

ORGANIZATIONAL ASSESSMENT OF PROCUREMENT MANAGEMENT PROCESSES

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ABSTRACT. This research builds upon the emerging body of knowledge on procurement and contract management process maturity assessments. In 2007, a team of graduate students at the U.S. Naval Postgraduate School (NPS) conducted an assessment of the procurement processes at two major U.S. Air Force logistics centers. The assessments were conducted using the Contract Management Maturity Model (CMMM). The purpose of this paper is to use these combined procurement process assessment results to characterize the current state of practice of contract management at these two logistics centers and also within the Air Force logistics community. This paper summarizes the assessment ratings, analyzes the assessment results in terms of contract management process maturity, discusses the implications of these assessment results for process improvement and knowledge management opportunities, and provides insight on consistencies and trends in these assessment results to federal government contract management.

OVERVIEW

Procurement and contract management have become increasingly important in the commercial industry as well as in the federal government. As organizations continue to focus on core competencies and outsource non-core, yet critical functions, these organizations are relying on procurement processes as a key to achieving and maintaining a competitive advantage (Quinn, 2005; Patel, 2006).

In addition, the federal government continues to increase its level of public spending for good and services. In fiscal year 2006, the federal

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government procured \$425 billion dollars in goods and services, an increase of 33 percent from 1996. The Department of Defense procurement spending in 2006 was \$305 billion, approximately 72 percent of total federal spend and is expected to continue to increase (Clark, 2007).

The extent and amount of federal procurement spending demands that these procurement processes be well managed (Thai, 2004). However, recent Government Accountability Office (GAO) reports reflect that this is not the case. The GAO has listed contract management as a “high risk” area for the federal government since 1990 and continues to identify it as high risk (GAO, 2007a). Within the federal government, the procurement and contracting function has been elevated to an organizational core competency (Kelman, 2001) and is receiving extensive emphasis in the areas of education, training, and the development of workforce competence models (Newell, 2007; GAO, 2007b). In addition to a focus on increasing individual procurement competency, organizations are now focusing on increasing procurement process competence through the use of organizational process maturity models. Just as individual competence will lead to greater success in performing tasks, organizational process capability will ensure consistent and superior results for the enterprise (Frame, 1999; Kerzner, 2001).

RESEARCH SCOPE AND OBJECTIVES

This paper analyzes the results of procurement process capability assessments conducted in 2007 using the five-level Contract Management Maturity Model (CMMM). The CMMM is used to assess an organization’s procurement process capability and to develop a road-map for implementing procurement process improvement initiatives. Using the survey assessment tool, the CMMM was applied to the procurement organizations of two large Air Force logistics centers. The results of the procurement process assessments will be discussed and analyzed to provide a characterization of the state of practice in contract management processes and activities based on the CMMM. The objective of this research is to characterize the level of procurement process maturity for these two Air Force logistics centers. The assessment results and related recommendations for procurement process improvement and knowledge management opportunities will guide the logistics centers in developing a road-map for increasing contract

management process maturity. A thorough understanding of the current level of contract management maturity will help the Air Force improve its procurement of logistics support functions.

The background and context of procurement process maturity and, specifically, the Contract Management Maturity Model will first be presented. The assessment sites will then be profiled, followed by the analysis of the assessment findings and implications for process improvement and knowledge management opportunities. Finally, a brief discussion on consistent trends in the practice of contract management throughout the federal government will be presented.

CONCEPTUAL FRAMEWORK

A review of the procurement literature finds a body of knowledge focused on the transformation of the procurement function from a tactical to a strategic perspective. Beginning with Henderson's (1975) prediction of the purchasing revolution in 1964, to Kraljic's work emphasizing the need for a strategic supply management perspective (1983) and Reck and Long's research on developing the purchasing function to be a competitive weapon (1988), research shows the use of various organizational models for the development of the procurement function. These development models reflect the transition of procurement from a tactical to a strategic or integrative function.

Procurement Development Models

Reck and Long's (1988) model describes a four stage development of the procurement function from passive, to independent, to supportive, and finally integrative. Leender's and Blenkhorn (1988) model describes the three degrees of the procurement function's contribution to organizational objectives. Bhote's (1989) model reflects four stages of procurement development ranging from confrontation, arms length, goal congruence, and finally full partnership. Freeman and Cavinato (1990) present a four stage procurement development model described as buying, purchasing, procurement, and supply. Burt, Dobler, and Starling (2003) present a four stage progression to world-class supply management. This progression includes clerical, mechanical, proactive, and finally world-class.

