DEFENSE CONTRACTING BUYER-SELLER RELATIONSHIPS: *THEORETICAL APPROACHES*

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This article examines the applicability of three theoretical approaches to defining defense buyer-seller relationships. Economic Free-Market Theory explains the relative economic power of the participants but ignores the legal, political, and socioeconomic aspects so pervasive in defense acquisitions. Transaction Cost Economics provides a framework for determining the most cost-effective type of contract governance for each transaction. Systems theory explores the degree of interdependence between the buyers' and sellers' systems. Each theory contributes unique insights into defense buyer-seller relationships that can be used to judge the appropriateness of contracting laws, regulations, policies, and management approaches for specific acquisition environments.

INTRODUCTION

Appropriate theoretical perspectives are needed if defense buyer-seller relationships are to be properly understood and managed. Theoretical models enable managers to understand why participants in the contracting process behave as they do and to define the complex relationships that exist. Theory is needed to understand how buyer-seller relationships should best be governed, to test the effectiveness of those management efforts, and to compare defense and non-defense related research streams. Such a theory will facili-

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tate the appropriate use of private sector management practices while avoiding those which are not appropriate.

This article explores three theoretical approaches. First, it examines a traditional free-market approach based on economic theory which focuses on the operation of market forces and the relative economic power of the participants. Next, a transaction cost economics approach is considered. It draws from economic and organization theory to describe the contractual relationship of the buyer and seller. Finally, a systems approach is used to describe the buyer and seller as separate, but interrelated systems. A brief description of each theory and its application to the defense contracting environment follows.

A MARKET APPROACH

One way to define the defense contracting buyer-seller relationship is in traditional economic terms with market forces operating to determine the price and quantities of the goods and services that are bought and sold. A perfect market (or perfect competition) exists when (1) the product is homogeneous in nature; (2) there are large numbers of buyers and sellers; (3) there is freedom of entry and exit for the sellers; (4) buyers and sellers have perfect

SELLERS \ BUYERS	ONE (Monopoly)	FEW (Oligopsony)	MANY	GREAT NUMBER
ONE (Monopoly)	Bilateral DOD Examples: F-22 Production Proprietary Spares Contract Changes	DOD Examples: F-16 Fighters M1A Tanks		DOD Examples: Electricity
FEW (Oligopsony)	DOD Examples: ICBMs Proprietary Spares Weapon System Development	Bilateral DOD Examples: Super Computers Commercial Aircraft		DOD Examples: Telephone Service
MANY	DOD Examples: ICBMs Spares with Specifications	Monopolistic Competition DOD Examples: F-16 Spares with Specifications	DOD Examples: Office Furniture	DOD Examples: Personal Computers Printers
GREAT NUMBER				Perfect Competition DOD Examples: ??????

Figure 1. **Grid of Economic Market Relationships**

information/foresight with respect to prices; (5) the sales/purchases of each seller/buyer are insignificant with respect to the total volume of transactions; (6) no collusion exists among buyers and sellers; (7) consumers maximize total utility and sellers maximize total profits; and (8) the commodity is transferable (Pearce, 1986, pp. 190, 285-286). When one or more of these conditions are absent, the market is imperfect to some degree. If the product is not homogeneous, but product differentiation prevails, sellers have increased influence over price and monopolistic competition prevails. As the number of buyers or sellers decrease, parties can exert greater influence on the market and conditions of oligopsony/oligopoly or monopsony/monopoly prevail, as depicted in Figure 1.

Applicability to DoD

To the degree the federal government sets aside its sovereignty and acts on equal footing with private sellers, the defense buyer-seller relationship could be defined in terms of the economic power the buyers and sellers exert over each other. In such cases, the government could be said to be operating at some point on the grid in Figure 1. When DoD buying agencies enter the marketplace to buy commodities or commercial items, they rely on competitive market forces to determine the price. This would hold true for buying such things as office supplies and equipment. As the government's needs become more and more DoD unique, such as buying strategic missiles or nuclear warheads, DoD takes on the characteristics of a monopsonistic buyer. At the same time, the number of sellers also decrease, although for some weapon systems (such as tactical missiles) and spare parts, there exists a certain amount of competition. When research and development or weapon system production is involved, competition is frequently reduced to one or a few sellers. At the extreme, with one buyer and one seller, a bilateral monopoly exists. Even when competition is used at the outset of an acquisition, when contract changes are required, the contractor has monopolistic power in the ensuing negotiations, unless the government is willing to terminate and recompete the acquisition.

