deming model to understand a partnering relationship between a carton supplier and a food processor. The partnership was disrupted when a decision was made to introduce a second supplier whereupon productivity gains were lost. These were recovered, however, when management was convinced to reestablish the original partnership (Stuart and Mueller, 1994, p. 19).

Writing in the International Management Review, James Richardson (1993) reports the results of a survey of American automotive, construction equipment, and
electronic firms (total N=8) for their perceptions of their relationships with their suppliers. While the foundation for this analysis was the transaction cost theory of Oliver E. Williamson and looked at specific assets, uncertainty, bounded rationality, and opportunistic behavior, the author explicitly indicates that "... Deming's argument in support of sole sourcing can be recast in terms of transaction costs" (Richardson, 1993, p. 57). He interprets Deming to mean that sole sourcing helps minimize total costs by minimizing the costs to help suppliers sustain quality and delivery. It would simply cost too much to do this for multiple suppliers. "In contrast to transaction cost theory, however, Deming is not overly concerned with the possibility of opportunistic behavior and shirking. He suggests that firms search out and select suppliers who are committed to quality and continuous improvement" (Richardson, 1993, p. 58). He found that while the nature of supplier relationships was tending toward longer-term relationships with fewer suppliers, they were not committed to using a single supplier and "... none of the firms expressed more than moderate satisfaction with supplier performance" (Richardson, 1993, p. 64). He points out, moreover, that Japanese firms do not use sole sourcing exclusively and in fact, use both multiple sourcing and a hybrid referred to as "parallel sourcing" (where, for example, the same part for different models is obtained from different suppliers).

Finally, research revealed an empirical study which was designed to understand what was called "best practice" supplier-management techniques in the auto industry. The researchers looked at three major Japanese automakers, more than a dozen of their major suppliers, 143 sub-suppliers, and 189 U.S. suppliers to American
automakers. They found that the Japanese do not treat all suppliers equally and that one
must be careful about generalizing from looking at only a handful. “Only an elite corps of
about a dozen first-tier suppliers enjoy full-blown partnerships with their customers.
(Typically, a Japanese automaker has about 100 to 200 first-tier suppliers.)” (Kamath and
Liker, 1994, p. 156). Consequently, the authors developed a scheme to depict the
different levels of relationships:

- Partner - relationship between equals. Supplier has technology, size and global
  reach
- Mature - customer has superior position
- Child - customer calls the shots
- Contractual - supplier used as an extension of customer's manufacturing
  capability (Kamath and Liker, 1994, p. 158).

If a supplier wants to be in on the development of the product, it has to be near the top of
this hierarchy according the authors. “World class Japanese automakers manage product
development tightly. They set clear, understandable goals and communicate them
consistently to suppliers, and they use targets and prototypes to enforce these goals. It is
a simple rigid process, much like an assembly line” (Kamath and Liker, p. 166).

**Summary**

The studies conducted on industrial supplier-customer relationships where
some form of quality management is apparent, reveal that the principles advocated by Dr.
Deming are very much in evidence, but at always fully and not always with the degree of
intensity which he might require. The firms or industries that were studied tended to
consider total cost rather than just price in making procurement decisions and were
moving towards more long-term, trusting relationships. The major disconnect with the theory was the industrial reluctance to commit to sole suppliers for particular items. While not unheard of, the studies showed that many firms, despite acceptance of other quality principles, tended to continue to make arrangements that would provide multiple sources of products even though they understood the transaction costs associated with such activity.
Analysis of the Empirical Studies

Introduction

In Chapter 9 of *Out of the Crisis* Dr. Deming discusses the need for "operational definitions" which he describes as "the record of what happens on application of a specified operation or test" (Deming, 1986, p. 270). By this Deming meant that without an agreed set of criteria and a way to sample and test, there can be no way to communicate what adjectives like "good," "uniform," "safe," or "tired" mean. He believed that this was true of "... any word, prescription, instruction, specification, measure, attribute, regulation, law, (or) system" (Deming, 1986, p. 276). Applying this principle to the supplier-customer relations in his Point 4, this section will develop operational definitions for its three components and provide the analysis of the data contained in the empirical studies.

Dr. Deming did not leave precise operational definitions of each component of his supplier-customer theory. Therefore, they will be derived from what he did say, what others said he said, or inferred from his philosophy, recognizing that the latter will be tentative in nature. These understandings are essential for assessment of the ability of the Federal procurement system to reflect his model of supplier-customer relations. It will be against these definitions that current practices in Federal agencies are compared.

The following three sections each address one of the three parts of Point 4: price tag and total cost, single supplier, and long-term relationship based on trust. Each section contains three elements: an operational definition; the current commercial
practices as indicated in the previously summarized empirical studies and adds anecdotal information where available; and a characterization the authorities within the Federal procurement system which would permit or hinder emulation of the operational definition.

Consider Total Cost Rather Than Price

**Operational Definition.** While reduction of variation is the objective of Point 4 of Dr. Deming's "Fourteen Points," his interest in making purchasing decisions based upon total cost rather than just on the immediate price stemmed in part from his view of the relationship between price and quality and on the consideration of the cost of using any item. He believed:

1. **The "price" of anything is meaningless without a measure of its quality.** Whether implicitly or explicitly, one must consider quality along with price when purchasing from a supplier, otherwise one would have no idea whether the item will fulfill the need in all its dimensions.

2. In addition to purchase cost, one must also consider the **cost of use,** that is, the costs of rework, scrap, complaints, and so forth that are attributable to that item as it moves through one's own processes toward some larger product (Neave, 1990, pp. 307-309).

But how does one judge "quality?" While Dr. Deming indicates that "quality" should be aimed at "... the needs of the consumer, present and future" (Deming, 1986, p. 5), he does not identify the specific attributes of quality. This "consumer" based
approach to defining quality is but one of five identified by David Garvin, the other four
being transcendental, product-based, manufacturing-based, and value-based (Garvin,
1984, p. 26). Garvin argues, however, that a better methodology is to look at inherent
attributes which include, in his construction: performance, features, reliability, confor-
mance, durability, serviceability, aesthetics, and perceived or subjective assessments of
"quality" (Garvin, 1984, pp. 29-30). Given Dr. Deming's insistence on "systems"
thinking, each of these attributes would seem to be consistent with his philosophy as long
as they are seen through the eyes of the customer, not the producer. In each case,
however, he would demand agreed means of measuring or testing for that attribute (If it
is supposed to be round, how do you know that it is? How is roundness to be measured?
(Deming, 1986, p. 279)). Dr. Deming, of course, believed that statistical process control
(SPC) is the essential methodology for measuring any process. To use SPC was to
demonstrate a concern for quality and an intent to continuously improve quality.

And what is to be included in costs of use? This can be difficult, as Dr. Neave
reminds us:

... especially remembering all those unknowable figures which ... warming to the
theme, Deming points out are unrecognized, not even suspected. It will require
knowledge, study, and maybe experimentation (Neave, 1990, p. 309).

It would seem that here, one must be as inclusive as possible, to consider the widest,
largest possible system of which the item is to be a part, be that a ball bearing in a rotor
shaft of a helicopter or the whole helicopter as part of an air assault unit. But as quoted
above, we can't always "know" that information, but we must keep trying to find out.
From the foregoing, an operational definition would include (within the process for making selections among potential suppliers) a set of quality criteria against which price can then be judged, a way to identify and consider knowable costs and a way to think about costs that may be "unknowable" in specific but at least identifiable in general. The process would consider the needs and perceptions of useability for everybody who must build, use and maintain that item; be able to identify each player (throughout the chain of actions) and their perceptions of quality; be able to get the players to agree on measures of quality; and, possess the means to continuously measure and test against the dimensions identified. Implicit in this process is the ability for all the actors to communicate using a system of profound knowledge based on data and facts.

Industry Experience. The movement by industry toward inclusion of non-price factors in purchasing decisions has apparently been moving apace according to anecdotal stories, but its dimensions are not clear from the empirical studies. James F. Cali reported (1993) anecdotally on twenty-eight major corporations (including Apple computer, Ford, Xerox, etc.) and their mechanisms and standards for quality performance by suppliers. These included certification for preferred suppliers, SPC capability, multi-dimension team assessment of supplier capacity, presence of TQM programs, and the like. Most companies had some means to measure quality on an ongoing basis tied in some way to statistical control (Cali, 1993).

Helper and Sako's study of auto suppliers (see above) showed significant increases in supplier provision of a detailed breakdown of steps in their production processes to the
auto makers, one means for a firm to understand the quality processes of a supplier. An average of 31 percent of American suppliers was disclosing this information in 1984, 50 percent in 1989, and 80 percent by 1993. Peculiarly, Japanese supplier disclosure actually decreased from 80 percent in 1989 to 77 percent in 1993 (Helper and Sako, 1995, p. 79).

In short, there is anecdotal evidence of the use of techniques to gauge supplier quality processes in the private sector but the breadth of their use has not yet been documented.

**Federal Procurement Authorities.** While the Federal Procurement system may be perceived to be tied to price alone, analysis indicates that this perception is not a valid representation. Only in the case of competitive seal bidding is price the criteria for selection. And even in these cases an evaluation is performed concerning whether the bidder is capable of producing the item in question in the quantities desired. While a selected company may prove in the end to be unable to adequately provide the product and may be "terminated" or declared in "default" as a result, the system requires that only bids from "responsible" firms be accepted. So while "price" seems to be the only criteria, some judgement on "quality" resides behind the decision.

Statistically, sealed bids make up a relatively small percentage of the total annual procurement expenditures. For example, in the Department of Defense, about 7 percent of the dollars expended and about 9 percent of the actions taken (8.3 billion of 117 billion total dollars and 21,000 actions of 224,000 total actions taken) were awarded in 1994.
through sealed bidding and the remainder through other forms of contracting (Federal
Procurement Report, Fiscal Year 1994, pp 82-83). Only about 15 percent of the contracts
awarded by the General Services Administration (.8 billion of 5.2 billion dollars) are

All other types of contracting arrangements permit the ability to conduct a
dialogue with the potential bidders and hence, gain some appreciation for other factors,
even though the price, when other factors are perceived to be about equal, may be the
final criteria used for making the selection. More importantly, however, the Federal
Acquisition Regulation and its recent amendments, as discussed above, explicitly
encourage the concept of “best value” purchasing which permit consideration of whole
life cycle costs of the item; ancillary costs such as maintenance; capabilities of the
supplier; and other factors, and dictates that “quality” be among the factors considered.
Flexibility is permitted, as long as the selection criteria are identified beforehand and
included in the solicitation and as long as there is a public record on what basis the deci-
sions were made. Thus, in the current state of play, the procurement system not only
permits the consideration of many factors other than price when making source selection
in most Federal Procurement actions, it explicitly demands that quality be a factor.

Use Single Supplier for Each Item

The Operational Definition. Again, the need to reduce and minimize variation was
Dr. Deming's primary reason to move toward a single supplier for a single item. Not
only does a single supplier who is committed to continual quality improvement provide a
more consistent product, costs associated with the contracting process are reduced: the
cost to "dicker" for lower prices; the costs of dealing (travel, telephone, visits, chances
for misunderstandings, etc.) with multiple suppliers; and the costs avoided by establish-
ing long term relationships which prevent having to do it all over again.

Dr. Neave indicates that Dr. Deming was not looking toward single suppliers out
of some ideological dogma. It was an entirely pragmatic consideration: to lower total
cost and reduce variation. But the single supplier must be chosen with great care and be
committed to continual improvement. Furthermore, to fully accomplish this goal, he
suggested that if a single supplier produced the same item in several different locations,
that the customer accept the item only from a single location because there is variation
even within a single vendor's operations. Dr. Neave also indicates, however, that Dr.
Deming recognized the practical difficulties of achieving single sourcing (Neave, 1990,
p. 311) and we are left with the sense that "single supplier" may be a goal that is seldom
achieved but that the thinking and actions that go into trying to achieve that goal will
serve one well.

The ideal model then would use a single supplier for each item and a single
production location within that single supplier. As a practical matter, however, it seems
that a few, carefully chosen suppliers could be within the limits of acceptability to Dr.
Deming.

6Gary Fellers indicates that within-vendor deviations are five to ten times better than among-
**Industry Experience.** Perhaps because it can be easily quantified, the move toward fewer, if not to single, suppliers is one of the most documented elements of the new management trends. However, while many individual cases are identified, there are few comprehensive surveys across industries or even within industries. James Cali, again anecdotally, reports that Harley-Davidson has reduced its suppliers from 820 to 415, McDonnell Aircraft reduced its supplier base from 2875 to 1000, and NCR from more than 2000 to 150 (Cali, 1993, pp. 49-53). The Italian automaker FIAT has “. . . chopped back the 500 leading suppliers it had four years ago to 130, who account for 90% of its parts bill” (Glover, 1994, p. 39). Ford Motors is reported to have changed philosophy from multiple suppliers to a new rule, at least with regard to truck brakes: “(w)e shall have a single source of supply and work very closely with that vendor” (Hammer and Champy, 1993, p.43).

Gary Fellers reports that the General Motor's SATURN automobile plant uses only 170 suppliers whereas a normal General Motors plant uses about 1800. He also points out that in his studies “. . . the fraction of the finished product variability resulting from multiple vendors was from 30 to 95 percent (with) (a) typical figure (being) about 70 percent”(Fellers, 1992, p. 165). From an engineering perspective, he says, “. . . the goal is to scientifically choose the best one or two vendors; however, it is not uncommon to find that sole sourcing with the worst vendor is better than back-and-forth switching among them all. Believe it or not” (Fellers, 1992, p. 165).

In his multi-company, cross industry survey, James Richardson found that the two
responding U. S. automakers reported an average of 4.8 suppliers for each item while the heavy equipment respondents indicated an average of 1.75 suppliers per item and the electronics firms an average of 2.6 suppliers per item. In his follow-up interviews with all the respondents to his survey, he found that all “... cited the benefits of sole sourcing claimed by quality practioners as their reasons for reducing the numbers of number of suppliers (e.g., reduced variability, closer working relationships, greater long-term commitment)” (Richardson, 1993, p. 61). Yet all also expressed some reservations about their dependence on sole sourcing and all were also engaged in some form of “parallel sourcing” for some items (having multiple suppliers for a single item which is used on multiple models so that it is somewhat interchangeable). In earlier studies Richardson had found that Japanese companies also engage in parallel and even multiple sourcing, though apparently not as frequently as do American firms (Richardson, 1993, pp. 61-62).

From the data available, it is difficult to determine the extent to which industry is moving toward single suppliers. While it seems apparent that significant segments of industry are moving toward fewer suppliers, the ones for which we have data do not appear to be approaching single suppliers for single items as Dr. Deming advocates nor that they really want to. While the transaction costs of multiple suppliers appears to be firmly understood, uncertainty about the dependability of delivery and the impact interrupted supplies causes many purchasing agents to continue to “hedge their bets” and retain some form of alternative sourcing for many, if not most, items.

