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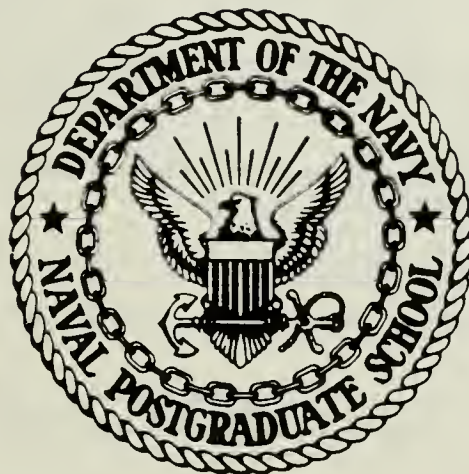
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NAVAL POSTGRADUATE SCHOOL

Monterey, California



THESIS

T45686

CONTRACTING:
A SYSTEMATIC BODY OF KNOWLEDGE

by

Connie L. Thornton

December 1987

Thesis Advisor:

David V. Lamm

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19. Abstract

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Contracting:
A Systematic Body of Knowledge

by

Connie L. Thornton
Lieutenant Commander, Supply Corps, United States Navy
B.A., Chadron State College, 1976

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

from the

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December 1987

ABSTRACT

This thesis attempts to develop a systematic body of knowledge for the acquisition contracting discipline. A general definition, as well as five critical attributes considered necessary for the formulation of a body of knowledge are identified and discussed. These are then applied to the contracting discipline in order to compile a body of knowledge for this specific field.

The thesis effort concludes that the contracting discipline possesses rudimentary elements of the requisite attributes to support a specific body of knowledge. The present acquisition contracting body of knowledge however, is not well organized and is deficient in many respects. Recommendations and areas for further research complete the research effort.

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I. INTRODUCTION

A. PROBLEM STATEMENT

Many past studies have focused on the efficiency of the acquisition process of the Department of Defense (DOD) and each have proposed various courses of action on methods to improve the overall process. Several recommendations have keyed on improving the quality and calibre of the acquisition workforce within the Department of Defense.

One step toward improving the level of quality requires establishing the Federal acquisition workforce as a professional rather than an administrative series by the Office of Personnel Management (OPM). Designation as a professional series by OPM requires the profession to have a defined body of knowledge. To date the Federal acquisition workforce does not.

B. OBJECTIVE

The purpose of this thesis is to define the body of knowledge for the contracting discipline as it relates to the Federal acquisition workforce. A body of knowledge is a key requirement in the designation of an occupation as a profession. Supreme Court Justice Brandeis at the Brown University commencement in 1912 stated that one of the peculiar characteristics of a profession provides that:

A profession is an occupation for which the necessary preliminary training is intellectual in character, involving knowledge and to some extent learning, as distinguished from mere skill. [Ref. 1: p.39]

Once established, the contracting body of knowledge would serve not only as the foundation for the Federal acquisition workforce as a professional series, but for the overall contracting discipline as well.

Specific objectives involved in this course of study include:

- 1) The development of a generic definition for a body of knowledge.
- 2) Determining the principle characteristics of a body of knowledge.
- 3) Designation of a specific body of knowledge for the contracting discipline.

C. RESEARCH QUESTIONS

The following primary research question was addressed in pursuit of the stated objectives.

How might the contracting discipline's body of knowledge be defined?

In support of the primary research question the following supplementary questions were addressed:

- 1) What is a generic definition of body of knowledge?
- 2) What might be the principle characteristics of a generic body of knowledge?
- 3) How might a comprehensive definition of a contracting body of knowledge be stated?
- 4) Why is it necessary to articulate a body of knowledge?
- 5) What are the perceived benefits of establishing a body of knowledge for the contracting discipline?

D. RESEARCH METHODOLOGY

A qualitative research approach was employed which involved a comprehensive literature review, informal interviews, personal observations, as well as personal experience with the Federal procurement process. Initial research was conducted via a literature review to obtain insight as to how "knowledge" is defined in the social sciences and acknowledged professions. This literature review yielded the prerequisites of a profession and provided background information on the research topic. A more in-depth literature search was conducted which focused on the marketing field of expertise due to its close relationship to the contracting discipline.

Informal inquiries were conducted via correspondence with highly respected and knowledgeable academia in the professional education field, as well as experts of the contracting discipline. This phase of research focused on the identification of a generic definition of a body of knowledge, as well as a description of the attributes involved in developing such an entity. The selection of personnel was made from the academic and research fields primarily because their expertise and knowledge would more readily lend itself to a discussion of body of knowledge.

Appendix A provides a list of the individuals contacted, and their organizations. Letters were sent out September 3, 1987, and responses were returned by October 5, 1987.

Appendix B exhibits the letter sent to the various participants.

E. ASSUMPTIONS, LIMITATIONS, AND SCOPE

Throughout the thesis it was assumed that the reader is somewhat familiar with Government contracting and procurement procedures. For the purpose of this research effort, the words contracting, acquisition, and procurement are assumed to have equivalent meanings and are used interchangeably through this study unless otherwise specified.

It was also assumed that the contracting discipline is similar to the marketing and purchasing fields in terms of being able to correlate the information generated from the respective research efforts to that of the contracting discipline.

Admittedly, the fifteen individuals who participated in defining a body of knowledge constituted too small of a sample upon which to base an accepted definition. The information and insight provided however, initiated a starting point from which to develop a basic framework.

The scope of the thesis involved identifying the body of knowledge as it is defined in acknowledged professions or social sciences, making comparisons to find similarities and using those similarities to develop a broad framework for a proposed contracting body of knowledge. The thrust of the

study centered on the GS-1102 contract specialists of the Federal acquisition workforce.

F. LITERATURE REVIEW

Research efforts for this topic precluded the use of Defense Logistics System Information Exchange (DLSIE) due to the abstract nature of this thesis endeavor. Additional background information was obtained from reviewing bibliographies of literature available to the researcher to investigate other possible sources of information pertaining to the research effort.

Much of the literature reviewed centered around the field of marketing, purchasing, behavioral and social sciences. Other literature sources included Federal agency regulations, General Accounting Office (GAO) studies, previous theses, and a review of current publications and periodicals related to the field of Federal procurement.

G. DEFINITIONS

For the purpose of this study, the following definitions apply.

1. Acquisition, Contracting, and Procurement

These terms are considered to be synonymous and are used interchangeably throughout this report unless otherwise stated. Subtle differences do exist, however. A collective description of these terms can be broadly defined as:

. . . the entire process by which all classes of resources (people, materials, facilities, and services) for a particular project are obtained. [Ref. 2: p.27]

For the uninitiated the following separately defined descriptions apply:

- a. Acquisition: The acquiring by contract with appropriated funds of supplies or services by and for the use of the Federal Government through purchase or lease, whether the supplies or services are already in existence or must be created, developed, demonstrated, and evaluated. Acquisition begins at the point when agency needs are established and includes the description of requirements to satisfy agency needs, solicitation and selection of sources, award of contracts, contract financing, contract performance, contract administration, and those technical and management functions directly related to the process of fulfilling agency needs by contract. [Ref. 3: Section 2.101]
- b. Contracting: Purchasing, renting, leasing or otherwise obtaining supplies or services from nonfederal sources. Contracting includes description (but not determination) of supplies and services required, selection and solicitation of sources, preparation and award of contracts, and all phases of contract administration. It does not include making grants or cooperative agreements. [Ref. 3: Section 2.101]
- c. Procurement: Includes all stages of the acquisition process, beginning with the process for determining a need for property and services through to disposition of such property and services. [Ref. 4: p.145]

2. Federal Acquisition Work Force

The Federal acquisition workforce is composed of over 165,000 personnel. Included are industrial specialists, quality assurance representatives, contracting officers technical representatives, industrial property managers, property disposal, packaging, transportation and traffic management personnel.

3. GS-1102 Contracting Series Personnel

Those personnel who manage, supervise, or perform work involving the procurement of supplies, services, construction, or research and development using the formal advertising or negotiating methods; the evaluation of contract price/cost proposals; the administration or termination and close out of contracts; and the development of policies and procedures for this work. [Ref. 5: p.1]

The following positions are established for this series:

- Contract Specialist
- Contract Negotiator
- Contract Administrator
- Contract Termination Specialist
- Contract Price/Cost Analyst
- Procurement Analyst
- Supervisory Contract Specialist

4. Contracting Officer

Government contracting officers are appointed in writing with a "Certificate of Appointment" which states any limitations on the scope of authority to be exercised. In accordance with the Federal Acquisition Regulation (FAR), contracting officers:

. . . have authority to enter into, administer, or terminate contracts and make related determinations and findings. Contracting officers may bind the Government only to the extent of the authority delegated to them [Ref. 3: Section 1.602-1(a)]

H. ORGANIZATION OF STUDY

The focus of the thesis effort is to determine a generic definition of body of knowledge and its identifying characteristics. Once established, this definition will be applied to the contracting discipline in order to develop a contracting body of knowledge.

Chapter I provides the standard thesis introduction, while Chapter II establishes the background information which provided the stimulus for the development of a contracting body of knowledge. Chapter III develops a general, or working, definition of a body of knowledge and discusses the requisite attributes needed for the formulation of such an entity.

In Chapter IV, the attributes previously established are compared to the characteristics of the contracting discipline to develop a broad description of the contracting body of knowledge. Chapter V discusses the various purposes for articulating a body of knowledge and addresses research problems encountered in defining a contracting body of knowledge. A proposed body of knowledge specifically designed for the contracting discipline and its perceived benefits complete Chapter V. Conclusions, recommendations, and areas for further research are provided in Chapter VI which concludes the thesis effort.

II. BACKGROUND

A. INTRODUCTION

This chapter focuses on the rationale leading up to the purpose of developing a body of knowledge for the contracting discipline. Included are recent initiatives developed for Federal acquisition reform, as well as a discussion of the characteristics considered unique to the establishment of a profession and a science.

B. FEDERAL ACQUISITION WORKFORCE REFORMS

Concern over the effectiveness of the Federal procurement workforce has reached epic proportions in recent years. As part of its regulatory oversight responsibility, Congress has voiced concern about the training and proficiency of the Federal acquisition workforce and its ability to deal effectively with contractors.

This concern has been echoed by the public sector as well. One author voiced the following opinion:

Regardless of the motivation behind bringing these problems to the public's attention, the result has been that many people feel that defense contracting officials are too stupid or untrustworthy to do their job
[Ref. 6: p.2]

Opinions such as this have only demonstrated the pressing need to overhaul the Federal procurement process. In today's procurement arena, the magnitude, complexity, and diversity of Government procurement functions involves a

coordinated effort requiring a comprehensive grasp of the total procurement process. This requires a variety of talents, experience, expertise, and often a myriad of unrelated skills.

Federal procurement has evolved rapidly over the years as evidenced by the transition from the Armed Services Procurement Regulation of 1947, the Defense Acquisition Regulation of 1978, to the Federal Acquisition Regulation of 1984 as modified by the Competition in Contracting Act of 1985. These changes have been accompanied by a plethora of procurement policies, legislation, and regulations. They affect not only the concept of Federal procurement management but also its relationship to commercial industry as well. The need to develop a competent Federal workforce with the capacity of exercising more initiative and judgement in making procurement decisions is now at hand. Nowhere else in the Federal procurement process do the abilities of one single individual, the contracting officer, make such a direct impact on the money spent by the Government. Annual DOD procurement requirements alone total over \$170 billion, involving an average of 56,000 contractual actions each working day.

Qualification requirements for selecting Federal contract specialists, especially contracting officers, have been questioned for many years. The following brief

narrative provides a review of Federal procurement reform initiatives over the past thirty years.

On August 13, 1970, the Comptroller General issued a report to Congress entitled "Action Required To Improve Department of Defense Career Program for Procurement Personnel." This report recommended an improved career and training program for procurement personnel, including action to raise the status and enhance the image of the procurement career field. Resistance from some of the Services and lack of executive support resulted in a failure to carry through on this initiative. [Ref. 7: pp.4-5]

A Commission on Government Procurement was created by Congress in November, 1969 for the purpose of conducting a comprehensive investigation of the Government procurement process. Completing work in December, 1972 the Commission advocated 149 recommendations for improvements to the Federal procurement process. One recommendation involved the creation of the Office of Federal Procurement Policy (OFPP) to provide central policy direction for Government-wide procurement. This office was eventually established on August 30, 1974. [Ref. 8: p.100]

The Federal Acquisition Institute (FAI) was subsequently established under the jurisdiction of the OFPP, to assist in the career development and training, and the improvement of the professional standing of the Federal procurement workforce.

On March 17, 1982, President Reagan mandated Federal procurement reforms under Executive Order 12352. This Order directed each executive agency and department to:

Establish career management programs, covering the full range of personnel management functions, that will result in a highly qualified, well managed professional procurement workforce [Ref. 9: p.111]

Executive Order 12526 of July 15, 1985 established President Reagan's Blue Ribbon Commission on Defense Management to "study issues surrounding defense management and organizations, and report its findings and recommendations." [Ref. 10: p.xi] Otherwise known as the Packard Commission, its final report, "The Quest for Excellence", was submitted to the President in June, 1986. The Packard Commission stated:

Contract specialists must master the extensive, complex body of knowledge encompassing materials and operations management, contract law, cost analysis, negotiating techniques, and industrial marketing. [Ref. 10: p.68]

The Defense Procurement Improvement Act, Public Law 99-145, Title IX, was introduced on February 20, 1986. Provisions of this legislation included requirements for determining qualification criteria for government procurement, and tasked GAO with the responsibility of examining the feasibility of establishing an independent civilian acquisition agency. [Ref. 6: p.11]

In reviewing these past initiatives, it is apparent that the need to improve the Federal procurement workforce has

been recognized. What now remains is to translate words into action.

C. CONTRACTING AS A PROFESSION

The Federal procurement workforce is composed of several types of Government service series. The GS-1102 series of contract specialists perform the majority of the contracting actions involved in Government procurement, from purchasing spare parts to handling major weapon systems acquisitions.

"Government procurement personnel" (GS-1102 contract specialist) and "contracting officer" are not synonymous terms. Not all Federal procurement personnel are Government contracting officers. A contract specialist must obtain a Certificate of Appointment to be designated a contracting officer. This designation then empowers that individual to sign procurement actions which legally obligate the Government.

Although not all contract specialists are appointed as contracting officers, they still perform many of the same functions of a designated contracting officer. Both are required to exhibit a high degree of knowledge, proficiency, and professionalism in the performance of their duties. Yet only the contracting officer is authorized to legally bind the Government. The Government's primary procurement regulation, the Federal Acquisition Regulation defines the responsibilities of a Government contracting officer as:

Contracting Officers are responsible for ensuring performance of all necessary actions for effective contracting, ensuring compliance with the terms of the contract, and safeguarding the interests of the United States in its contractual relationships. In order to perform these responsibilities, contracting officers should be allowed wide latitude to exercise business judgement. [Ref. 3: Section 1.602-2]

With the advent of recent publicity concerning Federal procurement, in particular cost overruns and spare parts pricing horror stories, the Packard Commission was tasked with addressing the issue of improving the Federal procurement process. One of Packard's recommendations involved enhancing "the quality of acquisition personnel . . . to attract and retain the calibre of people necessary for a quality acquisition program." [Ref. 10: p.65] To implement this recommendation, the present status of the acquisition personnel must be addressed. Contract specialists play a critical role in the Government procurement process. Today's procurement function ranges from relatively simple contract actions to weapon systems acquisition which involve complex contractual methods. To implement Packard's initiative of improving the quality of the Federal acquisition workforce, OPM has been requested to reconsider designating the Federal acquisition workforce as a professional job series.

