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**Services Supply Chain in the Department of Defense: Drivers
of Acquisition Management Practices in the Army**

13 February 2012

by

**Dr. Aruna Apte, Assistant Professor,
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Abstract

In this research, we reviewed contract files and interviewed subject matter experts to collect and analyze data regarding the Army's contract and management practices in the acquisition of services. We examined 154 contracts for four specific service types at eight U.S. Army Mission and Installation Contracting Command (MICC) organizations. The goal was to answer three research questions: (1) do the contract characteristics differ for different types of services, (2) do the types of services being acquired affect the management practices being used, and (3) does the capacity for carrying out acquisition-related work affect the management practices being used. The evaluation of the six contract characteristics revealed that a relationship does exist between service type and three of the contract characteristics—contract cost, number of modifications, and contract award strategies. The evaluation of the 13 management practices showed that there exists a relationship between service type and five of the management practices—the use of independent government estimates (IGE), the number of personnel assigned to a contract, the officer serving as the acquisition lead, the use of a quality assurance surveillance plan (QASP), and the use of an IGE for contracts valued over the simplified acquisition threshold. Our research findings also suggest that a relationship does exist between capacity and management practices and that further research is needed to confirm this relationship. Based on the findings of our research, we make several specific recommendations to the U.S. Army Mission and Installation Contracting Command for improving the efficiency and effectiveness in the acquisition of these four specific service types.

Keywords: Service Supply Chain, Services Acquisition, Service Life Cycle, Contract Management, Project Management, Program Management



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I. Introduction

Services acquisition in the U.S. Department of Defense (DoD) has continued to increase in scope and dollars in the past decade. Even considering the high value of weapon systems and large military items purchased in recent years, the DoD has spent more on services than on supplies, equipment, and goods combined. For example, the DoD's obligations on contracts more than doubled between fiscal years 2001 and 2008 to over \$387 billion, with over \$200 billion spent just for services (Government Accountability Office [GAO], 2009c). Specifically, as seen in Figure 1, the Army's procurement of services grew at a staggering rate of 13% per year between 2002 and 2010. The acquired services presently cover a very broad set of service activities.

As the DoD's services acquisition continues to increase in scope and dollars, the agency must give greater attention to proper acquisition planning, adequate requirements definition, sufficient price evaluation, and proper contractor oversight (General Accounting Office [GAO], 2002a). As stressed in a recent memorandum to acquisition professionals by the Under Secretary of Defense (USD[AT&L]; Carter, 2010), improving the efficiency of the acquisition of products and services is of utmost importance to the DoD. In many ways, the issues affecting services acquisition are similar to those affecting the acquisition of supplies and weapon systems. However, the unique characteristics of services and the increasing importance of services acquisition offer a significant opportunity for conducting research in and improving the effectiveness and efficiency of the management of services acquisition in the Department of Defense.