**Federal Procurement Authorities.** From one vantage point, that of a competitive
governmental procurement system, moving to a single supplier seems to run counter to the expressed values of that system. The desire for equal opportunities to compete for government contracts and taxpayer dollars influences the perception of this issue as does the belief that competition among potential bidders provides the best assurance that the government will pay the lowest price. These values would seem to argue for continual competition for each increment or batch purchased of a particular product. If these values were predominate, we might expect to see a constant turnover of suppliers for a given product. In fact, summary data for the procurement system reveals that competitive procurements are in the minority. As the data presented earlier in this report indicates, while the "standard" for procurement is full and open competition and everything else is an "exception," the exceptions represent a majority of the Federal dollars spent on procurement.

In addition to there being less competitive procurement than supposed, a large percentage of the total federal procurement dollars goes to a relatively few number of companies. In 1994, the "Top 100" companies accounted for about 57 percent (more than $100 billion) of the total non-small purchases ($174.6 billion) (there were approximately $21.7 billion small purchases). Twenty-four companies did over $1 billion worth of business with the Federal Government in 1994, the biggest was McDonnell Douglas at just under $10 billion (Federal Procurement Report, 1994, p. 14,15,74,75).

In practice, the opportunity for "single suppliers" (depending upon the unit of analysis) is in some instances a practical reality and the opportunity to approximate such
a relationship is also substantial, particularly when linked to the topic of the next section, “long-term relationships” which is affected by the length of contracts. The objective in using a single supplier in the Federal government, however, has less to do with reducing variation and more to do with attempting to minimizing the cost of the transaction and the costs of changing suppliers.

Establish Long-Term Relationship Based on Trust

The Operational Definition. There are, obviously, two components to this element: “long-term” and “loyalty and trust.” Unfortunately, Dr. Deming was never explicit about what he meant in either regard.

To review, Deming espoused long-term (long lasting?) relationships because these create conditions which encourage suppliers to innovate. Without expectations for future business, why would a supplier invest in improvements (Deming, 1986, p.35)? But how long is “long-term?” Deming never says but we can surmise that it is as long as the supplier is committed to continual improvement and continues to provide products at an acceptable price and with quality that meets the needs for use of the customer. To Deming, such an arrangement lets data from the process “speak to” management. Decisions about the future are derived from data about the process, not from some predetermined legal obligation. “The overriding requirement for a single supplier is his burning desire and ability to work with you on a long-term basis” [emphasis in the original] (Deming in Neave, 1990, p. 318).

If Deming’s operational definition of “long-term” lacked the specificity of a legal
contract, he was even less specific in defining what he meant by “loyalty and trust.” By loyalty we take him to mean a faithfulness to the supplier as long as that supplier maintains a commitment to continual improvement (thus reducing variation) and with the willingness to work with the customer to meet customer needs.

As the literature review revealed, the concept of “trust” is multifarious. It is both anticipatory (an expectation) and judgmental (the result of keeping commitments, having technical competence, and attending to the relationship). Dr. Deming does not provide his definition, but again, his would probably be a pragmatic approach, based on business needs, the need to reduce variation. Thus he would probably view trust without a moral dimension and look at it in the judgmental vein since that comes from data supplied by the process of relating over time. If a supplier keeps commitments (on price, on quality, on delivery), is technically competent and committed to continual improvement, he is to be trusted. Deming would not base trust on a personal affinity but rather would base it on a business relationship that reflected the keeping of commitments and a dedication to continual improvement.

Industry Experience. The notion of “long-term,” because it is generally quantifiable, is often covered in the literature in the sense that the length of contracts is identified and compared. Richardson reports contract lengths of 3, 3.1, and 1.5 years respectively for auto, heavy construction equipment and TV companies responding to his survey. Fortunately, this study also reports on "relationship length" which was reported as 5, 15, and "many" years respectively. And, “(a)ll of the firms expressed commitment to
developing longer-term relationships with their suppliers" (Richardson, 1993, p. 61).

In general, this longer-term relationship is reflected in the industrial literature as "partnering" and while there is no single definition, all express the recognition of greater interdependency between suppliers and their customers. Such partnerships "... are a departure from a relationship that was sometimes adversarial. Adversarial relationships may not have resulted in defective products, but such relationships often resulted in sullen service, posturing, price gouging, or other tactics that inevitably diminished the overall quality" (Hutchins, 1992, p. 7). The concept of partnering seems to be another way to articulate exactly what Dr. Deming was advocating in terms of the relationship.

In one construction, "partnering" is defined as:

... a business culture that fosters open communication and mutually beneficial relationships in a supportive environment built on trust. Partnering relationships stimulate continuous quality improvement and reduction in the total cost of ownership (Erickson and Kanagal, 1992, p. 17).

The NCR Corporation is reported to be an early advocate of partnering and in 1986 indicated in its annual report that: "We think of our suppliers as partners who share our goal of achieving the highest quality standards and the most consistent level of service" (Hutchins, 1992, p. 23).

While no comprehensive research could be located on the breadth and depth of the establishment of partnering relationships (involving some form of long-term, trusting interdependence), their presence is pervasive in the anecdotal stories told by all who advocate the quality management principles, be they directly or indirectly reflective of
Dr. Deming's philosophy.

**Federal Procurement Authorities.** The authority for Federal agencies to establish long-term, trusting relationships or to enter into such interdependencies is, again, situational. In macro-level analysis, by statute and regulation, such relationships would seem to be contrary to the intent of the procurement system and the realities of an annual budgeting environment. In actuality, however, in many instances, such as with major system acquisitions as occur in the Department of Defense or with research and development programs, long-term relationships do exist, though not always on the basis of mutual trust. Sometimes the relationship may be long-term but adversarial, or at least formal and arms length (Hunt, 1984, p. 248).

In the early 1980's Hunt proposed his two models of relationships for Federal research and development efforts, his formal (F) model and the joint (J) model. The F-model was predicated on what he says was:

. . . a customary image of commercial suppliers in which almost no one really believes but nearly everyone acts as if they do; i.e., that contractors are wholly national contract-by-contract profit maximizers whose decisions a buyer can conveniently control in all relevant respects by the simple mechanism of a suitable structured contract . . . (which) leaves little room for “discretionary” program management (Hunt, 1984, p. 249).

In contrast, the J-model “emphasizes nonbureaucratic cooperative problem-solving and shared managerial tasks” (Hunt, 1984, p. 251). Thus, in many instances, depending upon the category of acquisition and the particular solicitation vehicle, longer-term relationships are not only possible but are a structural reality.
Where long-term relationship exist, they may or may not reflect a high degree of trust. The length of a contract affects the degree to which a track record can be established. The longer the contract, the better the opportunity for judging the degree of commitment and the technical competence. So while longer contract periods provide increased opportunities to develop trust, trust is not an automatic outcome of a long contract. The nature of the solicitation also bears on the relationship: sealed bids demand little or no communications between the supplier and the government, but all negotiated contracts do, and it is in part through such a dialogue that trust, or mistrust, is established. In practice, Federal procurement policies permit long-term contracts and hence, long-term relationships but these need not be based on trust but may be based upon the high cost of changing suppliers.
CHAPTER IV
Federal Procurement Processes

Introduction

Federal procurement processes are established by the laws and regulations broadly outlined in Chapter III under Federal Procurement Policy. The purpose of this chapter is to provide an overview of the steps and processes that have been derived from those foundations. It will identify the major categories of acquisitions, the stages that an acquisition goes through, the types of contractual arrangements used, and some of the major actors in these events. A basic understanding of these processes is needed to understand the interview data that is reported in Chapter V and analyzed in Chapter VI.

Major Acquisition Categories

The Federal Acquisition Regulation (FAR) identifies six special categories of acquisitions, each of which possesses attributes which distinguish it from the general category which includes all other items.

1. Major System: for the Department of Defense, these are projects where the cost of research, development, test and evaluation is more than $75 million or the total cost is estimated to be more than $300 million. For civilian agencies it applies when the total cost is more than $750,000. Competitive procedures are to be used as long as it is “economically beneficial and practical to do so.”

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7Figures are from the 1993 edition of the FAR and are to be calculated in 1980 constant dollars. Thresholds may be increased by OMB Circular A-109.
2. Research and Development: intended to advance scientific and technical knowledge . . . directed toward objectives for which the work or methods cannot be precisely described in advance. It recognizes the possibility of failure. Work should be pursued with reasonable flexibility and minimum administrative burden. Generally not suitable for "sealed bids," hence will be "negotiated."


4. Service: includes both personal services (employee appears to be a Government employee) and nonpersonal services (employee does not appear to be a Government employee). This area can include maintenance, overhaul, repair, base services, etc. Cannot include performance for inherently Governmental functions. Generally are competitive, sealed bid contracts.

5. Federal Supply Schedule: provides Federal agencies with simplified process of acquiring commonly used supplies or services in varying amounts while obtaining discounts for volume purchases. Managed by the General Services Administration (GSA) which in turn procures the supplies from the commercial sector.

6. Information Processing Resources: used for certain automatic data processing, telecommunications, and related resources. They are covered by a separate regulation. (Federal Acquisition Regulation, 1993, Parts 33-39)
The general model for acquiring Federal goods and services involves three stages: Planning, Source Selection, and Contract Administration. Each stage has a number of steps as outlined in the diagram below:

THE ACQUISITION STAGES

ACQUISITION PLANNING

Requirement → Requirement → Specification → Procurement

Requirement → Specification → Request

SOURCE SELECTION

Solicitation → Evaluation → Negotiation → Selection → Award

CONTRACT ADMINISTRATION

Assignment → System → Performance → Mods → Payment

Compliance → Measurement → Closeout

(adapted from Cook, 1988, p. 8)

Some 112 sub-steps have been identified by the Office of Federal Procurement Policy.

For example, within the planning stage the following functions are identified:

* Assign contracting officer
* Choose source selection board
* Establish source selection authority
* Review procurement request and documentation
* Develop a source selection plan
* Develop an acquisition plan
  – Determine type of contract, pricing arrangement
  – Determine type of competition
  – Establish conditions to use sealed bid
  – Develop special clauses
  – Identify long lead items
- Approve deviations
* Obtain approval if noncompetitive procurement
* Obtain clearances/delegations
* Obtain prevailing wage determination (Cook, 1988, p. 10)

**Stage One: Acquisition Planning**

Generally, each procurement action starts with the perception of a "need" and generally follows the flow depicted above. That need may be simple and very specific or complex and vague. But eventually it gets translated in action by a government employee. Sometimes the government will decide to make the good itself or provide the service using government employees, but this research assumes that the decision is to buy the good or service from the private sector.

In the general model, the need perception is transformed into specifications, a detailed description of the item desired or the service to be performed, unless, of course, if falls into one of the special categories, such as research and development, in which case detailed specifications may not be possible or desirable. While not the subject of this research, in parallel with these activities there must be a budgeting process by which funds are obtained either from within agency resources or from Congress. This provides another check on the legitimacy of the requirement but can also affect the administration

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*It is possible, however, for "solutions" to be developed before that need becomes apparent. This is particularly true in research and engineering where new technologies may be discovered without there necessarily being a requirement.

of the procurement by making it fit the budget cycle rather than the optimum production cycle. Obviously, without funding, all else is moot.

Once specifications have been prepared and funding approved, the contracting officer must decide whether the procurement should use competitive procedures or not.

The "Competition in Contracting Act of 1984" (CICA) (PL 98-369) "... for the first time clearly established a legislative requirement to compete regardless of the method of procurement utilized" (Preston, 1986, p. 2). In the case of a competitive procurement, the next decision is whether it should be a sealed bid or negotiated process. In a sealed bid process, selection will be made based up the lowest bid from a responsible bidder who responds adequately to the solicitation. A negotiated process permits the offerers and the government to discuss the requirements and possible solutions before final selection is made.

While competitive procurement is the standard, the CICA permits seven exceptions to this policy (down from seventeen in prior legislation) (Preston, 1986; Callahan, 1987). These include situations where the product or service is available only from one responsible source; to maintain a source in the event of a national emergency; for national security purposes; or, when an agency head determines (with Congress notification) it is in the national interest (Callahan, 1987, p. 71). These exceptions are important for they permit considerable latitude for the procurement of items for national defense and at least to one observer, the history of Federal procurement is the history of military procurement (Nagle, 1992, p. 2). In fact, in the years prior to the passage of the CICA in 1984, the
General Accounting Office estimated that as much as 85 percent of defense contracts were not competitively bid (Sharansky, 1980, p. 119).

In the case where an exception to the CICA is appropriate, the normal method of procurement is through the use of "sole source" arrangements. In these cases (e.g., a follow-on procurement to upgrade the electronics in a military aircraft) the government contacts a contractor (usually the one who built the original) or the one known to possess the technical skills and resources needed to accomplish the task.

Whether the procurement is competitive, sealed bid or negotiated, the intent by this point in the process is for the government to have a set of expectations which will be sent to potential vendors.

**Stage Two: Source Selection**

If the contract type is to be a sealed bid competitive arrangement, the resultant solicitation is sent to a list of potential bidders for that type product and the solicitation is advertised in the *Commerce Business Daily*. Companies or individuals choosing to bid must do so within the announced time frame. "The contract is then awarded to the responsive/responsible offerer who submits the lowest price or to the offer that is most advantageous to the government" (GSA, 1986). If appropriate, solicitations may be sent only to small businesses, qualified minority owned firms, women-owned firms, or firms in areas of high unemployment rates in a conscious effort to use the procurement system to further socioeconomic goals (GSA, 1986).

Much the same procedure is followed for negotiated competitive procurements, the
difference being that there is an opportunity for a dialogue between the government and the potential bidders. Such dialogue, however, must be carefully conducted so that all potential bidders receive the same information at the same time and that selection criteria are identified in the original solicitation. The dialogue may go a number of rounds before the government asks for the “best and final” offer. If responsive to the requirements of the solicitation, which by this time may have been modified, the award will normally go to the lowest bidder.

A negotiated sole source procurement (an exception to competitive bids) follows a different course. In these instances, the government makes contact with a supplier with whom a dialogue may continue for as long as needed to reach an agreement. A number of actions are necessary to avoid collusion. These include approval from the agency’s “competition advocate” (a function established by the CICA), approval by senior agency officials (depending upon the dollar threshold), and preparation of pre-award “clearances” (publicly available explanations of the decisions made).

In cases of extreme urgency or high levels of uncertainty, another procedure called a “letter” contract is available and is normally used to get projects underway with a minimum of paperwork but is followed with a sole source, negotiated contract (FAR, section 16.603).

Despite the emphasis on the selection of the lowest bidder, the Federal Acquisition Regulations permit considerable leeway. While price must be a consideration, “quality” must also be considered as an evaluation factor in every selection.
Quality may be expressed in terms of technical excellence, management capability, personnel qualifications, prior experience, and schedule compliance. Any other relevant factors, such as cost realism, may also be considered. In certain acquisitions the government may select the source whose proposal offers the greatest value to the government in terms of performance and other factors (FAR, 1993, Section 15.605 (a)(b)).