A market approach in defining defense buyer-seller relationships is advantageous in that economic theory provides a language that is well recognized and understood. There is also a rich body of economic theory and research to draw upon. The defense contracting literature is couched in economic terms and premises underlying our contracting regulations are, rightly or wrongly, founded on economic market theory to a large degree. However, economic market relationships are only one aspect of the defense contracting buyer-seller relationship. The government's sovereign power, the unique nature of defense acquisition, and the role of politics limit the appropriateness of using economic market theory to describe the defense buyer-seller relationship in a comprehensive way.

Sovereignty

The government does not completely lay aside its sovereignty. As a sovereign power, the government makes the rules with which all participants must comply. For example, it reserves for itself the right to unilaterally change the contract, force continued performance, or to terminate the contract at its pleasure. It can force sellers to disclose cost and technical information that is normally considered proprietary. It maintains the right to audit and inspect the sellers' records and internal operations. It can also force government standards on the sellers' operations as conditions for selling to the government. Thus, the sovereign power of the government makes it a very unique customer and gives it considerable power beyond the economic power that market forces alone would give it.

Unique Nature

The very nature of defense acquisition tends to violate many of the underlying assumptions of market theory, especially when contracting for DoD unique requirements. Peck and Scherer (1962, pp. 57-62) concluded that "a market system in its entirety can never exist for the acquisition of weapons" due to (1) large capital requirements that largely preclude private financing, (2) unique uncertainties associated with weapons acquisition (changing threats, strategies, politics, technology, etc.), (3) the buyer's role as the specifier of weapon systems, and (4) the fact that pricing is largely based on anticipated or incurred costs rather than competition.

Researchers have observed that defense acquisition tends to substitute administrative control mechanisms (such as auditors, quality assurance representatives, government standards, etc.) for market mechanisms (Peck and Scherer, 1962; Fox, 1974; Scherer, 1964). Fox (1974) and Gansler (1980) found extensive differences between the conduct of the defense and industrial markets, especially in terms of cost-based, rather than market-based pricing; the tendency toward a monopsonistic buyer; and a limited number of suppliers. Gansler (1980) also cites extensive barriers preventing firms from entering the defense "market" and inhibiting large defense contractors from exiting. Such barriers include requirements for highly specialized equipment, engineering, and scientific resources; unique reporting, accounting, quality, and purchasing systems; extensive regulations; erratic and relatively inelastic demand; plus other DoD-unique requirements necessary to do business with DoD but which are not useful or transferrable to the commercial/industrial sectors.

These barriers make it difficult for commercial firms to navigate the maze of contracting procedures to effectively compete for government contracts even for commercial type requirements. Thus, the very nature of defense acquisition tends to violate many of the assumptions associated with a free market, especially those relating to the number of buyers/sellers, their influ-

ence on price/demand, and the freedom of market entry/exit.

Political Forces

Finally, one must consider the political nature of the defense acquisition process, especially as it relates to Congress' role in overseeing and managing the budgetary and acquisition processes. Congressional authorization of programs and appropriation of funding generate considerable political overtones. Gansler (1980, 1989) and Fox (1988) point to such political factors as major causes of program instability, cost growth, and overregulation leading to inefficiency and waste. Adams (1982), examining the relationship between Congress, DoD, and defense contractors, found that defense contractors engage extensively in politically oriented activities (i.e. personnel transfers to/from government service, political action committees, lobbyists, trade associations, etc.) to influence the process to their benefit. His research suggests political forces can impact the contracting process and the buyer-seller relationship and thus cannot be ignored, especially when high dollar weapon systems are involved.

Alternative Economic Models

The nonmarket nature of defense acquisition has prompted researchers to suggest alternative economic models. Kaitz (1984) and Peterson (1987) suggested defense industries producing weapons should be regarded as regulated industries, rather than participants in a free market. Economic theory related to regulated monopolies could provide a useful model, although one must recognize that the consumer, the buyer, the regulator, and resolver of disputes are one and the same when defense acquisition is concerned. Kaitz (1984) also suggests welfare economics provide a better explanation into the nature of the defense market than traditional free-market theory.

Except for the simplest of defense acquisitions, traditional economic market theory, by itself, is not sufficient to capture the complexity of the defense contracting buyer-seller relationship, although it can provide some insight into the economic power wielded by the buyer and seller. The next section describes a theory that uses economic and organizational theory to focus more extensively on the contractual relationship between buyers and sellers.

