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Contracting as a Science

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Naval Postgraduate School**

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Preface & Acknowledgements

Welcome to our Ninth Annual Acquisition Research Symposium! This event is the highlight of the year for the Acquisition Research Program (ARP) here at the Naval Postgraduate School (NPS) because it showcases the findings of recently completed research projects—and that research activity has been prolific! Since the ARP's founding in 2003, over 800 original research reports have been added to the acquisition body of knowledge. We continue to add to that library, located online at www.acquisitionresearch.net, at a rate of roughly 140 reports per year. This activity has engaged researchers at over 60 universities and other institutions, greatly enhancing the diversity of thought brought to bear on the business activities of the DoD.

We generate this level of activity in three ways. First, we solicit research topics from academia and other institutions through an annual Broad Agency Announcement, sponsored by the USD(AT&L). Second, we issue an annual internal call for proposals to seek NPS faculty research supporting the interests of our program sponsors. Finally, we serve as a “broker” to market specific research topics identified by our sponsors to NPS graduate students. This three-pronged approach provides for a rich and broad diversity of scholarly rigor mixed with a good blend of practitioner experience in the field of acquisition. We are grateful to those of you who have contributed to our research program in the past and hope this symposium will spark even more participation.

We encourage you to be active participants at the symposium. Indeed, active participation has been the hallmark of previous symposia. We purposely limit attendance to 350 people to encourage just that. In addition, this forum is unique in its effort to bring scholars and practitioners together around acquisition research that is both relevant in application and rigorous in method. Seldom will you get the opportunity to interact with so many top DoD acquisition officials and acquisition researchers. We encourage dialogue both in the formal panel sessions and in the many opportunities we make available at meals, breaks, and the day-ending socials. Many of our researchers use these occasions to establish new teaming arrangements for future research work. In the words of one senior government official, “I would not miss this symposium for the world as it is the best forum I’ve found for catching up on acquisition issues and learning from the great presenters.”

We expect affordability to be a major focus at this year’s event. It is a central tenet of the DoD’s Better Buying Power initiatives, and budget projections indicate it will continue to be important as the nation works its way out of the recession. This suggests that research with a focus on affordability will be of great interest to the DoD leadership in the year to come. Whether you’re a practitioner or scholar, we invite you to participate in that research.

We gratefully acknowledge the ongoing support and leadership of our sponsors, whose foresight and vision have assured the continuing success of the ARP:

- Office of the Under Secretary of Defense (Acquisition, Technology, & Logistics)
- Director, Acquisition Career Management, ASN (RD&A)
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We also thank the Naval Postgraduate School Foundation and acknowledge its generous contributions in support of this symposium.

James B. Greene Jr.
Rear Admiral, U.S. Navy (Ret.)

Keith F. Snider, PhD
Associate Professor



Panel 4. New Acquisition Paradigms

Wednesday, May 16, 2012	
11:15 a.m. – 12:45 p.m.	<p>Chair: Elliott Branch, Deputy Assistant Secretary of the Navy (Acquisition and Procurement), Office of the Assistant Secretary of the Navy (Research, Development and Acquisition)</p> <p>Discussant: Lenn Vincent, RADM, USN (Ret.), Industry Chair, Defense Acquisition University</p> <p><i>Contracting as a Science</i> David Lamm, <i>Naval Postgraduate School</i></p> <p><i>The Case to Widen Defence Acquisition Research Paradigms</i> Kevin Burgess and David Moore <i>Cranfield University</i></p>

Elliott Branch—Mr. Branch is the executive director for acquisition and logistics management in the Office of the Assistant Secretary of the Navy (Research, Development, and Acquisition). He is the senior career civilian responsible for acquisition, contracting, and logistics policy that governs the operation of the Navy's worldwide, multibillion-dollar acquisition system. Mr. Branch is the principal civilian advisor to the Navy Acquisition Executive for procurement matters and the community leader of the Navy's contracting workforce.

Prior to assuming his current position, Mr. Branch was the first civilian director of contacts at the Naval Sea Systems Command (NAVSEA). In that role, he led one of the largest and most complex procurement organizations in the federal government. As the senior civilian for contracting at NAVSEA, Mr. Branch was responsible for the contractual oversight of the nation's most complex shipbuilding and weapons systems procurement programs. His duties involved the obligation and expenditure of approximately \$20 billion annually.

He is a member of the Senior Executive Service (SES). Members of the SES serve in the key positions just below the top presidential appointees. They are the major link between these appointees and the rest of the federal workforce. SES members operate and oversee nearly every government activity in approximately 75 federal agencies.

Mr. Branch spent time in the private sector, where he specialized in acquisition and project management education, training, and consulting for the federal workforce and its associated contractors. In this role, Mr. Branch was responsible for the design, development, delivery, and maintenance for a wide variety of course material ranging from project management to contract law. Mr. Branch's clients included Computer Sciences Corporation, QSS Group, BAE Systems, the Pension Benefit Guaranty Corporation, and the Departments of Defense, Energy, Justice, and State.

Prior to that, he served as the chief procurement officer for the government of the District of Columbia, where he was the agency head responsible for procurement operations, policy, and for formulating legislative proposals for local and congressional consideration. Mr. Branch led a staff of over 200 employees that supported over 40 city agencies, administered a \$15 million annual operating budget, and oversaw the placement of \$1.5 billion, annually, in city contracts.

Before joining the District government, Mr. Branch held various positions in the SES with the Department of the Navy (DoN). In 1993, he became a member of the SES as the director for the Shipbuilding Contracts Division, at NAVSEA. He next served as executive director for acquisition and business management for the DoN, responsible for policy and oversight of contract operations throughout the entire Navy. While in this position, he also served as project executive officer for



acquisition related business systems. In this role, he was responsible for the formulation and execution of a multi-year effort to transform the Navy's acquisition system from a paper-based system into one that made use of electronic technologies and methods. In this role, Mr. Branch was directly responsible for a portfolio of projects worth more than \$200 million.

Mr. Branch graduated with a Bachelor of Science degree in economics from the University of Pennsylvania and completed the executive program at the University of Virginia Darden School. He has received the Navy Distinguished Civilian Service Medal, the David Packard Excellence in Acquisition Award, the Presidential Rank Award for Meritorious Executive, and the Vice Presidential Hammer Award for Reinventing Government.