A similar requirement, in fact perhaps an admonition, to consider quality in making awards is contained in a July 3, 1995 announcement in the Federal Register on a final rule for the FAR:

(a) The vision of the Federal Acquisition System is to deliver on a timely basis the best value product or service to the customer, while maintaining the public's trust and fulfilling public policy objectives. Participants in the acquisition process should work together as a team and should be empowered to make decisions within their area of responsibility [emphasis added] (Federal Register, July 3, 1995, p. 34733).

The rule goes on to state that the system will satisfy customers in terms of cost, quality, and timeliness; should use contractors with a proven track record; should promote competition; and conduct business with integrity, fairness, and openness. It calls for the establishment of an “Acquisition Team” composed of representatives from the technical, supply, and procurement communities “... but also the customers they serve, and the contractors who provide the products and services” (Federal Register, July 3, 1995, para. 1.102 (c)). Furthermore, all members of the team are to use their own initiative and sound business judgement in providing the “best value” product or service to meet the customer's need.
Following any negotiation\(^{10}\) that may be appropriate, selection is finally made, usually by a selection board, a level above that of the contracting officer. While normally a single winning contractor is selected, the Department of Defense uses a technique called “dual source” procurements in which the total government purchase is split between two contractors, “. . . with the larger share going to the lowest bidder and the smaller share going to the higher bidder. Thus we generally do not have a winner-take-all situation” (Math, 1991, p. 31). The purpose of this procedure is to protect the national security related industrial base.\(^{11}\)

Having made it this far, a written contract is finally signed. A contract (always written in the case of the government) is, of course, an “. . . agreement for the exchange of performance in the future” (Thompson, 1967, p. 35) and serves to reduce potential uncertainties for the participating parties and to prevent opportunistic behavior. But even contracts do not provide an absolute guarantee of performance. Witness the case of the Navy’s A-12 “Stealth-like” bomber program which was canceled for alleged non-performance by the contractor after nearly $3 billion had been spent on it. The contractors, however, sued claiming that the government had failed to provide the needed technology and appeared (as of December, 1995) to be winning their case (Mintz, 1995, 107).

\(^{10}\)Under the Truth in Negotiation Act of 1962, contractors must certify to the accuracy of their costing data and have been found liable if later to be found in error.

\(^{11}\)Additionally, Mark Cancian points out that in the 1980’s there was a tremendous rise in the size of what DOD calls “black programs,” acquisitions that required extraordinary security (such as the “Stealth” bomber) because this status removed many of the reviews and outside interference. (Cancian, p. 193)
While the next steps in the procurement process normally follow the winning contractor into the final stage, contract administration, attention should not be lost on the “losing” bidders. The procurement system contains provisions for the “losing” companies (FAR, Part 33) to protest the award and establishes administrative procedures for fair and equitable treatment for these claimants. Under some circumstances the filing of a protest is sufficient to suspend execution of the contract by the “winning” company and may force the agency to re-compete the contract in whole or in part. The right to challenge government decisions and the presence of administrative procedures to review such decisions serves as a protection against arbitrary decisions by government employees. This protection, of course, must be balanced against the time and attention required by contracting officers to either avoid a protest or to recover from such a filing (Callahan, 1987).

Stage Three: Contract Administration

Contract administration involves the establishment of appropriate oversight mechanisms for performance and financial aspects of the contract, mechanisms to handle modifications should such be appropriate, and final close out activities. The FAR specifies that Federal agencies should share contract administration and auditing services to provide consistent treatment of contractors and to optimize use of Federal manpower at or near the contractor’s location (FAR, Section 42.100). To this end, the Department of Defense has created the Defense Contract Management Command, responsible for
representing all government interests at a particular contractor site. DOD has also established a Defense Contract Audit Agency responsible for providing centralized auditing services to all Departmental elements. Other Federal Departments are encouraged by the FAR to use these Defense assets on a cost reimbursable basis.

Contract oversight is normally performed by Contract Administration Officers to whom the FAR assigns some sixty-six functions as diverse as reviewing contractor's compensation plans, their insurance plans, conducting post-award orientation conferences, reviewing and approving requests for payments, and monitoring contractor financial conditions. When specifically authorized, they may even negotiate or execute supplemental agreements incorporating contractor proposals, supplemental delivery schedules, and issue change orders (FAR, Section 42.302). Thus, the Contract Administration Officer has significant contact with the contractor but may or may not work in the same formal hierarchy of the contracting officer and the ultimate user.

Each contract with the Federal government is expected to have provisions ensuring that supplies and services conform to the contracts quality and quantity requirements. This is addressed the FAR, Part 46, “Quality Assurance.” For commercial and non-complex products it may be sufficient for the contractor to establish, maintain, and demonstrate an inspection system that is acceptable to the government (although the government reserves the right to conduct its own inspection). For products of higher complexity, the government may require independent inspection and testing, including having conformance established progressively “... through precise measurements, tests,
and controls applied during purchasing, manufacturing, performance, assembly and functional operation" (FAR, Section 46.202). Failure to comply with requirements by either party can lead to suspension and debarment from competing for government contracts on the part of the contractor (Nagle, 1992; Elmer and Gourly, 1988) or reimbursement to the contractor if the government is found at fault.12 Quality assurance specialists are assigned to conduct the required inspections and agencies are encouraged to share resources on a locality basis. Some contracts also include provisions for warranties on the product, further insuring that the product will meet the requirements and perform as expected.

Assuming that all parties to any Federal contract are satisfied that the product or service meets the agreed quality, quantity and schedule requirements of the contract and that the contractor has undertaken no opportunistic behavior, close out and final payment occurs. While cases where the system goes astray are periodically reported in the press, "(t)o be sure, much of the federal procurement system works reasonably well in terms of fairness and equity. Given the relatively huge volumes of activity and money involved, corruption is remarkably rare and federal contractors contribute much of value" (Gore, 1993, p. 1).

CHAPTER V

The Research Results

Naval Air Systems Command, United States Navy

Quality Framework

Mary Walton, in her 1990 book Deming Management at Work, devotes a chapter to the recognition by the United States Navy of the merits of the Deming quality philosophy and its subsequent implementation (Walton, 1990, pp.147-184). Among the components adopting this method of management was the Naval Air Systems Command, the 1994 winner of a Presidential Quality Award. NAVAIR, as it is known, develops, acquires, and supports aeronautical and related technology systems (i.e., missiles) with which Navy operating forces train for, and conduct, naval warfare. It is the logistical arm, if you will, of Naval aviation. It manages more than 200 programs, has an annual budget of about $16 billion, is located at eighteen major facilities in the United States, and has about 47,000 military and civilian employees. The Headquarters element, which was the target population for this research, is located in Arlington, Virginia, about a mile from the Pentagon. It initiated its quality management program, known as “Total Quality Leadership,” in the mid-1980's and recognizes the following results:

Development of a quality structure and vision leading to a cultural transformation, increased focus on our customers, greater training and empowerment of our employees, improvements in primary processes throughout our organization, significant business improvement savings, reduction in layers of management and red tape, and enhanced union/management partnership (NAVAIR Presidential
Procurement Environment

There are four salient points to consider in setting this stage: past supplier-customer relations; the effect of downsizing on the Defense establishment; the nature of contracting in NAVAIR; and, how quality management involves all organizational processes.

1. All respondents save one provided a historic, not necessarily a personal, view of the relationship with industrial suppliers. The most commonly used adjective was "adversarial." Other descriptive terms included: "great deal of mistrust," "communications just terrible," "we were going to be at each other's throats all the time," and "it's the government against industry." Some contracting officers (not the respondent) think "... industry is the bad guy and the way I make my name and add value is proving that the contractor is an --- and show how I can fix him" (R2). "I can remember back to the 70's when doing business was strictly conducted as a game ... in smoke filled rooms with people calling each other names and stuff like that" (R4). "Well ... there has always been an animosity, if you will, between the contractor and the government. Government thinks contractors are paid too much and do too little for the amount of money that they have so you have always had this offensive - defensive game being played" (R6). "We've been taught that the contractors are adversaries, enemies" (R8). "... (I)t was just a terrible, terrible game" (R8).

2. NAVAIR, like most elements in the Department of Defense, has been consider-
ably reduced in size during the past few years. From a high of 53,000 employees four years ago, it is headed toward 28,000 by 1999 and will reduce the 18 major facilities to eleven in the same time frame (R1). This “downsizing,” according to several respondents, has provided the major impetus for “... reengineering the acquisition process,” for:

. . .(T)rying to go in and reengineer and streamline those processes because we do an awful lot of stuff and a lot of it is buried in tradition and regulation that would be fairly easy to cut through if we could just open our minds a little bit . . . but . . . probably the most important is trying to change the way we interface with industry (R1).

3. The component of NAVAIR that provided the target population contracts mainly through the special procurement category of Major Systems Acquisitions or uses defense related exemptions (follow-on contracts) from the normal standards of competition. In Fiscal Year 1995, sole source contracting accounted for 35 percent of NAVAIR Headquarters contracts. No case of competitive sealed bid contracting was discussed by any respondent. As a consequence, only two kinds of contractual situations were described by the interviewees: “sole source” and “negotiated competition.” Despite the nomenclature however, negotiations occur in both instances, except in the first case it occurs directly been the contracting officer and the contractor and in the latter, between the government and the whole set of potential bidders.

In the case of sole source procurements, the negotiation ultimately occurs just between two people, a representative of the government and one for the contractor (though each may have lots of backup). Normally, the conditions of face-to-face
negotiations apply: how each party attempts to avoid being taken advantage of. In the case of negotiate competition, the government “negotiates” the set of requirements, specifications and understandings of the nature of the procurement simultaneously with all potential bidders, then accepts the lowest bidder or the offer that presents the best value. In these cases, all potential bidders must be given equal access to all information at the same time in order to avoid any appearance of government partiality.

4. Organizations involved with implementation of quality management principles may choose to focus improvement efforts on internal processes, external processes, or some combination of both. Normally, improvements to the procurement system involve some combination since many activities of the cycle must be performed internally by government employees yet by definition the system involves relationships with external suppliers. Consequently, efforts initiated with the intent to improve internal processes may coincidentally also improve processes involving external suppliers. In the case of NAVAIR, activities were described that while perhaps intended to improve internal processes, also resulted in improved relations with the contractors.

Data Collection

Entrance was acquired through NAVAIR’s command quality office which reviewed the proposed collection technique and made the initial selection of interviewees. It was suggested that the term “Total Quality Leadership” not be used in the interviews and that the term “streamlining” be substituted. This was done. NAVAIR is

most heavily involved with the planning and selection parts of the procurement cycle and contract administration is delegated to the Defense Contract Management Command. So most of the discussion dealt, as it turned out, with the planning and selection phases. Furthermore, though many people with different skills interface with contractors, it is “contracting officers” that have the legal authority to negotiate contracts and make changes to them. Thus, it was decided to interview primarily individuals in this job classification or their supervisors. Interviewees were, for the most part, members of the element responsible for the acquisition of “Air ASW (AntiSubmarine Warfare), Assault and Special Mission Programs,” a group that, according to the Quality Office, was particularly aggressive in establishing new relationships with contractors. Nine in-depth interviews were conducted between November 6, 1995 and December 12, 1995. Each was conducted in the interviewees office and recorded by consent. Standard interview protocols were provided to each interviewee.

The interviewees consisted of seven Federal civilian employees, grades Senior Executive Service through GS-14, and one military officer, a Naval Captain. All had been in the contracting or acquisition career field for many years, the fewest being seventeen years and longest being twenty-six years (average was 20.25). They averaged 22.8 years of Federal service. As mentioned above, to maintain anonymity, each was assigned a “Respondents” number in sequence “R--” and will be referred to by this number when appropriate.
Data Results

Five of the respondents spoke of their ability to apply what they called "best value" criteria to the selection process. One said:

I have best value contracting where we are taking multiple factors into account. I'm taking into account cost obviously, but I'm also taking in technical, and logistics, and ... account management ... and quality (which) also ties into logistics, reliability and maintainability (R3).

Another indicated:

We're permitted under the evaluation criteria we apply to make the judgement whether or not the more expensive system which provides greater performance is worth the additional cost over the more basic bid. And so our source selection procedures provides for that and we have been doing that fairly aggressively, I'd say, for almost ten years. And sort of mandated for the last five or six. But it has been used spottedly I know for many years (R2).

This respondent also indicated that while there had been industry protests over source selection involving the best value concept, the General Accounting Office (the auditing element of the Legislative Branch) had almost always sustained the initial evaluation as long as the evaluation factors had been previously identified, each was thoroughly assessed, and the selecting authority made a "rational decision." "(A)s long as you are reasonable ... and ... thorough and ... well documented, you can do the smart thing" (R2). "It gives you a little judgement instead of being a rule that the lowest bidder must win" (R8). Another indicated:

I think you have to show, to have to clearly show what you are getting value for the extra cost, but we generally do see it. We'll go through our evaluations of the competitive proposals and generally see different levels of quality and sometimes we get lucky and highest level of quality is also the lowest price ... they are not mutually exclusive (R4).
Yet, one respondent indicated that the Navy tends to go to the lowest bidder because "(i)t is easier to justify. It is hard to define 'best value'" (R5).

All respondents discussed the more general proposition that "total cost" could be reduced by streamlining procurement processes and by improving the dialogue (both internally and between the government and industry) that occurs during the contracting process. In the early 1990s NAVAIR started to use what are called "Integrated Product Teams." These were expanded to include other government actors, particularly government auditors from the Defense Contract Audit Agency and plant representatives from the Defense Contract Management Command. Now, even the contractors are sometime invited. There has been a steady move towards full inclusiveness of all the players who may have knowledge of total costs in the process.

Of note here is that NAVAIR is instituting what is being called a "competency" based organization. In this scheme, a "competency" (contracting, logistics, engineering, law, ethics, etc.) attends to the training and professional development of people with those skills, but these people "work for" a team leader responsible for a product with teams being established along product lines on an as needed basis. Thus, an "integrated product team" will have members from all the "competencies" needed to accomplish the development and acquisition of that product. This use of these product centered teams was mentioned, usually numerous times, by every respondent and their integration to include contractors was stressed. These teams appear similar to the "mandate teams" proposed by Carlisle and Parker in their text Beyond Negotiation (see Chapter III above).
One frequently cited example of this teaming concept involved a sole source acquisition of a follow-on component for a helicopter. At the suggestion of the contractor, a team was established to expedite a particularly critical procurement under this overall project. New ways to split up the contract for review were devised, actions were performed in parallel rather than the standard sequential form, and permission was obtained for government officials to review the contractor's proposal in draft form before formal consideration:

And we (NAVAIR) said, OK, well, it is put up or shutup time. Here's what we want to do: we want to be there while you are preparing your proposal. All the curtains come down. We get to see your warts. When you are putting in a management reserve, you're telling us that it is a management reserve. We are not going to play hide the pea. It is not a shell game anymore. We're there. And you're there. And our auditors are there, the Defense plant representative office, we're all there, we're all looking at it, and we are asking you the questions while you are building the proposal (R3).