A TRANSACTION COST ECONOMICS APPROACH

Transaction Cost Economics (TCE) matches business transactions with appropriate contractual governance structures that take advantage of production economies that may be available while minimizing transaction costs as much as possible (Williamson, 1979). Transaction costs are associated with "drafting, negotiating, and safeguarding the agreement" as well as costs associated modifying the agreement and resolving disputes and other postaward problems (Williamson, 1985, pp. 20-21). The range of governance structures

include total reliance on a competitive market (such as the use of sealed bidding or awarding contracts without discussions) on one extreme and performing the transaction entirely in house (such as government arsenals or depot repair facilities) at the other extreme. In between, contracts between the buyer and seller are used with varying levels of reliance on markets, negotiators, courts, and formalized contract administration and control mechanisms.

In order to select the best form of contract governance, two important behavioral assumptions and three transaction characteristics must be considered.

Behavioral Assumptions

The first behavioral assumption is *bounded rationality*. Individuals intend to act rationally but are limited in their capacity to solve complex problems and process information (Williamson, 1985) That is, individuals generally cannot anticipate and plan for all possible contingencies that may occur after contract award. Otherwise, they could include contractual provisions deal with all possible contingencies. Another problem is that some people resort to *opportunistic behavior* and are willing to deceive, steal, and/or cheat to gain greater benefit from a transaction. Incomplete or misleading information is a major TCE concern. Without the threat of opportunism, the parties of a contract could just trust each other to be fair and not take advantage of the other, regardless of any required changes. When such levels of trust are not prudent, the parties of a contract must find ways to protect themselves from dishonest behavior in all its forms (Williamson, 1985).

Transaction Characteristics.

According to Williamson (1985), there are three principal dimensions that characterize transactions. The first, and most significant dimension is *asset specificity*, which refers to the degree that special purpose investments (such as sites, physical and human assets, dedicated assets, etc.) are required for the transaction. The more highly specialized assets are, the less they can be converted to other uses and are subject to considerable risk should the transaction fail. For example, a contractor's plant dedicated to the production of strategic missiles uses assets that could not be converted easily to commercial uses.

The second dimension is *uncertainty*, which refers to unanticipated problems or those arising from opportunistic behavior, such as one party taking advantage of events that require contractual changes to improve its position at the expense of the other party. Uncertainty increases in importance when asset specificity is involved due to the high risk associated with highly specialized assets.

The third dimension is *frequency* of transaction occurrence. The costs

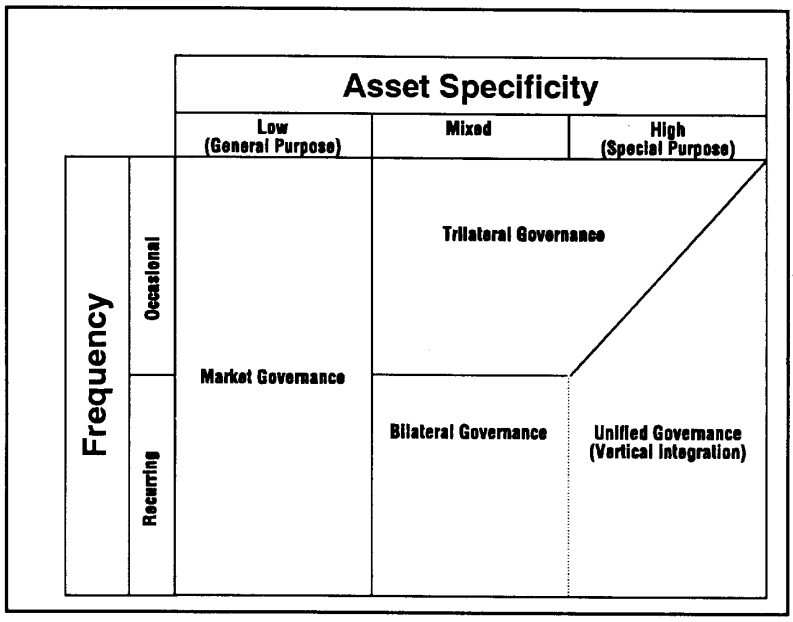

Figure 2. **Appropriate Governance.** Adapted from Williamson, *Economic Institutions*, p. 79.

associated with specialized governance structures are more easily justified when transactions are recurring in nature, rather than being a one time buy.