Lenn Vincent—RADM Vincent is the industry chair, Defense Acquisition University (DAU). An independent consultant, RADM Vincent uses his defense and industry experience, expertise, and perspective to advise the DAU management team, the OSD, the uniformed Services, and industry on matters relative to contracting, program management, logistics, and supply chain management. As a professor at the DAU, he presents views to foster a more viable and effective defense acquisition management system. An international educator, consultant, dynamic speaker, and respected government and industry leader, he has taught and/or consulted in contract management, capture management, project management, supply chain management, and leadership.

As a vice president at American Management Systems and CACI International, RADM Vincent was responsible for working with senior Department of Defense and industry leaders to build long-term business relationships and to help identify solutions to acquisition, logistics, and financial management challenges. His strategic focus was an initiative to create an integrated digital environment that would extend the DoD's automated procurement systems into industry and into the DoD program management offices, in addition to implementation and training strategies for new products and service.

Prior to entering civilian life, RADM Vincent completed a distinguished career in the United States Navy, serving at both sea and ashore. He has over 30 years of broad based and in-depth leadership and management experience in acquisition, supply chain management, logistics, and financial management.

When he retired on August 1, 1999, at the rank of rear admiral, he was the commandant, Defense Systems Management College (DSMC). While in this position, he began an overhaul of acquisition education to include reform principles and technology-based distance learning.

Prior to leading DSMC, RADM Vincent had served as the logistics, ordnance and fleet supply officer for Commander-in-Chief Pacific Fleet, where he established policy and coordinated logistics requirements to support supply chain operations in the Pacific Fleet and Indian Ocean.

RADM Vincent was the commander of the Defense Contracts Management Agency (DCMA), a diverse worldwide organization of 19,000 people responsible for administration and oversight of over 400,000 contracts valued at \$800 billion. Concurrently, he also served as the senior acquisition executive responsible for procurement policy within the Defense Logistics Agency (DLA).

Some of his other contracting assignments included assistant commander for contracts at the Naval Air Systems Command; commander, Defense Contract Management Command International; commander, Defense Contract Administration Services Region, Los Angeles; contracts director at Navy Inventory Control Point, Mechanicsburg; contracting officer, supervisor of shipbuilding, Bath, ME; and contracts director Navy Supply Center, Puget Sound.

RADM Vincent holds a master's in business administration from George Washington University. He also is a Certified Navy Material and Acquisition Professional, and is DAWIA Level III certified in both Contracting and Logistics.

He is past-president of the National Contract Management Association and served on its board of directors as well as the following boards: Navy League National Capital Council; NDIA Washington DC Chapter; Board of Directors Procurement Round Table; and Board of Visitors, Defense Acquisition University.



Contracting as a Science

David Lamm—Dr. Lamm is a professor emeritus in the Graduate School of Business and Public Policy (GSBPP), NPS. Dr. Lamm served at NPS as both a military and civilian professor from 1978 through his retirement in January 2004, teaching a number of acquisition and contracting courses, as well as advising thesis and MBA project students. During his tenure, he served as the academic associate for the Acquisition & Contracting Management (815) MBA Curriculum, the Systems Acquisition Management (816) MBA Curriculum, the Master of Science in Contract Management (835) distance learning degree, and the Master of Science in Program Management (836) distance-learning degree. He created the latter three programs. He also created the International Defense Acquisition Resources Management (IDARM) program for the civilian acquisition workforce throughout the country. Finally, in collaboration with the GSBPP Acquisition Chair, he established and served as PI for the Acquisition Research Program, including inauguration of an annual Acquisition Research Program symposium. He also developed the Master of Science in Procurement & Contracting degree program at St. Mary's College in Moraga, CA, and served as a professor in both the St. Mary's and The George Washington University's graduate programs.

He has researched and published numerous articles as well as written an acquisition text entitled *Contract Negotiation Cases: Government and Industry* (1993). He served on the editorial board for the *National Contract Management Journal* and was a founding member of the editorial board for the *Acquisition Review Quarterly*, now known as the *Defense Acquisition Review Journal*. He served as the NPS member of the Defense Acquisition Research Element (DARE) from 1983–1990.

Prior to NPS, he served as the Supply Officer aboard the USS *Virgo* (AE-30) and the USS *Hector* (AR-7). He also had acquisition tours of duty at the Defense Logistics Agency in Contract Administration and the Naval Air Systems Command, where he was the deputy director of the Missile Procurement Division.

He holds a BA from the University of Minnesota and an MBA and DBA both from The George Washington University. He is fellow of the National Contract Management Association and received that association's Charles A. Dana Distinguished Service Award and the Blanche Witte Award for Contracting Excellence. He created the NCMA's Certified Professional Contracts Manager (CPCM) Examination Board and served as its director from 1975–1990. He is the 1988 NPS winner of the RADM John J. Schieffelin Award for Teaching Excellence.
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Abstract

This presentation will convey the results of an effort to examine the feasibility that contracting might be viewed as a science. It will explore the essential characteristics of science and how these might apply to the concept of a contracting science, identify potential schools of contracting thought, identify and discuss the relationship of contracting to several of the established social sciences, identify the principal social science theories applicable to contracting research, identify a contracting paradigm (or paradigms) and potential contracting theories and principles, examine the nature of contracting research and practice, and present thoughts and ideas toward a general theory of contracting which, hopefully, will generate discussion and debate regarding the tenets of contracting.

Introduction

The purpose of this paper is to further explore the feasibility of the idea that the field of contracting might be considered a science. This concept was first set forth by Williams & Arvis (1985) and further explored by Park (1986). The field of contracting is often characterized as a discipline or profession, but rarely has it been portrayed as a science. What does it mean to refer to an area of study as a science and what benefit or value would be gained? Does the scientific label add any measure of responsibility for those researching in the field, and would it improve the practice of contracting or the training and education provided by contracting academics? Are there observable facts or phenomena unique to



contracting that can be identified, studied, understood, and explained; and which exist in an integrative fashion such that they constitute something that might be called the science of contracting? Do contracting theories exist, or could they be developed, that explicate these phenomena? Are there contracting principles or laws that govern these phenomena which might be articulated? Is there such a thing as a contracting paradigm or perhaps multiple contracting paradigms? If the contracting discipline is found lacking in achieving some of these measures, what might be needed in order to enhance its position as a potential science? The definition of contracting is tentatively proposed as the process of establishing and executing a contractual relationship between two or more parties for the purpose of obtaining some good or service for the benefit of one or more of the parties, in return for some tangible or intangible item of consideration. This definition is intended to cover all contracting aspects of procurement contracting (acquiring goods and services), employment contracting (employer–employee relationship), financial contracting (finance and property transactions), and any other process that establishes a binding performance relationship. Although the term *contracting* will be used throughout most of this paper, it is intended that it generally include the aspects considered to be *procurement* and *purchasing* as they are defined respectively. All three are frequently used synonymously but it will be left to other investigation to determine any crucial distinctions.