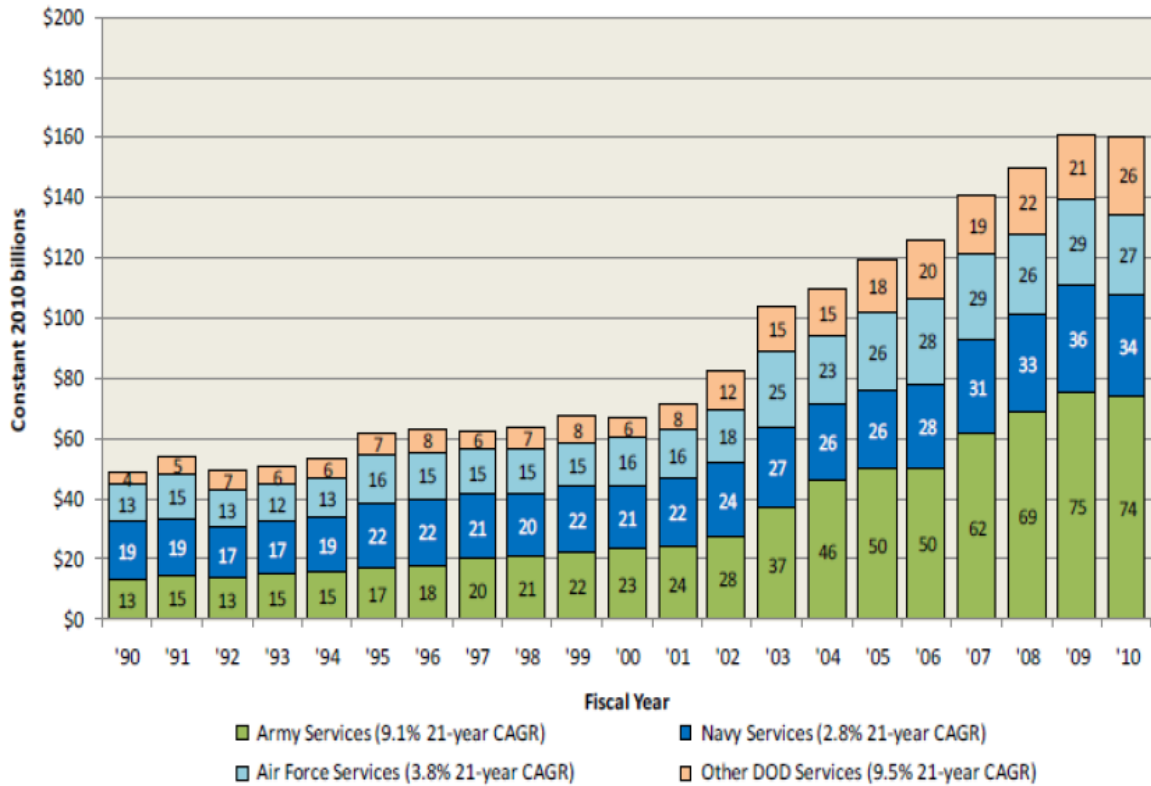


Figure 1. DoD Contract Spending on Services by Component, 1990–2010
 (Ellman, Livergood, Morrow, and Sanders, 2011, p. 11)



II. Background

We have addressed the need for research in this increasingly important area of services acquisition by undertaking a series of sponsored research projects over the past several years. The first two research projects, conducted in 2006 and 2007 (Apte, Ferrer, Lewis, & Rendon, 2006; Apte & Rendon, 2007), were exploratory in nature, and aimed at understanding the types of services being acquired, the associated rates of growth in services acquisition, and the major challenges and opportunities present in the services supply chain .

The next two research projects, conducted in 2008 and 2009 (Apte, Apte, & Rendon, 2008, 2009), were survey-based empirical studies aimed at developing a high-level understanding of how services acquisition is currently being managed at a wide range of Army, Navy, and Air Force installations. The survey questions were targeted at three broad areas: contract characteristics (degree of competition, contract types, and use of incentives), acquisition management methods (regional versus installation-level acquisition, use of project management, project leadership), and other program management issues (the use of a life cycle approach, adequacy of staffing levels, length of assignments, and level of training). The analysis of the survey data indicated that the current state of services acquisition management suffers from several deficiencies, including deficit billet and manning levels (which are further aggravated by insufficient training and the inexperience of acquisition personnel), and the lack of strong project–team and life cycle approaches.

Finally, the 2010 research project (Apte, Apte, & Rendon, 2010) analyzed and compared the results of the primary data collected in two previous empirical studies, involving Army, Navy, and Air Force contracting organizations, so as to develop a more thorough and comprehensive understanding of how services acquisition is being managed within individual military services. The conclusions of this research project indicated that contracts for the analyzed services are predominantly competitively bid, fixed-price contracts. In addition, services acquisition for the Navy



is predominantly managed at the regional level, whereas the Army and Air Force manage services acquisition at the installation level. Our research also indicated that the Army and Air Force predominantly use a project–team approach in managing services acquisition and that the Procurement Contracting Officer (PCO) predominantly leads the project team (Army and Air Force) or the services acquisition effort (Navy). We also found that the PCO owns the services requirement (less frequently, but significantly) for the Army and Navy, and the PCO provides contractor surveillance approximately half of the time for the Navy. Finally, we concluded that project life cycles are not consistently used in services acquisition in any of the military departments.