SELECTING THE BEST GOVERNANCE STRUCTURE

The best governance structure is one that can adapt to changes arising from bounded rationality while protecting the parties against the risks of opportunistic behavior. Assuming the presence of uncertainty, bounded rationality, and opportunism, the appropriate governance structure depends on the level of asset specificity and the transaction frequency, as depicted in Figure 2.

The competitive marketplace is most efficient when general-use assets are required, regardless of transaction frequency. Parties to the transaction rely on competitive market forces to protect each other from opportunism. If one becomes dissatisfied, the relationship is terminated in favor of another supplier (Williamson, 1985). When highly specialized assets are required, especially for recurring transactions, the transaction can be performed internally (vertically integrated) because the buyer can achieve the same economies of scale as the supplier, can more easily make changes, and can reduce transaction costs, since only the buyer's organization is involved. However, bureaucratic problems associated with the buyer's internal organization miti-

gate these benefits somewhat.

In between these polar alternatives are intermediate governance structures which are more efficient when a mix of specialized and general purpose assets are required. As asset specificity increases, the buyer and seller become more dependent on, and therefore committed to each other and the transaction. The supplier is more committed because alternative uses for its specialized assets are limited; the buyer's commitment increases due to higher costs associated with changing sources. Both benefit by maintaining the relationship, however, the hazards of opportunism grow because parties are in position to take advantage of one another. Mechanisms must be found to facilitate change while protecting against opportunistic behavior (Williamson, 1985).

Frequency of occurrence impacts the affordability of the contract governance structure. Williamson suggests a *trilateral governance* structure is most efficient for transactions involving mixed or highly specific assets but whose frequency of occurrence does not warrant the costs of establishing a specialized governance structure. In such cases, arbitrators or mediators are used to settle disputes that cannot be settled by the parties themselves. When transactions are recurring enough to warrant a specialized governance structure, *bilateral governance* is warranted. Problems associated with contract changes and opportunism must be addressed, either through automatic or routine contract adjustment provisions (such as economic price adjustment clauses, options, incentives, liquidated damages, etc.) or through predetermined means of resolving disputes.

One way to diminish the need for special contract administration provisions, and therefore costs associated with them, is the creation of *credible commitments* (transaction specific investments, posted bonds, reciprocal arrangements, etc.). In such cases, the parties provide "hostages" which make the relationship self-enforcing. For example, if executed properly, a warranty could serve as a hostage to motivate the contractor to make a quality product and lessen the need for the buyer to impose quality controls or inspections. The use of bid bonds and performance bonds are often used in a similar way to guarantee the reliability and performance of the seller.

Applicability to DoD

Williamson's theory appears to be applicable to defense contracting. Its underlying behavioral assumptions are relevant. The complexity and uncertainty associated with defense contracting suggest bounded rationality is an appropriate assumption. In addition to technical, schedule, and cost risks associated with the development, production, and support of complex, state-of-the-art weapon systems, changing technology, threats, defense budgets, political forces, economic forces, etc., create an ever changing climate that is impossible for the human mind to fully comprehend. Numerous ethics and

conflict of interest laws, disclosure requirements (such as the Truth in Negotiations Act), and the armies of auditors and investigators involved in the Federal contracting process attest to the presence (actual, perceived, or feared) of opportunistic behavior in the defense contracting environment.

Defense contracting generally follows the contracting pattern described by TCE. Competition for fixed-price contracts are used for products requiring standardized equipment, where uncertainty is not too great. If the production efforts require more specialized assets and involve greater uncertainty, negotiated bilateral contracts are used and administrative control mechanisms are substituted for market mechanisms. In a few cases, the government chooses to operate government owned production arsenals or depot repair facilities (such as depot maintenance of combat aircraft) rather than contract for those operations in the private sector. However, it generally relies on bilateral contracts with private industry to obtain its weapon systems and spare parts. Concerning the suggestion that only recurring transactions can support such a highly specialized governance structure, Williamson states the following:

> Defense contracting may appear to be a counterexample, since an elaborate governance structure is devised for many defense contracts. This reflects in part, however, the special disabilities of the government to engage in own-production. But for that, many contracts would be organized in-house. Also, contracts that are very large and of long duration, as many defense contracts are, do have recurring character. (1985, p. 73 footnote 1)

To some degree, the government uses credible commitments to reduce the level of administrative controls. For example, when contractors invest in a government-approved purchasing system, DoD relaxes its requirements for subcontract approval. However, in some cases the government insists on credible commitments without relaxing its level of control. For example, DoD frequently requires the contractor to provide warranties and use government-approved quality systems but still conducts duplicate government quality inspections. To the degree the contractor can show its system produces quality products, continued government surveillance incurs transaction costs without benefits.