The GS-1102 Contract Specialist Personnel series comprises a significant portion of the Federal procurement personnel and is currently designated by the Office of Personnel Management as an administrative job series rather

than a professional job series. Several requirements must be met before OPM will designate an occupation as a professional series. To satisfy the provisions of 5 U.S.C. 3308 (1982), OPM classifies positions as clerical, administrative, or professional. Restrictions imposed by this code include various entry level requirements, designated requisite skill levels, and minimum educational requirements, among other factors.

In 1977, OPM provided a working definition of "professional occupations" in response to various inquiries concerning this particular requirement for a professional occupation. The working definition stated:

Professional occupations or series are those that require knowledge in a field of science or learning customarily and characteristically acquired through education and training that meets the requirements for a bachelor's or higher degree with major study in or pertinent to the specialized field, as distinguished from general education. The work of professional positions is creative, analytical, evaluative, or interpretive, and is characterized by personal responsibility to keep abreast of and exercise judgement and broad perspective in the application of an organized body of knowledge that is constantly studied to make new discoveries and interpretations or to improve the data, materials and methods [Ref. 11]

This definition expressly addressed the issue of a "body of knowledge" as one of the attributes of a profession. M. L. Cogan, a noted lecturer on education at the Harvard Graduate School of Education, defined a profession as:

. . . a vocation whose practice is founded upon an understanding of the theoretical structure of some department of learning or science, and upon the abilities accompanying such understanding....The practices of the profession are modified by knowledge of a generalized

nature and by the accumulated wisdom and experience of mankind, which serve to correct the errors of specialism. [Ref. 12: p.107]

Although not mentioned precisely as a body of knowledge, the above definition instead refers to a "knowledge of a generalized nature".

Steven Howeler specifically mentioned body of knowledge in his discussion on "What is a profession?" He stated, "The purchasing profession may draw upon their resources to develop an interdisciplinary, synergistic body of knowledge." [Ref. 13: p.10]

Dr. Shelby Hunt in his exploration of the marketing theoretical structure stated, "The development of a unified body of theory (knowledge) is a worthy goal for any discipline." [Ref. 14: p.65] It is apparent from these various definitions, that a key requirement in the designation of a profession is a specialized body of knowledge.

D. CONTRACTING AS A SCIENCE

An interest has surfaced to establish the contracting discipline as a science. Still in an embryonic stage, a defense for the establishment of a contracting science was presented in a paper written by Robert Williams and Paul Arvis entitled "The Possibility of a Contracting Science". The following requirements must be met before a discipline can be considered a science:

- . . . a classified and systematized body of knowledge,
- . . . organized around one or more central theories and a number of general principles,
- . . . usually expressed in quantitative terms,
- . . . knowledge which permits the prediction and, under some circumstances, the control of future events.
[Ref. 15: p.33]

Norman Campbell in his discussion of What Is Science?, stated, "There are two forms or aspects of science. First, science is a body of useful and practical knowledge, and a method of obtaining it." [Ref. 16: p.1]

Other literature also referred to a body of knowledge in the discussion of the criterion needed for the development of a science. The formation of a contracting body of knowledge could help support the argument for establishing contracting as a science. It is not the researcher's intention to support the argument for a contracting science, but rather develop the background material that establishes the various uses of a body of knowledge.

An interesting perspective is offered on the various types of knowledge affecting the actions of individuals in an article entitled, "Transforming Managerial and Organizational Research: Creating a Science That Works". Four types of knowledge are presented: universal, direct situational, analogical, and response-educing heuristics. Generally accepted procedures and standardized methods generate universal knowledge. Personal experience equates to direct situational knowledge. Analogical knowledge is

derived from and imparted by the experience of others. Response-educing heuristics enables the doer to do his or her own learning. [Ref. 17: pp.446-447]

The following definitions as described by Webster's dictionary also revolve around the "knowledge" requirement in one form or another. [Ref. 18]

1. Art - an occupation requiring knowledge or skill.
2. Discipline - a subject that is taught; a branch of knowledge; also, a field of study.
3. Profession - a calling requiring specialized knowledge.
4. Science - a department of systematized knowledge as an object of study.
5. Expert - one who has acquired special skill in or knowledge of a particular subject.
6. Skill - the ability to use one's knowledge effectively and readily in execution or performance.

Depending of the viewpoint of the observer, the format for the contracting discipline can range from a science to an art. Whatever form it assumes, it is important to note that an underlying prerequisite is that of "knowledge" or a "body of knowledge".

E. SUMMARY

Numerous initiatives have been implemented to enhance the professionalism of the Federal acquisition workforce. Action is now required to replace rhetoric. Simply stated:

The acquisition workforce provides the foundation of all our acquisition improvement efforts. We cannot hope to solve the myriad of acquisition problems simply by establishing initiatives or enacting legislation. The

fact is this: we can improve the acquisition process only in direct relationship to the availability and application, across-the-board, of a sufficient and well-qualified and professional workforce. [Ref. 19: p.9]

To enhance the quality of the Federal acquisition workforce and establish the GS-1102 contract specialist series as a profession recognized by OPM, the development of a body of knowledge is a critical necessity. A body of knowledge is an essential synergistic characteristic to the contracting discipline, regardless of how it is classified.

III. AN OVERVIEW OF A BODY OF KNOWLEDGE

A. INTRODUCTION

A substantial portion of this thesis effort revolves around a common understanding of what is involved in a body of knowledge. This chapter develops a generic description as well as delineates principle attributes considered necessary to the composition of such an entity.

B. DESCRIPTION OF A BODY OF KNOWLEDGE

The dilemma of developing a body of knowledge for the contracting discipline begins with first comprehending what is involved in a body of knowledge. This effort proved difficult in that a detailed discussion of a body of knowledge was not readily available in the literature nor was there even a definition in Webster's dictionary. Although the phrase, "body of knowledge", was repeatedly used throughout the literature, it was rarely accompanied by a sufficiently detailed discussion of what the particular body of knowledge entailed.

If one could equate body of knowledge to similar wording found in the literature, the following phrases were used extensively: body of facts, body of principles, body of theory, body of thought, body of concepts, body of beliefs, a systematic collection of data; even a body of lore, set of

proverbs, code of ethics, and standard methods and procedures.

What is common among these various phrases is the use of "body" as a concept of collection which entails a grouping together of various components, elements, or ingredients. If it is permitted to assume the aforementioned phrases are equivalent meanings of body of knowledge, then it is possible to derive a potential generic description. To do so, one must first grasp the context in which the aforementioned phrases were applied.

Robert Bartels referred to a body of principles as "general conceptions underlying a given branch of learning or major discipline." [Ref. 20: p.322]

Robert Williams and Paul Arvis established a scientific body of knowledge as ". . . the collection of (contracting) research literature that meet the scientific criteria." [Ref. 21: p.3]

George Ritzer described a systematic body of theory as ". . . principles that describe in general terms the phenomenon with which the profession is concerned." [Ref. 22: p.26]

Ronald Pavalko indicated that comprising a systematic body of theory was a ". . . knowledge base (that) represents the results of scientific research." [Ref. 23: p.18].

Ernest Greenwood described a body of theory as ". . . a system of abstract propositions that describe in general terms the classes of phenomena comprising the profession's focus of interest." [Ref. 24: p.46]

The Council of State Governments submitted that:

Professions are built around bodies of knowledge that have been reduced in one fashion or another to an accepted set of rules or principles and standards that are both formalized and uniform. [Ref. 25: p.111]

James Simms presented a theory that knowledge is a ". . . true belief accompanied by definition." [Ref. 26: p.1]

Thomas Kuhn referred to a body of belief as ". . . implicit in the collections of facts" in his discussion on the early stages of science's development [Ref. 27: p.17].

After reviewing these descriptions a proposed definition of a body of knowledge was then developed around Bernard Barber's description of a body of facts in his book, Science and the Social Order [Ref. 28: p.20].

A body of knowledge is a collection and ordering of information in terms of a conceptual framework which is subject to reconstruction as new information becomes available and old information is refuted. It provides a sense of community or common identity among the participants associated with the framework.

This description was submitted for review and comment to fifteen knowledgeable academia and recognized experts of the contracting and purchasing disciplines. A listing of the participants is provided in Appendix A.

Although responses were varied, the general consensus of opinion approved the proposed definition. The following comments recommending modification or alteration were provided.

- Add the phrase "which is associated with a central topic or theme" after the words "conceptual framework".
- Use "central topic or theme" in place of "sense of community or common identity".
- Change "framework" to "frameworks" and include "the information is perceived to be true by the participants associated with the frameworks".
- It was suggested that organizational goals and common socialization is more appropriate than "the subject matter of the profession".

Professor Stanley Sherman provided his own definition of a body of knowledge which stated:

For purposes of studying and assessing the professional status of an occupation, a body of knowledge may be understood to mean the collection of information pertinent to the work and skills associated with the occupation. The body of knowledge for a multifarious occupation may not be subject to comprehensive tabulation, and in case of technically complex or intellectually challenging occupations, it will continuously change and grow. In such cases the body of knowledge will be sufficient to define the conceptual framework within which practitioners will understand their work to fall. Even though never complete, when fully developed, the conceptual framework will provide an ordering of the body and will include at its core a systematic expression of theory that justifies the practices of incumbents. Their understanding of it establishes a degree of community and a sense of identity among practitioners. In the case of technically complex or intellectually challenging occupations, the body of knowledge serves in a unique manner to establish the content basis for defining the work as a profession and provides in a definitive way the scope and parameters of practice for members of the profession. [Ref. 29]

The above description shares many of the same concepts as the researcher's initially proposed definition. Similarities include the element of collection or ordering of information, a conceptual framework, a common sense of identity, and the idea of continual change and growth.

After reviewing the critiques of the initially proposed definition and further analysis of the literature, a revised definition of a body of knowledge was developed.

A body of knowledge is a conceptual framework that is systematized about a central theme and formulated through the process of definition, classification, and analysis with reference to the discovery of general concepts, theories, laws, and/or principles. The body of knowledge establishes a synergistic alliance among the participants (denoting a common sense of agreement) associated with the central theme which continually evolves through the process of dynamic progression.

This description defines the generic definition and will be used to establish a systematic body of knowledge for the contracting discipline.

C. ATTRIBUTES OF A BODY OF KNOWLEDGE

It is not sufficient to merely develop a general definition of a body of knowledge. In order to provide a more complete description, one must also address the various attributes or characteristics that comprise a body of knowledge. An attribute is defined as an observable characteristic or property that allows us to assess the extent to which it satisfies a criterion [Ref. 30: p.66].

The following attributes are considered essential to the composition of a body of knowledge.

1. Central theme
2. Conceptual framework
3. Systematic classification
4. Operational axioms
5. Dynamic progression

A discussion of each attribute is provided to expand upon the significance of its contribution to a body of knowledge.

1. Central Theme

In order to establish a body of knowledge one must first have a subject matter about which to develop a body of knowledge. The central theme is therefore, the phenomenon that is under examination, inspection, or discussion.

This attribute infers an allegiance among those individuals involved with the field of study or analysis. Evidence of this allegiance is exhibited by the establishment of academic programs and professional organizations, publication and dissemination of literature, and the conduct of organized research efforts.

Critical to this attribute is not only a common understanding of the subject matter, but also general agreement of what is involved or associated with the subject matter. This implies a general consensus of opinion on the definition of terms and concepts used by the individuals

involved in the dynamic progression of the central theme. Therefore, collectively established definitions and concepts are objectives of this particular attribute.

The study of medical sciences, for example, focuses on preserving the human body and maintaining its proper functioning. Numerous academic curriculums are maintained throughout the country to impart the present store of medical knowledge. Professional organizations, such as the American Medical Association, furnish an alliance of practitioners as well as provide an avenue for dissemination of published articles and research efforts.

Libraries devoted solely to medical sciences are filled with a profusion of published material. Organized research abounds in practically every aspect of the medical sciences, its findings made readily available to the medical community for comment and discussion. In addition, medical practitioners possess a language unique to their organization which serves to emphasize the sense of common identity.

2. Conceptual Framework

The framework delineates the scope and parameters of the field under discussion. It is in essence, the skeletal structure that establishes the range of boundaries and the essential parameters fundamental to the central theme. This

attribute is comparable to a paradigm in that the framework provides guidelines for further deliberation.

The Constitution of the United State best demonstrates this particular attribute. The Preamble manifests the aims and purposes of the Constitution and the Government it established. Serving as the foundation of our country, it determines the organization of our Government, the functions and powers of the Government in general, and specifies how these functions and powers are to be exercised. Additionally, the Constitution sets forth limitations on the exercise of powers and establishes the fundamentals needed to deal with basic principles.

3. Systematic Classification

Essential to a body of knowledge is a method of providing order to the substance of the central theme. Coordinating the various elements material to the composition of the theme requires a systematic arrangement or ordering of the subject matter. Implicit in this requirement is a taxonomy which assists in indicating relationships between ideas and aids in describing them, while remaining open-ended to incorporate new information discovered in the expansion of the body of knowledge.

Zoology furnishes a basic example. Zoology involves the study of the animal kingdom and its members as individuals and classes. Its classification scheme uses

nomenclature and family relationships to group similar animals into a species. In fact, over 800,000 species are in existence. Similar species are grouped in a genus and similar genera are subsequently grouped in a family. Higher groupings of classification include orders, classes, and phyla which constitute the major subdivisions of the animal kingdom.

4. Operational Axioms

Operational axioms are those collective general concepts, theories, laws, and principles that have been discovered and currently hold true for the central theme. These elements provide substance to the framework and help definitize the body of knowledge.

Collectively the axioms establish the precepts that compose the foundation for the body of knowledge in its most current form. These concepts are essential to the comprehension of the phenomenon and provide a means for understanding the observations. They assist in both explaining and comprehending the phenomenon associated with the central theme.

For purposes of this particular thesis effort, the hierarchy of operating axioms is set forth below.

1. General Concepts: Result from empirical observations and demonstrate if/then relationships.
2. Theory: A set of interrelated constructs (concepts), definitions, and propositions that present a systematic view of phenomena by specifying

relationships among variables, with the purpose of explaining and predicting the phenomena. [Ref. 31: p.9]

3. Law: A statement of an order or relationship of the phenomena which, so far as known, is invariable under given conditions. [Ref. 20: p.319]
4. Principle: A fundamental truth, comprehensive law or doctrine, from which others are derived or on which others are founded. [Ref. 20: p.319]

A general concept is demonstrated by the following example. If A is greater than B, then $(A)(C) > (B)(C)$. Einstein's Theory of Relativity, simply described, states that no matter how fast one pursues a light signal moving away from the individual, that signal always moves away from him at the same speed.

Newton's three laws of motion demonstrate how objects move by describing the relationship between force and motion.

First Law of Motion: A body continues in its state of rest or uniform motion unless an unbalanced force acts on it.

Second Law of Motion: The acceleration of a body is directly proportional to the force exerted on the body, is inversely proportional to the mass of the body, and in the same direction as the force.

Third Law of Motion: Whenever one body exerts a force upon a second body, the second exerts an equal and opposite force upon the first. For every action there is an equal and opposite reaction. [Ref. 32: pp.89-93]

Finally an illustration of a principle is provided by Archimedes who discovered the principle of buoyant forces. Archimedes' Principle states, ". . . the buoyant

force which a fluid exerts on a body placed in it is equal to the weight of the fluid the body displaces."