What is a Science?

Before we examine the idea that contracting might be a science, it may be useful to discuss the key characteristics of science. A generally accepted view of science is that it deals with the systematic study of observable facts organized to reveal the operation of general laws within a branch of knowledge (Ackoff, 1962). It is the study of those judgments concerning which universal agreement can be obtained using the scientific method for the purpose of finding general patterns or laws (Bunge, 1967). A science consists of a body of knowledge that has been classified and systematized to include general principles and at least one central theory which permits the prediction and possible control of events (Buzzell, 1963). Science is an endeavor by which a specific type of ordered knowledge is obtained about natural phenomena through means of controlled observations and theoretical interpretations (Miner, 2006). The basic aim of science is theory, which is a set of interrelated concepts, definitions, and propositions that present a systematic view of phenomena with the purpose of explaining and predicting those phenomena (Kerlinger, 1986). Scientific disciplines frequently emerge as a result of attempting to attack practical problems (Klein, 1970). By adding to the organized body of knowledge, theories, principles, and laws can be developed which not only increase scientific understanding of phenomena in a discipline but describe, understand, and explain facts with the ultimate goal of predicting and controlling events and objects within that discipline (Bunge, 1967). Because knowledge generation is one of the principal outcomes of attempts to develop theory, valuable insights regarding the “core” of the discipline are made possible. Good theories tend to attract research and the “interplay between theory development and research is at the very heart of any scientific discipline” (Miner, 2006, p. xi). Such research could be of a basic nature which exposes underlying laws and principles, or of an applied nature that articulates application of the discipline’s body of knowledge to its practice (Miner, 2007).

Why a Contracting Science?

Of what benefit would it be to pursue the idea of a contracting science? Here are a few considerations. First, science puts heavy emphasis on obtaining greater precision of relationships among phenomena under stated conditions (Thompson, 1956). Contracting as a process, a collection of functions or as a progression of events and activities can be characterized and could be examined as a set of relationships. These would include, for



example, the buyer–seller relationship, the principal–agent relationship, the supplier–customer relationship (Salle et al., 2000), business networks (Håkansson & Johanson, 2001), and a portfolio of transactional collaborative and alliance relationships (Burt et al., 2010). Recording facts and figures is not good enough; searching for cause and effect relationships is dictated by science characteristics. Second, science attempts to simplify understanding of phenomena relationships, an abstract feature critical to gaining the general consensus necessary for a science (Thompson, 1956). With the proliferation of facts and knowledge resulting from increased research, the “integration of knowledge on higher planes of unification and abstraction” is needed (Bartels, 1968, p. 29). Competition, for example, must be expressed as the number of competitors and the type of competition in order to be of value to the contracting community. Competition as an abstract concept would permit generalized statements and schemes to be developed leading to new paths of observation and experimentation. Third, science supports and even demands the development of operational definitions for terms (Dubin, 1978). Contracting faces the same definitional problems that plague other disciplines in that several terms or phrases used extensively throughout the field lack commonly accepted definitions. Through more rigorous development and application of operational definitions, semantic difficulties can be reduced, more precise relationships can be identified, and a more exacting application of the scientific method in procurement research can be attempted. Fourth, a contracting science will help to focus the efforts of researchers while in turn supporting the credibility of their endeavors. Researchers will have more organized output and will have confidence in the validity of the accumulated body of knowledge. Academicians will be able to teach not only contracting policy and techniques but also the theory behind contracting phenomena (Williams & Arvis, 1985). The increased importance and significance of contracting has demanded emphasis on the conduct of contracting research. Such research is needed to provide insight and understanding into the intricacies, relationships, and complexities of contracting. Difficulties exist in understanding the nature of contracting research, in the valid identification of contracting problems, in the proper evaluation of research results, in the integration of research efforts into a systematic body of knowledge, in the maintenance of research objectivity, and in the establishment of a coherent research data base (Lockwood & Strayer, 1977). These problems hamper the effectiveness and reliability of contracting research. By approaching contracting from a science perspective, many of these difficulties could be reduced or mitigated. Fifth, much of contracting research tends to be applied and is primarily practitioner oriented. To a certain extent, this is good. Many disciplines decry the situation that research and practice are separated by a wide gap with those on either side having little interest in the other (Lawler, 1985). But practice-oriented research by itself is modest at best in generating new knowledge that contributes to the theoretical body of knowledge necessary to the development of a social science (Lee & Lings, 2008). Examining contracting as a science would focus efforts on the theoretical aspects of the discipline without lessening its application strength (Ober, 1988). Finally, contracting decision-makers will be greatly assisted in their efforts to find solutions to perplexing and complicated problems. Old-fashioned judgmental decision making will be supplanted by a more systematic approach (Buzzell, 1963). Greater certainty and predictability will be introduced into areas previously held to be uncertain or chaotic. Contracting data collection, evaluation, and analyses can be more rigorously injected into the fabric of the practitioner’s day-to-day decisions.

Theories, Laws, Principles, and Paradigms

The underpinning of science is theory (Dubin, 1978). Theories provide a logical ordering of observations used for simplifying decision making and for predicting the occurrence of certain phenomena (Hunt, 1983). One of the paramount aspects of a theory is



its ability to explain the relationship between phenomena or concepts. Once relationships can be validly explained, researchers seek to comprehend why they exist and to what extent there might be a cause and effect link between the concepts. Scientific theory is the structuring of known facts into an arrangement of logical constructs or interrelated symbolic concepts (Miner, 2007) and is essential to an understanding of empirical phenomena (Hempel, 1952). Because the major role of theory is to foster scientific understanding, theories must be systematically related sets of statements, including law-like generalizations, from which are derived empirically testable hypotheses (Hunt, 1983). Positive theory describes, explains, and seeks to understand phenomena whereas normative theory is of a prescriptive nature intended to assist decision-makers, through the use of models, and often based on positive theory (Hunt, 2002). Theories are necessary for any science and the sophistication of theories is a measure of the maturity of a science (Kuhn, 1970).