While only one such instance was related of this much government involvement, internal teams were reported as being frequently operative and contractors are included at the earliest possible stage, depending on the circumstances. In contrast to the old method where the government would "... throw a requirement ... over the fence and tell the contractor to go away and do it and come back and deliver it to us when you're ready ..." (R7), NAVAIR is "... trying real hard to integrate our teams where we have government/industry people sitting side by side losing their identity and focused on the product" (R1).

Since the type of contract involved is often what is known as a "cost plus fee"
contract where the government pays for whatever costs are incurred plus a fixed (or variable) fee for profit on top of that, there are opportunities to avoid costs throughout the development and production cycle:

(T)here were 17 major contractor houses (in the meeting). And I stood in front of them and said: Here is what I expect of you. You will provide people for joint government/industry integrated product teams. But you must understand that I will support this only as long as they are responsible to the product. If I get the feeling that they are withdrawing and being loyal to you, or loyal to a site, instead of loyal to the product, than all bets are off and we can go back to the way we've been doing business in the past ... And overall, it has been pretty successful (R5).

Other cost reductions are being applied to internal process improvements, both through the use of automation and the elimination of unnecessary paperwork, some of which directly influence the government's ability to come up with better “total cost.” In one case, the government is linking up directly with costing data in the contractor's data base, providing the contractor with “... less opportunity to monkey around” (R3). One respondent indicated that since the government does not do well at developing “should cost” data (data used by auditors to check the price and costing data submitted by a contractor prior to the award of a sole source contract) direct computer to computer linkages between the government and the contractors could greatly assist the government in understanding what products really ought to cost (R6). Simple things like standardizing the style of the automated spread sheet used by both the government and contractor has also saved time and manpower (R6).

The interest in cost reduction, along with the reductions in manpower and available funding, have been the driving forces behind NAVAIR's reassessment of what total
costs truly are and led them to reduce processing time. According its award booklet, development of management guides and checklists for use by contractors and government personnel in the preparation and review of Engineering Change Proposals has reduced preparation time by 45 percent, approval time by 35 percent, and first-pass approval rate by 21 percent. Average processing time for major procurements has been reduced from 147 days in 1991 to about 50 days in 1994 (NAVAIR Award booklet, p. 20).

Thus, through increased use of automation, improved processes, and teaming NAVAIR has been reducing total cost of procurement while, apparently, using the "best value" authority to consider total cost in its procurement actions.

The issue of moving toward a single supplier for NAVAIR is colored greatly by the nature of the products acquired. Generally they are what might be called "end items": a helicopter, a missile, an airplane. While each is part of a larger combat system (and must have people to operate them, fuel to move them, and ordnance for them to deliver), they are large, complex "systems" unto themselves. They generally require years to develop and produce and once a contractor is selected and the initial purchases completed, it is prohibitively expensive to change contractors. Likewise, contractors which provide major components of say a helicopter, will also be the most likely candidate to produce any follow-on or upgrades of that component since they are the most knowledgeable. Thus, in many instances there already is a de facto single supplier.

The presence or possibility of a single supplier was not always to the liking the
Lack of competition is difficult . . . especially when you get into major weapon systems. Because how many F-18s are there? How many manufacturers are here? And it makes it tough, because some of these companies know they are the only game in town. And it makes it tough to negotiate with them (R8).

Competition is still my preferred method. Because I get lower prices with competition and I get better quality with competition. And, a lot of the Deming rules don't apply because I have a different kind of business (R3).

When push comes to shove, I'm counted on to protect the United States of America, and if I go with one contractor, and this is somebody I can trust and the quality is always going to be about the same, what am I doing about my surge capability (R3)?

And competition drives so much of my technological development . . . two or Three contractors duke it out year in and year out. And the loser of each competition is going to get a percentage of the total buy so we can keep two contractors in place with the technological advances that they keeping banging against each other (R3).

This latter instance is a case of what is called in the Department of Defense, “dual sourcing,” an arrangement wherein the Department reduces uncertainty by keeping two contractors in a nominally “competitive” market but it is essentially intended to maintain an industrial base. As this respondent indicated, from his perspective, it also resulted in better products.

While permitted to sustain single suppliers for many of it purchasing decisions, interviewees displayed some ambivalence with this reality and did not display a desire to emphasize the need for single suppliers.

With respect to the establishment of long-term relationships based on loyalty and
trust, Dr. Deming put no time domain on the idea of "long-term." In his construction, the
duration was predicated on the ability of the supplier to provide the product with the
quality required by the customer under conditions of continual improvement. As a
practical matter, however, government relationships with contractors are in fact predi-
cated on a formal contract with some designated time limit, subject to periodic renewal.
As described above, the conditions of NAVAIR procurement for this set of respondents
was largely sole source with contractors who have provided the same product for some
time. Thus, "long-term" relationships exist, again on a de facto basis. Respondents made
no specific comments on the length of their association with specific contractors beyond
those quoted above displaying some concern with the commitment to a single supplier.
But the nature of these relationships was frequently mentioned. Historically it has been
categorized by a lack of trust. Long-term relationships do exist, but for operational
reasons and not because of the presence of trust.

Factors mentioned as contributing to the lack of trust, in addition to those already
mentioned, included: government regulations (R4); government managers who are not
good listeners (R5); industry that protests too much (R1); government thinking it has
"perfect" requirements (R7); and, contractors who were "fat and lackadaisical" (R7).

On these issues, one respondent indicated that an effort had been made to signifi-
cantly reduce the regulations that were needed. A two-inch manual of contracting in-
structions had been "reduced" to eight pages, but it was confessed that while the conden-
sation made a nice overview, it had not resulted in the elimination of the manual (R3). A
review of the manual indicated that it contained the forms and procedures needed to establish and complete a procurement action, however copious in the breadth and detail. The respondent indicated that some form of a check list (which the manual provides), some means of standardization of data (which the forms provide) and some sequence of events recognized by all (which procedures provide) will continue to be needed. Another respondent indicated that in his experience, perceived procedural restrictions and constraints had usually been locally generated and were not based on statutes or even Departmental instructions (R4). In his view, to the extent that the procedures constrained the procurement function, this was often a case of a “self-inflicted” wound which could be locally repaired with the proper incentives and change in culture (R4).

An issue of industrial protests to the outcome of competitive selections was identified by a number of respondents. They indicated that protests were a common occurrence and were perceived to be increasing. The respondents perceived that the rate of protests could be an indicator of the success or failure of their efforts to improve communications with the contractors and their efforts to streamline the procurement process. Data from the Command Financial Management staff indicated that the Command had averaged about 40 competitive awards per year from 1991 thru 1994 and that protests had in fact increased from 1991 to 1993 but decreased in 1994 and were at a low rate for the period in 1995 for which data was available (about half the year). Thus, the respondents’ perceptions may not be keeping up with the latest data.

As important to the respondents as number of the protests, however, was the
number that had been sustained (low being the best for the Navy). A total of 184 competitive contracts had been awarded by NAVAIR Headquarters between 1991 and 1995, 47 of which had resulted in industry protests, a rate of 25 percent. Of the 47 protests, however, only one had been sustained by the reviewing officials. Interestingly, data from NAVAIR components in the field indicated that rate of industry protests tended to be lower per award than experienced at Headquarters. Furthermore, the rate was the lowest since the inauguration in 1993 of joint government-contractor source selection symposia (briefing slides, private communications, 1996).

It was in the context of current efforts to change the relationship and the building of trust that respondents referred often to “teaming” or “partnering” and new ways to integrate government and contractor employees. One effort, informally referred to as “Alpha Acquisition,” grew out of a contractor proposal to do things differently. The president of the company approached NAVAIR and said: “We want to do something different. We want to improve the process. We want to be the Alpha contractor. We want to be the one that you turn to when you want to try something smarter and better” (R3). Another respondent, in reflecting upon the resulting experience indicated:

That was done very well but it did indeed take higher management and the result was, after the fact, a little better level of trust . . . (a)nd so we developed that, we were more comfortable with each other, we were able to get things done and then follow it up with written documentation. Nothing that would put either he or the government at substantial risk, but things that just could move quicker because we had developed that level of trust (R8).

In this particular instance, (also cited above) processes were worked in parallel instead of
the standard serial or sequential order. Government auditors from the Defense Contract
Audit Agency, which performs the auditing function for NAVAIR, were brought in early
and made part of the team: "And they were really excited because nobody had ever made
them part of the team before" (R3). "They were ecstatic because . . . they truly didn't
know how it worked. All they knew was they put their hats on, rolled up their sleeves,
and go in there and audit. And not truly understanding what the end product was or how
the process worked. So they were glad to be part of it from the beginning" (R8). So,

Things were going serially. We had the audit process on-going...and we actually
had looked at the contractor's proposal before he officially released it. And so we
substantially cut down on the time it took from the RFP (request for proposal) to
quote to award. And in doing that, you are working so closely with the contractor
that you had to develop some level of trust. The big thing is that management (on
both sides) has to be totally involved (R8).

More generally, another respondent indicated:

Another item that has to happen is partnership with industry. Building relation-
ships, trust, respect. Not playing games. Partnerships with industry. I and my
people do not see it as abrogating our duties and responsibilities, we still have
these responsibilities to the taxpayers. But we can execute our duties in very
professional business modes with industry without playing all the games (R4).

This same respondent provided an example of how two way communications must
exist and how the government must relinquish its traditional mind-set:

When we write our contracts now, we're trying to, more than we did in the past,
describe the outcomes, the end objectives, as opposed to telling the contractor how
to do the job. Now from that standpoint there's probably more empowerment of
industry . . . because we are giving them a little more flexibility in how they
perform. As an example, we just wrote a large maintenance contract for T-34 and
T-44 aircraft. The contract was for a total of $325 million dollars and in the old
way of doing business . . . we would have said: 'Give us your proposal. We want
you to provide a hundred plane captains, we want you to provide 25 electricians,
we want you to provide 30 janitors, we want you to provide 16 ferry pilots... etc., etc.' That was the old way. The new way is to say: "Gentlemen, we have 346 aircraft located at these three bases, we desire for them to be fully operational at least 80% of the time. These are the maintenance tasks required by the FAA (Federal Aviation Administration) for the aircraft type. Please tell us what you will charge us..." (R4).

A senior official noted that there is "...much more willingness now for government people to engage contractors in teamwork arrangements, a much more complementary relationship has evolved" (R7). And another:

But out of all the teams... and I can't tell you how many different contractors I work with, but I work with every major defense contractor except... and (only) one person out of all those teams that I have had to have replaced, based upon being as open as I can and trying to develop the relationships (R5).14

He went on to note that the whole issue of acquisition reform is based "...upon the concept of developing long term relationships between government and industry. If you are doing that, there is a whole lot more trust and confidence that has to take place. Trust and confidence can only come with being open, and being open always can create the perception of keeping somebody else out, or inside track, or an unlevel playing field" (R5).

How open? This respondent said that once a contract has been awarded:

I don't hide anything. My budget goes right on the table and we all sit down and we say: I've got 'x' dollars. Here are the things that are causing us problems. And we put in front of everybody with every body's expertise because that contractor, not only does he have a vested interest, he has a great deal of experience on what it takes to modify something like that, or where the money should be best spent in

14This respondent also noted that the development of these relationships require that "we...spend a lot of time with our business ethics folks...not because our people are doing wrong things, it's because the potential exists for perception." (R5)
the best interest of the program (R5).

Respondents were, by their account, actively engaged in changing the nature of their relationships with their contractors, contractors to whom they were committed by contract and operational necessity for a long duration. These long-term relationships seemed to be accepted by the respondents and they saw it as being in the government's best interests in light of the reductions in funding and to avoid the high transaction costs associated with the "old way" of doing business.

Summary

There are five important lessons to take away from the data provided by NAVAIR that relate to supplier relations as Dr. Deming expressed them:

1. Single source suppliers exist, but for complex reasons that have little to do with the reduction of variation but is more associated with the complex nature of the item being procured and the costs associated with transferring to a different contractor.

2. Trust can develop in a relationship if one party is willing to try a new arrangement, is willing to say so, and the second party is willing to give it a try.

3. The government is able to establish internal teams, not only within the customer organization itself but it can include other government players such as auditors and contract administrators. These teams can provide comprehensive, knowledgeable, and timely support to its contract negotiators. Because of the sharing of resources, particularly auditors and contract administrators in the Department of Defense, the contracting organization must be willing to make special efforts to include these other important
participants early in the contracting process.

4. These NAVAIR contracting officials still hold the concept of "competition" in high regard and are as yet not willing to abandon such arrangements if they can avoid it. Neither are they willing to forego the opportunity to retain multiple sources for the same item whenever possible in order maintain the industrial base and provide for a surge capability in the event of a national defense emergency.

5. In comparison to the doctoral dissertation study conducted in the late 1980s (Perkins, 1989) some NAVAIR contracting officers do seem willing to consider quality factors in making source selection decisions.
The General Services Administration (GSA) was created by the Federal Property and Administrative Services Act 1949 to manage federal property and equipment. It supervises the construction and operation of government buildings, obtains and distributes supplies to Federal agencies, disposes of surplus property, and oversees the acquisition of certain telecommunications and computing equipment. In general, it was created to provide centralized logistic services to Federal Departments and Agencies. The particular quality award winning component which was the subject of this research is responsible for obtaining and distributing supplies to Federal agencies, providing nearly $800 million a year in common-use goods and services:

Products and services are provided to all Federal agencies with the U.S. Department of Defense, the U.S. Postal Service, and the U.S. Department of Veterans Affairs being the largest customers. These customers demand high-quality products and services, low prices, fast and uninterrupted deliveries, and rapid resolution of problems (FSS Award Booklet, p. v.).

By its own account, Federal Supply Region 2, encompassing part of the Mid-Atlantic area and all of New England, by the late 1980's was in trouble:

...stock levels were inadequate and back orders had skyrocketed; products were sometimes of an unacceptable quality; and customer dissatisfaction was widespread (FSS Award booklet, p. v.).

In 1988 Congress further added to its woes by directing that GSA become industrially funded, that is, no longer receive appropriated funds but rather exist solely on the "prof-
its" it could realize on the sale of goods and services to Federal agencies. Furthermore, Congress removed the requirement that Federal customers had to purchase from GSA, forcing GSA to be competitive in the marketplace. Though some felt this would be the "death knell" of Federal Supply Services, Region 2, it became instead a "wake-up call" (FSS Award Booklet, p. v). Indeed, by 1993 customer satisfaction surveys indicated that their customers now rated them as "10" on a one to 10 scale (10 being high) and "8" on product quality. This transformation occurred in part through the use of "the practices and principles of total quality management . . ." (FSS Award Booklet, p. v.).