[Ref. 32: p.202]

5. Dynamic Progression

Inherent to operational axioms is the element of discovery. The body of knowledge is one of dynamic evolution, one in which new discoveries are made and old ideals are refuted or amended.

Discovery is fueled by research, analysis, and measurement techniques which are necessary for the continual transformation of the central theme. The dynamic progression assists in refining vague ideas and suggestions into meaningful concepts that will ultimately develop into theories, laws, and principles.

As stated by Kuhn, ". . . discovering a new sort of phenomenon is a necessary but complex event, one which involves recognizing both that something is and what it is." [Ref. 27: p.55]. Research and analyses attempt to discern the significance of facts and provide explanations for patterns and relationships discovered. The following test is provided to determine whether new concepts are compatible with the operational axioms currently contained in the body of knowledge. This test was adopted from one utilized by Polanyi in his discussion of scientific merit in Knowing and Being.

To be accepted as part of the body of knowledge the concept must first have a sufficient degree of plausibility. Secondly, the concept must be measured in terms of its scientific value. This includes an assessment of its accuracy, its systematic importance, and the intrinsic interest of its subject matter. The third criterion concerns scientific merit or the notion of originality. [Ref. 33: pp.53-54]

Although a particular concept may have sufficient plausibility and be a given scientific value, it may vary with respect to its originality. The first two criterion enforce conformity, while the third encourages challenge and inquiry. Challenge and inquiry are considered essential to the transformation of a body of knowledge as it stimulates dynamic progression. It is this aspect of conflict that fuels the discovery of new axioms and the development of new knowledge.

The five attributes of central theme, conceptual framework, systematic classification, operating axioms and dynamic progression are considered essential elements in the composition of a body of knowledge. The attributes are not considered to be independent entities. Each is influenced by the other, and in turn they collectively influence the content of a body of knowledge.

The development of these five attributes is by no means a comprehensive listing of what is contained in a body of knowledge. It is expected that the merits of such attributes will be subjected to criticism and debate.

D. SUMMARY

This chapter developed a generic description of a body of knowledge, as well as provided a discussion of the attributes considered critical to the composition of such an entity. Now that a common understanding of what is involved in a body of knowledge has been developed, it is now necessary to apply this description to the contracting discipline. In Chapter IV, the five attributes as they relate to the contracting discipline will be evaluated and discussed.

IV. ATTRIBUTES OF THE CONTRACTING DISCIPLINE

A. INTRODUCTION

The previous chapter provided a basic description for a general body of knowledge and established five essential attributes required for its composition. The five attributes include a central theme, conceptual framework, systematic classification, operational axioms, and dynamic progression.

To establish a body of knowledge for the contracting discipline, a determination must first be made that this field contains the five attributes considered essential to the formation of a such an entity. Application of each attribute to the contracting discipline is provided in the following discussion.

B. DISCUSSION OF THE GENERAL ATTRIBUTES

Prior to applying the five attributes a review of the attributes is in order. A brief description of each attribute is provided below.

1. Central Theme: The phenomenon under observation or study. Supported by a coalescence of opinion, as demonstrated by a common language, specific academic curriculum, associated professional organizations or entities, and rigorous research.
2. Conceptual Framework: The foundation that establishes the range of boundaries, essential parameters and basic objectives fundamental to the central theme.

3. Systematic Classification: A taxonomy that provides for a method of indexing, cataloging, or categorizing published/unpublished material, thoughts, ideas, processes, levels of outcome, and research efforts surrounding the central theme.
4. Operational Axioms: The collective generalizations, theories, laws, and principles that currently hold true for the body of knowledge. Combined together, it forms the precepts that compose the foundation of the body of knowledge.
5. Dynamic Progression: The continual discovery and reformation of the body of knowledge. Fueled by a visible and active dialogue of agreement and/or dissent. Tools utilized include scientific research, analyses, and measurement techniques.

The above attributes influence and interact with each other in various ways and therefore, no single attribute can be considered an independent entity. This interaction makes it difficult to assign values that would necessarily rank them in any priority order.

Key to the body of knowledge is the establishment of the central theme. All the other attributes revolve around this particular entity in establishing character and purpose to the body of knowledge. One could not have a forest without any trees, consequently it would be difficult to have a body of knowledge without a central theme.

In degrees of importance, the researcher would rank dynamic progression second to the central theme. To have a forest, one must not only have trees, but trees that grow from saplings into mature timber. The concept of dynamic progression assumes that a framework, classification, and

axioms have been previously established. Yet without a framework, classification scheme, or operational axioms, the dynamic progression would not function. The last three attributes are likened to the soil, sun, and water which induce the dynamic progression to grow.

In the final analysis, no one attribute is more important than any of the others, with the possible exception of the central theme and dynamic progression. All are considered essential ingredients and the intensity of their interaction determines the growth and development of the body of knowledge.

C. METHODOLOGY OF APPLICATION

To apply the five specific attributes to the contracting discipline, the researcher first needed to develop a uniform method of evaluation and comparison for each specific entity. No known system was readily available that would lend itself to such an application. A multiattribute utility model was initially considered and subsequently rejected due to the abstract and intricate nature of the thesis effort.

The researcher instead devised a series of questions designed to determine the veracity of each attribute and the extent of its existence in the contracting discipline. The methodology consisted of the uniform application of the following four questions to each of the five attributes with respect to the contracting discipline.

1. Does the contracting discipline embody the specific attribute and to what degree is it manifested?
2. Does the contracting discipline address individually stated objectives of the specific attribute, and if so how are they demonstrated?
3. What predominant forces in the contracting discipline warrant the establishment of the specific attribute?
4. Identify and discuss any significant deficiencies resulting from the application of the specific attribute to the contracting discipline.

The objective of the first question is to ascertain whether or not the particular attribute exists in the contracting discipline. The last three questions are provided to identify potential deficiencies and weaknesses for future resolution or research efforts. Individual responses to the questions are not addressed directly but are acknowledged in the general discussion of each attribute.

It is the researcher's opinion that the contracting discipline should contain three or more of the five attributes in order to support a body of knowledge. In particular, at least two of the attributes must be the central theme and dynamic progression. As stated earlier, these two are the more important attributes. The following sections discuss application of the above methodology to each of the five specific attributes.

D. CENTRAL THEME

The Federal Government's procurement process is considered by many to be the world's largest business

entity. Annual procurement requirements for the Department of Defense alone average \$170 billion. This involves approximately 15 million separate contractual actions enacted annually by a Federal acquisition workforce of over 165,000 personnel [Ref. 10: p.43].

In industry, approximately 50% of every dollar received in sales is expended on the purchase of goods and services. Material requirements for U.S. manufacturing firms in 1981 equated to an incredible \$1,193,969,000,000. [Ref. 34: p.4].

The magnitude of contractual actions involving such immense dollar values by a multitude of procurement personnel provides convincing evidence that the contracting discipline supports the requirement as a primary course of study. The impact imposed upon our economy alone by such a voluminous procurement effort justifies an intense analysis of the subject matter.

The magnitude of contractual actions conducted annually as previously mentioned demands a sense of common identity among its participants. This sense of identity can be substantiated by numerous professional organizations associated with the contracting discipline. Some of the more notable professional organizations include the following:

- American Production and Inventory Control Society
- American Society for Quality Control

- American Society for Traffic and Transportation
- National Association of Purchasing Management
- National Association of State Purchasing Officials
- National Contract Management Association
- National Institute of Governmental Purchasing
- National Property Management Association
- National Purchasing Institute
- Society of Logistics Engineers
- Universal Public Purchasing Certification Council Program

Additionally, several industrial foreign countries also have their own professional purchasing associations; many of which are affiliated with the International Federation of Purchasing and Materials Management. Professional organizations stress the importance of education, training and experience. Many offer certification examinations to measure an individual's comprehension of the body of knowledge associated with and established by the particular organization.

To reinforce the theme of a common identity, many colleges and universities offer acquisition or procurement programs in their curriculums. Those schools participating in this endeavor include The George Washington University, Central Michigan University, University of Virginia, Florida Institute of Technology, St. Mary's College of California, Florida State University and Arizona State University among

others. The professional and academic organizations associated with the contracting discipline constitute general agreement and a form of alliance to the subject matter.

Comprehension of the important role that contracting fulfills in industry and government has also fostered various research efforts directed towards improving the efficiency and effectiveness of this field. This is accomplished through the study and analysis of the central theme, the contracting discipline.

Many large industrial concerns have in-house resources directed towards this particular effort. The Government also has organized procurement research efforts through its various services and agencies. Much of the research conducted by industry is proactive as compared to the Government, which tends to be more reactive in nature. Examples of some of the better known research organizations associated with the contracting discipline include the following:

- Aerospace Industries Association
- Air Force Institute of Technology
Wright-Patterson Air Force Base
- Army Procurement Research Office
Army Logistics Management Center
- Defense Acquisition Research Elements (DARE)
- Defense Logistics Studies Information Exchange
Army Logistics Management Center

- Defense Systems Management College
Fort Belvoir
- Federal Acquisition Institute
General Services Administration
- Jet Propulsion Laboratory
- Logistics Management Institute
- Naval Postgraduate School
Monterey, California
- Office of Naval Research
- The Rand Corporation

The procurement of needed goods and services is a routine event experienced by all. However, grocery shopping is not equivalent to a major weapon system acquisition. Between these two extreme cases, purchasing can take on various colors in differing hues of intensity. Therefore, consensus on procurement terminology is difficult to effect.

To promote the theme of a common identity, participants must share a common language that provides agreement on the definition(s) of the various terms and concepts used throughout the procurement process. Based on individual experience, each of us have our own perspective of what procurement entails. Consequently this perception provides us with differing opinions on definitions.

The words acquisition, procurement, purchasing, buying and even contracting have different meanings to different people. To some the terms are even synonymous. The practitioner must become conversant with the vocabulary of

the organization, otherwise ". . . events and actions have no meaning until we learn the language of the particular organization that provides the context for meaning." [Ref. 35: p.125]

Major differences in a common language are also experienced in the communication between industry and Government. However within organizations, differences can and will occur. The Department of Defense fails to even speak the same language between the various Services. Each Service has their own method of defining words and ingenious acronyms that only serve to bewilder the uninitiated.

Internal differences are further supported by the three separate supplements to the Federal Acquisition Regulation. The FAR was established for the "codification and publication of uniform policies and procedures for the acquisition by all agencies." [Ref. 3: Section 1.101] Due to different procurement philosophies, GSA, NASA, and DOD have separate interpretations of the FAR, which has resulted in three FAR supplements.

The contracting discipline and its contents have received general acceptance by the participants as noted by the number of professional organizations, academic programs, and research efforts; however, general agreement on a common language has not been accorded. A common language is important because it is woven throughout the texture of a

body of knowledge. Lack of a common language can inhibit dynamic progression and frustrate systematic classification efforts.

The contracting discipline fulfills the initial objective of the central theme attribute. The contracting discipline has established academic curriculum, professional organizations, and dedicated research efforts. The particular aspect of a common language is somewhat deficient which can impede the progress experienced in the other attributes.

E. CONCEPTUAL FRAMEWORK

Purchasing methods, or derivatives thereof, have been around since biblical times. Back then the procurement process usually consisted of bartering in the trading of goods and services. The current intense interest in procurement would appear to be of a recent development, but in all actuality its significance was recognized over 100 years ago as demonstrated by a quotation from a book written in 1887.

The purchase of goods embodies many varied talents and experiences. The ability to buy advantageously, depends largely upon the knowledge of men possessed by the purchaser and his skill in taking advantage of this knowledge The assistance that an experienced purchasing agent can extend to his associates is hardly to be estimated. His duties not only familiarize him with all new devices, but his observation enables him to point out those most likely to lessen expenses or add to the efficiency of a property. [Ref. 36: p.40]

World War I and II vividly pointed out the need for efficient and effective procurement due to the shortage of materials experienced during the war effort. The oil crisis of the 1970's and the huge budget deficit we currently face have significantly influenced our present purchasing practices.

Throughout the literature the following overall objective for any procurement activity was repeatedly mentioned. The primary purpose of the contracting discipline is to:

. . . obtain the right materials (meeting quality requirements), in the right quantity, for delivery at the right time and right place, from the right source (a vendor who is reliable and will meet its commitments in a timely fashion), with the right service (both before and after the sale), and at the right price. [Ref. 34: p.22]

This basic generalization applies to all procurement activities, whether it is personal, industrial or government-related. This statement designates the essential framework of the contracting discipline. The determination of what is considered "right" involves the analysis of often many factors which can be achieved through the application of operating axioms in conjunction with the dynamic progression.

The scope of the framework can be expanded upon by including the following objectives.

1. To supply the organization with a steady flow of materials and services to meet its needs.

2. To do so with the minimum investment in materials inventory consistent with safety and economic advantage.
3. To procure materials at the lowest cost consistent with the quality and service required.
4. To avoid duplication, waste, and obsolescence with respect to materials.
5. To ensure continuity of supply by maintaining effective relationships with existing sources and by developing other sources of supply either as alternatives or to meet emerging or planned needs.
6. To continually search the market for new and alternative ideas, products, and materials, the adoption of which might improve efficiency.
7. To maintain sound cooperative relationships with other departments, providing information and advice as necessary to ensure the effective operation of the organization as a whole.
8. To develop policies, procedures, and organization to ensure the achievement of the foregoing objectives.
[Ref. 37: p.13; Ref 38: p.13]

These eight objectives could also be considered as individual procurement goals within the framework of the contracting discipline.

Parameters of the framework concern the basic process(es) associated with the overall objective. The literature described various procurement processes which were very similar in comparison. Consolidated they form the following process which is necessary to translate requirements into actual goods and services.
[Ref. 39: p.14]

1. Defining a need
2. Budgeting and financing
3. Soliciting and exploring alternative solutions
4. Choosing what to procure
5. Selecting sources
6. Conducting price and cost analyses
7. Contract negotiation, award, and administration
8. Operational use and disposal

Each of these steps can be broken down into smaller elements, which depending on the circumstances, can be a very simple or very complex, time consuming operation.

Boundaries of the framework are determined by the type of acquisition to be incurred and the associated economic environment. Acquisitions can take on many forms which include small purchases, large purchases, industrial methods, governmental procedures, major weapon systems acquisition, sole source, competitive, research and development, construction, and services to name a few.

The framework of the contracting discipline has been defined with a broad objective which is supported by stated parameters, boundaries, and goals. The framework of Government procurement is empowered by the requirement to protect the public trust, while industry's motivation is more profit oriented.

The framework depicted is too broad in many respects. The lack of a sufficiently defined framework can be an

obstacle to the development of a systematic classification scheme and the dynamic progression.

F. SYSTEMATIC CLASSIFICATION

The complexities and often unrelated functions associated with the acquisition procedures complicate the process of classification. The need for an efficient method of systemization is emphasized by the important role procurement fulfills in our daily environment. An insufficient method of classification can inhibit organized and effective research.

The Federal Acquisition Institute under the auspices of the OFPP is required to coordinate Government-wide research studies. As part of its charter, the FAI houses a library composed of procurement related books, journals, conference notes, research reports, student papers, correspondence, handbooks, directives, policies, regulations, laws, procedures, and other similar documents. According to Helen Hertel, FAI Librarian, much of the information is not in hard-cover format, therefore the standard library method for indexing and classification does not "begin to scratch the surface." [Ref. 40: p.608] The procedure used by the Library of Congress for classification is limited in the depth of detail needed for categorizing such a specialized subject matter as the contracting discipline.