Scientific laws are confirmed hypotheses that portray an objective pattern that has been discovered through scientific research (Bunge, 1967). Laws are basically universal generalizations about classes of facts and depict invariable associations between such facts (Babbie, 2006). A law is composed of two distinct parts: *units* that are connected by a *law of interaction* (Dubin, 1978). Scientific laws should meet the following criteria: (1) generalized conditionals—if/then relationship; (2) empirical content—laws must have a basis in factual observations; nonsense statements or strictly analytical statements would not qualify; (3) nomic necessity—the implication that the occurrence of some phenomenon must be associated with some other phenomenon; the relationship cannot be just chance (invariable association); and (4) systematically integrated—laws must not be just a summary statement of observed regularities, but must be able to be assimilated into the larger body of scientific knowledge (Hunt, 2002).

Scientific principles can be defined as fundamental statements or general truths providing a guide to thought or action which applies to a series of phenomena and identifies what results to expect when the principles are applied (Fawbush, 1987). When overwhelming corroborating evidence has accumulated for laws that are considered to be of extreme central significance to a discipline, these laws could be elevated to the level of principles (Hunt, 2002). Empirical science has two principal objectives: to depict specific phenomena in the realm of our understanding and to institute general principles by which they can be explicated and predicted (Hempel, 1952).

Paradigms are broad frameworks or viewpoints which generally describe the overall personality of a discipline (Babbie, 2006). A paradigm could be viewed as a fundamental image of the subject matter within a scientific field which guides what should be studied, what questions to ask, and the rules to be followed in interpreting the answers (Ritzer, 1975). The paradigm is the most extensive unit of consensus within a science, differentiates one scientific community from another, and subsumes, defines and interrelates the exemplars, theories, methods, and instruments that exist within it (Ritzer, 1975). A paradigm is a set of general philosophical assumptions, shared by researchers in a specific field or discipline, about the character of the world and how we can comprehend it (Maxwell, 2005). The development of a paradigm, and the esoteric research it encourages, is generally considered to be a sign of maturity in any emerging scientific field (Kuhn, 1970).

Classification/Taxonomy

One of the key characteristics of a science is the description and classification of the distinct subject matter of a discipline. Taxonomy is defined as the theoretical study of systemic classifications including their bases, principles, procedures, and rules (Prendergast, 1991). The paramount purpose of a classification is to describe the structure



and constituent objects to each other and to similar objects, and to simplify these relationships in such a way that general statements can be made about classes of objects (Sokal, 1974). All disciplines can be characterized by some type of taxonomical framework that represents a loose consensus among the participants in a discipline concerning its fundamental nature. These frameworks, explicit or implicit, customarily include the discipline's phenomena to be investigated and general approaches to such investigations (Hunt, 2002). Among other things, the taxonomical framework of a discipline plays a central role in guiding the research efforts of scholars because they are the primary means for organizing phenomena into classes or groups that are amenable to systematic investigation and theory development (Fleishman, 1982). A taxonomy can assist in exposing gaps in the body of knowledge by delineating categories and subcategories where extensive research has been done and where research is lacking (Fleishman, 1982). Research in contracting includes the following: a classification of procurement tasks according to the type of skill needed to perform a function (Fowler, 1987), a taxonomy of decisions made by federal government contracting officers (Page, 1989), a taxonomic structure for classifying goods purchased by the federal government (Wenger, 1990), a taxonomy for classifying services (Allen, 1991), and a taxonomy of buying decision approaches (Bunn, 1993).

Selected Theories Employed by Contracting, Purchasing, and Procurement

Many of the theoretical underpinnings found in contracting research and practice come from other social sciences similar to the development of several mature sciences (Webster, 1992; Stock, 1997). Contracting (purchasing/procurement) has been investigated through the lenses of several different theories originating in a variety of disciplines. Presented in this section are some of the more prominent theories utilized in scientific research and applied to the practice of contracting. *Principal-agent theory* focuses attention on the contract between a party (principal) that delegates work to another (agent; Jensen & Meckling, 1976). Agency relations are problematic to the degree that the principal and agent have conflicting goals, and it is difficult or expensive for the principal to monitor the agent's performance (Eisenhardt, 1989). Contracts are used to govern such relations and efficient contracts align the goals of principals and agents at the lowest possible cost (Arino & Reuer, 2004). Costs can arise from providing incentives and obtaining information about the agent's behavior and performance outcomes (Kettl, 1993). *Transaction cost theory* suggests that there is a cost to the organization in performing its transactions, both internally and externally, and that a critical responsibility of management is action to minimize or eliminate such costs (Williamson, 1975). When markets fail, hierarchies are created as a more efficient form of governance for transaction costs which are characterized by the following dimensions: opportunistic behavior by the actors, asset specificity, future uncertainty, and bounded rationality (Williamson, 1975). The heart of the transaction cost model is the contention that differences in asset specificity are what determine the relative efficiency of various forms of governance. With low asset specificity, market structures are relatively more efficient while with high asset specificity, hierarchical forms are relatively more efficient for governing transactions. Agent opportunism is viewed by some as pervasive and a part of every complex economic transaction and thus must be addressed by principals monitoring the actions of agents as a potentially significant cost (Kettl, 1993). Transaction cost theory provides insight to assist in determining if a firm might act in an opportunistic manner, such as a hold-up, after a contract has been negotiated and signed. The critical understanding is that opportunistic behavior could exist in certain transactions and to use contractual arrangements to counter its effects (Powell, 2002). The *theory of organizational buying behavior*, originating in the marketing discipline, focuses on the decision-making process wherein behavioral and economic concepts of power, conflict, and influence are applied in an attempt to understand the group dynamics within a buying center (Sheth & Garrett,