Transaction Cost Economics provides a good theoretical base for understanding defense contracting buyer-seller relationships, especially in regard to the level of government control that is incorporated into the contracting relationship. It provides a framework for assessing the appropriateness of the contractual governance structure employed, given the characteristics of the transaction (especially asset specificity and uncertainty). For example, relying on competition and "market" controls for weapon system development and production is questionable, especially when extensive changes are likely

to occur after award or when cost reimbursement contracts are involved. It also provides a structure for assessing the level of credible commitment provided by the contractor and the level of related government control mechanisms.

Since TCE defines the buyer-seller relationship in light of governing contractual control mechanisms, it captures relevant economic and organizational issues of the relationship and is applicable even if the buyer has sovereign power and can impose controls over its suppliers. The next section uses general systems theory for defining how the government and defense contractor systems impact one another.

A SYSTEMS APPROACH

One way to better understand the buyer-seller relationship and the impact defense contracting requirements have on the contractor's operations is to examine the relationship as two linked systems. General systems theory can be used to focus on the linkages that exist between the buyer and the seller and how the two systems interact with each other. Churchman (1968) suggested the systems approach, used by scientists to study and comprehend scientific phenomena, could be effectively applied to the study of government, business, industry and human problems. Ashby (1960) showed how systems can be fully joined so that one system reacts mechanistically to disturbances from the other or how independencies can be achieved so that the system reacts only to selective disturbances. Glassman (1973) defined how the degree of coupling between living systems affects stability.

Relatively independent, or loosely coupled systems tend to have fewer variables in common or share weaker variables. Changes in one system therefore do not seriously impact the other. However, when systems are closely linked together, sharing many and/or stronger variables, changes in one system significantly impact the other. Loose coupling can be maintained actively, such as when the system defends itself against disruptive influences; or passively, such as when a system insulates itself such that it only responds when variables gain limited access. Glassman (1973) and Weik (1976, 1979) extended these concepts to organizational systems.

In order to determine the degree of coupling between the buyer and the seller, the number and strength of the variables connecting them must be identified. Landeros and Monczka (1989) applied systems theory to defining buyer-seller relationships. Three types of relationships were defined. A loosely coupled relationship is one in which the relative independence of the parties is maintained through open market bargaining. Contracts are frequently competed, generally based on a strategy of seeking lower prices. Both buyer and seller maintain a level of independence. Buying firms may attempt to insulate themselves from supplier disruptions through multiple sourcing and safety stock inventories. A tightly coupled relationship involves cooperative, buyer-

ATTRIBUTE:	BUYER-SELLER RELATIONSHIP Loosely Coupled (Market Bargaining)	Tightly Coupled (Cooperative Relationship)	Fully Coupled (Vertical Integration)
Supply Pool	Numerous Suppliers	◄——►	Internal Supplier
Alliance	Credible Threat	◄——►	Credible Commitment
Dispute Resolution	Unyielding Negotiations	◄——►	Managerial Tradeoffs
Information Exchange	Minimal	◄——►	Great
Marketplace Adjustment	Separate	◄——►	Joint

Figure 3. **Buyer-Seller System Coupling**
Source: Adapted from Landerous & Monczka, 1989, p.13.

seller relationships, designed to achieve mutually beneficial long-term, strategic goals, such as reducing total costs, better product performance, greater levels of quality, timeliness, and reliability in the flow of supplies flowing between suppliers and customers. Close buyer-seller relationships imply considerable interdependency and therefore a high degree of cooperation. A fully coupled relationship is analogous to backward integration with the source of supply internally integrated within the organization. Here, the buyer and seller are fully joined so that they now operate as one system.

Figure 3 illustrates these relationships in terms of five components which can be used to determine the degree of coupling in a buyer-seller relationship: (1) the number of suppliers in the supply pool, (2) the amount of credible commitment, (3) the manner in which disputes are resolved, (4) the flow of communication, and (5) the manner in which the two parties adjust to marketplace conditions.

Applicability to DoD

This model can generally be used to describe the level of interdependence between the government and the defense contractor, especially in terms of

the supply pool and information exchange. The Competition in Contracting Act has greatly increased the government's use of competition, and thus a move toward more loosely coupled relationships. This is especially so when there are numerous suppliers available. By and large, this is especially so at the middle and lower tiers of the defense industrial base where subsystems, spare parts, and materials are acquired. Where competition is less possible, such as in the production of a major weapon system, both parties tend to be committed to each other, resulting in a tighter coupling.