Procurement Environment

GSA supplies a wide range of general office supplies as well as many other items used by Federal agencies, everything from rags, to showerheads, to special couplings for fire hoses, to envelops for postal stamps, to tool boxes and wrenches. In so doing, GSA deals with a wide range of commercial enterprises, small and large, and is charged with being an assured outlet for special government manufacturing facilities including prisons. Federal Supply Services Region 2 oversees between 400 and 500 contractors who are making products based on contracts awarded from that Region or any of the other five Regions spread out across the United States. Regardless of which Region awards the contract, its administration will be accomplished by the Region nearest the contractor's facility which actually makes the product. Products are produced in accordance to designs established by GSA engineers who are also responsible for the establishment and maintenance of these specifications. Conformance to these specifications has
historically been used as the measure by which to judge product quality.

Each respondent provided their view of the nature of supplier-customer relationships prior to the transformation. Since the major responsibilities of the respondents involved monitoring compliance with contracts that have been awarded by others staff members, nearly all of their descriptions of relationships were in terms of the contractor's ability to meet the government's contractually established rights:

We were of course all taught in the procurement field that here are the regulations and here is the specific way to do every little thing... (and) it is our job to enforce them (the contracts) to make sure that the contract is delivered on time and that it complies with our terms and conditions (R20).

Ten years ago we'd try to find everything wrong and kill them... Direct them to do this and direct them to do that. We used to play this game with them: 'You're wrong, guess again. Guess what we want for the right answer.' We could always find something wrong and go crazy over it. It was an antagonistic relationship. In court all the time (R21).

Although probably for the first... years that I worked here it was a very adversarial type relationship with our contractors. We did business in accordance with... regulations which (were) black and white and there was no, or there used to be no middle ground... we had very rigid types of rules that we had to follow (R23).

Respondents reported that employees (not necessarily themselves) believed that contractors were going to try to put something over on the government (R26) or were skeptical about contractors and thought that everyone was out to "beat us" (R28). Four respondents indicated that the relationship was "adversarial."

In transforming the status of services in Region 2, the GSA credits three tools: the use of statistical process control (SPC); designation as a "re-invention laboratory" by the
Clinton Administration; and a modification to contracts which allows the temporary purchase of an item outside a contract without canceling a purchase order or terminating the original order (FSS Award Booklet, p. 15). Each of these tools was mentioned by interview respondents.

Data Collection

In selecting the target population for this research, the management of Federal Supply Service Region 2 suggested that the research focus on the “Contract Management Division.” Since this component deals mainly with the contract administration phase of the procurement cycle, this appeared to provide a suitable complement to the NAVAIR components which dealt mainly with the earlier phases (planning and selection) and because, again, the research effort was designed not to compare organizations against each other, but to find the “best fit” with the Deming model. Together, the two organizations would provide a perspective on the entire cycle. Furthermore, the members of this Division deal with a wide variety of small and medium sized contracting firms on a continuous, daily basis and would be able to provide data from a perspective quite different from that experienced by the NAVAIR respondents who dealt mainly with large Defense contractors. Thus, the suggestion was followed and all interviews were conducted with employees of this division. Questions asked of these participants were the same four basic questions posed to the participants at NAVAIR.

The Contract Management Division has about fifty employees, evenly divided among two job skills: Contract Administration Officer (CAO) and Quality Assurance
Specialist (QAS). The CAOs all work in the Federal Office Building in Boston, Massachusetts, but the QASs, who must visit contractor facilities throughout Region 2, work from their homes. Three each CAOs, QASs, and supervisors were interviewed, ranging in grade from GS-11 to GS-15, and averaging 13.55 years in their occupation with an average of 16.7 years of service in the Federal Government. All nine interviews took place in the Federal building on December 11-12, 1995. Each interviewee was provided a standard interview protocol and all interviews were recorded by consent. Assurance of confidentiality was provided to each respondent.

The responsibility of a Contract Administration Officer is to oversee the performance of contracts, to assure conformance with contract provisions in terms of quantity, quality and delivery. Delivery is tracked by date and quantity shipped through telephone contact between the CAO and the contractor. The Quality Assurance Specialist is responsible for assuring that the quality of the product meets government specifications for existing contracts and to pre-survey potential contractors for their ability to successfully undertake a proposed contract. Evidence of non-conformance with the requirements of the contract can lead the CAO to initiate a series of events, spelled out in detail in regulations, to terminate the contract and provide the government with restitution for its loss.

Conformance with quality standards is the responsibility of the QAS through observation of company conducted tests or independent testing as appropriate. The criteria used are known as the "Accepted Quality Level" (AQL) terms written into every
contract that provided the legally binding quality level with respect to the government's stated specifications for the particular item. Non-conformance, again, can lead to contract termination and government restitution. Steps have been devised to prevent litigation and protect both parties, but ultimately, court provided remedies are available if resolution can not be achieved. In addition to restitution to the government, the firm can also be placed on a “disbarment” list maintained by the GSA which would prevent it from competing for future contracts for a period of time.

Data Results

Only one respondent explicitly discussed the concept of total cost, in this case in terms of “best value:”

...best value procurement is sort of the new concept. It’s where you are getting away from just being cost driven. Which is sort of important because for years the government was buying things according to the lowest bidder (R22).

The response was placed in the context of source selection and while the respondent was familiar with this part of the procurement cycle, the respondent had no responsibilities in the selection process nor did other members of the target population.

To this set of interviewees, “total cost” was seen in terms of the costs incurred by the government if the contractor fails to live up to the conditions in the contract in terms of quality, timeliness, and/or quantity. These costs can include the cost of terminating a contract and having to re-compete it; the costs of any litigation that might ensue if there is a disagreement between the contractor and the government; and the “cost” to GSA if a customer (a Federal Agency) decides to go elsewhere for a product that GSA was
supposed to supply but couldn't or didn't. In light of the possible costs associated with a failure to attain and maintain high quality standards, GSA management decided to use statistical process control as the key way to judge contractor performance, formally for quality, less formally for delivery.

Every respondent made reference to statistical process control (SPC), how it had changed the way they did business, and either explicitly or implicitly indicated how it had help reduce "total cost." The idea of using SPC instead of a reliance on AQL as the measure for quality was apparently started in-house by employees familiar with quality assurance techniques and statistical processes (R20, R21). During the late 1980's and early 1990's members of the staff were trained by other members of the staff, SPC software was obtained, and portable (laptop) computers were acquired for the Quality Assurance Specialists to use in the field, in contractor facilities.

The experiment in using SPC was spurred by a belief that the typical GSA quality measurement system for quality was flawed:

Because historically, governments, and I think a lot of private industries, focus on end items. They forget about the process and they try to measure quality after everything has been done. Too late. You can't inspect quality into anything. You better build it in from the very, very earliest stages (R21).

You either meet the spec (specification) or you don't meet the spec. That is how quality is typically measured . . . And we taught our people . . . (t)ake all of the data, put it, put it into context in terms of a histogram or a run chart and look at it. Let the data talk to you. What is the data saying? The process is either capable of

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15This change in status makes this government organization look like, and perhaps operate as, a private sector firm. The arrangement seems to be another incident of the mingling of private and public responses to public demands.
meeting the specs or it is incapable. So that is really the way we had to get our people to think about how quality is actually measured (R21).

The deployment strategy for SPC was to train all Division staff members on the general principles of SPC with more intense training for the Quality Assurance Specialist who would take it into the field. Copies of Dr. Deming's "Red Bead" experiment had been fabricated by members of the staff (when this researcher visited, two sets were apparent and copies of Dr. Deming's Out of the Crisis were observable). Copies of books which simplified SPC were purchased and given to staff members. Classroom training was provided to all employees by members of the staff. Once the quality assurance staff was familiar with the concepts and armed with software and hardware, they started to take in on the road (R20, R21).

Some companies were already using SPC but many were not (R21). "We started introducing this to contractors slowly. One at a time. Some were more receptive than others. Others still don't get it and never will" (R21). Eventually, companies running into quality problems were alerted to their problems with a suggestion that they consider using SPC:

This is to advise you that FSS R2's trend analysis indicates that your quality assurance system is not now guaranteeing the degree of precision required . . . and thereby is endangering your contract . . .

Achieving the high quality standards specified in your contract involves continuously reducing the variation in products. We recommend that you adopt a preventative philosophy rather than a reactive one and suggest that you focus on continuous improvement plan to ensure the quality of your products. We further

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recommend that you explore ... Statistical Process Control as a tool for improving your operations (Excerpt from SPC Information Letter quoted in FSS Award Booklet, p. 14).

The Division's approach to introducing SPC was not to demand that contractors use it. Instead, the quality assurance specialist offered to help the contractors understand the concepts and they even had a set of licensed software that they could provide the contractor at no cost. As a result of this "soft-sell" approach, one respondent told how SPC was adopted in some unlikely places. The proprietor of a firm (located in tough neighborhood in New York City) that provided bales of rags (used by the Navy to wipe up oil in the engine rooms) became interested after being shown how SPC could reduce waste. He ended up purchasing his own computer and software to implement it. "So in a place where you would think it was absolutely impossible, we have some success" (R20).

Benefits for using SPC were developed as ways to encourage its application. For those that were already using SPC, at least for a year,

... we would modify their contract to do away with end item inspection, and hard copy inspection, as long as they could prove that they had an SPC system that was controlling the product and giving a consistently good product. This went over big. They thought this was the greatest thing since sliced bread (R28).

Companies that maintained stable systems and performed well were given favorable ratings when they bid on succeeding contracts (R22). They are visited less often. One respondent in a knowledgeable position estimated that about "one hundred" contractors

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17 Another task of the Quality Assurance Specialists is to perform "pre-award" evaluations, a requirement of the Federal Acquisition Regulations, that examines the capability of a firm to actually accomplish the work for which it is bidding. An "outstanding" rating would improve a company's likelihood of winning the award.
have “switched” to the use of SPC and all contractors in the region had been introduced to these concepts (R21). The FSS Award booklet indicates that 60 vendors have converted to the use of SPC (FSS Award Booklet, p. 14). “Vendors have generally responded favorably to this approach because it helps them reduce rework, scrap, and waste” (FSS Award Booklet, p. 14).

The broader possibilities of viewing the world through the lens of variation, of which SPC is a part, has been applied by the Division to the contract administration function as well to the quality assurance component. The reality that companies could not always meet delivery dates, often for reasons beyond their control, meant that they too could be analyzed in a statistical sense, though no respondent indicated that a formal measurement system had been applied to this application. Instead, respondents spoke of giving contractors some "slack," of working with them to adjust deliveries based upon the circumstances at hand:

We think they (the contractors) are good people just trying to run a business, just trying to make a good product. Trying to deliver on time. They have real problems that we try to understand. We know that, gee, the production foreman can in fact be sick and not show up or something like that. They have machines go down, production line can't do what it is supposed to do . . . We encourage them not to hide these things from us. Don't wait until the delivery is due and tell us. If you're going to have a problem you tell us about it right now and we'll work with you (R20).

We try to get everybody involved when we have a situation or a problem and we all talk about it because it affects everybody. And we try to come up with decisions, talking about delivery for example, if we have to let a delivery slide a little bit, suppose its going to be late three days, we talk to the (GSA) inventory manager. And say: what can you do? Is this intolerable, or can you shift some stock around amongst the other warehouses? How does this effect the national
supply picture (R20)?

Sometimes we will exercise the clause, there is a new clause under the re-invention lab where we give a contractor a break if you will.\(^{18}\) If he's got something wrong (and) he can't get caught up . . . We might give him a break of a month or two so that we don't give him any orders so that he can get caught up and correct the problems that he's had (R20).

Though the contract administrators are now more willing to be understanding of problems, they can still be hard nosed and follow the regulations when needed, when it is clear that a company simply is inept or unwilling to conform to contract requirements (R25, R28, R20). “We are in a business relationship. They have to perform . . . we do have some basic rules that they have to follow” (R20). But penalties have been significantly reduced: in 1990, 270 vendors were issued preliminary notices of default but only 10 received such notices in 1994; in 1990, there were 2,330 purchase order terminations for nonperformance but only 140 in 1994 (FSS Award Booklet, p. vi). One contract administrator commented:

I just last week issued my first cure notice (notification to a contractor of serious problems) in six months. I mean it used to be, if you didn't have one a week you were surprised by it (R23).

To perpetuate optimal relationships, the Division has instituted what is called a “Teaming Agreement” with selected companies judged to be worthy performers. Its conditions are illustrative of the concern for “total cost:”

By teaming with you GSA envisions a contractual relationship where we are both partners in achieving successful performance by having quality products delivered

\(^{18}\)This is an apparent reference to the clause which permits purchase through other channels without having to first terminate the original contract.
on time every time. In order for this to happen we agree to accomplish the following efforts toward improving service to GSA's Federal Customers, saving tax dollars and reducing the corporate costs of doing business with the Government:

* You will do everything possible to ensure that Government Orders are of the highest quality, delivered on time and, when requested, expedite deliveries for back ordered items.

* We will provide honest and open communications on any situations affecting performance and work together to arrive at mutually acceptable solutions.

* GSA will 'cut the red tape' by reducing formal correspondence to a minimum, whenever possible.

* GSA will offer any special assistance required to help you in performing the contract by providing technical information, increased support by our Quality Assurance staff and adjustments to the delivery schedule (Attachment to Letter subject: “Forming Teaming Arrangements with Contractors,” GSA, Contract Management Division (2FQ-1), Oct. 14, 1994).

This agreement establishes the government's expectations which include reciprocity on the part of the contractor for early shipments when necessary. To date, about twenty-two companies have signed this agreement.

All this effort, to avoid the expenses associated with end-item inspections, termination procedures, and so forth, were, in the eyes of the respondents, important in reducing “total cost.” As one concluded:

Marginal performers would actually cost the government additional money during the contract performance. And you have to spend time inspecting and more time dealing with defective products or problems. More time on customer complaints because the product was not really, was borderline acceptable quality. Legally the contract would be performing but your indirect cost and effort could be substantial and you'd actually be better off and paying a little bit higher for a bid price and getting a better product to begin with (R22).
Regarding the tenet of moving toward a single supplier, only two respondents alluded to the issue:

And that's really what we are all about is working for continuous improvement . . . but in essence that's what we are working toward and trying to develop a pool of qualified vendors that you can go back to time after time (R23).

Another said:

We want to continue the relationships we have with our vendors and I guess make everybody's job in here very, very easy because everything is going so smoothly we never have a problem. I think that is the ultimate goal (R20).

Neither of these is explicitly directed at the planning and selection phases of the procurement cycle, phases which are beyond the responsibilities of the target population.

Only two respondents discussed the issue of length of relationships and this was in terms of the length of contracts. One respondent had noticed that:

. . . GSA is contracting for longer periods with proven performers . . . contracts run anywhere from one to two with three option years now and our schedule contracts run five years. That is a lot different from what it used to be. It used to be one to two years on term contracts and maybe a sixty-day extension. And schedules might be anywhere from one to three years (R23).

The other indicated that they've extended the contract period to two years in many cases and “. . . I think we'll probably be going to five year contracts as the standard at some point” (R20). The result of such contracts would be:

. . . this makes them more competitive, they can lower their price, or at least not raise their price as much for the next contract period. It's good for the government, it's good for their commercial business (R20).