The Defense Logistics Studies Information Exchange also collects, organizes, stores, and distributes information related primarily to logistics management. Over 15,000 studies associated with material acquisition are contained in its data base. The material acquisition subdivisions used for cataloguing purposes are very broad and do not support a sufficiently detailed classification scheme.

In addition to the methods used by the Library of Congress and DLSIE to classify literature, there are other techniques of classification. Three known efforts have been identified which involve developing acquisition taxonomies for the Department of Defense.

The first study is entitled "A Defense System Acquisition Management Taxonomy and Inventory of Official Acquisition Management Documents." The purpose of this study was to develop a universally applicable taxonomy for classifying important elements of defense systems acquisition management concepts, knowledge and practices. The taxonomy developed a classification system that revolved around a subject and environment/source methodology.

[Ref 41: p.A-1]

The taxonomy of the defense system acquisition management included the following broad categories: systems requirements determination, program/project management, organizational behavior, decision/statistical analysis

methods, systems engineering management, financial management, procurement management, test and evaluation, production management, initial deployment management, modernization and improvement management, and operations information feedback.

The second study, "Procurement Research: Is There One Best Way?", provided observations about the modes and dimensions of procurement research. The modes of procurement research included the participants, the forms of the output product, and the methodology of the study. Combined with the dimensions, (which are the set of circumstances or environmental factors within which something is viewed), a construct was devised to clarify the various forms taken by procurement research. In response to the question, "Is there one best way?", the study concluded, "Only in the context of the problem and its environment can we decide on the best way for procurement research to proceed." [Ref. 42: p.486]

The third effort, "An Evaluation of The Definition, Classification and Structure of Procurement Research in the Department of Defense", used a method to summarize and categorize various procurement efforts by: division of scientific study, breadth of application, degree of control, level of outcome, level of effort, and placement in the acquisition and procurement processes. [Ref. 43: p.37]

A taxonomy was then developed to display five levels or tiers of the procurement process. The five tiers described below were then created to establish the taxonomy of the procurement process [Ref 43: p.42].

1st Tier: Procurement Process

2nd Tier: Three Phases of the Procurement Process

- a. Pre-Award
- b. Award
- c. Post-Award

3rd Tier: Cycles Within the Phases

- a. Requirement
- b. PR/MIPR
- c. Solicitation/Evaluation
- d. Award
- e. Contract Administration

4th Tier: Events describing the actions pertinent to the life of a procurement.

5th Tier: Issues relating to each of the above events.

A decision flow chart was also devised to qualify acceptance of an effort as procurement research. Of the three studies, the last taxonomy appears to best represent a classification scheme for the overall DOD procurement process.

The literature associated with the contracting discipline is relatively immature as compared to other established disciplines such as the physical sciences and mathematics. Instead of centuries of written documentation, the contracting discipline's literature is only approximately 100 years old. According to Dr. Harold Fearon,

The literature on the purchasing function extends back into the nineteenth century....Charles Babbage, in his classic work on industrial management, On the Economy of Machinery and Manufacturers, published in 1832, made reference to the purchasing function in two places.

Before the end of the nineteenth century, articles had been published which discussed topics such as: seeking competitive bids (1870), organization of the purchasing function (1890), duties of a purchasing agent (1890), standardization (1890), capital equipment purchasing (1892), and the responsibilities of the purchasing agent (1898). [Ref 44: p.50]

Although an abundance of procurement literature is available, it is very tangled and difficult to unravel. As a result, much of the new information associated with the contracting discipline involves combinations and permutations of old information which only compounds the situation.

Much of the procurement literature is in the form of magazine articles, cost-benefit analyses, management reports, conclusions and recommendations resulting from various studies, and policy guidance. In comparison to the associated procurement literature, very few hardback books exist. Three well-known books include Dobler, Lee, and Burt's Purchasing and Materials Management, Heinritz and Farrell's Purchasing: Principles and Applications, and Leenders, Fearon, and England's Purchasing and Materials Management. These books offer a good summary of today's procurement practices.

Many of the professional organizations associated with procurement publish magazines as a means of communicating with their members and providing the latest information relating to the procurement process. Some of the more familiar periodicals include Contract Management, Purchasing, Defense Management Journal, Journal of Purchasing and Materials Management, and National Contract Management Journal.

Professional procurement associations also have specific certification programs which are designed to test the candidate's comprehension of the contracting discipline. In preparing for certification examinations, many candidates seek out texts and other publications to use in studying for the exam. This need precipitates a demand for more information which in turn creates a need for more literature.

Current procurement literature is primarily used as a method of providing information rather than stimulating a reflective dialogue. Readers are offered few valid principles or theories for consideration or application. This type of reporting impedes the dynamic progression which thrives on healthy conflict.

Although its roots go back centuries, the contracting discipline is still in early development, and its literature is not as mature as that associated with more established

disciplines. Two methods of classification have been presented. The system used predominantly by libraries focuses primarily on subject matter. The three taxonomies in comparison, appear to revolve around the procurement process.

Although there have been attempts to classify the material associated with the procurement process, it appears that this particular attribute is not well established in the contracting discipline. Systematic classification is important to designating a specific framework. Together, these two attributes reinforce the dynamic progression.

G. OPERATIONAL AXIOMS

Execution of the procurement process draws heavily from many precepts of other disciplines such as economics, marketing, quantitative analysis, organizational behavior, law, accounting and finance. The amorphous nature of the contracting discipline poses some obstacles in the formation of specific operating axioms for the procurement process.

Standard operating procedures or general guidelines are commonly intermixed throughout the acquisition process, but they do not qualify as operational axioms. Instead, axioms should help determine the values associated with the "right quantity at the right time from the right source, etc.," for the conceptual framework of the contracting discipline. A comprehensive synopsis of the general concepts, theories,

laws, and principles is not immediately accessible, instead an illustration is provided for each type of axiom as it relates to the contracting discipline.

1. General Concepts

A general concept identifies if/then relationships. One general concept used throughout contracting implies that if competition is present then higher quality materials will result at lower prices.

The objective of a formal contractual agreement can also be considered a general concept. If there is a formal contract then it serves to acknowledge "the meeting of the minds" of those individuals associated with the particular agreement.

Yet another general concept concerns the "prudent businessman rule" which is used predominantly in resolving contractor claims and constructive changes. It applies the response of what a reasonable prudent businessman would do if he were faced with a similar situation.

2. Theories

A theory is a plausible or scientifically acceptable general assumption. The learning curve theory is probably the most recognized and often applied theory used in the procurement process. This theory demonstrates that a relationship exists between production volume and production costs. The main objective of the theory states that as

output quantities double, production costs decrease at a constant rate. Other concepts that are closely related to the learning curve theory include improvement curves, experience curves, and progress curves.

Another theory that impacts indirectly on the contracting discipline concerns Adam Smith's theory of price. His theory proclaims " . . . that an individual, in pursuing his own selfish good, would be able to achieve the best good for all." [Ref 45: p.2-1] The basic thrust of the theory reasons:

. . . that prices and price levels are regulators that tend to bring supply and demand into equilibrium and to cause, in the long run, the most efficient allocation of scarce resources. [Ref 45: p.2-2]

Acquisition personnel must comprehend the concepts of the price theory and interpret its impact on the conditions of the economic market place, because the price theory ultimately affects the determination of price. Acquisition personnel need to look beyond the price offered and investigate the causes which have determined that particular price.

3. Laws

Regulatory laws enacted to affect the way Government conducts its business are prevalent throughout the acquisition process. These laws are authorized by Congressional legislation and are not the results of scientific research. A law, as applicable to the operating

axioms, is a statement of an order or relation of phenomena that so far as is known is invariable under the given conditions.

The law of supply and demand is most often associated with the study of economics, but is equally applicable to the contracting discipline as well. Closely associated with Adam Smith's price theory, the law of supply and demand regulates economic activity which in turn sets the market price. When an item is in demand, the price for that item increases. On the other hand, when supply exceeds demand, the price usually drops. Price is a critical factor in Government acquisition and it is essential that acquisition personnel understand how the various market conditions can affect prices received in response to a solicitation.

The law of supply and demand also encompasses varying degrees of competition (perfect, effective, imperfect), as well as economic conditions concerning monopolies, oligopolies, and monopsonies. Each condition impacts price in a different way. Comprehension of these differences is important in the development and implementation of the acquisition strategy.

4. Principles

Application of cost or accounting principles in conducting cost analysis readily come to mind when thinking

about this particular axiom. While these principles are widely used throughout the procurement process, they do not have the same degree of authority as natural laws of the hard sciences.

A principle is instead a comprehensive and fundamental law, doctrine, or assumption. The researcher is not aware of any principles directly associated with the contracting discipline. Two economic principles that have possible application include the principle of marginal productivity and the principle of increasing costs.

The principle of increasing costs states that "as the production of a good expands, the opportunity cost of producing another unit generally increases." The marginal productivity principle states "in competitive factor markets, it pays a profit-maximizing firm to hire that quantity of input at which the marginal revenue product is equal to the input price." These two principles impact the production costs of an industry which in turn impacts the price charged to the Government. [Ref. 46: pp.38,653]

The theories, laws, and principles used in the contracting discipline are not unique to this specific field of study. Instead of creating and developing operating axioms unique to the contracting discipline, many of the axioms in use have been "borrowed" from other disciplines.

The lack of theories, laws, and principles in the contracting discipline may result from immature scientific research. The contracting discipline is still a relatively undeveloped field of study. The lack of operating axioms inhibits the discovery and understanding of fundamental relationships unique to the procurement process. This attribute is key to the growth of dynamic progression.

H. DYNAMIC PROGRESSION

Active research is essential to the continued advancement of the dynamic progression. However, conducting research without first knowing what the subject matter involves is difficult. Modeling techniques are often employed as research tools to help develop an understanding of the subject matter under observation. The objective of the conceptual framework for the contracting discipline combined with the discussion on the central theme presented earlier in this chapter have established the basic procurement model.

The goal of the dynamic progression is to establish an accumulation of useful and practical knowledge that explains various relationships, stimulates an active dialogue, challenges conventional wisdom and preconceived concepts. Current research efforts involve independent and joint analyses of on-going and completed acquisition efforts, as well as specific areas of the contracting discipline. The

results are often informative, rather than stimulating any dialogue.

Individuals involved in current research efforts include personnel from government, industry, and academia. Procurement research is very active as evidenced by the number of governmental and commercial agencies involved in the effort. Specific organizations conducting procurement research were mentioned in the discussion of the central theme. The current interest in procurement research results from the present economic conditions and the rapid technological change currently experienced in the procurement environment which substantiates the requirement for proficient procurement personnel.

It does not appear that present procurement research is conducted under rigorous analysis. Instead, too much effort has gone into a collection of cases studies and illustrations to support particular viewpoints, rather than a comprehensive analyses of underlying relationships within the contracting discipline.

Measurement techniques are also important. Techniques used in the procurement process include engineering estimates, parametric cost estimating, should cost, design to cost, and life cycle cost. Parameters such as procurement administrative leadtime (PALT) can be developed to measure efficiency, however quantifying effectiveness is

an illusive objective. Different operating environments between industry and government can make comparisons between the two difficult.

Critical to the dynamic progression is the concept of self-correction. This aspect utilizes a series of checks throughout the scientific process in the pursuit of valid knowledge. The checks are created in such a way that they regulate and corroborate the conclusions obtained from the research activity. As stated by Kerlinger:

Even if a hypothesis seems to be supported in an experiment, the scientists will test alternative hypotheses that, if also supported, may cast doubt on the first hypothesis. A scientist does not accept a statement as true, even though the evidence at first looks promising. He insists upon testing it. He also insists that any testing procedure be open to public inspection. [Ref. 31:p. 6]

For example, when Einstein developed his Theory of Relativity, many of the classical laws of physics that had been accepted up to that time lost their meaning and relevance. Many of the previous laws of physics had to be modified.

One viewpoint on procurement research was presented by Dr. J. L. Hood and Dr. Daniel E. Strayer in their 1973 article, "Sequential Research Needs in the Evolving Discipline of Procurement". They submitted that research progresses through different stages in the evolution of a discipline. The six sequential stages are viewed in a cone-like progression rather than a linear fashion as depicted in

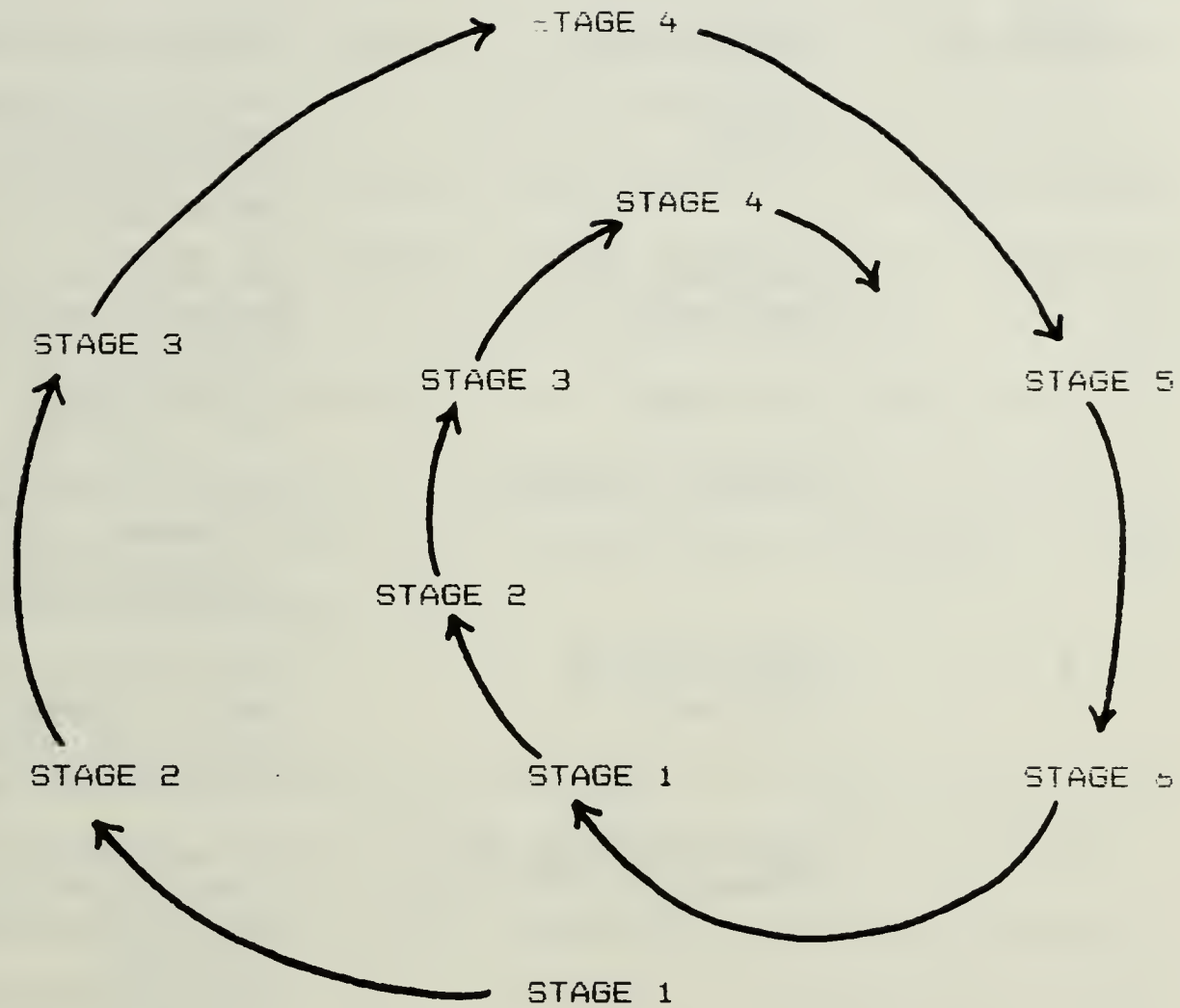
Figure 4-1. Table 1 displays the different stages along with the organic need and relevant research associated with each stage. [Ref 47: p.443]

The cone-like progression represents the concept that as research becomes more refined and sophisticated it passes through the stages more than once, but on a higher plane. This particular viewpoint, as presented by Hood and Strayer, dovetails nicely with the researcher's perception of dynamic progression. Relationships in the contracting discipline, once identified, must be subjected to continual refinement until they are accepted or rejected.