It should be noted that these procurement development models are based on the development of the procurement *function*, specifically the

procurement function's orientation and support of organizational strategy and objectives. As noted by the literature works noted earlier, some organization's procurement function reflects more of a tactical purchasing perspective, while other organizations' procurement function reflects a more strategic perspective. The development models found in the literature reflect the stage of development of the organization's procurement function. These development models are not focused on the capability of the procurement *processes* or the strength and maturity of the procurement *processes* within the organization. An organization's procurement *function* can be in the early stages of development from tactical to strategic, yet its procurement *process* may reflect a high level of maturity. On the other hand, an organization's procurement *function* may be at the later stages of development toward strategic procurement, but may have weak or immature procurement *processes*. These procurement developmental models reflect the transformation of the organization's procurement function, whereas capability maturity models are used to assess an organization's processes to determine the degree of capability or maturity of those processes.

Process Capability

A review of the literature on process capability begins with the quality management research of Deming (1986), Juran (1988), and Crosby (1979). From this research, a greater emphasis was placed on continuous process improvement and increasing the capability of organizational processes. Process capability, in this sense, is defined as "the inherent ability of a process to produce planned results." As the capability of a process increases, it becomes predictable and measurable (Ahern, Clouse, & Turner, 2001). Deming, Juran, and Crosby revealed that, as process capability increases, the inherent ability of a process to produce planned results also increases, thus becoming more predictable and measurable. This increase in process capability results in the organization controlling or eliminating the most significant causes of poor quality and productivity. As organizations steadily improve their process capability, they increase their competence and thus become more mature (Ahern, et al., 2001). Competence, in this case, is defined as "an underlying characteristic that is causally related to effective or superior performance, as determined by measurable, objective criteria, in a job or in a situation" (Curtis, Hefley, & Miller, 2001). Maturity can be defined as a measure of effectiveness in any specific process (Dinsmore, 1998). It is important to note that process maturity is not related to the passage

of time. Different organizations mature at different rates, depending on the nature of the business and the emphasis placed on process improvement. Process maturity is more reflective of how far an organization has progressed toward continuously improving its process capability in any specific area. An organization's process capability maturity level describes the level of organizational capability created by the transformation of one or more domains of an organization's process. It is an evolutionary plateau on an organization's improvement path from ad hoc practices to a state of continuous improvement (Curtis, et al., 2001).

By the 1990s, it became clear that for organizations to remain competitive in this dynamic marketplace, they must operate competently and with capable, mature organizational processes. Organizational competence would lead to higher levels of maturity or learning capability (Yueng, Ulrich, Nason, & Von Glinow, 1999), thus enabling them to produce high-quality goods and services faster, cheaper, and better than their competitors. Even more important, was the concept that the degree of organizational competence and level of maturity could be described and assessed objectively according to some generally accepted evaluation criteria. Frame (1999) expands on this by describing the environment that supports organizational competence. Frame states that organizations demonstrate competence when they provide their employees clearly defined and well-formulated procedures for performing work, access to information needed to perform work effectively, sufficient quantities of qualified human and material resources, opportunities for training and education, clearly defined visions of where the organization is headed, a culture of openness, and the institutionalization and executive management support for achieving competence. Frame (1999) also discusses the common features for assessing organizational competence, including adopting performance standards, assessing what it will take to achieve these standards, developing an organizational plan to achieve these standards, implementing the plan, assessing the organization to see whether it is meeting these standards, and documenting the findings. The use of maturity models as a method for describing, measuring, and assessing organizational capability maturity began to take hold along with the movement toward total quality management.

Capability Maturity Models

Capability maturity models have been used by many organizations to assess the level of capability and maturity of their most critical processes. In these maturity models, process capability is defined as “the inherent ability of a process to produce planned results” (Ahern, Clouse & Turner, 2001), and maturity is defined as “a measure of effectiveness in any specific process” (Dinsmore, 1998). Some of the more better-known capability maturity models include the Software Engineering Institute (SEI) Capability Maturity Model (SEI CMM), People Capability Maturity Model (People CMM), and the Project Management Maturity Model (PMMM). Most maturity models are built on a series of maturity levels--each maturity level reflective of the level of competence for that process. As the organization gains process competence, it moves up the maturity scale. As maturity increases, so does capability and predictability, while risk decreases.