As a result of the research projects undertaken thus far on the Services Supply Chain in the DoD we have developed a comprehensive, high-level understanding of services acquisition in the DoD, have identified several specific deficiencies, and have proposed a number of concrete recommendations for performance improvement. This understanding has served as a foundation for carrying out the in-depth study of services acquisition described in this report.



III. Literature Review

The academic research in contracting practices is founded on several economic and management theories including agency theory (Eisenhardt, 1989), transaction cost economics (Williamson, 1979), contractual theory (Luo, 2002), and service operations and supply management (Fitzsimmons & Fitzsimmons, 2006). A discussion of the management of defense acquisition projects is found in Rendon and Snider (2008).

A contract between the government and a contractor reflects a principal-agent relationship. The principal (government) contracts with the agent (contractor) to perform a level of effort, such as manufacturing a product or providing a service. In this relationship, the government's objectives include obtaining the product or service at the right quality, right quantity, right source, right time, and right price (Lee & Dobler, 1971). The federal government also has the additional objective of ensuring that the product or service is procured in accordance with public policy and statutory requirements (FAR, 2011). Contractors, on the other hand, pursue the objectives of earning profit, insuring company growth, maintaining or increasing market share, and improving cash flow, just to name a few. The principal-agent problem is concerned with the conflicting goals between the principal and agent in obtaining their respective objectives and is focused on mechanisms related to obtaining information (for example, about the marketplace, the supply or service, or the contractor), selecting the agent (to counter the problem of adverse selection), and monitoring the agent's performance (to counter the effects of moral hazard). Thus, how contracts are planned (for example, competitive or sole source), structured (fixed price or cost reimbursement, with or without incentives), awarded (based on the lowest price technically acceptable offer, or the highest technically rated offer), and administered (centralized or decentralized, level and type of surveillance, use of project teams, etc.), has its basis in agency theory and the principal-agent problem (Rendon, 2011).



Between 2001 and 2009, the Government Accountability Office (GAO) issued 16 reports related to trends, challenges, and deficiencies in defense contracting. Between 2002 and 2008, the DoD Inspector General (DoD IG) issued 142 reports on deficiencies in the DoD acquisition and contract administration processes. These reports have identified poor contract planning, contract administration, and contractor oversight as just some of the critically deficient areas in DoD contract management. Because of these deficiencies, the GAO has identified contract management as a “high risk” area for the federal government since 1990 and continues to identify it as high risk (GAO, 2007b, 2009a).

Based on the foundation of the above-mentioned management theories, conclusions of the GAO and DoD Inspector General’s reports, and findings of our own previous research projects on the topic, we believe that the performance of services acquisition contracts is significantly influenced by four broadly defined factors: (1) the type and quantity of services being outsourced and the associated acquisition-related workload; (2) the characteristics of contracts being awarded; (3) the capacity available to carry out the contracting, project management, and surveillance work; and (4) various management practices, such as use of project team or life cycle approaches, and so forth. A conceptual framework indicating the interrelationship between these factors is shown in Figure 2.