The word “trust” was seldom used by the respondents, yet it seemed their descriptions of relationships with contractors entailed not only competency and commitment
trust, but also goodwill trust. "Trust" seemed to exist with those many firms which routinely met their commitments. These firms were rarely mentioned in the interviews. It seemed that the new GSA attitude of being the instigator of developing a trusting relationship (such as through giving contractors "slack" on deliveries, helping them with the implementation of SPC, and even helping them find alternate suppliers) was most obvious with the marginal performers and resulted in newfound success for many of these companies. One respondent noted:

We still know how to terminate a purchase order in a contract. And we do. But it is really a last resort. We're not there to play 'gotcha ya' and hurry up and terminate and think that we've done something successful because it is not. It is really a failure if you ever have to do that. So, I think that is the attitude that we try to promote . . . (R20).

While some unsuccessful interventions were described, respondents mostly wanted to describe successful ones. One success was a contract with the National Institute for the Blind which bid and won, against the Division's recommendation because of prior problems, a contract for paper products. The respondent indicated that the staff decided to work with the Institute and taught them the use of SPC and now the Institute is considered one of their best suppliers. (R23). Another case was of a mug supplier who was about to have the contract terminated for poor performance but over a period of several years was taught to use SPC, greatly improved the product, and now has to be visited only once in a while (R21).

Sometimes, the contractor instigated a change. A case was cited when one came to the Division confessing that he was not doing well with his deliveries. After a site visit,
it was recognized that he simply had not properly prioritized the government work and he went from a 34% on time delivery to 100% on time in six months (R23).

Several cases were cited where companies went out of their way to help the Division. One case involved the staging of SPC demonstrations for visiting staff from GSA Headquarters (R20). In another case a company's sales of small envelopes used by the U.S. Post Office plummeted, only to find that GSA's catalogue had misidentified the item. Company representatives traveled to Washington and worked with GSA to straighten things out. The contract administrator was amazed when her company contact commented: "If one person benefitted from this, not only did we benefit, but GSA benefitted from it. If we all work together, we are all going to do better" (R25). One respondent summarized it by saying: "...(we) encourage them (the staff) to be proactive, to work with the vendors. Not worry so much about what our contractual rights are but to focus on the common interests that we have" (R20).

Internal processes and culture seemed to affect how Division employees dealt with contractors. Five of the non-supervisory respondents mentioned how the management of the Division made it a rewarding place to work. The appraisal system was changed so that it would take away the fear of "screwing up" (R21). This authority was available under the "Reinvention Lab" designation. And the bonus system was changed through unanimous consent (including union representatives) so that all bonus money was shared equally among all members of the Division (R21). Mention was made of the wide range of opportunities for training and the implicit trust in the staff demonstrated by their
discretionary authority while “on the road” (where the QAS were most of the time) (R28).

One respondent made particular note of a difficult work related opportunity that was taken only because of the historical commitment to employees' careers and opportunities (R25). The sense of the conversations was that the trust demonstrated internally affected the degree of trust they were willing to advance toward the contractors, absent evidence to the contrary.

On a more negative note, several respondents identified audits of the Division either by GSA auditors or the General Accounting Office were a potential problem in furthering the use of SPC and developing partnerships:

...they will come down from time to time and they will say: ‘Let’s see your handbook.’ And they become experts in the handbook and then they say: ‘OK, well, we're going to go through your files out there.’ And their game is to look through files and to find some areas where we didn't comply with every step in that book ... ‘show me the rules and I will just measure whether or not you complied with the rules.’ That's all they know. They don't look at your effectiveness as an organization (R20).

Relief from these rules was cited as the big benefit of the “Reinvention Lab” status, permitting them to do “some things” that they “... were kind of sneaking in anyway” (R20). The Division had, at least symbolically, “thrown out” its guidance manual as a result of this authority, but it was evident that is was only symbolic and these rules were still in place but seemed to be applied differently and only as last a resort when all other means to resolve issues had been exhausted. The “reinvention lab” status gave them the authority to be less formal with the contractors:

And I'd say the vast majority of them (the staff) enjoy it because we don't have
to be so formal all the time. And some of the CAOs felt that this was actually little change, that this is the way they had been relating to their contractors for years anyway (R22).

Summary

Five primary lessons were derived from the research conducted a Federal Supply Service Region 2.

1. The use of statistical process control techniques has had significantly changed the relationships Division has established with its supplies. While these techniques are not directly an element of the supplier-customer relationships advocated by Dr. Deming, they are an important ingredient of his broader concept of A System of Profound Knowledge and are intended to be used as a technique throughout that System. The effort to improve the quality of supplies that the Region was receiving and in turn “selling” to Federal agencies was founded on core principles of Dr. Deming’s methods, an example of how the components of his philosophy are interdependent.

2. Single supplier issues are not a consideration to these employees who are involved in the contract administration phase of the procurement cycle.

3. The level of trust displayed toward the contracting firms may have been influenced by level of trust displayed internally within the Division.

4. The government can initiate changes in supplier relationships and can actively work to improve the quality of the products it receives. It does not have to wait for industry to institute the use of management methods intended to continuously improve products. The government can encourage firms to do so and provide substantial imple-
mentation assistance.

5. "Total cost" computations may at best include only the transaction costs to the organization performing procurement activity, not the costs of use of the item as it moves through the entire governmental system, a cost that is probably unknowable.
Quality Framework

The Tank Automotive Research, Development and Engineering Center (TARDEC), located in Detroit Arsenal, Michigan, is a subordinate unit of the Army's Tank-automotive and Armaments Command, a component of the Army Material Command. Its mission is to conduct research, development and engineering to maintain global technological superiority in military ground vehicles and advance the role of science in the broad national interest. It initiated what it calls its "quality journey" in 1989 and was selected a winner of the Presidential Award for Quality in 1995. Its 1995 budget was $248 million and it has 1,354 employees. Key results to date for the quality journey include the elimination of five layers of management and 160 supervisory positions; creation of the National Automotive Center and the TARDEC University; and, "... through virtual prototyping and testing in simulation, reduced development time for the M1A2 main battle tank by four years and reduced development costs by $168 million" (TARDEC Award Booklet, p. 2).

Procurement Environment

TARDEC's primary suppliers are firms which provide engineering and development technical skills. TARDEC, as a research and development center, does not manufacture armaments, but rather, explores basic research associated with this equipment and develops prototypes for potential application. Most of its contractual arrangements fall
under that section of the Federal Acquisition Regulation dealing with research and development. Thus, they are by nature longer in duration and contain less specificity than other categories of contract arrangements. According to the respondents, most of these contracts were arranged under competitive conditions and no particular change in relationships was identified by the responsible contracting officers. Relationships may change, however, because of forthcoming changes in processes.

In October, 1995, the Department of Defense approved a 20 month test of procedures for streamlining research and development contracts. It will test the feasibility of using standardized solicitation and contracts, cut out unnecessary clauses and provisions, and reduce paperwork and processing time for both government and industry ((DDDR&E(OLM&TT) Memo, September 1995)). This is understood to apply to TARDEC which has been designated as a “Science and Technology Reinvention Lab Participating Organization,” one of sixteen United States Army elements so designated by the Department of Defense. This status permits the command to request waivers from certain policies and procedures in order to streamline business practices and to be a test case in the use of newer, simpler research and development contracting procedures. While it is too soon for results of this to be apparent, respondents anticipate simplified and more efficient contracting.

Waivers to existing rules have already been proposed by TARDEC for five levels of authority: local, Army, Department of Defense, Office of Management and Budget, and Congressional. Of the twenty-six waivers identified, eleven procurement related
items have been included, most of which are recommended changes to dollar limits on various purchasing authorities. While each could make acquisition quicker and more convenient, none were seen as to have a particular impact expressly on supplier relationships. What was of note was that of the three items identified requiring legislative change by Congress, only one had to do with procurement, and that was to raise the authority of the TARDEC Director's approval authority for minor construction projects to $1 million. The other two dealt with policies on training for degrees and reimbursement of professional fees. While this data is in no way conclusive, it is interesting that even when given an opportunity to suggest legislative changes to the procurement system, relatively few suggestions were forthcoming.

Data Collection

TARDEC was selected as a candidate target for this research because it was a recent winner of a Presidential Quality Award, represented the Department of Defense, and explicitly mentioned its suppliers in its award booklet. It had established a "supplier of the year award" and presented five such honors the preceding year (1994). Telephone interviews were conducted between February 6 and 27, 1996 with four Federal employees associated with TARDEC. Two were employed by TARDEC but the other two, both procurement officers, are employed by the parent command and are responsible for providing procurement services to TARDEC.

Data Results

Interviews with the employees resulted in a some ambiguous data about the status
of the purported partnering relationships with suppliers. Of particular note was a statement (R33) that TARDEC had decreased its supplier base from 1000 to 367, a statistic of which two other sources (R30 and R32) in responsible positions were unaware and which they could not explain. According to its literature, TARDEC has established a "Supplier Partnership Program" (which appears to be similar to that established by GSA). Such partners are to be: committed to quality management; promote long-term relationships, continuously looking for improvement; able to apply metrics to determine good, bad, and marginal; and, be trustworthy and trusting (TARDEC Award Booklet, p. 32). However, neither the contracting officers nor the quality management staff was able to identify with whom these partnership programs had been established. In keeping with the data collection strategy of this research project, this anomaly was not pursued since a successful partnering relationship by the Federal Supply Service had been identified and documented.

TARDEC is unique among the organizations examined for this research because it utilizes an arrangement between a supplier and the government which could put supplier-customer relationships closer to the model proposed by Dr. Deming, though for different reasons. This arrangement is known as a "Cooperative Research and Development Agreement" (CRADA). "These arrangements will allow Defense Laboratories to more effectively exchange and share information on emerging technologies with industry and academia" ((DDDR&E(OLM&TT) Memo, September 1995)). These arrangements do not fall within the purview of the Federal Acquisition Regulation and, except for
restrictions based upon dollar limitations, will allow potential suppliers and the government to quickly and easily establish cooperative relationships for information exchange purposes. The purpose seems not to be the reduction of variation but rather to improve the flow of technology from government to industry in order to improve industrial competitiveness. One respondent (R32) indicated, however, with declining governmental research budgets, these arrangements may be more useful in helping government take advantage of industrial research efforts which, in his recent experience, were now outstripping what government was doing.

Summary

Four items of note were derivable from the collection about TARDEC.

1. Partnering relationships between TARDEC and its suppliers, according to the literature, were purportedly being established consistent with the precepts of quality management. However, this could not be verified during the interviews.

2. Another form of cooperative arrangement between the government and suppliers was identified. These "Cooperative Research and Development Agreements" completely avoid the constraints and restrictions of the procurement statutes and regulations. They provide an alternative means to, under certain circumstances, establish cooperative relationships in research areas where there is a high degree of uncertainty.

3. It was noted that given the opportunity, the TARDEC staff did not suggest wholesale changes to the procurement rules or statutes. The research did not attempt to explore the reason for this but it may reflect a procurement "culture" which basically ac-
cepts the current system as an acceptable way to balance the competing demands placed upon it.

4. TARDEC's quality journey is apparently being assisted by its designation as a research and development "reinvention" laboratory, a status which permits it to waive or relax perceived restrictive regulations or guidelines.
John F. Kennedy Space Center

National Aeronautics and Space Administration

Quality Framework

The John F. Kennedy Space Center was a 1995 winner of the Quality Improvement Prototype Award sponsored by the Federal Quality Institute. It instituted its quality management effort, which it refers to as "continual improvement," in 1990. Its mission is to provide the prelaunch checkout, assembly, testing and processing of the Space Shuttle and payloads that fly aboard it, as well as Shuttle launch, landing and solid rocket booster operations at the country's only manned spaceport. It employees 2,200 Federal civilians and 10,800 contractors. Its 1994 budget was $1.32 billion. Key results of its quality efforts have included the reduction of the number of labor man-hours by 47 percent, from 1.2 million in 1990 to .6 million in 1993 (J.F. Kennedy Space Center Quality Award Booklet, p. ii).

Procurement Environment

The missions and functions of the Space Center, generally to prepare and launch the Shuttle Space Vehicle, has resulted in a procurement environment somewhat similar to that of the Department of Defense. That is, the complexity of the tasks and the need for relatively few highly trained technicians has resulted in long-term contracts with large aerospace firms.

Data Collection

The quality contact points were contacted by phone and by mutual agreement, a set
of questions was sent by facsimile to the Space Center in early February, 1996. These addressed both the procurement processes such as the category of contracting used, the degree of reliance on sole source contracts, the length of the relationship with the prime contractors as well as general impressions of supplier-customer relationships before the institution of the “continual improvement” program and the status of relationships today in light of the significant reduction in man-hours used to process Shuttle missions.

Interviews were conducted by telephone with one quality management personnel and three contracting/procurement officers between February 15 and 25, 1996.

Data Results

From the data available in the award booklet, backup material provided by the Space Center, and in response to direct questions, it is clear that the procurement system for the Center very much follows the Federal Acquisition Regulation. Its large contracts to launch the Space Shuttle are considered “Major System Acquisitions” and fall under those provisions of the regulations. As with all such contracts under the regulations, the Center establishes basic requirements, sends out solicitations, evaluates contractor responses, makes selections, negotiates contracts, and makes contract awards.

As was the case with NAVAIR, much of the contracting does not fall within competitive guidelines. In 1995, 57 percent of the new award obligations were conducted through noncompetitive procedures and another 7 percent through negotiated competition. While sealed bid procedures accounted for 36 percent of new obligational awards in 1995, because so much work is performed at the Center under existing long-
term contracts, those new sealed bid awards accounted for less than 2 percent of the total obligational authority for the year. So, on an annual basis, competitive procedures account for a small percentage of the contracting activity (Procurement chart, JFK Space Center, private correspondence).

The Federal employees at the Center serve generally in an oversight capacity while the work on the Shuttle and cargo packages is performed by contractor personnel. Because of the highly technical nature of the preparation and launch of the Space Shuttle, the contracting firms are generally the large firms historically associated with National Defense missions. And like the procurement of long term national defense equipment and support, there has been little turnover among these contractors. Hence, there are de facto "single suppliers" engaged in long-term relationships, but based on technical skills and the prohibitively high cost of contract transference. The primary contractor for the shuttle rehabilitation and launch has retained the contract for many years, at least fifteen that the respondent could recall (R11).

Textual data supplied by the Center showed steady improvements in some of the Center's key quality indicators since the late 1980s, including costs per shuttle launch, processing incidents, workmanship, and stacking of the solid booster rockets. The prime contractors have all implemented formal quality management programs since that time. However, several respondents (R10 and R11) indicated that they had seen a steady improvement in quality before the formal program and had not seen any particular acceleration or new emphasis since the formal program went into effect in 1990. Both
opined that the nature of Shuttle operations, the inherent safety issues associated with such an enterprise, the tragic loss of the Challenger shuttle in 1986, and the declining Federal budgets all had had more effect on the management of the Center than had the introduction of a formal quality management effort.

While perhaps no dramatic change had been observed, there were more integrated product teams with both government and contractor employees taking active parts whereas before, the contractor was expected to solve problems on their own. One respondent did see more and better communications between the government and contractor employees (R13).