1996). The theory addresses buyer–seller interaction and relationships, partnering with suppliers, supply chain partnering, and the use of information technology (Sheth & Garrett, 1996). Considered to be one of the broadest and most researched areas in business marketing, it has been characterized as replete with conceptual models but lacking in empirical testing and integration with the purchasing management literature where it could be more heavily directed toward what individuals in buying departments actually do and how they perceive their work and manage their operations (Reid & Plank, 2004). Perhaps even more important would be research regarding the strategic importance of the purchasing team to its organization as well as global procurement as a managerial issue and the nature of buying in different cultures (Reid & Plank, 2004). *Portfolio theory* was developed in the finance field for the quantification of the relationships between risk and return for a specific group of investments, taking into account their contribution to the overall risk level of the portfolio (Markowitz, 1952). Kraljic (1983) introduced the first comprehensive portfolio approach for use in purchasing with a matrix that classifies products in one of four categories: strategic, leverage, non-critical, and bottleneck on the two dimensions of supply risk (from low to high) and profit impact. Marketing has used it to analyze the supplier–customer relationship since the early 1980s (Salle et al., 2000). *Resource dependence theory* is based on a number of assumptions: (1) organizations are dependent on external resources delivered as goods and services to customers for money to allow further acquisition of resources (Pfeffer & Salancik, 2005), (2) the environment contains scarce and valued resources necessary for organizational survival (Ulrich & Barney, 1984), (3) organizations consist of internal and external coalitions formed to acquire and maintain needed external resources (Pfeffer & Salancik, 1978), (4) to survive, organizations must be effective, which in turn increases their power (Pfeffer & Salancik, 2005), (5) power and dependence are directly linked in that one organization's power over another is equal to the latter's dependence on the former's resources, and (6) organizations strive to acquire domination over resources that minimize their dependence on other organizations and/or to acquire control of resources that maximizes dependence of other organizations on them (Ulrich & Barney, 1984). The theory is principally centered on the way managers endeavor to ensure organizational survival, and dependence occurs as the result of the level of importance of an input or output to an organization controlled by a few other organizations with asymmetric exchange providing net power to the less dependent organization (Miner, 2007). The theory has been applied to job opportunities for women in defense contractor management positions with the hypothesis that contractors will respond to pressures from the government to take affirmative action hiring practices as a function of their dependencies on the government for sales relative to the government's dependencies on them for supplies (Salancik, 1979). In contracting, an examination of the interdependent relationships between prime contractors and subcontractors, between contractors and governmental buying organizations, and between small businesses and large businesses are all areas of potential application of the theory. What are the implications for contract structure in reflecting dependence on external organizations, particularly in sole source or single source situations? *Relationship marketing* is a broad concept that generally refers to the development of longer-term customer relationships with both trust and commitment as antecedents to relationships in markets (Morgan & Hunt, 1994) and with buyer–seller exchange relationships on a continuum from pure transactions to pure relationships (Dwyer et al., 1987). The theory centers on the development of a relationship that strengthens commitment and cooperation, discourages opportunistic behavior, minimizes risk and uncertainty, increases the quality of relational exchanges, reinforces the effectiveness of interorganizational governance, and enriches the sharing of values and norms. The less the expectation of purchasing opportunism, the more efficient are transactions between partners with lower transaction costs and reduced monitoring (Fryman & Haile, 2011). *Expectancy*



theory can be viewed from two separate origins. Lawler (1981) approaches this concept in organizational behavior terms from the perspective of an individual's motivation to perform with an expectation that valued outcomes will be achieved. Oliver (1980) approaches the concept in marketing terms, finding that disconfirmed expectations lead to consumer satisfaction or dissatisfaction. The former approach presents the idea that if an individual exerts effort, the expectation is that successful performance will occur leading to a desired result. In contracting, the theory might be applicable to the structure of contract incentives that motivate individual and company performance to achieve such results as reduced performance costs or increased quality. The latter approach asserts that customer satisfaction is connected to the degree and direction of disconfirmation, which is defined as the difference between an individual's initial expectations of a product or service and actual performance. If initial expectations are confirmed, the individual's expectations have been met by actual performance, resulting in satisfaction. If initial expectations are disconfirmed negatively, actual performance has fallen short of the individual's expectations, resulting in decreased satisfaction. Gray (1997) utilized disconfirmation of expectations theory to examine customer satisfaction in the procuring contracting officer (PCO)–program manager (PM) relationship in acquisition. A comparison of satisfaction/dissatisfaction levels between private sector customers and public sector customers could have implications for the design and operation of contracting systems.

Selected Theories With Potential Application to Contracting Research

Several theories have emerged over the past few decades which have been applied in various social sciences which suggest important implications for contracting. *Resource-advantage theory* is a general theory of competition and the foundation for a general theory of marketing (Hunt & Morgan, 1996). It emphasizes the significance of market segments, heterogeneous firm resources, and marketplace positions of competitive advantage/disadvantage. Resources here go beyond neoclassical theory to be classified as financial, physical, legal, human, organizational, informational, and relational. Each firm will have some unique resources that could lead to positions of long-term competitive advantage in the marketplace (Hunt, 2002). Buying organizations could study their relationships with those firms that hold unique resources and what benefits accrue as a result of marketplace advantage. *Prospect theory* is a descriptive framework for the way individuals make choices in the face of risk and uncertainty and predicts risk-averse behavior when individuals are evaluating gains and risk-seeking behavior when individuals are evaluating losses (Kahnemann & Tversky, 1979). One application in contracting could be negotiator behavior from both the buyer's and seller's perspective. Framing an offer or argument as a gain for both sides will result in a dominant risk-aversion behavior, and a negotiated settlement is more likely (Bazerman, 1983). Research has found that negotiators who have developed a positive framework for their positions are significantly more concessionary and successful than their negative counterparts (Bazerman, 1983). *Goal setting theory* suggests that specific, difficult goals, accompanied by feedback on performance, lead to higher performance by focusing individuals' attention, increasing effort, and strengthening persistence toward task accomplishment (Locke & Latham, 1990). Research has shown that increases in the difficulty of assigned goals leads to increases in performance and that specific and difficult assigned goals result in higher performance than "do best" or no assigned goals (Locke & Latham, 1990). Regarding application to contracting, the concept that feedback can enhance performance could be the basis for past performance reports to contractors, debriefing of unsuccessful offerors during contract award, and award fee determination feedback during contract performance. *Equity theory* explains the relationship between what individuals feel they have contributed to their job and the outcomes they have received in comparison to what others in their same relative position have contributed and