In 1986, the Software Engineering Institute (SEI), with assistance from the MITRE Corporation, began developing a process maturity framework intended to assist organizations in improving their software engineering process. The fully developed Capability Maturity Model (CMM) and associated questionnaire was released in 1993 (Ahern, et al., 2001). The SEI CMM has become the most influential quality management system in the United States software industry (Persse, 2001). The CMM is based on five maturity levels--Level 1- Initial, Level 2 - Repeatable, Level 3 - Defined, Level 4 - Managed, and Level 5 - Optimizing (Persse, 2001; Ahern, et al., 2001).

In 1995, the People Capability Maturity Model (People CMM) was first published as a continuous process improvement guide for developing the capability of an organization’s workforce. The model focuses on improving the process capability for attracting, developing, organizing, motivating, and retaining an organization’s workforce. The People CMM has been successfully implemented in companies such as Boeing, Lockheed Martin, Ericsson, Novo Nordisk IT A/S, and Tata Consulting Services. The People CMM is structured similarly to the other capability maturity models currently in the software management and project management fields. The People CMM consists of five maturity levels and is focused on specific workforce management and development processes and sub-processes. The People CMM also uses a

questionnaire-based maturity assessment as an optional method for conducting people capability maturity assessments.

The application of capability maturity models to the project management field has been the topic of recent field research within academia as well as project management training and consulting companies (Bolles, 2002; Crawford, 2001; Foti, 2002, Kerzner, 2001; Ibbs & Kwak, 2000; Jugdev & Thomas, 2002; Helms, 2002). This recent field research extends the theory of the Software Engineering Institute's CMM model and applies this framework to the project management discipline. There are several project management maturity models currently in use today. Kerzner's Project Management Maturity Model (PMMM), similar to the SEI CMM as well as the other project management maturity models, is comprised of five levels, with each level representing a different degree of organizational maturity in project management. The PMMM is based on five maturity levels--Level 1- Common Language, Level 2 - Common Processes, Level 3 - Singular Methodology, Level 4 - Benchmarking, and Level 5 - Continuous Improvement (Kerzner, 2001).

The SEI CMM, People CMM, and Kerzner maturity models are excellent examples of how the concept of capability maturity models have been applied to the software management, workforce management, and project management processes. The purpose of this abbreviated literature review was to show that maturity models are effective methods for assessing and improving organizational competence and maturity. The next section will discuss the application of the maturity model concept to contract management.

Contract Management Maturity Model

The maturity model concept was first applied to contract management by Rendon (2003). With the increase in importance of the procurement function, the procurement function's transformation from a tactical to strategic perspective as reflected in the procurement literature, the Contract Management Maturity Model (CMMM) was developed to assess the capability and maturity of an organization's contract management processes (Rendon, 2003). "Contract management," as used in the model, is defined as the "art and science of managing a contractual agreement throughout the contracting process" (Garrett & Rendon, 2005, p. 270). "Maturity," as defined in the model, refers to organizational capabilities that can consistently produce successful business results for

buyers and sellers of products, services, and integrated solutions (Garrett & Rendon, 2005). Thus, contract management refers to the buyer's (procurement) process as well as the seller's (business development and sales) process. The CMMM assessments analyzed in this paper focused only on the buyer's procurement process. The structure of the CMMM is based on six contract management key process areas and five levels of process maturity.

Six Contract Management Key Process Areas

The CMMM provides the organization with a detailed roadmap for improving the capability of its contract management processes. The model reflects the six contract management key process areas as well as key practice activities within each process area. These contract management key process areas are described below.

1. **Procurement Planning:** The process of identifying which organizational needs can be best met by procuring products or services outside the organization. This process involves determining whether to procure, how to procure, what to procure, how much to procure, and when to procure. Procurement planning activities include conducting stakeholder analysis, conducting outsourcing analysis, determining requirements and developing related documents, conducting market research, selecting the procurement method, and selecting the contract and incentive type.
2. **Solicitation Planning:** The process of preparing the documents needed to support the solicitation. This process involves documenting program requirements and identifying potential sources. Solicitation planning activities include developing solicitation documents such as RFPs (Request for Proposal) or IFBs (Invitation for Bid), developing contract terms and conditions, and developing proposal evaluation criteria.
3. **Solicitation:** The process of obtaining information (bids or proposals) from prospective sellers on how project needs can be met. Solicitation activities include advertising procurement opportunities, conducting industry and pre-proposal conferences, and amending solicitation documents as required.
4. **Source Selection:** The process of receiving bids or proposals and applying evaluation criteria to select a provider. Source selection

activities include evaluating proposals, negotiating contract terms and conditions, and selecting the contractor.