Another respondent (R12) did believe that there had been a positive change in the past few years: that contractors treated government employees more like customers, did better follow-up work, and in general were more communicative and inclusive. Whereas training for federal and contractor employees on a system or part used to be done separately, now they are done together as a team. This respondent has seen a shift away from “individualistic” thinking to more “systems” thinking and away from (for Federal employees) “inspecting” to “problem solving” (R11).

Summary

There are two points of unique interest regarding the Space Center’s relationships with its suppliers.

1. Quality is always a component of high visibility, high personal risk enterprises such as the Shuttle launches and recoveries that occur at the Space Center. Continuous
improvement seems to have been an expectation for many years. Thus, the formal quality program does not appear to have been a major transformation as it has been elsewhere. Respondents simply did not make statements about how it used to be in the “old days” with the contractors. Whether that was a result of the data collection technique (telephone) or the nature of a relationship in which the contractor must work under exacting standards at all times because of the criticality of the space vehicles could not be discerned.

2. The Space Center presents its own set of supplier practices. Single source suppliers are a fact of life and in the context of the mission of a few Shuttle launches per year, probably provide the best possible hedge against variation in vehicle preparation and launch. The nature of the enterprise demands quality assurance procedures for safety reasons far beyond those found in the average manufacturing facility so that the conditions of trust among parties would be probably be naturally higher. The respondents made no mention of past difficulties. Certainly, the relationships are long-term and while that was a “de facto” reality, the respondents made no comments that would indicate that they were displeased with this arrangement. It was not clear to what extent “price” was the primary consideration in source selection, but the presence of long-term contracts with the primary contractors indicates that past performance, technical competence, and commitment to the mission of the Space Center are also apparently major considerations.
CHAPTER VI

Analysis, Conclusions and Recommendations for Further Research

Introduction

This chapter analyzes the data collected during this research by comparing them with the model of supplier-customer relationships identified in the literature of Dr. Deming or an interpretation of his meaning. It does so through the lens of the three components of Dr. Deming's theory for making purchasing decisions: consider total cost rather than just the price; use a single supplier for each item; and establish long-term relationship based on trust. Secondly, the chapter responds to the research questions posed in Chapter I. Thirdly, it provides analysis derived from the data but which were not part of the original question set. Lastly, it provides suggestions for further research.

Data Analysis

Consider Total Cost Rather Than Price

The operational definition developed in Chapter III indicated that to conform to the admonition to make purchasing decisions based upon total cost rather than immediate price, the ideal supply situation would include a set of quality criteria against which price can be judged and a way to identify and consider all knowable costs of use of the item. Included in the process of knowing all costs of use would be a demonstrated commitment to continual improvement of quality. Continual improvement in quality should assure a continual reduction in wasted time and materials, thus reducing total cost.
The application of this principle involves full and open communications with all the people who know what potential costs might be.

No individual organization of those responding to this research fully met the criteria of this element. But in aggregate they demonstrated an ability to move towards the achievement of its primary objectives. As an organization involved primarily with the planning and selection phases of the procurement cycle, the NAVAIR respondents are very conscious of total cost and are conscious of the authority to make selections based on "best value," though specific examples of the use of "best value" concepts, however, were not provided by the respondents. This lack of specificity about the use of best value concepts may have been caused by the fact that many of the respondents in NAVAIR deal with sole source procurements and are sufficiently committed to present suppliers that "best value" evaluations are in effect a moot point. All NAVAIR respondents indicated that "price" was not to be considered the sole, nor necessarily, the primary source selection criteria, even though they themselves were not in a position to apply the concept of "total cost."

The component of Federal Supply Service Region 2 studied for this research, which is primarily concerned with contract administration and quality assurance, is implementing the use of statistical process control with many of the contractors it oversees. It has established a formal "teaming" arrangement with selected suppliers in the expectation that mutually agreed conditions will provide the government better sustained quality and the flexibility for accelerated deliveries when needed. In this
instance the government took the initiative to change formerly adversarial relationships
to ones based on data and facts derived from the industrial processes involved, very much
in keeping with the philosophy of Dr. Deming’s System of Profound Knowledge.

All four of the organizations studied were addressing the issue of the cost of
cconducting contracting transactions. While this does not appear to be a major issue for
Dr. Deming, it was an item of interest (“dickering over price”). As a component of total
cost, each of the organizations recognized they could save money (or get more products
for the same amount) by attending to this component. Through the increased use of
automation, standardization of spread sheets, reductions in litigation, and parallel rather
than sequential processing of contracts, internal processes have been improved. These in
turn have improved the relationships that exist between the Federal government and these
particular contractors.

Private sector application of the “total cost” concept seems to be extensive,
though a comprehensive picture is not discernible. There are many anecdotal stories
about the use of techniques to consider and reduce total costs including the use of
statistical process controls by the supplier, consideration of “life cycle costs,” and
supplier partnering (Cali, 1992). Of note is the fact that the empirical research that
addresses the use of total cost concepts only in manufacturing firms. It is not clear from
that research whether total cost concepts are being broadly used in all commercial
enterprises, including service enterprises, or is limited in practice to enterprises that can
readily count and measure their products.
Use Single Supplier for Each Item

The purpose of using a single supplier for a single item is to reduce variation. This research indicates that in fact, the presence of a single supplier is often a feature of the Federal procurement environment, however, in the organizations studied, not for the purpose of reducing variation. Rather the use of a single supplier usually occurs as the result of a complex set of technological and managerial needs. And even where it is a de facto reality, it was not necessarily seen as an advantageous situation. In the perception of some of the respondents, competition was seen as either a positive influence or at least a built-in feature of the procurement system and one not to be lightly tampered with. The need to maintain a defense industrial base, the potential need for a surge capacity, and the perception that competition tends to keep people "on their toes" all seemed to be elements arguing against the movement to a single supplier.

The move to a single supplier is complicated in the Federal procurement system by the fact that there are often multiple potential suppliers who believe they should have an equal opportunity to receive public funds. Thus, as contracts expire, re-competition is expected even when high quality, continually improving arrangements already exist, a process which can work against the establishment of single supplier relationships. Data was not available which might help understand what the turnover rate among contractors for the same item might be. Though this is potentially a problem, clearly such turnover has been infrequent among both NAVAIR and the Space Center contractors so it may not
be a constraint in practice. The Federal Supply Service is making a point that "teaming" status could be beneficial in competing for future contracts, thus implying that a firm could become the single supplier in a de facto sense.

A certain ambivalence towards the use of a single supplier was apparent in the case of NAVAIR, where there is usually a single supplier for a particular weapon system. The reasons for this situation are again not necessarily ones that Dr. Deming would approve. The respondents indicated that multiple suppliers were needed to prevent technology stagnation and to provide an industrial base in the event of the need for a surge capacity. That is, some respondents believe that NAVAIR should not reduce its supplier base to a few in order to minimize variation, rather it should worked to maintain its multiple supplier base for reasons of national defense.

In the case of the Space Center where single suppliers were also a reality in a de facto sense, the one-of-a-kind characteristics of the Center prevent alternative companies from possessing the technical know-how to take over operations without a long transition period. In this instance, however, the need to reduce variation, that is, errors in vehicle recovery and refurbishment, apparently was a consideration in contracting processes which indicates that in some situations, the government does end up with a single supplier and probably for the reasons that are consistent with Dr. Deming's theory.

In summary, single supplier relationships do exist in the Federal government, but only sometimes for the reasons of reducing variability. More often, it is for other, complex political and economic reasons. Some of the participants interviewed for this
research who explicitly discussed this element are not desirous of a move toward single suppliers. What they are more interested in is to reduce that portion of the "total cost" that is within their control, to prevent some of the perceived high transaction costs of how they have been doing business.

The evidence available on the status of the principle of using a single supplier in the commercial sector seems to indicate that industry does not accept it in a "pure" form. Several studies showed that major manufacturing firms, even those seemingly accepting quality management principles, continue to maintain multiple sources for many items and use concepts such as parallel sourcing to hedge their bets, even though Dr. Deming believed that this was a costly undertaking.

Establish Long-term Relationships Based on Trust

The duration of supplier relationships was seldom addressed or volunteered by the respondents. The derived operational definition put no numerical limits on the length of time the relationship should last. Dr. Deming was mainly concerned that suppliers continue to demonstrate a commitment to the methods of continual improvement in product quality. Certainly long-term relationships exist in Federal procurement, though not necessarily for reasons of demonstrated continual improvement. Contracts in the Department of Defense are often long-term due to the complexity and long life spans of the weapon systems being acquired. Likewise, the primary contractors at the Kennedy Space Center have had a long association with the Center. In the case of NAVAIR, some respondents felt that the long association might not have been for the best. No criticism
was expressed about the longevity of the prime contracts at the Space Center.

Longer term contracts also seem to be in the offing at the Federal Supply Service, but it was not clear whether the purpose of this trend is to reduce transaction costs or to improve quality through a long term association. It is not knowable, yet, whether the many smaller firms which provide supplies to the Supply Service will accept the concept of longer contracts if it results in some of their number eventually being unable to obtain of government business. If there is a constant amount of a product needed by the government, longer contracts should result in fewer companies needing to produce that product. Whether, or if, these firms have the interest and political influence to effectively challenge this trend was not a subject of this research, but such occurrence would obviously impact on the ability of the Supply Service to implement such policies. In effect, a policy of longer contracts by the GSA could affect the political dynamics of Federal government support to small and minority owned business.

Of all the issues involved in Dr. Deming's proposition, the advocacy of loyalty and trust, particularly trust, drew the most responses from the respondents. As has been indicated, often the long-term relationships have persisted despite a lack of trust. If it is accepted that Dr. Deming would agree with a formulation of "trust" that is business based, that is, dependent upon competency, commitment and goodwill, then such trust is developing between the Federal Supply Service and many of its suppliers and a significant effort designed to enhance trust with an additional set of formerly marginal performers is underway. Likewise, respondents in NAVAIR described significant efforts
underway to improve its relationships with some of its contractors. And there were some
indications of improved relationships between the government employees and the
contractors at the Kennedy Space Center.

The evidence about the development of long-term relationships in industry
presents something of a mixed picture. Richardson's study is the only one that actually
asked about the length of the relationship, vice the length of the contract. In some
instances, duration had been for over a decade. Most studies looked only at the length of
the contract which generally was only for a few years at most. Another angle was
revealed in the Helper and Sako study which showed that there are tiers of suppliers to
Japanese automakers. Only the ones at the top of the tier get a great deal to say in the
relationship. Those at the bottom do not, implying that they are perceived not be a
suitable long-term partner. In general, many industrial firms are moving towards longer
term relationships where the supplier is making a commitment to, and achieving,
continual improvement in product quality.

Summary

While an analytical effort was made in this research to separate the components of
the supplier-customer relationship advocated by Dr. Deming, in the end this segmenta-
tion proved to be unwieldy because the components are in fact interdependent just as the
components of his "System of Profound Knowledge" are interdependent. The elements of
the Federal organizations which were studied proved to be aware of the advantages of
more cooperative, trusting relationships with their suppliers and were activity engaged in
efforts designed to move in that direction. The respondents in this research see these advantages: reduction in the cost to perform the contracting function; improvement in the quality of the product through better communications about the government’s needs and the contractor’s knowledge and abilities to meet those needs; or, being in a better position to compete for Federal funding for their activities or, in the case of the GSA, maintaining their Federal government status.

**Answering the Research Questions**

**Question 1**

Do Federal Organizations which are using quality management practices establish the kind of supplier relationships advocated by Dr. Deming?

The Response: The diversity of the Federal procurement system makes generalizations unwise. The research indicates that in composite, organizational practices can emulate these principles, but that none of the organizations studied have put the whole theory into practice. Nevertheless, no structural impediment in the Federal procurement system was identified that would prevent the application of this principle.

At the beginning of this research, the Federal procurement system seemed to represent the antithesis of the Dr. Deming's concept of the ideal supplier-customer relationship. Whereas Deming saw the ideal relationship as trusting and cooperative in order to reduce variation, the perception of the Federal procurement system was that it was highly competitive, price dependent, adversarial, rule-bound, and tied up in red tape. However, long-term relationships do exist, quality can be considered in contract source
selection, cooperative relationships are maintained, price need be but one consideration
in contract awards, much less competition exists than is often supposed, and flexibility in
contract type and texture is permitted. The Federal procurement system seems to have
the characteristics and authorities needed to accommodate almost any situation. General-
izations about “problems” with the system, often apparently derived from isolated
incidents of failure, have lent it an image of disrepair that is questionable. A more
balanced assessment might be developed using the framework of A System of Profound
Knowledge.

Question 2

If Federal organizations are able to emulate the proposed supplier-customer
relationships advance by Dr. Deming, are they able to do so in all respects? That is, are
they able to equally apply all three aspects of this “Point”? Are they able use total cost
not just price for purchasing decisions, and use a single supplier for each item, and base
the relationship on long-term loyal and trust? Are the three aspects of this “Point”
indivisible or is there unequal application in practice?

The Response: While we do see many reflections of Deming’s theory, none of the
organizations studied had fully applied all three components. And particularly on the
subject of single suppliers, a number of respondents clearly did not believe that a single
supplier would be to their advantage.

One difficulty that exists in understanding the extent to which either government
or industry is moving toward a single supplier is that the data is usually presented in
aggregate form for the entire enterprise. Those who believe that a simple reduction in the number of suppliers will reduce variation fail to comprehend what Dr. Deming meant by the reduction of variation. Reduction in the overall number will not do (though it might!). Reductions in total suppliers can occur for a number of reasons, including industrial consolidations, reductions in funding, or from a myriad of other causes. What needs to be known is how many suppliers there are for a particular item, not how many there are for the entire enterprise.

Of the respondents only TARDEC was able to provide data on the number of suppliers. These had been reduced from about 1000 to 367 over a several year period. But it was unclear how much of that was due to an intentional reduction in variation and how much was due to other factors. None of the other respondents indicated that they were working toward, or had a desire to work toward, the single supplier status beyond that which existed for systemic reasons.

Competitive procurement was seen by a number of respondents as still a beneficial means for reducing prices and pushing technological advances. They displayed little or no interest in moving toward a single supplier. In dealing with the uncertainty that they perceive, namely the loss of industrial capacity in the event of national security crisis, they clearly were uncomfortable with the idea of acquiring the weapons of war from only a single firm.

While the single supplier issue was the most problematic of the theory, the proposition of "long-term" was linked to it. Long-term relationships between the Federal
government and its contractors do exist, regardless of the length of the contracts. Good
performers will keep being awarded contracts. Indeed, the length of contracts can, as in
the case of single suppliers, be an irrelevant number. The duration of the relationship is
what is most important and that is based on whether the supplier is committed to
continual improvement of the product in response to the customers needs. As the
research data shows, long relationships have not necessarily equated to a demonstration
of that commitment but exist for reasons of technological complexity and the high cost of
transference to another contractor.