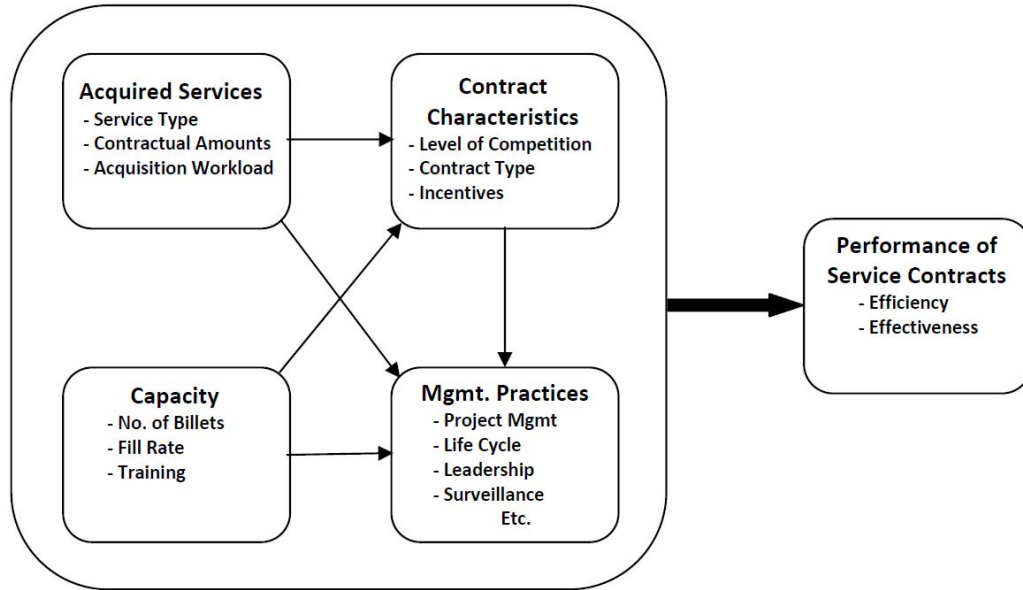


Figure 2. Drivers of Acquisition Practices and Performance

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IV. Research Methodology and the Empirical Study

As shown in Figure 2, contract characteristics are affected by the type of service being acquired, while the management practices being used are influenced by the services being acquired, the contract characteristics, and, more importantly, the capacity available to perform the acquisition work. As indicated in Figure 2, the primary question driving our research is “what drives the performance of services contracts?” Our approach in answering this primary question is to break down the overall services acquisition system into smaller parts, gain understanding of the functioning of each part, and then put all the pieces together to better understand the overall system and answer the primary question. Hence, this research project focuses mainly on understanding the drivers of management practices (i.e., the factors that promote or obstruct the use of best practices in acquisition management), which in itself is a worthy and non-trivial goal. The results of this research will then be highly useful in our follow-on research wherein we will return to answering the primary question of “what drives the performance of services contracts?”

The objective of this research project is to build on the understanding developed in prior research projects by undertaking a focused, in-depth study of services acquisition in the Army so as to understand the drivers of acquisition management practices (i.e., the factors that promote or obstruct the use of best practices in acquisition management). Hence, this research focuses on answering three specific research questions:

- Do the contract characteristics differ for different types of services?
- Do the types of services being acquired affect the management practices being used?
- Does the capacity for carrying out acquisition-related work affect the management practices being used?



Our research methodology included conducting contract file reviews to capture specific contract data, and conducting interviews with subject-matter experts to gather information on management practices. The contract file reviews were documented using a data collection form that was specifically developed for this research, and pilot tested and used in earlier empirical studies (McFall & La, 2011; Ramos & Nabors, 2011). The contract file reviews and subject-matter expert (SME) interviews were conducted in 2011 at eight U.S. Army Mission and Installation Contracting Command (MICC) contracting organizations. A total of 154 contracts were reviewed at these eight MICC contracting organizations. The research was focused on the following four product service codes (PSCs):

- R (Professional, Administrative, and Management Support Services)
- J (Maintenance, Repair, and Rebuilding of Equipment Services)
- S (Utilities and Housekeeping Services)
- D (Automatic Data Processing and Telecommunications Services)

These service types are common throughout the DoD and the U.S. Army, and accounted for over 60% of Army services procurement dollars in fiscal year (FY) 2009 (McFall & La, 2011).

The contract file reviews and SME interviews were focused on the following contract characteristics and management practices:

- *Contract Characteristics:* Level of Competition; Contract Type; Award/Incentive Fee; Contract Cost; Number of Modifications; Award Basis
- *Management Practices:* Use of Independent Government Estimate (IGE); Number of Personnel Assigned; Use of a Team Approach; Acquisition Leadership; Contract Award Time; Acquisition Plan; PWS/SOW; Price Analysis; Price Negotiation Memorandum; Quality Assurance Plan; Closeout Letter

In answering the research questions, we used descriptive and inferential statistics to analyze the data on service type, contract characteristics, and



management practices. We explored the relationship between service type and contract characteristics, and between service type and management practices, using the chi-square test of independence. We tested our null hypothesis that there is no significant statistical dependence between service type and contract characteristics, or between service type and management practices.



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V. The Empirical Study: Data, Analysis, and Results

In this section, we present the results of our survey and its analysis. As discussed earlier, the survey was conducted at eight MICC offices to collect data on four service types for 154 contracts. This data was analyzed to answer the three research questions identified earlier.