5. **Contract Administration:** The process of ensuring that each party's performance meets contractual requirements. Contract administration activities include conducting a post-award conference, monitoring the contractor's performance, and managing contract changes.
6. **Contract Closeout:** The process of verifying that all administrative matters are concluded on a contract that is otherwise physically complete. This involves completing and settling the contract, including resolving any open items. Contract closeout activities include verifying and documenting contract completion and compliance with requirements, making final payment, disposing of buyer-furnished property and equipment, documenting lessons learned and best practices, and collecting contractor past performance information.

Each of these contract management key process areas includes various key practice activities supporting the specific process. The current state of practice of contract management includes various best practices in performing these key practice activities. How an organization performs the key process areas and the extent to which the key practices incorporate best practices will determine the organization's contract management process maturity level.

Five Levels of Contract Management Process Maturity

The CMMM consists of five levels of maturity applied to the six key process areas previously discussed. The five maturity levels reflected in the model allow an organization to assess their level of capability for each of the six key process areas of the procurement process. The six key process areas and related practice activities allow the organization to focus on specific areas and activities involved in procurement.

The five levels of maturity range from an "ad hoc" level (Level 1), to a "basic," disciplined process capability (Level 2), to a fully "structured," established, and institutionalized process capability (Level 3), to a level characterized by processes "integrated" with other organizational processes resulting in synergistic enterprise-wide benefits (Level 4), and finally, to a level in which "optimized" processes focused on continuous

improvement and adoption of lessons learned and best practices (Level 5). The following is a brief description of each maturity level.

Level 1 - Ad Hoc: The organization at this initial level of process maturity acknowledges that contract management processes exist and that these processes are accepted and practiced throughout various industries and within the public and private sectors. In addition, the organization's management understands the benefit and value of using contract management processes. Although there are no organization-wide established basic contract management processes, some established contract management processes do exist and are used within the organization, but these established processes are applied only on an ad hoc and sporadic basis to various contracts. There is no rhyme or reason as to which contracts these processes are applied. Furthermore, there is informal documentation of contract management processes existing within the organization, but this documentation is used only on an ad hoc and sporadic basis on various contracts. Finally, organizational managers and contract management personnel are not held accountable for adhering to, or complying with, any basic contract management processes or standards.

Level 2 – Basic: Organizations at this level of maturity have established some basic contract management processes and standards within the organization, but these processes are required only on selected complex, critical, or high-visibility contracts, such as contracts meeting certain dollar thresholds or contracts with certain customers. Some formal documentation has been developed for these established contract management processes and standards. Furthermore, the organization does not consider these contract management processes or standards established or institutionalized throughout the entire organization. Finally, at this maturity level, there is no organizational policy requiring the consistent use of these contract management processes and standards on other than the required contracts.

Level 3 – Structured: At this level of maturity, contract management processes and standards are fully established, institutionalized, and mandated throughout the entire organization. Formal documentation has been developed for these contract management processes and standards, and some processes may even be automated. Furthermore, since these contract management processes are mandated, the organization allows the tailoring of processes and documents in consideration for the unique

aspects of each contract, such as contracting strategy, contract type, terms and conditions, dollar value, and type of requirement (product or service). Finally, senior organizational management is involved in providing guidance, direction, and even approval of key contracting strategy, decisions, related contract terms and conditions, and contract management documents.

Level 4 – Integrated: Organizations at this level of maturity have contract management processes which are fully integrated with other organizational core processes such as financial management, schedule management, performance management, and systems engineering. In addition to representatives from other organizational functional offices, the contract's end-user customer is also an integral member of the buying or selling contracts team. Finally, the organization's management periodically uses metrics to measure various aspects of the contract management process and to make contracts-related decisions.