The information exchange between the government and the contractor can vary substantially. During a competitive awarding process, especially when sealed bidding is used, communication prior to award is strictly controlled. After award, communication is usually minimal and is limited to contacts with the buying and administrative office personnel, especially contract surveillance, quality, and transportation representatives. For negotiated contracts for complex systems, communication is extensive before and after contract award. Such contracts are also characterized by extensive communication with multiple functional representatives such as program managers, engineers, and technical representatives, in addition to the normal contracting officer's representatives. Thus, the amount of communication also describes the degree of coupling in a defense contracting environment.

The alliance between DoD and its contractors is generally considered to be at arms length and even adversarial. Still, use of credible threats and credible commitments varies. In many cases, the DoD modus operandi is the use of credible threat. When multiple sources are available, it uses threats of competition and termination to encourage contractor performance. When competitive sources are lacking, DoD withholds progress payments, threatens development of alternate sources to get leverage with the contractor. When DoD is coupled tightly to contractors, such as with developers of large weapon systems, credible commitments are more likely to be made. These include multiyear contracts, out-year options, provision of government-owned equipment/facilities, etc. Threats of termination or competition are much less noticeable.

As suggested earlier, contractors also make credible commitments, such as investment in DoD unique equipment, specialized expertise, and DoD approved systems. Such investments tend to lock contractors into the defense industrial base. The Government may reward them with less Government oversight.

The other two components may not be as applicable as in the private sector. Dispute resolution in government contracting is a fairly standard and formalized process, consisting of submission and negotiation of claims followed by appeals to boards or courts, if necessary. It is uncertain whether DoD is more accommodating to large prime contractors than to small ones. This would warrant some investigation. Market place adjustment is some-

what problematical since DoD requirements are driven by defense needs and congressional appropriations. As these requirements change, they are immediately passed on to defense contractors in the form of a change in the frequency and size of contracts awarded or, if current contracts are affected, by change notices, schedule changes, terminations, etc. and settlement costs are determined by negotiation or disputes.

For large weapons programs, there may be some joint resolution activities but for the most part, contractors are left to cope with changing demand and conditions on their own. This does not mean that these components are not applicable to defense contracting. Rather, they are not as useful in defining the contracting relationship as they might be in the commercial sector.

Such a systems approach concentrates on how tightly the buyer's system is joined to the seller's system. In the government's case, fewer available suppliers, greater communication, and strong commitments to each other would signal tighter coupling between the defense contractor and the government. According to the systems theory described above, a tightly coupled defense contractor would be subject to greater government influence and control over its internal operations than a more loosely coupled contractor. This is consistent with Gansler's (1989) research that suggests prime contractors facing limited competition, requiring extensive negotiation during the award process (or for subsequent changes), and whose factors of production are highly specialized toward defense production face extensive government controls. The opposite holds for contractors producing stable products with extensive competition, requiring little negotiation or communication, and using less specialized factors of production.

CONCLUSION

Each of the theories presented here provided distinct insight into the defense contracting buyer-seller relationship.

Economic theory as applied to markets is important to understand how the defense contracting environment is different from the traditional concept of markets. It is useful for gaining insight into the economic power of the buyer and seller. However, one cannot underestimate the importance that politics and sovereignty have in the defense contracting process.

Transaction cost economics provides a more useful theory for defining the nature of the contracting relationship between the government and defense contractors and the regulatory aspects of the administrative controls the government uses to protect its interests against potential opportunistic behavior by participants in the process. It provides a model that is useful for the full range of contractual relationships ranging from the use of competitive, firm-fixed-price contracts using a quasi market governance mechanism to cost reimbursable contracts with extensive administrative control mechanisms.

Finally, systems theory helps to explain the interrelationship between the

government and the defense contractor as two linked systems. It is especially useful to describe how the government's controls and requirements impact the internal operations of the defense contractor and how the performance of the defense contractor impacts the government.

The important issue is not whether one particular theory can or cannot capture all the intricacies of the defense contracting buyer-seller relationship. Rather, that each provides a unique theoretical perspective that can be used, either individually or in concert with other theories, to focus on the particular issues of interest. Theoretical perspectives open up a vast amount of non-defense literature that can be used to better define and understand the buyer-seller relationships operating in the defense environment. The common features between non-defense and defense buyer-seller relationships can be explored and understood while at the same time recognizing the unique differences.

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