We used the statistical technique of chi-square hypothesis testing to answer the first two questions (i.e., to determine whether or not there exists a relationship between the service type and specific contract characteristics, and between the service type and specific management practices). We present the data and discuss our analysis and results in the following three subsections to answer three research questions respectively.

A. Service Type and Contract Characteristics

The focus of our first research question was to determine whether a relationship exists between service type and contract characteristics. As illustrated in Figure 3, we collected and analyzed service type's relationship with six specific contract characteristics: (1) level of competition used, (2) contract type, (3) award/incentive fee, (4) contract cost in dollar value, (5) number of modifications, and (6) award basis. The results of the chi-square test are presented in Table 1, while a summary of the survey data is presented in Table 2. After presenting these results, we discuss the details of the relationship between service type and each contract characteristic.



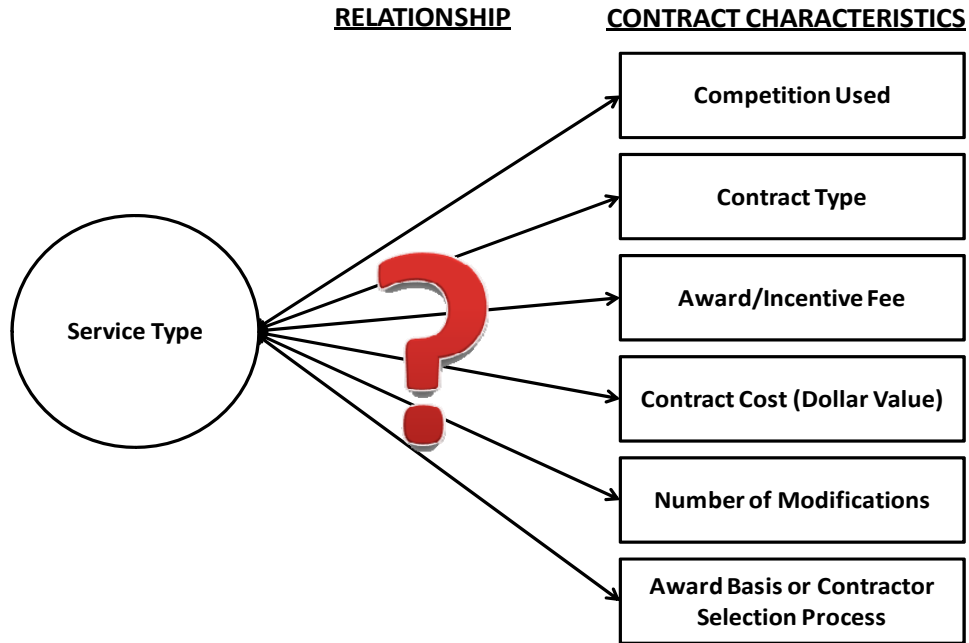


Figure 3. Relationship Between Service Type and Contract Characteristics

Table 1. Results of Chi-Square Test Between Service Type and Contract Characteristics

Factor 1	Factor 2	<i>p</i> value	Significance	Reject Null Hypothesis?
Service Type	Level of Competition Used	0.8958	> 0.05	No
Service Type	Contract Type	Not Applicable	Not Applicable	No
Service Type	Award/Incentive Fee	Not Applicable	Not Applicable	No
Service Type	Contract Cost (Dollar Value)	0.0022	< 0.05	Yes
Service Type	Number of Modifications	0.0442	< 0.05	Yes
Service Type	Award Basis or Contractor Selection Process	0.0268	< 0.05	Yes