Level 5 – Optimized: The fifth and highest level of maturity reflects an organization whose management systematically uses performance metrics to measure the quality and evaluate the efficiency and effectiveness of the contract management processes. At this level, continuous process improvement efforts are also implemented to improve the contract management processes. Furthermore, the organization has established Lessons Learned and Best Practices programs to improve contract management processes, standards, and documentation. Finally, contract management process streamlining initiatives are implemented by the organization as part of its continuous process improvement program.

It should be noted that the CMMM assessments do not constitute a quantitative analysis nor does it provide any determination of statistical significance in the assessment results. The CMMM uses a purposeful survey designed to acquire data on organizational contract management processes. The CMMM survey is only administered to fully qualified Contracting Officers and supervisors, as opposed to lower level and inexperienced contract specialists. The assessment results are used to provide a qualitative assessment of organizational contract management process maturity and not an assessment of an individual's knowledge of contract management. Additional information on the CMMM key process areas, key process activities, and maturity levels are provided in Garrett and Rendon (2005).

The CMMM is limited as an assessment tool simply by the fact that it is based on qualitative survey data. Thus, it is only as effective as the responses to the survey questions. The CMMM should be used as an initial tool in assessing an organization's contract management processes. The CMMM results should be validated with follow-up assessments including personal interviews based on the initial CMMM assessment results, audits of procurement files, and reviews of procurement process documentation. Additionally, comparison of CMMM results with other procurement metrics such as procurement administrative lead time, small business awards, and number of protested contract awards will also provide additional back-up to the CMMM assessment.

The next section of this paper will provide a brief profile of the two procurement organizations that were assessed using the CMMM.

ASSESSMENT ORGANIZATION PROFILES

In 2007, a team of graduate students at the U.S. Naval Postgraduate School conducted an assessment of the procurement processes at two major Air Force logistics organizations using the CMMM. The two procurement organizations are described below.

Oklahoma City Air Logistics Center

Oklahoma City Air Logistics Center (OC-ALC) provides contracting support for the logistics and sustainment of over 2,261 aircraft such as the B-1, B-52 bombers, E-3, E-6 airborne surveillance command, control and communications aircraft, as well as the KC-135 and KC-10 air refueling tankers. OC-ALC also provides contracting support for the logistics and sustainment of almost 23,000 jet engines and air-launched missile systems. In terms of contracting support for the aircraft, jet engines, and missile systems, the OC-ALC annually executes approximately 17,000 contacts valued in excess of 5 billion dollars (Nordin & Burton, 2007; U.S. Air Force, 2007).

Ogden Air Logistics Center

Ogden Air Logistics Center (OO-ALC) provides contracting support for the logistics and sustainment of the A-10 attack aircraft, B-2 bomber, C-130 cargo aircraft, and the F-16 and F-22 fighter aircraft. OO-ALC also provides contracting support for the logistics and sustainment of the

Air Force's intercontinental ballistic (ICBM) missile fleet. In terms of contracting support for the aircraft and intercontinental ballistic missile systems, the OO-ALC annually executes approximately 13,000 contacts valued at almost 3 billion dollars (Sheehan, Moats, & VanAssche, 2007; U.S. Air Force, 2007).

Although these two Air Logistics Centers support different types of aircraft, missiles, and related commodities, the procurement processes used are very similar. In fact, the procurement processes used at these two agencies are very similar to other Air Force, DoD, and federal government procurement processes for major systems and components. The conclusions based on the analysis of the results from these procurement process assessments can be applied to other government procurement organizations. The next section of this paper will summarize the findings of the procurement process assessments at these two organizations.

SUMMARY OF ASSESSMENT RATINGS

The Contract Management Maturity Model (CMMM) was applied to the Oklahoma City Air Logistics Center (OC-ALC) and the Ogden Air Logistics Center (OO-ALC). Each of these Air Logistics Centers consists of various aircraft program offices, commodity program offices, and the procurement staff supporting each of those program offices. The OC-ALC procurement process assessment included six different procurement organizations (identified as organizations A through F), and the OO-ALC procurement process assessment included four procurement organizations (identified as organizations G through J). Each procurement organization is responsible for providing procurement support for a specific aircraft, missile, or related equipment/component. A top-level summary of those assessment results are provided in Figures 1 and 2. More detailed information on the specific results and analyses of each of these procurement process assessments are found in Nordin & Burton, 2007 and Sheehan, Moats, & VanAssche, 2007. The following is a brief top-level summary of the CMMM assessment at the two Centers.