Hood and Strayer suggested that the contracting discipline may be entering stage 6 of their model. The researcher maintains that the contracting discipline has just entered stage 4. Experimental research and case studies are currently being conducted however, the contracting discipline is still deficient in the areas of theory-building and action-research.

Generating knowledge that is both worthwhile and transferable is a critical product of research. A clear understanding of policies, practices, techniques, and their application to different acquisition situations is essential to the dynamic progression of the contracting discipline.

Much of the research accomplished has been useful. For example, risk analysis alone has provided a positive



Source: Sequential Research Needs in the Evolving Discipline of Procurement by Joseph L. Hood, Ph.D., Defense Systems Management College and Daniel E. Strayer, Ph.D., Air Force Business Research Management Center

Figure 4-1 Research Progression

TABLE 1

RESEARCH PROGRESSION STAGES

<u>Stage</u>	<u>Organic Need</u>	<u>Relevant Research</u>
1	Definition of the Field	Survey-Descriptive Census Studies Case Reports Demographic Studies
2	Differentiation of the Field	Comparative Studies Exploratory Studies Report of Artistic Experiences Need Analysis
3	Standard Setting	Normative-Descriptive Studies Evaluative Research Instrumental Studies
4	Technological Refinement	Experimental Research Case Studies Theory-building Action-Research
5	Respectability and Dynamics of the Field	Historical Studies Biographical Research Field-Evaluative Studies Survey-Descriptive Studies Comparative Studies
6	Understanding of the Dynamics of the Field	Institutional Studies Environmental Studies Force-Field Analysis Systems-Analysis Prediction Studies

Source: Sequential Research Needs in the Evolving Discipline of Procurement by Joseph L. Hood, Ph.D., Defense Systems Management College and Daniel E. Strayer, Ph.D., Air Force Business Research Management Center

influence on the development and execution of acquisition strategy. The use of probability analysis, statistical inference, estimating relationships and decision analysis among others has enabled the procurement work force to better grasp and control risk associated with Federal acquisition.

Seeds for the dynamic progression of the contracting discipline have been sewn. It is impaired as a result of weaknesses described in the previous attributes. The lack of a definitive framework, an adequate classification scheme, and operating axioms restricts the dynamic progression and therefore, the evolution and growth of the contracting discipline.

I. SUMMARY

As demonstrated, the requirements of each of the five attributes have been fulfilled with varying degrees of success. In total, it is apparent that the contracting discipline possesses rudiments of the necessary attributes required to establish a body of knowledge.

Chapter V will address the purposes of establishing a body of knowledge for the contracting discipline. Difficulties encountered in defining a contracting body of knowledge will also be examined. The chapter will conclude with the contracting discipline's body of knowledge.

V. CONTRACTING DISCIPLINE'S BODY OF KNOWLEDGE

A. INTRODUCTION

A case was made in the previous chapter that the contracting discipline possesses rudimentary elements of the attributes considered essential to the promulgation of a body of knowledge. These attributes must now be incorporated into a body of knowledge tailored to the contracting discipline.

Like the blind men and the elephant, no one sees the whole animal, but each forms an opinion, based on the review of his own set of facts, as to the nature of the beast. The body of knowledge constitutes a conceptual orientation encompassing the "big picture" perspective, rather than one that has been pieced together in a patchwork fashion. This chapter develops and articulates the contracting discipline's body of knowledge.

B. PURPOSE OF ARTICULATING A BODY OF KNOWLEDGE

The basic premise for a body of knowledge is briefly summarized by the following statement.

It is necessary that we study the total surrounding system (field) of support and gain appreciation of what that system is composed of, how the pieces fit together and feed each other, and what it would take to unfreeze the dynamic system so that it could sustain a more fruitful form of social science. [Ref 17: p.425]

By furnishing a fundamental understanding of the nature and function of the central topic, a more definitive structure of the convention under observation is established. This then is used to establish:

. . . general laws covering the behavior of the empirical events or objects . . . thereby enabling us to connect together our knowledge of the separately known events, and to make reliable predictions of events as yet unknown.
[Ref 48: p.1]

A body of knowledge, therefore, represents the present store of primary knowledge and establishes the foundation for more meaningful analysis.

It is accepted that not all of the phenomena associated with any central topic will be explained nor solved. Some of the conclusions produced via the process of dynamic progression will not even be usable. They will however, provide partial solutions or serve as building blocks for future resolution. Consequently, the body of knowledge provides a sense of continuity with the past in recognizing the previous efforts of others who have laid the groundwork for those yet to come. Conversely, it confers a sense of solidarity for future generations who will in their own turn advance the body of knowledge, much the same as the passing of the Olympic torch.

A body of knowledge furnishes a firm grasp of the subject matter through the development of well-defined concepts and through the articulation of existing

relationships on which there is wide-spread agreement. A basis is established for others in the field to build upon in order to advance a body of knowledge that is both useful and practical.

The creation of a separate and unique entity affords a systematic exploration in the development of theories, laws, and principles underlying the course of study. Focusing on the present state of knowledge stimulates scientific exploration of new data. Often this requires contesting currently accepted operating axioms.

Via the body of knowledge we are concerned with the investigation of the environmental forces around us, determining what those forces are, interpreting them, and making them intelligible to others. Breakthroughs in the discoveries of new patterns of relationships contribute to the store of knowledge and supports dialogue.

The body of knowledge increases our learning. In fostering a scholarly approach to the field, it sets the stage for continuing education and personal research efforts. It serves to focus efforts in education, training, certification, research, writing, and the development of standards and operating axioms.

The theoretical base enables us to connect together knowledge of separately known events. Relationships occurring in the field must be discovered and identified,

along with cause-and-effect correlations associated with the contracting process. Once a pattern is determined, prediction then becomes possible. Meaningful concepts and procedures are refined to serve as guides in developing contracting theories and in gathering data for analysis.

Providing a consistent theoretical perspective of the logical structuring of a body of knowledge enables one to trace specific situations back to theory. The body of knowledge serves as a repository for the present store of knowledge associated with the specific field of endeavor. In identifying the forces that are present and interpreting the changes and assimilating correlations, the body of knowledge provides a basis for assessing future applications.

C. PROBLEMS WITH DEFINING A CONTRACTING BODY OF KNOWLEDGE

The problems associated with establishing a body of knowledge for the contracting discipline are caused primarily by the lack of clearly defined boundaries and the amorphous shape that it assumes. Procurement is a universal occurrence and it is conducted in varying degrees of intensity, depending on the environment in which it occurs. This contributes to the lack of precise boundaries for the field.

Procurement can assume many forms from simple acts of replenishing office supplies out of petty cash to the

acquisition of complex sophisticated weapon systems. Contracting is influenced by a number of social, political and economic activities all of which act, interact, and react with each other. Further complicating the matter is that the contracting process does not occur as a solitary transaction. Instead, its execution involves numerous procedures and processes that are conducted either separately or together, in a series or parallel manner, or even in a reciprocal or duplicate fashion. Out of this intricate labyrinth, it is difficult to isolate the effects of any one single element.

In addition, the innate human behavior associated with the contracting discipline can be very ambiguous and unpredictable. Consequently, contracting is more closely associated with the social sciences which are an "inexact" and "soft science". This creates difficulty in applying the scientific method. The hard sciences are easier to understand and are more conducive to prediction due to their physical makeup, whereas human behavior is inherently more complex. It is difficult to establish models that portray a particular human behavior. Progress is being made in this area through the use of heuristics. The contracting discipline may be incompatible to the application of the scientific method, therefore, modification of it may be required in order to produce viable results.

Although procurement is universally practiced, it does not articulate its mission well. Research has focused more on goals than on actual processes. The lack of effective research conducted in the contracting discipline can be accounted for in the following summary:

The development of management science, operations research, computer technology and similar fields have equipped specialists with more rigorous and more abstract knowledge. The more dynamic organizations increasingly are incorporating abstract knowledge; this has occurred primarily by incorporation of a wider array of other disciplines-mathematics, engineering, economics, law-rather than by any dramatic increase in the theoretical base [Ref. 49: p.43]

By focusing on goals instead of processes many of the problems faced today are the result of solutions to previous dilemmas. Compounding the research problem is the lack of clean data. Much of the data are erroneous and have been mislabeled as a result of personal opinions and attitudes.

William Gates addressed the difficulty of diagnosing procurement inefficiencies in his discussion on DOD procurement policy.

There are at least three types of diagnostic problems: causes and symptoms are easily confused; there are generally several plausible explanations for apparent program inefficiencies, and, some actual inefficiencies may not be captured by observable program data...it is important to distinguish between problems, symptoms, and causes. Procurement problems should be related to their underlying causes and reforms should address the causes. Unfortunately, causes and symptoms (or their proxies) are frequently confused and reforms treat the symptoms. [Ref. 50: p.12]

Further exacerbating the situation are the objectives of the parties involved in the contracting process. Industry and Government are intrinsically at odds with each other. Much of Government procurement is controlled by Congressional laws, regulations, and policies; whereas commercial industry operates in a free market environment.

Coupled with the diversity of forces impacting on contractual parties is the dynamic nature of the procurement process. Relationships are continually changing and what once held true for a particular situation is no longer valid in a future circumstance. The contracting discipline is permeated with a myriad of integrated variables that are too difficult to isolate and account for which hinders establishing a specific body of knowledge.

D. A CRITIQUE OF THE CONTRACTING BODY OF KNOWLEDGE

Attributes of a body of knowledge have been identified and applied to the contracting discipline. Rationalization for the development of such an entity as well as problems encountered with a specific description have also been addressed. What remains is the articulation of a body of knowledge as it applies to the contracting discipline.

What such a body of knowledge should look like is not an easy task to fulfill. This is primarily due to the number of variables involved with the procurement process, as well

as the number of disciplines, contracting draws from to implement its procedures.

The complex combinations of laws, finance, economics, engineering, management techniques, and policy implications, as well as the dynamic market forces impacting on the procurement environment, precludes a detailed definition of a specific contracting body of knowledge. The proficiency to buy advantageously is dependent upon the skills, experience and knowledge commanded by procurement personnel.

One view of the contracting body of knowledge could be best summarized by the following description which states what a procurement specialist should be:

Enough of a lawyer to understand legal implications of contract claims, enough of an accountant to understand the arithmetic, enough of an engineer to know if the contract fits the sought after hardware, enough of a negotiator--diplomat to communicate his contract proposal's intent to the other side of the buyer-seller relationship, enough of a business manager to understand whether or not the planned contract is in his organization's best interest. [Ref. 51: p.68]

The origin of contracting resides in many of the other disciplines as noted above. Defining a distinct body of knowledge for the contracting discipline involves the process of solidifying and articulating its key responsibilities.

The FAR, which establishes acquisition policy for all executive agencies, states in Section 1.603-2 that in the selection of contracting officers the appointing official

will consider the candidate's "experience, training, education, business acumen, judgement, character, and reputation". Selection criteria include:

- (a) Experience in Government contracting and administration, commercial purchasing, or related fields;
- (b) Education or special training in business administration, law, accounting, engineering, or related fields;
- (c) Knowledge of acquisition policies and procedures including this and other applicable regulations;
- (d) Specialized knowledge in the particular assigned field of contracting, and
- (e) Satisfactory completion of acquisition training courses. [Ref. 3: Section 1.603-2]

The FAR's knowledge requirements are very broad in scope. Further refinement is provided by OPM in the work description of the GS-1102 contracting series. This work description states:

Positions in this occupation require a basic knowledge of all phases of the contracting process, ie., the use of clauses and provisions, contracting methods including formal advertising and negotiation, cost or price analysis to evaluate the reasonableness of bids or proposals, contract administration requirements, and termination procedures, as well as knowledge of business and industry practices related to the products, services, construction, or research and development being procured. In addition to the basic knowledge of contracting and business practices, some positions perform the full range of preaward, price/cost analysis, and postaward functions, while others specialize in one functional area. [Ref. 5: p.1]

The various specialized functional areas are further defined in Appendix C which contains the entire work description for the GS-1102 contracting series.

A pitfall to be avoided in developing a body of knowledge is establishing a base that is "too general or vague or one that is too narrow and specific for achievement of the exclusive jurisdiction and autonomy of a profession." [Ref. 52: p.157] In order to narrow the scope to a manageable level, the bodies of knowledge developed for the professional organizations as stated below were reviewed [Ref 53: pp.37-39].

1. Universal Public Purchasing Certification Council:

Represents joint authorization for the National Association of State Purchasing Officials and National Institute of Governmental Purchasing:

The government purchasing professional should be familiar with the principles of economics, business law, accounting, statistics, management, business finance, marketing, purchasing and materials management, pricing and negotiation, contract administration, human relations, productions, automatic data processing, market research, managerial economics, and traffic and transportation.

2. National Association of Purchasing Management:

Purchasing professionals must have a well rounded knowledge and understanding of the total sphere of business operations, including principles of purchasing; materials management; business and economics; and quantitative areas of business. They must be competent in all phases of these specific areas: purchasing, storekeeping, traffic and transportation, production control, inventory control, management and organization, finance, basic economics, purchasing law, socioeconomic factors, accounting statistics, statistical quality control, and data processing.

3. Society of Logistics Engineers:

Logistics engineers define their discipline as one requiring an understanding of the concepts of systems

and logistics; principles and functions of management; system engineering; formal design review; system test and evaluation; acquisition of logistic support resources and production support; physical supply and distribution; customer support; and equipment phase-out and disposition.

4. National Property Managers Association:

Certification of a property manager involves understanding of the basic principles of the twelve categories of property management: acquisition, receiving, records, storage and movement, consumption, utilization, maintenance, physical inventory, subcontract administration, disposition, reporting, and contract completion/termination.

The last two bodies of knowledge were presented for informational purposes and are discounted because they are somewhat outside the scope of the contracting discipline. Comparison of the first two entities indicate agreement on the knowledge requirements for economics, law, accounting and finance, statistical analysis, purchasing or marketing, materials management, data processing, management techniques, traffic and transportation.

The National Contract Management Association (NCMA) appears to provide the best definition of the current contracting body of knowledge in that it is neither too narrow nor too broad. It focuses on basic categories of knowledge which are broken down into 69 individual modules that comprise the NCMA Education and Training Program Structure in support of its professional body of knowledge. An exhibit of this structure is furnished as Appendix D.