Table 2: Survey Data on Service Type and Contract Characteristics

Contract Characteristic	Service Type				Total
	D	J	R	S	
Level of Competition					
Full/Open Competition	18	18	27	23	86
Sole Source	16	11	22	19	68
Total	34	29	49	42	154
Sole Source Justification					
Only Provider	5	3	17	1	26
Unusual/Compelling Urgency	3	3	1	4	11
Set Aside	8	4	4	3	19
Ability One		1		5	6
Utilities				6	6
Subtotal Sole Source	16	11	22	19	68
Contract Type					
Firm-Fixed Price	34	29	49	42	154
Cost Reimbursable	0	0	0	0	0
Total	34	29	49	42	154
Award/Incentive Fee					
Yes	0	0	0	1	1
No	34	29	49	41	153
Total	34	29	49	42	154
Contract Cost (\$)					
Cost > \$100K	12	6	23	27	68
Cost ≤ \$100K	22	23	26	15	86
Total	34	29	49	42	154
Type of Modifications					
Option	16	20	30	27	93
Funding	21	40	113	108	282
Admin	19	21	70	39	149
Termination	0	0	1	0	1
Novation	1	0	2	0	3
Supplemental	0	0	2	0	2
Total	57	81	218	174	530
Award Basis or Contractor Selection Process					
LPTA	17	16	18	18	69
Direct Award	8	4	13	7	32
Ability One	0	1	0	7	8
Best Value	1	2	9	4	16
Urgent/Compelling	2	2	3	4	11
Only Provider	6	4	6	2	18
Total	34	29	49	42	154



1. Level of Competition Used

The contract characteristic *Level of Competition Used* refers to whether or not the contracts were solicited by the MICC offices using full and open competition or sole-source methods. As Table 1 shows, the p value is greater than 0.05; therefore, we cannot reject the null hypothesis that there is no relationship between service types and the level of competition used. Table 2 shows that, out of a total of 154 contracts, 86 (i.e., 56%) contracts were solicited using full and open competition, while the remaining 68 (i.e., 44%) contracts were sole sourced. Based on this data, we recommend that the MICC offices further analyze their methods to increase competition and steer away from the use of sole-source methods, unless regulation or law dictates otherwise. Competition needs to be increased in an effort to answer Under Secretary Carter's call for the DoD to focus on promoting real competition and to "do more without more" (Carter, 2010, p. 1).

To develop a better understanding of this large percentage of sole-source contracts, we identified various justifications used for those contracts. They are presented in Table 2. We note that out of the 68 sole-source contracts, 26 (i.e., 38%) contracts were justified on the basis that there was only one responsible provider that could satisfy agency requirements. In addition, 11 (i.e., 16%) of justifications claimed unusual and compelling urgency; this is a high percentage, considering that the contracts being awarded were not for a contingency.

Of the remaining 31 sole-source contracts, 19 (i.e., 28%) contracts claimed the justification of being part of a set-aside program, such as SBA- designated Small Businesses, while another six (i.e., 9%) contracts were AbilityOne contractors, such as National Industries for the Blind (NIB) and National Industries for the Severely Handicapped (NISH). Finally, utilities, which are usually regulated by states or counties, accounted for 9% of the justifications. The use of both AbilityOne contractors and specific utility companies is understandably a result of mandatory laws and regulations limiting the MICC offices from providing for full and open competition in these instances. Nevertheless, the other justifications possibly



indicate that contracts are not being competed to the fullest extent possible. This does not conform to FAR (2011) part 6 (Competition Requirements) and statutory requirements to provide for full and open competition to the maximum extent possible. In our view, these justifications should be scrutinized further to increase competition in service contracts at Army MICCs.

2. Contract Type and Incentive or Award Fees

The characteristic of *Contract Types* is grouped into two broad categories: fixed-price contracts and cost-reimbursement contracts. The sample of contracts we reviewed consisted of all firm fixed-price (FFP) contracts. With only one contract type being present in the sample, the chi-square test was no longer applicable. The types of services that we evaluated were all highly commercialized and well-defined. The FAR (2011) subpart 16.201 states that the contracting officer shall use FFP contracts when acquiring commercial items. Hence, as expected, FFP was the preferred method for the four types of services we evaluated in this study. The only conclusion we can draw from our data, which contains only FFP contracts, is that there appears to be no relationship between the contract type and type of services we studied.