The Oklahoma City Air Logistics Center (OC-ALC) assessment included six separate procurement organizations. As illustrated in Figure 1, the majority of the organizations had procurement processes rated at the Structured (Level 3) level of maturity. Specifically, 5 of the 6

organizations (B, C, D, E, and F) were rated as Structured (Level 3) for the Solicitation Planning, Solicitation, and Source Selection key process areas. In addition, 2 of the 6 organizations (B and E) were rated at the Basic (Level 2) or Ad-Hoc (Level 1) levels of maturity for the Contract Administration and Contract Closeout key process areas. Other notable assessment ratings reflect one organization (A) being rated Integrated (Level 4) for the Procurement Planning, Solicitation Planning, Solicitation, and Source Selection key process areas (Nordin & Burton, 2007) (Figure 1).

The Ogden Air Logistics Center (OO-ALC) assessment included four separate procurement organizations. As illustrated in Figure 2, the majority of the organizations had procurement processes rated at the Structured level (Level 3) of maturity. Specifically, 3 of the 4 organizations (G, H, and J) were rated as Structured (Level 3) for the

FIGURE 1
OC-ALC Procurement Process Assessment Results

CONTRACT MANAGEMENT MATURITY MODEL						
MATURITY LEVELS	CONTRACT MANAGEMENT KEY PROCESS AREAS					
	Procurement Planning	Solicitation Planning	Solicitation	Source Selection	Contract Admin	Contract Closeout
5 OPTIMIZED						
4 INTEGRATED	A	A	A	A		
3 STRUCTURED	D B E	D B E C F	D B E C F	D B E C F	A D C F	D F
2 BASIC	C F				E	A E C
1 AD-HOC					B	B

Source: Adapted from Nordin and Burton (2007).

Procurement Planning, Solicitation Planning, Source Selection, Contract Administration, and Contract Closeout key process areas. In addition, 1 of the 4 organizations (I) was rated at the Basic (Level 2) or Ad-Hoc (Level 1) levels of maturity for the Solicitation Planning, Solicitation, Source Selection, Contract Administration, and Contract Closeout key process areas (Sheehan, Moats, & VanAssche, 2007).

FIGURE 2
OO-ALC Procurement Process Assessment Results

CONTRACT MANAGEMENT MATURITY MODEL						
MATURITY LEVELS	CONTRACT MANAGEMENT KEY PROCESS AREAS					
	Procurement Planning	Solicitation Planning	Solicitation	Source Selection	Contract Admin	Contract Closeout
5 OPTIMIZED						
4 INTEGRATED						
3 STRUCTURED	G, J, H, I	G, J, H	G, H	G, J, H	G, J, H	G, J, H
2 BASIC		I	J, I	I	I	
1 AD-HOC						I

Source: Adapted from Sheehan, Moats, and VanAssche (2007).

**FIGURE 3
Combined Procurement Process Assessment Results
(Combined Assessment Results)**

CONTRACT MANAGEMENT MATURITY MODEL						
MATURITY LEVELS	CONTRACT MANAGEMENT KEY PROCESS AREAS					
	Procurement Planning	Solicitation Planning	Solicitation	Source Selection	Contract Admin	Contract Closeout
5 OPTIMIZED						
4 INTEGRATED	A	A	A	A		
3 STRUCTURED	D H B E I G J	D G B E H C F J	D B E G C F H J	D G B E H C F J	A D G H C F J	D G H F J
2 BASIC	C F	I	I J	I	E I	A E C
1 AD-HOC					B	B I

ANALYSIS OF ASSESSMENT FINDINGS

When the Oklahoma City and Ogden procurement process assessment results are combined, some basic trends can be seen in terms of consistency of maturity ratings for specific procurement process key process areas. The purpose of this analysis is to discuss the implications these trends and consistencies have in terms of procurement process capabilities within the Air Force logistics community, as well as overall Air Force and DoD contract management process capability. The implications of these assessment results will be discussed in the areas of contract management maturity levels, process improvement opportunities, knowledge management opportunities, and overall federal government contract management trends.