Professional proficiency in NCMA requires broad knowledge and a range of skills in the areas of:

1. Business management, particularly materials and operations management, industrial marketing, financial management and related accounting.
2. The economics of materials and operations management.
3. Cost and price analysis and negotiation techniques.
4. Legal and regulatory aspects of procurement and contracting.
5. Managerial planning, decision making, communication, and control.
6. Procurement and contracting policy and procedures.
7. Management information systems, and information and data analysis. [Ref. 54: p.III-1]

Combined with the individual educational and training modules, NCMA's body of knowledge addresses the entire scope of the contracting discipline as it relates to commercial, industrial, governmental, and international procurement.

Of the various bodies of knowledge exhibited, it appears that NCMA presents the most organized and comprehensive approach to the methodology of the contracting discipline. When contrasted with the five attributes considered necessary to the establishment of a body of knowledge, NCMA does not fare so well.

The central theme requirement is demonstrated by the composition of NCMA members who from the fields of Government and industrial contracting are dedicated to promoting excellence and high standards of professionalism

in the contracting discipline. NCMA maintains a library of educational training materials and has also established a stringent certification program that recognizes individuals who have accomplished a high level of education, experience, and training in the contracting profession. In addition to holding national, regional and local conferences, NCMA provides a monthly Contract Management magazine and a semiannual National Contract Management Journal which provides a forum for the exchange of information and ideas.

The seven knowledge requirement areas previously listed could be loosely interpreted as a framework with the 69 education and training modules possibly qualifying as a type of classification system in the broadest sense of the word. NCMA, however, fails to address the two attributes of operating axioms and dynamic progression. Although the two magazines and the various conferences sponsored by NCMA furnish a forum for the exchange of ideas, much of the information either supports a particular viewpoint or is philosophical in nature.

Much of the dialogue goes unchallenged. Instead members address the symptoms or results of the problems instead of fostering a systematic inquiry of the underlying causes and relationships. This does little to further the discovery of unique operating axioms or the dynamic progression of the contracting discipline.

Summarized, NCMA provides strong support for a central theme, barely addresses the issues of framework and classification, and totally ignores the concepts of operating axioms and dynamic progression. As demonstrated, even though NCMA provides the best portrayal of the current contracting body of knowledge, it still does not satisfy all the essential ingredients required to establish a definitive body of knowledge.

E. A CONTRACTING BODY OF KNOWLEDGE

It is impossible to present the entire body of knowledge associated with any field of study in one page or even one book. The knowledge associated with mathematics or even anthropology would take up row upon row of shelving in a library. It is even more difficult to summarize the body of knowledge for such an undeveloped discipline as contracting.

If one were to define the contracting body of knowledge, providing it possessed all the necessary attributes, how would it be envisioned? Given this situation the researcher's perceived definition of a body of knowledge for the contracting discipline would be summarized accordingly:

The contracting body of knowledge revolves around the procurement process in which stated requirements are translated into goods and services (framework) as supported by professional procurement associations, contracting curriculums, and rigorous inquiry designed to refine and advance the present store of information (central theme).

Characterized by a classification scheme that addresses the events, tasks, activities, and relationships associated with the procurement process (classification), it focuses on the progression of procurement theories, laws and principles in developing underlying relationships (operating axioms) that describe the classes of phenomena comprising the contracting field.

It is stimulated through a dialogue designed to challenge convention and encourage inquiry and critique of the contracting process (dynamic progression) which is manifested by its practitioners through various forums, research, and literature.

This description is intended to provide a definitive statement of what the contracting body of knowledge is expected to assume providing it meets all the requisite attributes. Ideally, it will be expanded upon in much the same manner as the NCMA education and training modules.

F. BENEFITS OF A CONTRACTING BODY OF KNOWLEDGE

The purposes for creating a body of knowledge were presented earlier in this chapter. Benefits are the products that result from the establishment of a body of knowledge. It is expected that by increasing the proficiency of the workforce, the quality of the Federal acquisition process in turn will be improved. The perceived benefits are briefly summarized in the following discussion.

1. Decision Making

Risks involved in the procurement decision making process can be alleviated through the enhanced awareness of the inner workings of the procurement environment. An informed contract specialist can develop a better statement

of the problem at hand and more readily recognize and identify alternative solutions.

The corporate memory which is ingrained in the knowledge base supplies a wealth of information in lessons learned. Knowledge that is augmented by this corporate memory leads to acquisition personnel making more timely and intelligent decisions.

2. Enhanced Communications

A common understanding among the participants involved in the procurement process can do much to reduce confusion, misunderstanding, and ambiguities that often plague contracting practitioners. Communication is critical to the procurement process, because the contract itself must reflect the intentions of the contracting parties. A clear understanding of terms ensures the intent of the contracting parties are understood by all.

Enhanced communication between the parties contributes to the creation of a better contract, thus eliminating the need for contract modifications or claims resulting from misconceptions. In addition, enhanced communication fosters more amicable relationships between Government and industry.

3. Improved Research

A definitive body of knowledge provides the foundation for the conduct of meaningful analysis. A

thorough and comprehensive understanding of the nature and function of the contracting discipline permits the researcher to address specific causes of contracting problems and not just the symptoms.

The initiation of meaningful inquiry and analysis serves as a basis to support implementation of corrective action, prediction, and decision making. Organized research serves as the testing ground for the development of procurement methods. In addition, it provides the means for evaluating the effects of major acquisition policies and procedures on Government and industry prior to their issuance.

4. Better Buying

The composition of competent decision making, enhanced communication, and improved research results in better buyers. A definitive body of knowledge leads to the creation of more proficient acquisition personnel who proactively approach the execution of their duties in a more professional manner.

Being able to better monitor their procurement environment and interpret changes occurring in relevant purchasing related factors, acquisition personnel can execute more intelligent and responsible procurement determinations. Recognition of the impacts and benefits of sound procurement policies and practices increases one's

confidence and ability in handling diverse and complicated contractual actions.

5. Increased Throughput

More proficient buyers are then able to expand their latitude and as a result acquire more responsibility in effecting and administering business decisions. Improving the ability to obtain and correctly analyze relevant data enables acquisition personnel to do their jobs "right the first time". This enhances the overall effectiveness of the acquisition process. Accordingly increased product performance ensues, the amount and degree of paperwork declines, procurement leadtimes are reduced, better cost control is afforded, and approval levels can be eliminated.

6. Decreased Congressional Attention

The positive results effected through buying "smarter" should reduce the amount of Congressional attention currently focused on Federal acquisition procurement. This is not to say that Congress should totally ignore Government procurement, but rather relieve some of the emphasis currently being felt. In addition, the public's confidence in the Federal acquisition process should increase.

7. Greater Control Over Environment

The establishment of a common understanding of mission roles and responsibilities will do much to create a

more effective organization and in providing clearer direction to those individuals involved in the Federal acquisition process. Increased visibility and understanding of the procurement process as a whole will allow acquisition personnel to focus on what their world is actually about. A definitive body of knowledge ultimately affords acquisition personnel more control over their environment which in turn impacts on the quality of the Federal acquisition process.

G. SUMMARY

The contracting discipline appears to possess the basic elements needed to meet the attributes of a body of knowledge. The importance of such an entity was demonstrated in that it embodies the establishment, acceptance, and promulgation of the definition, structure and convention of the contracting discipline.

Although there are many problems associated with the formulation of a contracting body of knowledge, basic definitions for such an entity have been attempted. Of the efforts presented, the NCMA best mirrors the current form of the contracting discipline's body of knowledge.

Still NCMA does not address in sufficient detail all the requirements needed for such a body of knowledge. A specific definition for a contracting body of knowledge was proposed and offered as an objective to attain. The chapter concluded with the perceived benefits expected to result from such an entity.

VI. CONCLUSIONS AND RECOMMENDATIONS

A. INTRODUCTION

The need to enhance the quality of the Federal acquisition workforce has been identified and acknowledged as a means to improve the efficiency and effectiveness of the Federal procurement process. One method of accomplishing this initiative calls for the professionalization of the Federal acquisition workforce, specifically the GS-1102 contracting series. This series is currently designated as an administrative series by OPM. To be considered as a professional series, OPM requires the discipline to possess, among other regulatory requirements, an organized body of knowledge. To date, the GS-1102 contract specialist series does not have such a body of knowledge.

To fulfill the requirement of an organized body of knowledge, comprehension of what a body of knowledge entails is imperative. A general definition was subsequently addressed and developed. In addition, five critical attributes considered essential to the establishment of a body of knowledge were identified and examined. Associated with the general description of a body of knowledge, the five attributes consist of a central theme, conceptual

framework, systematic classification, operational axioms, and dynamic progression.

Application of the attributes to the contracting discipline determined that the rudimentary requirements were sufficiently established for a basic derivation of a body of knowledge. The rationale for developing a body of knowledge was furnished along with a discussion concerning difficulties encountered in defining such an entity for the contracting discipline. A compilation of various bodies of knowledge relating to five professional organizations associated with the contracting discipline were presented and analyzed.

It was determined that the NCMA body of knowledge best represents the current contracting body of knowledge presently available for the professionalization of the GS-1102 contract specialist. Yet the NCMA's body of knowledge is deficient, consequently an alternative proposal was offered as the objective to be attained in defining a specific body of knowledge for the contracting discipline. Specific conclusions, recommendations, and areas for further research complete this thesis effort.

B. CONCLUSIONS

1. A Body of Knowledge Contains Five Attributes

As determined in Chapter III, a body of knowledge can be identified by the existence of five attributes. The

five attributes consist of a central theme, conceptual framework, systematic classification, operating axioms and dynamic progression. These five attributes are considered necessary to the promulgation of a body of knowledge.

2. The Contracting Discipline Supports a Body of Knowledge

Chapter IV demonstrated that the rudimentary elements needed for the establishment of a body of knowledge are present in the contracting discipline.

The attribute of central theme is supported by the establishment of professional procurement organizations, contracting curriculums, and procurement research. A broad procurement objective, supplemented by boundaries, parameters and goals form the premise for a conceptual framework.

Various classification schemes and taxonomies are being cultivated to support the attribute of systematic classification. Operating axioms used by other disciplines are being adapted for application in the contracting discipline. Although not fully developed, dynamic progression is being achieved through case studies and tentative procurement research efforts.

The researcher contends that the requisite attributes, met with varying degrees of success, are sufficiently present to establish the basic groundwork for the development of a contracting body of knowledge.

3. Contracting is an Immature Discipline

In comparison to the more mature disciplines, the contracting discipline is still in its early developmental stages. Recognition of the contribution contracting provides to the Government and industrial procurement process has been a relatively recent development.

The lack of well-developed attributes support this assertion as demonstrated by the following deficiencies. Procurement literature is not extensive as it has only been in existence for little more than a century. Unique operating axioms specifically applying to the contracting discipline are nonexistent. Research efforts do not demonstrate a rigorous analyses of underlying relationships.

4. A Definitive Body of Knowledge is Needed to Enhance the Federal Acquisition Process

The significance of the important role procurement has in our economy has heightened concern over the effectiveness and efficiency of the Federal acquisition process. A definitive body of knowledge is needed which embodies the establishment, acceptance, and promulgation of the definition, structure, and convention of the contracting discipline. This affords more proficient acquisition personnel possessing greater control over the acquisition environment, thereby enhancing the overall quality of the Federal acquisition process.

C. RECOMMENDATIONS

1. The General Description of a Body of Knowledge Merits Application

Is it recommended that the general description, including the development of the five attributes described, in Chapter III be accepted as a model for a general body of knowledge. It can be utilized as a starting point from which to further analyze, evaluate, and refine the composition of a general body of knowledge.

2. Proposed Definition of a Contracting Body of Knowledge

The specific definition of a contracting body of knowledge proposed in Chapter V should be utilized as a goal to attain in the ultimate promulgation of a systematic body of knowledge for the contracting discipline. This definition can serve to guide the development of the procurement process into a mature discipline.

3. Proposed Procurement Research Taxonomy be Utilized as a Method of Systematic Classification

The contracting discipline is deficient in an adequate classification methodology. The taxonomy presented in Chapter IV, entitled "An Evaluation of the Definition, Classification and Structure of Procurement Research in the Department of Defense", best represents the procurement process involved in Federal acquisition.

A classification scheme is important to the formulation of a body of knowledge. It is recommended that

this particular taxonomy be further evaluated and refined for universal application in the procurement process.

4. Application of Scientific Research Methods

Procurement research should utilize the scientific method to analyze the environmental aspects affecting the contracting discipline. Too much emphasis has been placed on surveys, case studies, and cost-benefits analyses. Many of the research findings, consequently cannot be subjected to generalizations or challenges. The scientific method associated with the hard sciences may need to be adapted in order to apply it to procurement research.

D. ANSWERS TO RESEARCH QUESTIONS

1. Primary Research Question: How Might the Contracting Discipline's Body of Knowledge be Defined?

The process of defining a body of knowledge for the contracting discipline required formulating a general description of what is involved in such an entity. As described in Chapter III, this led to the identification and establishment of five attributes considered necessary for the development of a body of knowledge. Chapter IV addressed the application of the five attributes to the contracting discipline.

In Chapter V the researcher proposed a definitive statement describing the contracting body of knowledge,

which assumed that the five required attributes were sufficiently satisfied. This definition stated:

The contracting body of knowledge revolves around the procurement process in which stated requirements are translated into goods and services (framework) as supported by professional procurement associations, contracting curriculums, and rigorous inquiry designed to refine and advance the present store of information (central theme).

Characterized by a classification scheme that addresses the events, tasks, activities, and relationships associated with the procurement process (classification), it focuses on the progression of procurement theories, laws and principles in developing underlying relationships (operating axioms) that describe the classes of phenomena comprising the contracting field.

It is stimulated through a dialogue designed to challenge convention and encourage inquiry and critique of the contracting process (dynamic progression) which is manifested by its practitioners through various forums, research, and literature.

This specific definition also addresses the supplementary question of, "How might a comprehensive definition of a contracting body of knowledge be stated?".

2. What is a Generic Definition of Body of Knowledge?

After reviewing the critiques of the researcher's initially proposed definition and further analysis of the literature, the following generic definition of body of knowledge was formulated:

A body of knowledge is a conceptual framework that is systematized about a central theme and formulated through the process of definition, classification, and analysis with reference to the discovery of general concepts, theories, laws, and/or principles. The body of knowledge establishes a synergistic alliance among the participants (denoting a common sense of agreement) associated with the central theme which continually evolves through the process of dynamic progression.

This generic definition provided the basis for the discussion of a contracting body of knowledge.

3. What are the Principle Characteristics of a Generic Body of Knowledge?

The principle characteristics or attributes of a general body of knowledge are identified as a central theme, conceptual framework, systematic classification, operating axioms, and dynamic progression. An in-depth discussion of each of these attributes is provided in Chapter III.

4. Why is it Necessary to Articulate a Body of Knowledge?

A body of knowledge essentially provides a theoretical base which serves to focus efforts in education, training, certification, writing, rigorous research, and the development of standards and operating axioms. Further elaboration on this particular subject is provided in Chapter V.

5. What are the Perceived Benefits of Establishing a Body of Knowledge for the Contracting Discipline?

A summary of the benefits resulting from a definitive contracting body of knowledge include more timely and intelligent contracting decisions, enhanced communication, improved procurement research, better buying techniques, increased throughput, decreased Congressional attention, and greater control over the procurement environment.

E. AREAS FOR FURTHER RESEARCH

1. Framework

The conceptual framework for the contracting discipline addressed in Chapter IV is too broad to support a definitive body of knowledge. Additional analyses is required to narrow the scope and refine a more distinctive framework.