received (Adams, 1963). The existence of under-rewarding and over-rewarding causes distress which leads the individual or organization to undertake efforts to correct the imbalance (Bartol & Durham, 2000). Application in contracting could include distress-reducing actions in such areas as the following: an offeror feels they have been treated inequitably by the buyer in a source selection evaluation process, feedback to unsuccessful offerors reduces or eliminates feelings of inequity, a negotiated agreement is considered inequitable, company perception of inequitable treatment in a dispute resolution decision. The most probable consequence of perceived inequity is dissatisfaction, which could result in diminished performance, complaining or expressing hostility, being uncooperative, committing sabotage, or quitting (Bartol & Locke, 2000). *Representative bureaucracy theory* seeks to understand if race, ethnicity, and gender add validity to bureaucratic actions (Long, 1952). It has been argued that diversity in the workforce connects the beliefs and values of citizens with the bureaucracy through socialization, such as the link between minority representation and policy benefitting minority citizens and communities. Smith and Fernandez (2010) studied the relationship between minority representation in senior executive positions within federal agencies and the level of contracting with small disadvantaged businesses and found evidence that minority representation increases the amount of contracts awarded to these firms. *Adaptation-level theory* suggests that one's judgment or assessment of an outcome is based on past experience regarding similar outcomes, and the existing level is considered the norm against which future outcomes will be judged (Helson, 1964). Some of the areas to which researchers have applied adaptation-level theory include price perception and the prices individual consumers are willing to pay for products and services (Emery, 1970) and assessment of customer service (Pisharodi & Langley, 1990). In public contracting, the contracting officer must determine if an offeror's price is fair and reasonable. Although there are existing standards against which a comparison may be made, the decision-maker is still utilizing his/her perception of what they believe is fair and reasonable. *Stewardship theory* evolved as a management alternative to the basic assumptions of agency theory developed within the economics field (Donaldson & Davis, 1991). Whereas principal-agent interests are assumed to usually diverge, where opportunistic behavior could easily occur requiring coercive and compliance-based monitoring and reporting mechanisms, principal-steward goals are assumed to converge. Stewardship theory emphasizes collective, pro-organizational, contractual behavior wherein agent self-interest is subordinate to goal congruence between the two parties (Van Slyke, 2007). It assumes that long-term contractual relations are established and maintained based on trust, reputation, collective goals, and involvement; considering success of the contract as accomplishment and an incentive to strive for goal alignment because the steward perceives that contractually aligned behavior will result in greater utility than will individualistic, self-serving behavior (Davis et al., 1997). In contracting, the theory has been applied predominantly to the procurement of social services from non-profit organizations at the state and local levels (Van Slyke, 2007).

Schools of Contracting Thought

Disciplines or fields are frequently characterized by the types of thinking in which members of the community typically engage. Over periods of time, "schools of thought" evolve which may reflect the "roots" of the discipline, principles espoused by the discipline's community, predominant tendencies, conventional wisdom generally presented in the literature and taught in training and education forums, prevailing theories, significant paradigms, political influences, and several other potential features of the field. Organizational science defines a school of thought as "an integrated theoretical framework that provides a distinct viewpoint on organizations and that is associated with an active stream of empirical research" (McKinley et al., 1999, p. 635). Schools of thought can be



overlapping and may even be in opposition to each other. Can “schools of thought” be identified in contracting? What are the “things” (events, actions, decisions, etc.) that occupy our thoughts and dialogue? Briefly, here are a few candidate areas for schools of thought in contracting. (1) *Process School of Thought*: the literature frequently characterizes contracting in terms of a process that consists of various phases or stages that are accomplished in a sequential fashion in order to meet organizational requirements. Perhaps there is a “process” school of thought that concentrates on the step-by-step phases of contracting and has led to several procurement models (Kettl, 1993; Sherman, 1999; Martin et al., 1978; Cooper, 2003) to explain actions needed in each of the models’ phases. (2) *Behavioral School of Thought*: A comprehensive body of research has developed in consumer and industrial buyer behavior, principally by marketing researchers, which has led to a theory of organizational buying behavior (Sheth & Garrett, 1986). Greve and Ejersbo (2005) address behavioral assumptions regarding actors in contracting in examining application to both “hard” and “soft” contracts. Lane (2000) presents contracting behavior in three dimensions: judicial behavior, legislative behavior, and executive behavior. (3) *Relationship School of Thought*: contracting is often viewed in terms of the relationships that are established and nurtured in the process of accomplishing contracting objectives. Examples are the buyer–seller relationship, the principal–agent relationship, the trust-based relationship, the principal–steward relationship, and formal versus informal relationships, to name a few. Burt et al. (2010) refer to a portfolio of relationships in describing the three levels of buyer–seller relationships that could exist: transactional, collaborative, and alliance. Each of these relationships differs on several dimensions including communication, trust, resources, duration, and competitive advantage, to name a few. (4) *E-Procurement/E-Commerce School of Thought*: one of the major changes in procurement in recent decades has been the movement toward the use of electronic commerce methods and techniques to acquire goods and services. Abramson and Harris (2003) identify e-procurement as one of the three major transformations in government procurement at all levels. Recent research in this area has included Moon’s (2003) work regarding application issues in state government, Neef’s (2001) examination of the implementation of e-procurement strategy, and Pani and Agrahari’s (2007) theoretical and empirical work on e-procurement in emerging economies. (5) *Reformist School of Thought*: a considerable amount of effort has gone into reforming the government acquisition process, including procurement and contracting (Gore, 1993; Kelman, 2009). For those companies dealing with government organizations at all levels, these efforts have had an impact on the manner in which they conduct procurement activities, not only with their governmental customers but also with their industry suppliers. (6) *Contracting Out/Outsourcing/Privatization School of Thought*: a significant stream of research has occurred regarding the concept of organizations accomplishing tasks or functions under contract or agreement with external organizations. The federal government developed a major policy of relying on the private sector for goods and services and would not compete with the private sector unless a function was “inherently governmental” (Sherman, 1999). Government, particularly at the state and local levels, were contracting out primarily for financial considerations but frequently meet with political resistance in implementing the practice (Reca & Zieg, 1995). Some studies have found that a lack of competition and an absence of public-management capacity with contract management experience to manage programs in a complex political environment have had a significant impact on the delivery of services (Van Slyke, 2007). A broader issue has become the extent to which government shares its power and authority with those in society upon which it relies to provide satisfactory delivery of services to the public and the success with which the government manages private agents to pursue the public interest (Kettl, 1993). Public managers are cautioned to address the monitoring issues as part of the contracting out decision, including the cost of monitoring, who will perform the monitoring, and what