Contract Management Process Maturity

As reflected in Figure 3, the majority of the organizations are rated at the Structured (Level 3) level of maturity for the Procurement Planning, Solicitation Planning, Solicitation, Source Selection, and Contract Administration key process areas. This means that for these organizations, these key process areas are fully established, institutionalized, and mandated throughout the entire organization. The organizations have formal documentation developed for these contract management processes and standards, and some processes may even be automated. Furthermore, the organizations allow the tailoring of procurement processes and documents in consideration for the unique aspects of each contract, such as contracting strategy, contract type, terms and conditions, dollar value, and type of requirement (product or service). Finally, within these organizations, senior management is involved in providing guidance, direction, and even approval of key contracting strategy, decisions, related contract terms and conditions, and contract management documents.

As also reflected in Figure 3, approximately half of the organizations are rated at the Basic (Level 2) or Ad Hoc (Level 1) levels of maturity for the Contract Closeout key process area. This means that for these organizations, the Contract Closeout process activities are applied only on an ad hoc basis or only on selected contracts. Based on the assessment results, this key process area is not established or institutionalized throughout these organizations nor is there any organizational policy requiring the consistent use of this process and related activities on other than the selected contracts. In addition, within these organizations, there are no established policymaking contract management personnel accountable for adhering to, or complying with, contract close-out policies and standards.

Process Improvement Opportunities

The true value of the CMMM is the continuous process improvement of the organization's contract management processes. The assessment results can be analyzed to develop a road-map for implementing contract management process improvement (Garrett & Rendon, 2005).

Based on these assessment results, the OC-ALC and OO-ALC should focus on increasing the process maturity of the Procurement Planning, Solicitation Planning, Solicitation, Source Selection, and Contract Administration key process areas. To reach the Integrated

maturity level, specific training and guidance should be provided on fully integrating these procurement key activities (such as determining requirements, conducting market research, developing contract terms and conditions, conducting pre-proposal conferences, negotiating contract terms and conditions, selecting the contractor, conducting a post-award conference, monitoring the contractor's performance, and managing contract changes) with other organizational core processes such as financial management, program management, and systems engineering. The ALCs should also ensure that representatives from other organizational functional offices, as well as the contract's end-user customer, are integral members of the contracting team. Increasing the maturity level of these procurement key process areas will also require the use of metrics to measure various aspects of the procurement process and to make procurement processes improvement decisions.

Also, based on these assessment results, the OC-ALC and OO-ALC should focus on increasing the process maturity of the Contract Closeout key process area. To reach the Structured maturity level, specific training and guidance should be provided on fully establishing, institutionalizing, and mandating Contract Closeout processes and activities (such as verifying contract completion and compliance, making final payment, disposing of buyer-furnished property and equipment, documenting lessons learned and best practices, and collecting contractor past performance information) throughout the entire organization. The ALCs should also develop formal documentation for conducting these Contract Closeout activities. Finally, for these organizations, senior organizational management should be involved in providing guidance, direction, and even approval of key Contract Closeout strategy, decisions, related contract terms and conditions, and documents.

Knowledge Management Opportunities

The CMMM assessment results can also be used to identify any knowledge gaps or knowledge deficiencies within and between procurement organizations (Garrett & Rendon, 2005). Another finding that is evident from the combined assessment results relates to the potential for knowledge management opportunities within and between each ALC. Figure 1 shows that some OC-ALC procurement organization's process maturity levels were rated at Level 4, while others were rated at the lower levels for the same procurement processes. We see this in the case of organizations A (Level 4), B, D, E (Level 3), C and

F (Level 2) for the Procurement Planning process. This is also apparent for organizations D and F (Level 3), E (Level 2), and B (Level 1) for the Contract Administration and Contract Closeout processes (Nordin & Burton, 2007). Figure 2 reflects the same situation with organizations G, H, J (Level 3) and organizations I (Level 2) for Solicitation Planning, Solicitation, Source Selection, Contract Administration, and Contract Close-out processes (Sheehan, Moats, & VanAssche, 2007). Within both of these ALCs, there exist valuable opportunities to develop knowledge sharing and knowledge transferring initiatives related to the performance of the related procurement process activities. The organizations with higher process maturity should be sharing techniques, best practices, lessons learned, and other valuable tacit knowledge information on performing the key practice activities to the organizations with the lower process maturity levels.

These knowledge management initiatives should also be applied between Air Logistics Centers. Since the procurement processes are similar between OC-ALC and OO-ALC, there are definitely knowledge sharing and knowledge transfer opportunities between these two organizations and possibly other logistics support organizations within the Air Force as well as throughout DOD.