Lastly, it was in the nature of the interpersonal relations that the research showed
the most interesting efforts to improve relationships. Generally, relationships were
characterized as having been adversarial. According to the literature, this condition
arises, in part, from different perceptions by contractors and government employees of
each others' real interests. Confirming this theory was beyond the scope of this research,
but the research did identified government employees who had colleagues that felt that
contractors did not have the interests of the American taxpayer at heart. The recent
experiences of the respondents indicated that adversarial relationships were not a lifelong
affliction. With management support, innovative ways in conducting the contracting
business, establishment of open and inclusive communications, and a motivating need, a
more trusting relationship can be developed and sustained with the attendant advantages
of lower costs, better products, and improved organizational outcomes. But while trust
can emerge, it does so in the context of contractual relations between the two parties and
are subject to the legal rights and obligations established thereby. Regardless of the level of trust that evolves, contracts, as the preferred means to reduce uncertainty and to achieve rational, planned objectives will always influence the nature of the interchange between the government and its contractors.

**Question 3**

To the extent that the practice of Federal organizations reflects Dr. Deming's theory about supplier-customer relationships, what conditions, techniques or approaches have permitted them to achieve this status and are there commonalities among the organizations under study?

The Response: Certain themes regarding efforts intended to improve supplier-customer relationships were discernible among the four selected Federal organizations. These themes include:

**Motivation.** All four organizations indicated some driving force which led them to re-examine their relationships with their suppliers. In the case of the Defense organizations and the Space Center, it was the reduction in budgets and manpower together with expectations to continue to perform at prior levels. In the case of the Federal Supply Service it was the move to industrial funding and the elimination of its monopoly sale status to Federal Agencies.

**Authorities.** In two (GSA and TARDEC) of the four organizations studied, relief from standard Federal acquisition rules through "reinvention lab" status permitted the organizations to try new approaches to supplier relationships and in one of these cases
(GSA), establish statistical means to measure performance, consistent with Dr. Deming's admonition in his System of Profound Knowledge. In this particular case, his model of using statistical process control was exactly the model that was installed. In the two other organizations, sufficient authority existed, or was perceived to exist, within the organization to permit some new practices. In both these instances (NAVAIR and the Space Center) it should be remembered, however, that the products being procured are highly technical pieces of hardware and software and already under enormously complex systems of quality assurance.

It is not clear, however, from the design of this research which was intended to test the practice of supplier-customer relationships against the model espoused by Dr. Deming, the extent to which perceived restrictions in procurement policies were locally generated or in fact had a basis in law. There was some indication that they may be contained primarily in local regulation thus permitting local variance and thus permitting local managers desirous of establishing such relationships the necessary authority.

Authority to change the nature of supplier relationships, as essential as it is, by itself is insufficient. The contracting officers must be willing to make such changes in their day-to-day interchanges with the contractors. Procurement rules and regulations can provide for consistency and equity among contracts and among government agencies, but some believe they can become, as Dr. Kelman asserts in his study of Federal computer acquisition, an end to themselves. At issue is the role of the contracting officer. If is role is seen is providing a mediating influence between the demands of the user, the
profit incentives of the contractor, and the conservation of resources by the taxpayers through their representatives in Congress, then the procurement rules provide a means to balance these often conflicting perspectives.

The respondents in this research seemed somewhat ambivalent about the procurement rules and regulations. Despite public assertions of the abolishment of the rule-books, in fact they remain in place and in use. The sense conveyed in the interviews was that without these books there would be no way to know how to get the “job” done. In the interests of “effectiveness” in support of the user, Dr. Kelman would provide the contracting officer more discretion and fewer rules. But abandonment to the rules and the use of more discretion could leave the contracting officer vulnerable to being “second guessed” by the Congress or the contractor that the interests of either one had not been protected. Since all interests can seldom be completely protected, the contracting officer must at least show that an equitable process was used in making the decisions. Contracting officers, as public officials, must protect against arbitrary choices. This presents a significant dilemma to the procurement community.

A way out of this dilemma may be presented by the use of Dr. Deming’s philosophy. As has been demonstrated in the case of the Federal Supply Service, the application of statistical process control can provide facts and a data from the real world that provide a solid basis for making judgements to augment the rules and regulations and permits performance judgements that recognize the real world presence of variation. This application does not do away with the rules but augments them with data that can protect
against arbitrary decisions by either the government and the contractor.

**Leadership.** In each case studied, government employees became interested in the concepts of quality management and were willing to take some risks in attempting its implementation. In the case of the Federal Supply Service, mid-level employees, with management's blessing, essentially set the entire SPC system up with no apparent outside help. Acquisition managers in NAVAIR were willing to provide waivers to some rules to permit speedier handling of contractual documents. Likewise at TARDEC the boundaries of the procurement rules, as perceived by the respondents, were challenged and extended.

It was also apparent from the data that the Federal government can be effective in leading a change away from adversarial relationships toward more cooperative arrangements. While the government must set the conditions of the relationship in the context of the relevant statutes and social values, industry must be willing and be prepared to reveal more of its corporate activities if there is to be a feeling of mutual trust and respect. Dr. Deming believed strongly that there must be cooperation in order to optimize the system. Though both parties must have the desire to cooperate, one of the parties must start the ball rolling. One must initiate a transaction which will permit the other to respond in kind, in this case in a cooperative framework. Carlisle and Parker clearly believe that the partner with the superior "power" should be the instigator in these situations and the customer is almost always in that position. If this formulation is correct, then government should be the initiator for establishing relationships based on these principles. That
is exactly what the Federal Supply Service did when it put is Quality Assurance Specialists on the road with laptop computers and SPC.

**Oversight.** The question of oversight and the nature of audits was raised several times in two contexts. One had to do with auditing the contractors, the other with audits of the Federal activity itself. In the former instance, NAVAIR decided to do the unusual and invite the participation of Defense auditors early in the contracting process so that the auditors would fully understand the nature, intent and requirements of the contract before reviewing the contractor’s activities. By two accounts this was highly successful from the standpoint of expediting the contract and saving on auditing costs, and hence, total costs.

The other instance where audits were mentioned demonstrated a concern about internal audits performed by government elements on government organizations. These audits are seen to primarily review compliance with the organization’s own rules and regulations and do not address what is seen by the audited organization as the more important issue, namely, the effectiveness of the organization’s outcomes. In a philosophic sense, Dr. Deming would object strongly to such audits. He looks to a process of data collection and analysis to reveal when the system is performing satisfactorily with respect to the aim of that system. If public organizations are to effectively to adopt his theory, a way must be found to handle oversight in ways that do not obviate the advantages of the process being used.

**Institutionalization of Procurement.** As a core administrative function of the
Federal government, a procurement community independent of the Departments and Agencies has emerged since World War II. The laws governing it and the regulations that have been written to guide it apply to most Federal activities. The principal players charged with its implementation must serve several masters: their parent organization and the procurement community. The implementation of quality management is being accomplished, at least as evidenced by this research, by the formal organizations contained within Federal Departments and Agencies. Yet the contracting officials, at least in the Department of Defense, are now being trained based upon a centralized curriculum under the umbrella of a Defense Acquisition University. This research did not attempt to identify the nature and objectives of this training program, but it can be speculated that if this program does not offer material relevant to the application of quality management principles in general or Dr. Deming's theory in specific, it will be difficult for the formal organizations to apply quality management techniques in the procurement function. This research tended to indicate that there is a procurement community and a procurement culture present in the Federal Government. This culture could be instrumental in the acceptance or rejection of quality management regardless of what choice is made by the formal organizations. If Dr. Deming's theory is to find wider acceptance in the domain of the Federal government, its utility must be considered concurrently in both the formal Departmental organizational structures and through the "institution" that is the procurement community.
Conclusions

This research demonstrates that Dr. Deming's theory of supplier-customer relationships can be applied to the Federal procurement system though such applications will not necessarily match the Deming model within a single organization nor will it match the model equally in all regards. The research also indicates that while applications of this philosophy in the private sector are more "advanced" than those in government, industry has also not equally implemented all the parts of the supplier-customer relationship advanced by Dr. Deming.

The single application in government which most closely resembled Dr. Deming's model was observed in the General Services Administration's Federal Supply Region 2 which has instituted the use of statistical process control techniques to understand variations in product quality and delivery. These techniques permit a fact and data based dialogue that recognizes the reality of variation and results in better communication between the supplier and the customer. In turn, this potential for dialogue permits the government to instigate a process for improving the products it gets without using adversarial, legal mechanisms. It provides a means by which government becomes more capable of helping entrepreneurs using objective, quantifiable data that can withstand public scrutiny. By more fully supporting this segment of the society, the Federal government is in fact enhancing democratic governance through what might commonly be believed to be simply a mundane purchasing arrangement.

In addition to altering the traditional manner in which the Federal government
purchases goods and services and reducing the adversarial nature of the relationship with the contractors that provide these goods and services, the use of statistical process control techniques provides a method to augment the current procurement rules and regulations in a way the provides data and facts upon which to base contracting judgements and thereby diminishing today's reliance on process oriented strictures.

At a broader level, Dr. Deming's System of Profound Knowledge provides a managerial philosophy applicable to the procurement process, elements of which were seen being used in conjunction with the use of statistical process controls. This combined usage reflects the interdependence of the elements of Dr. Deming's philosophy and reflects the simple elegance but broad utility of a System of Profound Knowledge which can be applied on the shop floor or in a Cabinet Office.

Secondly, the research revealed no structural impediments in the Federal procurement system which would inherently prevent the application of Dr. Deming's theory of supplier-customer relationships. Difficulties with its application come from the political and economic environment of the procurement process rather than from the rules and regulations as is often charged. The procurement system appears to have the flexibility to accommodate almost any situation that arises. Impediments to the application of these quality management principles seem to arise as much in the culture of the procurement community as they do in the rules and regulations that serve as a guide. The research indicates that to some Federal government contracting officials contractors are interested primarily in making a profit and less concerned with providing the government with the
goods and services which would best fulfill government needs. The government respondents to this research, however, all of whom are interested in and applying quality management methods, reject this perspective. By actively pursuing techniques to increase communications and risking the establishment of more trusting relationships, they are finding that there is improvement in product quality and delivery. They are finding that the contractors they deal with, on the most part, respond positively to this changed status.

The fact that the research did not locate a exact match with Dr. Deming's model does not invalidate his theory of supplier-customer relationships. The indication that its three components could individually be approximated (that is, within some general frame of variation) provides the evidence that the theory does work in practice. In the aggregate, the research demonstrates that cooperative relationships between suppliers and the government can be established in the Federal setting. This research was not intended to assess the Federal procurement system, but that system has been shown to be less restrictive, less rule bound, more adaptable, and less competitive than the public perception. If this is a valid viewpoint, then the possibility of applying Dr. Deming's theory of supplier-customer relationships more broadly seems like a reasonable conclusion.

**Recommendations for Further Research**

In terms of the application of Dr. Deming's concepts for supplier-customer relations as it relates to the Federal procurement process, several possibilities for further research present themselves. First, the research found no instances of a longitudinal
study of a particular Federal procurement action conducted under the quality management philosophy, a study that followed one transaction through from requirements definition to close out. Such a study could provide invaluable insights about the nature of a trusting relationship, how it developed over time, and what potential problems were posed. Another obvious area for study is to locate quality practicing, non-award winners involved in procurement as an alternate target population. If such a population exists, it may have found solutions to impediments not revealed in this research. A third fruitful avenue would be to study other Presidential award winning organizations.

In the context of gaining a better understanding of the more general application of Dr. Deming’s System of Profound Knowledge as a management style for the delivery of services by public administrators, research is needed in any number of areas. We need to understand how public managers relate and understand Dr. Deming’s philosophy relative to what is generically referred to as “Total Quality Management.” We need to understand how public managers accept and apply “bits and pieces” of this philosophy without appreciating the interdependence of Dr. Deming’s “Fourteen Points.” Finally, we need research which will help us predict those situations where the application of a System of Profound Knowledge will have a high pay off and those were the payoff may be marginal, or if in fact it is universally applicable to the same degree in all public administrative settings.
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BOOKS


DiJulio, John J., Jr., Gerald Garvey, and Donald F. Kettl.


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**DISSERTATIONS**


ARTICLES


Kurland, Nancy B. "The Defense Industry Initiative: Ethics, Self-Regulation, and Ac-


Perry, Dr. James H. "Integrating Quality Considerations in the Systems Acquisition Pro-


GOVERNMENT PUBLICATIONS


John F. Kennedy Space Center.


NEWSPAPERS


My name is Gene Bacher. I am conducting research on the application of quality management principles in the public sector as part of an academic program at Virginia Tech. My advisor is Dr. Jim Wolf who can be contacted at 703-698-6084 if you have any questions. If you have questions of me, I can be reached at 703-281-2595.

Thank you for your willingness to participate in this project. It is very much appreciated. Before we start the interview, I would like to make you aware of your rights in this process:

* First, your participation is entirely voluntary, which means:
  ** You are free to decline to answer any question at any time.
  ** You are free to withdraw from interview at any time.

* This interview will be kept strictly confidential and will be available only to members of the research team.

* Excerpts of this interview may be made part of the final research report, but under no circumstances will your name or identifying characteristics be included in the report.

I would be grateful if you would sign this form to show that I have read you its contents.

________________________________________ printed name
________________________________________ signature
________________________________________ date

Would you like me to mail you a copy of the completed report?   YES ____   No____

If YES, please provide a mailing address:

________________________________________
________________________________________
________________________________________

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APPENDIX B – INTERVIEW QUESTIONS

INTERVIEW INTRODUCTION AND QUESTIONS

Introduction: "I am doing research for a dissertation on the use of quality management principles in the public sector. You have been suggested as a person knowledgeable on this topic. Before we begin, I would like to read you this interview form and if it is agreeable to you, have you sign and date it at the bottom. I will also give you a copy." (read form and obtain signature. Provide copy to interviewee)

"Is it agreeable to you that, in order to be accurate in capturing your answers, I tape record this interview? If it is, let's make sure that the recorder is on and working." (make test recording and play back)

"I have divided the questions into two parts. The first few questions are demographic in nature. These will be followed by a number of open ended questions about quality management."

DEMOGRAPHIC QUESTIONS

Organization:
Your Occupation:
Number of Years in Occupation:
Number of Years in this Occupation in this organization:
Functional area you work in:
Number of years in Federal Government:
(Federal employees only)
Grade:
(Federal employees only)
Supervisory responsibilities: Yes No

GENERAL QUESTIONS

Could you describe how you are streamlining procurement processes in your area of responsibility?

During your tenure in this organization, has this streamlining affected the way you deal with contractors, and if so, in what ways?

Are there barriers to the way in which you communicate with organizations with which NAVAIR contracts for goods or services? If so, could you please describe them?

Are there changes you would recommended to the manner in which you deal with contracting organizations?

FLOATING PROMPTS

What is/was the difference between __ and ___?

What exactly do you mean by the term/phrase ________?

Could you describe in more detail the incident you just related?

Were there other people/procedures/contractors/organizations affected by that event/incident?
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