Incentive or Award Fee refers to whether or not an incentive or award fee was used in the contract to motivate contractors. None of the contracts we evaluated included incentive or award fees, except for one; as a result, the chi-square test was again inapplicable. The single contract that did include an award term was for a 10-year dining facilities contract, a service type S contract. The fact that there was only one contract that utilized an award term fee, out of the 154 contracts we reviewed, confirms the null hypothesis that there is no relationship between the types of services used and the use of incentive or award fees in the acquisition process. Incentive or award fees require additional resources and can discourage contracting offices from using them. Using incentive or award fees also requires a higher level of contracting expertise, and many offices may not have enough qualified personnel available to administer them. Additionally, there is little risk and uncertainty in these



four types of commercial services. It may be useful to conduct future studies to analyze cost-reimbursable contracts in these four service types and determine whether there are any reasons for or benefits to using cost contracts, or incentive or award fees for these types of services.

3. Contract Value

The average base value of contract by service type, as given in Table 2, shows that, on average, the base value of service type S contracts (Utilities and Housekeeping services) is significantly greater than the base value of the other three types of services. Typically, services for utilities and housekeeping are annual services versus the non-recurring services that may exist for short duration in the other three types of services we evaluated. Furthermore, the contract for utilities and housekeeping typically supports the needs of the whole military installation, which results in higher costs. A good portion of service type S contracts are not competed because of the required use of AbilityOne contractors or specific utility providers, which potentially drives up costs. As illustrated in Table 1, the chi-square test resulted in a p value of less than 0.05. Hence, we reject the null hypothesis, and disprove that there is no relationship between service type and contract value.

4. Number of Modifications

In the sample of contracts we evaluated, there were a total of 570 modifications. The types of modifications we observed included supplemental agreements, novation agreements, termination of contracts, administrative changes, funding changes, and the exercising of options. Service type R and S contracts had a total of 423 (237 + 186) modifications, which is significantly higher than the total number of modifications for service types D and J. We expected this high number, since the contracts for service types R and S are usually for services recurring for multiple years, compared to service types D and J that are typically severable or non-recurring. However, we note that the percentage of modifications that were made to exercise an option were greater for service types D and J. This result was not



expected, considering that service types D and J are typically severable services. Additionally, the percentage of administrative changes was relatively high for service types D and J. The percentage of funding modifications was higher for service type S, which is most likely due to the type of contract used. Based on the number of modifications, we can assume that service type S contracts have many requirements or use indefinite delivery indefinite quantity (IDIQ) contracts in which funding is added whenever a task order is executed off the basic contract.

The p value, shown in Table 1, is less than 0.05; therefore, we can reject the null hypothesis. Accordingly, the data suggest that there is a relationship between service type and the number of and reasons for modifications. However, one caveat that should be kept in mind in drawing conclusions from this particular chi-square test is that there were fewer than five observations in a few cells of the contingency table. As a result, we believe that this particular relationship warrants further data collection and analysis.

We recommend that MICC offices further evaluate this statistic to determine whether there is any potential for reducing the number of modifications for service type R and S contracts to ease unnecessary burdens on contracting personnel. The restructuring and management practices of the MICC centers normally drive administrative changes, and, if not managed correctly, these changes increase the workload for contracting personnel, who are valuable resources. In order to avoid numerous modifications that could drive up costs, requirements should be defined as early and as clearly as possible during the acquisition planning phase. Although the data suggest a relationship between service type and the number of modifications, other factors not related to service type might also share a relationship with the number of contract modifications.

5. Award Basis or Contractor Selection Process

Award Basis refers to the strategy used to select which contractor receives the contract award. The categories for the award basis or contractor selection



process include lowest price technically acceptable (LPTA), best value trade-offs (for full and open competition procurements), and AbilityOne, direct award to small business set-asides, only one provider, and unusual and compelling urgency (for sole source procurements). The chi-square test revealed a p value of less than 0.05; therefore, we reject the null hypothesis and suggest that there is a relationship between service type and award basis. We note in Table 2 that the LPTA contract award was used more frequently for all service types. Additionally, the data illustrate that direct awards to small business set-asides exist regardless of the service type, and that there is a relationship between AbilityOne programs and service type S. The data also show that a best value trade-off determination that includes an evaluation of price and non-price factors for awards was used more for service types D and R.

All the contracts we observed that were solicited through full and open competition were awarded based on an LPTA or best value trade-off. Nevertheless, an LPTA was the preferred method over best value trade-off because the majority of the requirements were well-defined, and the best value was expected to result from the selection of the technically acceptable proposal with the lowest evaluated price.