Trends in Federal Contract Management

The analysis of the CMMM assessment results at both of the ALCs also provides some insight on consistent trends throughout the DoD. Based on these two assessments and reflected in Figure 3, it can be determined that the Contract Administration and Contract Closeout key knowledge areas may be more deficient in terms of process capability and maturity. It is interesting to note that recent reports by the Government Accountability Office (GAO) have identified the same areas as problematic throughout DoD and the federal government. These reports have identified problems related to ensuring proper management, oversight, and surveillance of awarded contracts (GAO, 2005; GAO, 2006a; GAO, 2007c), as well as management of contractor performance information (GAO, 2007d). The DoD Inspector General (IG) has also identified that “organizations are deficient in contract administration, including the surveillance of contract performance, assignment of contracting officer representatives, preparation of quality assurance surveillance plans, and collection and recording of contractor past performance” (DOD IG, 2007, p. i).

Another interesting insight from the combined CMMM assessment results is the low number of organizations rated at the integrated level of process maturity. The key to achieving Level 4 Integrated is having contract management processes that are fully integrated with other organizational core processes such as financial management, schedule management, performance management, and systems engineering. In addition to representatives from other organizational functional offices and stakeholders, the contract's end-user customer is also an integral member of the procurement organization (Garrett & Rendon, 2005). Within the DoD, integration in defense procurement projects is implemented using cross-functional teams called Integrated Product Teams (IPTs). IPTs are used to maintain continuous and effective communication and collaboration among program management, procurement, financial management, and end-users (DoD, 2003). Recent GAO reports have identified that IPTs were not operating effectively, and IPT decision-making processes were sequential and involved numerous external consultations for approval (GAO, 2001). The CMMM assessment results at these two ALCs seem to reflect the ineffectiveness of the ALC's IPTs.

The knowledge management opportunities identified in the CMMM assessment results within and between the two ALC are similar to other CMMM assessments conducted at other major contracting agencies (Garrett & Rendon, 2005). The opportunity for knowledge sharing and knowledge transferring has been identified as the number one goal for the Department of Defense Acquisition, Technology, and Logistics (AT&L) Human Capital Strategic Plan (HCSP). The overarching purpose of the goal is to promote DoD-wide sharing of workforce best practices by the military department (DoD, 2007). It is also interesting to note that recent GAO reports have identified the need for improved training management of the contracting workforce and for creating a culture for knowledge sharing in improving federal acquisition as an opportunity in federal contract management (GAO, 2002; GAO, 2006b). These opportunities for knowledge management initiatives in contract management will only increase in importance as the government contracting workforce continues to retire and is replaced with more junior and less experienced contracting professionals.

CONCLUSION

This paper analyzed the results of procurement process capability assessments conducted in 2007 at two Air Force logistics centers using the five-level Contract Management Maturity Model (CMMM). The results of the procurement process assessments revealed that the majority of the organizations are rated at the Structured (Level 3) level of maturity for the Procurement Planning, Solicitation Planning, Solicitation, Source Selection, and Contract Administration key process areas. Additionally, approximately half of the organizations are rated at the Basic (Level 2) or Ad Hoc (Level 1) level of maturity for the Contract Closeout key process area. An analysis of these procurement assessment results identified opportunities for improving the procurement process, increasing procurement process maturity, and implementing knowledge management initiatives. An area for further research in these specific assessments would include identifying any relationships between the CMMM assessment results and other procurement performance metrics such as procurement administrative lead time (PALT), number of letter contracts awarded, number of sole source contracts awarded, number of contracts completed on time and on schedule, and number of sustained protests. Further analysis of these procurement performance metrics may provide additional validation and granularity of the CMMM assessment results and also identify additional procurement process improvement opportunities.

The analysis of the results of the procurement process assessments also identified trends and consistencies in DoD and federal government contract management. These include problems areas within the contract administration and contract closeout process areas, procurement process integration and teaming issues, and contract management knowledge sharing and training issues.

As the body of knowledge on procurement and contract management process maturity assessments continues to emerge, the use of maturity models will continue to gain wider acceptance in the contract management field as a tool for assessing organizational contract management process maturity and for providing a road-map for implementing contract management process improvement initiatives.

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