techniques will be used (Rehfuß, 1990). One of the controversial areas of government outsourcing has been contracting with firms for the performance of procurement functions for public organizations (Lamm & Yoder, 2008). (7) *Eclectic School of Thought*: in comparative management (Schollhammer, 1969) no attempt to develop and test a concept by various contributions occurs but rather researchers adopt a framework which facilitates practical investigation of various aspects of the field. Some contracting studies, particularly those that are practitioner-oriented, might also fall within the eclectic realm. A major advantage to this approach, especially for developing disciplines, is that it is a relatively quick way to develop a body of empirically derived knowledge to which a variety of researchers can contribute and from which generalizations can be obtained which could provide guidelines for further research. (8) *Other potential schools of contracting thought*: practitioner versus academician, reinvention, partnership/alliance, performance-based contracting, implementation, and governance schools of thought. The discussion of schools of contracting thought is likely to create significant disagreement and divergence of opinion. Koontz (1964) created a firestorm with his “management theory jungle” which has been portrayed as a period of great conflict and uncertainty engaging different hard-to-define groups which presented major problems (Miner, 2007). Koontz (1980) attributed entanglement in the jungle to several sources including varying meanings of common terms, disregard for the findings of practicing managers, and the inability or unwillingness of “experts” to understand each other. Attempts to develop contracting schools of thought may face these same types of hurdles.

Contracting Body of Knowledge

A systematically integrated theoretical body of knowledge is an essential component of a science. As research presents new theories that are tested and validated, a contribution of new knowledge to the existing body of knowledge occurs. As new knowledge is integrated with existing knowledge, current theories may be strengthened or, in the alternative, they might be challenged. Scientific research starts with the awareness that the existing stock of knowledge is insufficient to handle certain problems, and questions can be neither asked nor answered outside some body of knowledge where it can be discerned that something is missing (Bunge, 1967). As the body of knowledge matures, so also does the social science which it represents. The contracting body of knowledge could be viewed from two perspectives. The first would be the researcher’s viewpoint in which the body of knowledge would consist of theories (partial or complete), including principles, laws, and paradigms, that have been generated from discovery/pure research resulting in new knowledge (Thornton, 1987). Empirical studies would be undertaken applying the scientific method to a range of research processes such as experiments, surveys and case studies incorporating appropriate taxonomies, models and typologies useful to researchers. The second would be from the practitioner’s perspective wherein the body of knowledge would employ applied research and focus on tools and techniques of the profession using methods and procedures that are considered “best practices” under guiding rules and regulations (Norby et al., 2004).

Contracting Paradigms

Is there anything that resembles a contracting paradigm? What is it, how is it articulated, and how can it be recognized in the literature? A “first blush” consideration of paradigms in contracting leads this writer to identify four potential candidates. The reader will notice a significant overlap in these potential paradigms but the predominant thrust of the thinking or viewpoint of each is, to a certain extent, considered unique. The first potential paradigm involves management concepts applied to contracting. Contract management involves achieving goals and objectives by applying decision-making, planning, organizing,



directing, and controlling skills. In a broader sense, organizations responsible for performing contracting functions with a skilled workforce are managed using both general management principles and unique contract management principles. Concerning public procurement, Kelman (2001) believes that the ability to manage the contracting process should be considered a core competency of buying organizations and “should be used aggressively to promote central agency goals” (p. 89). Organizations have shifted their emphasis on contracting tasks and functions from a transaction-based perspective to a more strategic approach to contracting management. This paradigm also includes the particular contracting (procurement, purchasing, buying) perspectives of supply chain management, logistics management, financial management, and marketing. Theoretical facets of this paradigm might include agency theory, stewardship theory, equity theory, goal setting theory, image theory, prospect theory, organizational buying behavior, adaptation theory, relationship marketing, representative bureaucracy theory, and portfolio theory. This paradigm would probably hold with the relationship school of thought, the partnership/alliance school of thought, the behavioral school of thought, and the performance-based school of thought. Exemplars would include the research and writings of Burt et al., Hunt, Kelman, and Van Slyke. A second potential contracting paradigm focuses on the economic aspects of contracting. Bolton and Dewatripont (2005) refer to the theory of incentives, information, and economic institutions as generally a contract theory. They identify the benchmark contracting situation as one between two parties operating in a market economy surrounded by a properly operating judicial system. Contracts are enforced perfectly by the legal system as long as they do not breach any laws. Judges, as rational individuals, stay close to the terms of an agreement and penalties for breaching the contract are substantial enough that parties avoid such action. The interest is in determining what contractual clauses rational economic individuals are willing to sign and what types of transactions they are willing to undertake. They assume away most of the problems in contract practice and concentrate only on the economic aspects of the contract (Bolton & Dewatripont, 2005; Hart & Holmstrom, 1987). Concepts and constructs frequently studied in economic contract theory include moral hazard, adverse selection, asymmetric information, hold-ups, auctions, incomplete contracts, lock-in effect, relational contracts, screening, signaling, truth telling, collusion, shirking, property rights, and self-enforcing contracts, to name a few. Transaction cost theory, the theory of the firm, contract theory, the theory of incomplete contracts, auction theory, resource dependence theory, game theory, and expected utility theory are just some of the key theories that might be considered in this paradigm. Exemplars might be Bolton and Dewatripont’s contract theory, Hart and Holmstrom’s contract theory, Grossman and Hart’s theory of incomplete contracts, and Bajari and Tadelis’ theory of procurement contracts. A third potential contracting paradigm embraces the legal/judicial features of contracting. Case law shapes and forces many of the contracting policies, practices, and relationships today. Statutory, common, and administrative law all prescribe and guide the conduct of public contracting (Buffington & Flynn, 2007). In the private sector, the Uniform Commercial Code (UCC) has played a key role in the nature and character of business transactions. Legal rights for both buyer and seller are established through the contractual relationship and provide certain types of protection for each party. A significant amount of discussion has centered around relational contracts in a legal theory of contract (Macneil, 1985). Theoretical facets of this paradigm might include the legal origins theory, the prediction theory of law, and the justice theories. This paradigm would probably embrace the governance school of contracting thought. An exemplar or piece of work that stands as a model for those working within this paradigm might be Kimel, and Cibinic and Nash literature in contracting. A fourth potential contracting paradigm centers on the political facets of contracting and the use of contracts as a policy tool encompassing thinking from political science, sociology, and public administration. The public sector at all levels has increasingly