2. Common Language

Due to our individual perceptions of the procurement process, consensus on procurement terminology is difficult to effect. Further examination is required to establish uniform definitions of procurement terminology that can be standardized throughout the contracting discipline.

3. Operational Axioms

Operational axioms specifically identified for the contracting discipline are nonexistent. General concepts, theories, laws, and principles are needed to understand underlying fundamental relationships unique to the procurement process. Further investigation is needed to identify specific operational axioms directly associated with the contracting discipline.

4. Dynamic Progression

Too much emphasis has been directed towards descriptive and statistical procedures rather than developing the conceptual basis for the underlying

cause-and-effect relationships of the contracting discipline. Thorough and thoughtful study must be afforded to the identification and explanation of these relationships.

F. SUMMARY

The researcher is conscious of many gaps and imperfections in this presentation of a contracting body of knowledge, and recognizes that it will require the work of many dedicated individuals over a period of time before a definitive contracting body of knowledge can be established. The researcher doesn't presume to have addressed all the aspects associated with this particular study and realizes it will be subjected to much scrutiny and criticism.

It is hoped that this thesis effort will provide a different perspective on the contracting discipline. The requirement to establish a systematic body of knowledge is vital to the contracting discipline if we are to solidify our efforts in enhancing the acquisition process. The following proverb illustrates the need for such an entity:

A man felt himself to be fairly rich and wanted a house much the equal to that of his neighbor who had a three story house. The man commissioned a carpenter to build such a house. The carpenter began to build a foundation, a first floor and a second floor, preparatory to building the third floor. The man became angry and terminated the contract. He demanded that all he wanted was the third floor, so that he could display equality with his neighbor. Of course, the carpenter was unable to help.

as BUDDHA said:

A foolish man thinks only of results and is impatient with effort that is necessary to get good results. No good can be attained without proper effort, just as there can be no third story without the foundation and the first and second stories. [Ref. 55: p.439]

Without a body of knowledge to anchor the foundation for the contracting discipline, the efforts to improve the quality of the acquisition workforce and ultimately enhance the overall procurement process will be tenuous and unfocused at best.

APPENDIX A

LIST OF PARTICIPANTS

- Arvis, Paul., Ph.D., Professor, Florida Institute of Technology (Ret), Fort Lee, Virginia
- Beck, Al, Ph.D., Professor, Business Management Department, Defense Management Systems College, Fort Belvoir, Virginia
- Evered, Roger, Ph.D., Professor of Management, Naval Postgraduate School, Monterey, California
- Fearon, Harold, Ph.D., Director, Center for Advanced Procurement Studies, Arizona State University, Tempe, Arizona
- Hood, Joe, Ph.D., Assistant Director, Federal Acquisition Institute (Ret), Washington, D.C.
- Hunt, Dr. Shelby, Ph.D., Professor of Marketing, Texas Tech University, Lubbock, Texas
- Judson, Robert, Ph.D., Senior Manager, Contracts and Grants, The Rand Corporation, Santa Monica, California
- Lamm, David V., DBA, CDR, SC, USN (Ret), Adjunct Professor, Naval Postgraduate School, Monterey, California
- Martin, Martin D., Ph.D., Col, USAF (Ret), Associate Professor, School of Business Management, Western Carolina University, Cullowhee, North Carolina
- Minor, Art, Assistant Group Manager, Advanced Technology, Reston, Virginia
- Pursch, William C., Ph.D., LCOL, USA (Ret), Chairman, School of Systems and Logistics, Air Force Institute of Technology, Wright-Patterson AFB, Dayton, Ohio
- Scanlon, Jim, Partner, The Lyceum Corporation, Bethesda, Maryland
- Sherman, Stanley, Ph.D., Professor, School of Government and Business Administration, The George Washington University, Washington, D.C.

Smart, Donald D., Director, Education and Professional
Development, National Institute of Governmental
Purchasing, Inc., Falls Church, Virginia,

Wells, Rita L., Professor of Procurement, Air Force
Institute of Technology, Wright-Paterson AFB, Dayton,
Ohio

APPENDIX B

LETTER SENT TO THE PARTICIPANTS

Dear

I am a thesis student at the Navy Postgraduate School in Monterey, California currently identifying a body of knowledge for the contracting (purchasing) discipline as a thesis effort. Dr. Dave Lamm is my thesis advisor and recommended that I contact you regarding your thoughts on this particular subject.

To provide a very brief background I have been evaluating the characteristics that are involved in the development of a profession. One of the key characteristics of any profession is the existence of a systematic body of knowledge. Although I continually see the words "body of knowledge" mentioned in my research, I have yet to see it clearly defined.

I am attempting to develop a generic definition of "body of knowledge". Thus far I have developed the following working definition:

A body of knowledge is a collection and ordering of information in terms of a conceptual framework which is subject to reconstruction as new information becomes available or old information is refuted. It provides a sense of community or common identity among the participants associated with the framework.

From your perspective, does this working definition adequately define a "body of knowledge"? If not, how would you change it?

I am also interested in learning what principle elements you feel are necessary for the composition of a body of knowledge. For example, from my working definition, I feel the sense of community or common identity is a necessary ingredient that is required for the formulation of a body of knowledge. Do you have any thoughts along this line?

As with any research effort, the researcher is always anxious to get back replies as soon as possible. A response by October 1, 1987 would be greatly appreciated. I have enclosed a self-addressed stamped envelope for your convenience. Your comments would be greatly valued for this thesis effort.

Sincerely

Connie Thornton
LCDR, SC, USN

APPENDIX C

GS-1102 CONTRACTING SERIES WORK DESCRIPTION

CONTRACTING SERIES

GS-1102
(p. 1)

Contract Specialist (all positions), GS-5/15
Contract Negotiator, GS-5/15

Contract Administrator, GS-5/15

Contract Termination Specialist, GS-5/15

Contract Price/Cost Analyst, GS-5/15

Procurement Analyst, GS-5/15

Supervisory Contract Specialist, GS-9/15

DESCRIPTION OF WORK

Positions in this series manage, supervise, or perform work involving the procurement of supplies, services, construction, or research and development using the formal advertising or negotiation methods; the evaluation of contract price/cost proposals; the administration or termination and close out of contracts; and the development of policies and procedures for this work. The work requires knowledge of the legislation, regulations, and methods used in contracting; and knowledge of business and industry practices, sources of supply, cost factors, and requirements characteristics.

Specializations

Positions in this occupation require a basic knowledge of all phases of the contracting process, i.e., the use of clauses and provisions, contracting methods including formal advertising and negotiation, cost or price analysis to evaluate the reasonableness of bids or proposals, contract administration requirements, and termination procedures, as well as knowledge of business and industry practices related to the products, services, construction, or research and development being procured. In addition to the basic knowledge of contracting and business practices, some positions perform the full range of preaward, price/cost analysis, and postaward functions, while others specialize in one functional area. (See descriptions below.)

Contract Specialists require a knowledge of preaward and postaward procedures to plan and conduct the contracting process from the

description of the requirements through contract delivery.

Contract Negotiators require a specialized knowledge of negotiation techniques to meet and reach agreement through discussion with a proposed contractor on the pricing and performance terms, and to set forth all these terms in a procurement document.

Contract Administrators require a specialized knowledge of postaward contracting procedures to oversee or ensure compliance with the terms of contracts, to determine the reasonableness of and to negotiate claims, to resolve disputes and other problems concerning obligations of either the Government or the contractor, and to negotiate contract modifications.

Contract Termination Specialists require a specialized knowledge of postaward procedures and negotiation techniques to represent the Government in terminations for convenience or default, claims and settlements.

Contract Price/Cost Analysts require a specialized knowledge of price and/or cost analysis techniques to evaluate price and/or cost proposals, contract changes, repricing actions and final contract pricing; to obtain and review data from auditors and technical specialists; to recommend cost and profit negotiation objectives; to conduct or participate in negotiations on cost and/or price issues; or to develop and advise on policies and procedures relating to these functions.

Procurement Analysts require a broad knowledge of procurement policies and procedures to plan, analyze, or evaluate procurement programs; review proposed contractual actions for conformance with regulatory requirements and procurement practices; or develop policies and procedures or provide advice and guidance to subordinate activities concerning a variety of procurement issues.

Additional information concerning the work of contract specialists can be found in the position classification standard for this series.

(TS 205)
November 1983

KNOWLEDGE, SKILLS, AND ABILITIES

Knowledge and Skill

The requirements contained in this standard constitute the core knowledge and skill in procurement required for all positions in this series, i.e., knowledge of preaward, postaward, and price/cost regulations, and business and industry practices relating to products, services, construction, or research and development being procured. The requirements are keyed to the progression of grade levels in the classification standard for this occupation.

At the GS-5 entrance level, knowledge and skill requirements are general in nature and focus on basic analytical abilities, general problem solving ability, arithmetic or quantitative skills, and communicative skills. For succeeding grade levels the knowledge and skills required become more specialized. Education may be substituted for practical work experience through grade GS-9 provided the education demonstrates possession of the required knowledge and skill.

Experience Criteria

The experience criteria in this standard reflect minimum requirements for individuals to obtain and demonstrate the knowledge and skills required at the grade level sought. For entrance positions GS-5, the requirement gives employing agencies minimum assurance that applicants can perform the work.

It also provides each applicant with an equal amount of time to develop and demonstrate possession of the required knowledge and skills.

For succeeding grade levels, experience criteria are based on the premise that demonstrated proficiency in the application of knowledge and skills at a given level indicates likelihood of success in similar work at the next higher level.

These criteria are based on the premise that the performance of procurement related work and training assignments validly demonstrate the individual's ability to learn and competently perform the work of this occupational field.

Substitution of Education for Experience

The nature and quality of basic education is most valuable in evaluating candidates at the entrance levels (GS-5 and GS-7) and to some extent at GS-9. Undergraduate training is of less significance at succeeding higher levels, as compared with experience.

Several institutions offer programs specifically in Government procurement. Those courses which are available and which deal with the fundamental principles and concepts of procurement make a significant contribution to a candidate's capability for problem solving and serve as an excellent base for future development. Credit should be given for procurement course work, as well as other directly related course work, when evaluating candidates for appointments or promotions.

Promotions

The provisions of 5 C.F.R. 300, Subpart F, must be complied with concerning the rate at which employees may be promoted, irrespective of their qualifications.

MINIMUM QUALIFICATION
REQUIREMENTS*GS-5 Level*

- A. Three years of general experience, one year of which must be equivalent to GS-4. General experience is experience in administrative, technical, or other responsible work which provided opportunity for the applicant to gain and demonstrate:
- Knowledge of procurement practices and procedures;
 - Knowledge and skill to collect and analyze data, relate data to established guides, and evaluate the significance of the collected data;
 - Knowledge and skill to draw conclusions and make recommendations by analyzing facts and conditions, and make suggestions for corrections or improvements;

- Knowledge of arithmetic practices used in business to compare prices, including discounts and warranties;
- Knowledge and skill to apply guideline material by reading and interpreting regulations and technical material, and translating the guidance into specific actions;
- Knowledge and skill to present technical information in written form;
- Skill in dealing with others in a work relationship to present information orally and accomplish a given purpose.

OR

B. Completion of a full four year course of study in an accredited college or university that meets all requirements for a bachelor's degree in any field.

OR

C. A time equivalent combination of experience and education as defined in A or B above. In combining education with experience, an academic year of study is equivalent to nine months experience.

The knowledge and skill required in A above may have been gained in a variety of administrative or technical support work. Experience of a routine nature (i.e., work which primarily involved typing, filing, or procedural clerical work) is not qualifying.

While not inclusive, the following types of work experience are illustrative of ways in which the basic skills and underlying knowledge may have been obtained:

- Purchasing, rental, or lease of supplies, services, and equipment through informal open-market methods, including imprest fund (cash) accounts, orders under blanket purchase agreements (charge accounts), orders under indefinite delivery contracts such as Federal Supply Schedules, or other simplified purchase procedures.
- Substantive technical support work for purchasing, procurement, contract negotiation, administration, or termination functions which included prepar-

ing, controlling, verifying or abstracting procurement documents, reports, or industry publications; assembling product and price data for procurement negotiations; reporting on performance of contractors in meeting terms of contracts; and similar work.

The following are examples of related types of work experience which in some cases may have provided the basic skills and knowledge required by the specific position.

- Work of an accounting nature requiring a basic understanding of existing accounting systems and procedures to examine, verify, and maintain accounts and accounting data, or to perform technical audit functions, develop or install revised accounting procedures, or similar work.
- Examining work including the review for accuracy and adequacy of documentation or citations, compliance with regulations, and justification of vouchers, invoices, claims, and other requests for payment for goods and services provided to or by the Government, or satisfaction of breach of contract or default in fulfilling contractual obligations, e.g., unauthorized substitution of materials specified in a contract or change from contracted price.
- Technical support work for property management, inventory management, material coordination, or similar work involving knowledge of supply operations, program requirements, established policies, management techniques, and ability to deal with a variety of operating officials regarding program needs.

GS-7 Level

- A. In addition to the requirements for GS-5, a background which includes one year of work no lower than GS-5 or the equivalent and demonstrates:
 - Knowledge of commonly used contracts and clauses, methods and pertinent

regulatory and guideline material sufficient to perform assignments of an advanced trainee nature for which there are clear precedents;

- Knowledge of pertinent product characteristics and sources of supply sufficient to identify commercial or other established sources and to solicit bids or quotations for repetitive items or services when specifications are well established, e.g., office machines, automotive equipment, medical supplies, or minor repairs of buildings or roads.
- Knowledge of price analysis techniques and commercial business practices sufficient to evaluate price data on the basis of comparative prices, standard price lists, or previous prices.
- Skill in summarizing, analyzing, and evaluating data to prepare documentation, justifications, and terms and conditions.
- Demonstrated skill in forming effective interpersonal relationships and coordinating work efforts.

OR

- B. Successful completion of one full academic year of graduate education in an accredited college or university with major study in a directly related field, e.g., procurement, business administration, marketing, industrial management, or accounting.

OR

- C. A combination of graduate study, as indicated in B above, and a background of work experience which demonstrate possession of the knowledge and skill required to perform the work of the position to be filled.

OR

- D. Meeting one of the superior academic achievement provisions at the baccalaureate level provided the pertinent criteria in Section III, Part II, of this handbook are fully met.

In addition to directly applicable experience obtained at the next lower grade in the career ladder, the knowledge and skill may have been acquired through progressively responsible work experience in activities that are closely related to procurement, such as accounting, auditing, program analysis, grants management, logistics management, supply, engineering, manufacturing, quality assurance, industrial specialist, production control, equipment evaluation, inspection, industrial property management, operations research, or statistics.

Such experience is creditable when the work requires: (1) familiarity with basic contracting work methods and operating procedures and (2) familiarity with basic business practices sufficient to perform the duties of the position to be filled.

GS-9 Level

- A. In addition to the requirements for GS-7, a background which includes one year of work no lower than GS-7 or equivalent and demonstrates that the candidate possesses the following:

- Knowledge of established principles and accepted practices of contracting work including the application of formal advertising and negotiation techniques sufficient to develop, administer, or terminate contracts which are well precedented;
- Knowledge of a variety of moderately complex contracts (e.g., firm fixed-price, indefinite quantity, indefinite delivery or cost-plus-fixed-fee); the use of applicable clauses and provisions (e.g., special packaging instructions, use of Government-furnished property, or first article testing or preproduction samples); and special program considerations (e.g., small and disadvantaged business set-asides or labor surplus areas) sufficient to recommend contract award or monitor contract performance.

- Knowledge of business practices and market conditions, including commercial market sources or other competitive sources to obtain adequate price competition or establish reasonableness of price, and to evaluate contractor responsiveness and responsibility sufficient to recommend contract award.
- Knowledge of price and/or cost analysis sufficient to evaluate price and/or cost proposals when historical data and precedents are available and applicable for standard commercial or specialized items having detailed specifications or special performance requirements, e.g., spare parts, hospital equipment, items modified to specification, or minor alterations and maintenance of buildings and equipment.
- Demonstrated skill in interpreting and explaining a variety of procurement procedures and technical requirements, in negotiating preaward or postaward contractual actions, and in making independent judgments or evaluations concerning such things as the extent to which contractor's proposals, management systems, or performance conform to requirements.

OR

- B. Successful completion of two full academic years of graduate education or completion of all requirements for a master's or equivalent degree in an accredited college or university with major study in procurement or in a field directly related to the position to be filled. Directly related means that the completed course work provided both the type and level of knowledge and skills required in the work of the position to be filled.

OR

- C. An appropriate combination of graduate study and work experience which provided the required knowledge and skill.

OR

- D. Completion of all requirements for an LL.B. or J.D. degree.

AND

- E. Evidence that the candidate possesses any selective factors appropriate to the position to be filled.

Alternate types of work experience which may have provided some or all of the knowledge and skill include progressively responsible work in private industry in such capacities as a contract specialist, accountant or auditor, or other meaningful, comparable functions. Such experience should have clearly equipped candidates with the knowledge and skill applied in the position to be filled.

In addition, work of a responsible nature in activities closely related to contracting, such as are described above for GS-7, may have provided some or all of the required knowledge and skill. However, the knowledge and skill required are of a higher level and more specialized nature than those at GS-7, which typically involve advanced trainee assignments. Therefore, candidates for GS-9 who offer such experience will be required to demonstrate knowledge and skill equivalent to those described in A above through significant and concrete work accomplishments, e.g., special projects, working groups, or detail assignment which involved work related to contracting.

GS-11 Level and Above

- A. In addition to the requirements for GS-9, for the GS-11 level and above, a background which includes one year of work experience or equivalent to the next lower grade in the normal line of promotion, and which demonstrates possession of the following:

- Thorough knowledge of contracting methods, contract types, and contracting principles and procedures applicable to the full range of preaward, postaward, or price/cost analysis activities involving complex and diversified

products, services, or construction (e.g., engineering and manufacturing requirements of major types of equipment, technical services or services involving major equipment and vehicle overhaul, research and development including technology development or demonstration projects, design and construction of buildings requiring architect and engineering services, complex computerized management information and process control systems or a system in support of research and development, or large-scale procurements of specialized commodities or services to meet the consolidated requirements of the agency, department, or departments).

- Familiarity with business practices and market conditions applicable to program and technical requirements sufficient to identify or develop new sources; evaluate the responsibility of the contractor to perform the contract in terms of present commitments, financial soundness, adequacy of management systems, and capacity of facilities; determine the reasonableness of price and/or cost proposals including evaluation of individual cost elements; evaluate the progress and performance of the contractor; or evaluate the extent of work completed and negotiate settlements.

—Or for some positions—

- Intensive and detailed knowledge of special programs or a specialized area of contracting and skill in applying this knowledge to the resolution of complex problems or development of contracting plans or procedures in the role of a technical specialist or consultant.

- Thorough knowledge of trends, program requirements, and operating policies and procedures to coordinate plans and programs with a variety of related activities, e.g., program or technical offices, other contracting specialists, legal counsel, small and disadvantaged business representatives, auditors, transportation specialists, subordinate activities, or higher headquarters.

AND

- B. Evidence of possession of any selective factors appropriate to the position to be filled.

The knowledge and skill required for positions at GS-11 and above are typically gained through progressive work assignments in the GS-1102 series. This does not preclude obtaining directly comparable knowledge and skill through work in other series. For example, in some instances engineers or industrial property management specialists perform substantial analyses, technical evaluations, and monitoring functions of contractors performing work for the Government, sufficient to obtain qualifying experience for this occupation. Responsible experience in private industry contracting work may also have provided the requisite knowledge and skill.

SUPERVISORY POSITIONS

For supervisory positions use the qualifications standard for "Supervisory Positions in General Schedule Occupations" in Part III of Handbook X-118 in conjunction with this standard.

SELECTIVE FACTORS

Some contract specialist positions require highly specialized knowledge and skill above that provided by application of the basic qualification standard to the extent that these become a primary consideration in identifying qualified candidates. In such

cases, the use of selective factors as screen-out elements may be appropriate provided:

- The knowledge, skills, and abilities are essential for satisfactory performance of the work;
- The selective factors are job-related; and
- The knowledge, skills, and abilities could not be acquired on the job without undue interruption of the work or prolonged training.

Normally, selective factors will be applied only to positions at GS-9 and above. Trainee positions by their nature usually do not satisfy the criteria for the use of selective factors. For example, in filling full performance level positions in price/cost analysis requiring particular competence in the use of advanced price and/or cost techniques (e.g., to perform life cycle cost analysis, should cost studies, or parametric estimating), or in a specific commodity field (e.g., aircraft, textiles, or electronics), it may be appropriate to restrict consideration to those candidates possessing knowledge and skill related to these areas. However, it would be inappropriate to use selective factors when the purpose of the positions is to receive training leading to the attainment of the required knowledge and skill. For additional information in ranking of eligibles, refer to the section titled Evaluating Candidates.

BASIS OF RATING

Candidates will be rated based on the extent and quality of their experience, education, and accomplishments in relation to the requirements of the position. Such ratings will be based upon statements of candidates in their applications, upon qualification inquiries, and upon any additional information that may be secured by the rating examiner.

PHYSICAL REQUIREMENTS

The following physical requirements apply to employees occupying positions covered by this standard as well as to applicants for such positions. Applicants and employees must have the capacity to perform the essential

functions of the position without risk to themselves or others. In most cases, a specific medical condition or impairment will not automatically disqualify an applicant or employee. A physical condition or impairment may be disqualifying only if the condition, for good medical or management reason, precludes assignment to or warrants restriction from the duties of the specific position. The loss or impairment of a specific function may be compensated for by the satisfactory use of a prosthesis or mechanical aid. Reasonable accommodation shall also be considered in determining an applicant's ability to perform the duties of a position. Reasonable accommodation may include, but is not limited to: the use of assistive devices, job modification or restructuring, provision of readers and interpreters, or adjusted work schedules.

In positions where there is exposure to environmental agents for which there are occupational/environmental standards which require protective measures or medical surveillance, applicants and employees shall undergo initial and periodic medical evaluation in accordance with the surveillance requirements. Also, all positions involving Federal motor vehicle operation carry the additional medical requirements specified in FPM Chapter 930.

EVALUATING CANDIDATES

For both competitive and inservice placement, the evaluation of experience, training, and education should focus on those factors which reflect an applicant's ability to successfully perform the duties of the position to be filled. The required amount of experience will not in itself be accepted as proof of qualification. FPM Supplement 335-1 and 271-2 contain detailed information on candidate evaluation methods.

The evaluation process should start with an analysis of the duties and responsibilities of the position to determine the related knowledge, skills, and abilities. The analyses should also identify any selective factors essential to satisfactory performance, and the appropriate

quality ranking factors, i.e., those factors which distinguish the better qualified applicants from those who may meet only the minimum requirements. Quality ranking factors will vary according to the nature and grade level of the position to be filled.

Evaluating Work Experience

It is important that the evaluation process go beyond a cursory examination of job titles of positions held in the Federal service or private sector. Potential sources of information about a candidate's qualifications include supplemental questionnaires, supervisory performance appraisals, reference inquiries, and interviews with the candidate and with present and former supervisors.

Position classification standards provide information useful in evaluating the level of prior work experience. Relevant experience obtained in other occupations in the Federal service, in the military, or experience obtained as an unpaid volunteer may be evaluated using the classification standard for this or other occupational series.

Evaluation of candidates for positions at GS-5 and GS-7 should be based on evidence indicating probable success in learning quickly the technical work and progressing to higher level assignments in the work of the full performance positions in the career ladder. Other things being equal, candidates who can be expected to progress to full performance proficiency most quickly will usually be distinguished by the caliber and extent of work experience which provided the knowledge and skill typically used in the work of these positions.

Evaluation of candidates for positions at GS-9 and above should be based on knowledge and skill specific to the position to be filled, and as appropriate, consideration of any selective factors. Required knowledge, skills, and other characteristics vary in importance from one position to another, between procurement functional programs, or according to the grade level involved. In evaluating the level and quality of a candidate's background, consideration should be given to such factors as:

- (1) *The nature, scope, and functional specialization of the experience:* Whether the candidate's experience has involved more than one aspect of contracting (negotiation, administration, termination, price analysis, or staff work); the extent to which the candidate specialized in the procurement of certain services, supplies, or equipment; whether the experience included carrying the entire transaction from receipt of purchase request through to completion; whether the experience involved primarily providing assistance to higher grade employees; whether the assignments were limited to certain parts of large contracts.
- (2) *Knowledge of contracting regulations, procedures, and policies:* The degree to which the candidate's work has involved application of knowledge of contracting regulations, procedures, and policies; and the degree to which the candidate had to apply judgment in the application of this knowledge.
- (3) *Knowledge of different types of contracts and contracting methods:* The degree to which the candidate's work has involved the use of various types of contracts and contracting methods, including formal advertising and negotiation; and the degree to which the candidate had to apply judgment in the selection of the most appropriate method of procurement.
- (4) *Knowledge of business practices and supply sources:* The degree to which the candidate's experience has required knowledge of arithmetic or quantitative methods, business practices, organization, management, labor skills, production experience, financial responsibility, markets, availability of services and supplies, distribution patterns, and pricing techniques and structures; whether the candidate's experience demonstrated an understanding of the differing effects these factors can have on the procurement processes, and the interrelation-

ships between the many factors present in the process.

- (5) *Ability to meet and deal effectively with others:* The degree to which the candidate has demonstrated ability to deal with a variety of people in many circumstances, such as coordinating work with that of others or persuading others to adopt a recommendation; the degree to which the candidate has demonstrated ability to deal with pressures exerted by others.
- (6) *Analytical ability:* The degree to which the candidate has demonstrated the ability to analyze facts, alternatives, and problems independently, and to arrive at conclusions which form the basis for decisions and recommendations; the relative intensity of such analysis, the availability of precedents to guide the analysis, and the extent to which supervisory assistance was available.
- (7) *Decision-making ability:* The degree to which the candidate has demonstrated the ability to evaluate alternative methods of solving problems, and to foresee advantages and disadvantages of alternative courses of action; whether the candidate has demonstrated the ability to consider pertinent facts, the ideas of others, and precedents in making a decision or recommendation; whether the candidate has demonstrated the ability to make decisions under pressure and within deadlines.
- (8) *Ability to speak and write effectively:* The degree to which the candidate has demonstrated ability to express ideas clearly and effectively, both in writing and orally; the extent of the candidate's ability to explain decisions, procedures, and requirements in such a way as to gain a favorable response.

Evaluating Education and Training

Evaluation should focus on the job-relatedness of education, training, or self-development activities which provided familiarity with contracting and business principles, techniques, and terminology. Extra credit may be awarded in the ranking process to those candidates offering specific course work which is related to the work of this occupation to the extent that such course work is related to the position being filled, for example procurement courses.

Home study and correspondence education is acceptable in meeting the educational substitutions, when such study is accepted for credit as the equivalent to education completed in an accredited college or university.

Inservice Placement

For inservice placement actions, applicants who have experience in clerical, purchasing, or technical support positions related to procurement work may be laterally reassigned to this occupation at the GS-5 or GS-7 level provided:

- The experience has provided a knowledge of procurement procedures, terminology, and general terms and conditions of buying, with the candidate demonstrating potential for probable success at higher levels;
- The candidate has the demonstrated ability to exercise mature judgment, and has potential for dealing with others in person-to-person relationships;
- The candidate is immediately given intensive training in the particular phase of procurement to which assigned. The training must be clearly designed to provide the difference between what the trainee already knows by virtue of prior experience or education, and what he or she needs to know to perform successfully at the grade level to which assigned.

APPENDIX D

NCMA EDUCATION AND TRAINING PROGRAM STRUCTURE

NCMA has developed this program structure under the guidance of Dr. Harry Page and based on questions asked over the years in the Certification examinations. The program structure represents NCMA's statement on the body of knowledge required to be a professional in contract management. It is intended to be a dynamic statement, subject to revision. All of the NCMA materials under development relate to this program structure. Comments are invited and should be sent to NCMA Education Department, 1912 Woodford Road, Vienna, VA 22180.

Education and Training Program Structure (ETPS)

Basic Tools and Functions

Economics	Accounting & Finance	Materials & Operations	Commercial Law (UCC)
Macroeconomic Concepts	Cost Accounting Basics	Elements of Production	Elements of a Contract
Microeconomic Concepts	Cost Accounting Standards	Elements of Industrial Marketing	Terms & Conditions
Industrial Organization	Elements of Business Finance	Elements of Logistics	Agency
Labor Economics	Financial Reports	Elements of Inventory Management	Warranties
	Break-Even Analysis	Surplus & Excess Property	Unconscionability
	Make or Buy Analysis	Materials Management	Breaches & Remedies





Contracts and Procurement

Management			
Procurement Organization & Management			
The Procurement Process			
Statutory & Regulatory Foundation			
The Contracting Officer			
Pre-Award		Post-Award	
Acquisition Planning		Contract Administration	
Requirements Determination	Solicitations, Bids, Awards	Financial Management of Contracts	Changes
Contract Types	Source Selection	Quality Assurance	Terminations
General Contract Provisions	Source Development	Inspection Acceptance & Warranties	Claims, Disputes & Appeals
Standards & Specifications	Negotiating Strategies	Monitoring Contract Performance	Contract Closeout
Patents & Data Rights	Cost & Price Analysis	Contract Auditing	Acquisition Management Information Systems

Special Topics and Considerations

Special Topics		Special Considerations
Budgeting for Procurement	Socio-Economic Objectives	Considerations in Architect & Engineer Contracting
Systems Acquisitions	Small & Minority Business Development	Considerations in Construction Contracting
Program/Project Management	Vendor's Management System Audit	Considerations in Services Contracting
Productivity	Subcontracting & Subcontract Management	Considerations in R&D Contracting
Automated Procurement	Commercial & Industrial Products	Considerations in AIDP Contracting
Ethics, Conflict of Interest	Small Purchases	
Value Analysis	International Purchasing	
Safety, Reliability & Maintainability	Government Property	

Key:

-  indicates completed module
-  being developed as one module
-  module being developed
-  module under revision

APPENDIX E

ACRONYMS

DOD	Department of Defense
DLSIE	Defense Logistics System Information Exchange
FAI	Federal Acquisition Institute
FAR	Federal Acquisition Regulation
GAO	General Accounting Office
GSA	General Services Administration
MIPR	Military Inter-Department Purchase Request
NASA	National Aeronautics and Space Administration
NCMA	National Contract Management Association
OFPP	Office of Federal Procurement Policy
OPM	Office of Personnel Management
PALT	Procurement Administrative Lead Time
PR	Procurement Request; Purchase Request

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10. Mrs. Marjorie Neeland 1
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