used the contractual process as an instrument of public policy with the contracting officer as one of the most significant political actors in the contracting process (Cooper, 2003). It is characterized by procedures for governance that differ from those one would expect to see between private sector firms. The government often acts as both a market participant and as a maker regulator (Cooper, 2003).

Potential Contracting Theories

Only a few theories unique to contracting exist in the contracting discipline. Most of these have emanated from economics, focus on the contract as opposed to contracting, and are viewed through an economic lens (quite often with employment contracting examples). Serious consideration should be given to developing new contracting theories that expand our knowledge of distinctive contracting concepts and constructs leading to greater comprehension of contracting issues and problems. These theories should be integrated with each other and the scientific body of contracting knowledge. Some areas for potential contracting theories (partial or complete) include the following themes. A *theory of contract types* would play a significant role in examining, understanding, predicting, and perhaps even controlling the dynamic features of contract types. A deeper understanding of the nature and characteristics of contracts as they interplay with contractual performance could greatly enhance our ability to more carefully craft contractual arrangements, including hybrid contract types. A *theory of equitable adjustment* would address a concept that has uniquely developed in federal government procurement that seeks to “make whole” both the buyer and seller who have been contractually affected by a decision (frequently on a unilateral basis) changing certain aspects of contract performance made by the sovereign buyer. The concept has been shaped and forced through the years by court and boards of contract appeals decisions and through application by buying organizations. A *theory of contract termination* would focus on the dynamics of concluding contract performance before the desired or expected contractual outcome has been achieved. Some contract terminations occur due to the breach of contract terms by one or both parties, while other terminations occur due to the federal government’s right, as a sovereign, to unilaterally determine that a good or service is no longer needed or desired and to terminate at its convenience. A *theory of reasonableness* would explore the various aspects of the concept as it applies to such dimensions as time, cost, and any other facet of the contractual relationship for which the ideas of fairness and equity apply.

Is Contracting a Science?

Contracting (including most of purchasing and procurement) is an applied discipline which could be considered an emerging science in the very earliest of stages. What evidence suggests this might be the case? We will utilize some of the thinking regarding the characteristics of science from Buzzell (1963) and Hunt (1983, 2002). First, the basic subject matter of contracting is the contractual relationship established between two or more parties, frequently exhibited by the principal–agent relationship. This is the *distinct subject matter* of contracting. Second, contracting has initiated the process of *describing and classifying its subject matter*. This is demonstrated through the taxonomical work that has occurred, as well as efforts to articulate a contracting body of knowledge. Third, similar to Hunt’s (2002) reasoning that because marketing involves the investigation of human behavior in the same fashion as other behavioral sciences and, therefore, can *presuppose the existence of underlying uniformities and regularities of the subject matter phenomena*, contracting also involves human behavior and could make the same supposition. The revealing of these underlying uniformities leads to empirical regularities, law-like generalizations, theories, laws, and principles (Hunt, 2002). Fourth, contracting has employed the *scientific method* in its analyses of the subject matter phenomena. Although it might be argued that a significant



portion of contracting research has not rigorously applied the scientific method, has been practitioner-oriented with less directed toward theory building, has predominantly involved normative decision models, and has yet to fully articulate a comprehensive conceptual framework within which contracting resides, the early stages of contracting science do exist. Even if contracting ultimately is not judged a science, several benefits might exist if the field of contracting is approached in the manner of a science. Academics and practitioners will no doubt take violent issue with what has been stated in this paper. Strong disagreement with the idea that contracting should even be considered a valid discipline is bound to exist. The case for “contracting as a science” is clearly in its early stages, beyond which it may never mature. A significant debate about what is offered in this paper would be useful, exploring the depth and breadth of the contracting discipline in a more scientific fashion. Only through a continual examination and challenging of its basic assumptions, underlying principles, key concepts, existing theories, and known paradigms can contracting begin to evolve. This discussion/debate should involve both academicians and practitioners, occur in the open literature as well as during conferences, workshops, seminars, and similar professional forums, and occur in the education and training environment within educational institutions as well as public and private sector organizations.

Future Actions

In order to assess the current state of contracting, it is recommended that a *colloquium* be held regarding its theory and practice with attendance sought from among the academic, research, and practitioner communities. A specific *journal* should be dedicated to contracting research and theory drawing from a variety of disciplines including international educational and research organizations. There is a need for a comprehensive *annotated bibliography* of the contracting literature to provide practitioners, researchers, and educators a thorough review of existing writings in the contracting discipline. *Classification schemes* unique to the contracting discipline would be extremely beneficial. Potential areas for a taxonomy would include the following: elements of the supplier base, incentives regarding supplier performance, unethical practices (comparing public and private sectors), public-sector versus private-sector contracting practices, pricing strategies, and contracting reforms over the last several decades. Building on contracting research work previously mentioned involving tasks, goods, and services would greatly enhance our insight into the relationship of contracting characteristics. A *body of knowledge* has recently evolved in the contracting field which has done an excellent job of focusing on the knowledge areas and competencies required of practitioners but lacks a theoretical structure. A body of knowledge that focuses on development and application of contracting theory would greatly improve our understanding of contracting phenomena which could lead to superior contracting practices. Consideration should be directed toward the idea of what constitutes a *paradigm* or set of paradigms in the contracting field, perhaps starting with the four broad viewpoints or frameworks discussed earlier. It is believed that all of the above considerations would significantly enhance the field of contracting and, potentially, lead to a science of contracting.

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