Due to the large number of sole-source procurements we observed in this sample, we took a deeper look to see if contract files included documentation of fair and reasonable pricing, as required by both law and the FAR. The types of sole-source acquisition justifications that we observed in this research were AbilityOne, direct award to small business set-asides, only one provider, and unusual and compelling urgency. In order to determine whether fair and reasonable pricing was considered for all sole-source requirements, we reviewed the contract file to see whether independent government estimates (IGE) or a pricing analysis was documented in the file. We found that 50% of the requirements that were considered sole source had no determination of fair and reasonable pricing located in the contract file. The MICC offices should further investigate this practice, because determining fair and reasonable pricing is required regardless of the sole-



source justification. This statistic shows that this practice may be resulting in increased costs for these types of services.

As we discussed previously in the subsection A.1 above, sole-source justifications should be reduced significantly to align installation-level goals, such as promoting real competition, with those of the USD[AT&L]. Even though circumstances permit competitions that are not full and open (i.e., sole source), the MICC offices should compete all requirements to the maximum extent practicable, which may result in cost savings.

B. Service Type and Management Practices

For our second research question, we investigated whether a relationship exists between service type and management practices. As illustrated in Figure 4, we considered 13 management practices.

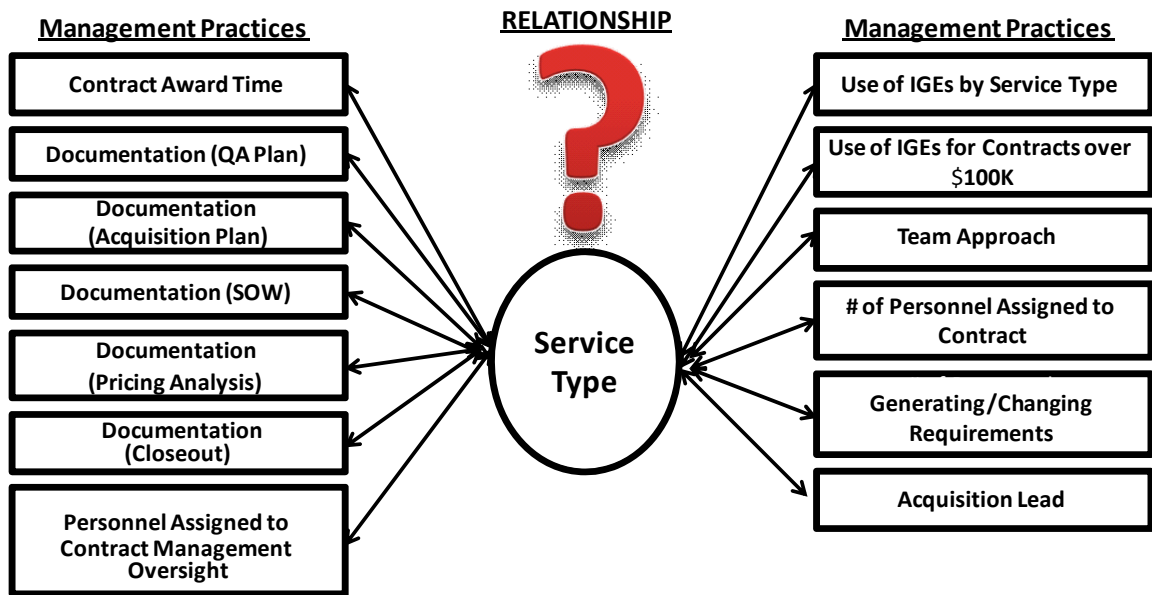


Figure 4. Assessment of Relationship Between Service Type and Management Practices

The majority of management practices we evaluated show no evidence of a relationship between the two factors. Specifically, the chi-square test results suggest



that there exists a relationship between service type and the following management practices: the use of IGEs, the use of IGEs provided for contracts based on contract value, the number of personnel assigned to a contract, the contracting lead for the requirement, and the use of a quality assurance surveillance plan (QASP). A summary of the survey data about the relationship between service type and management practices is given in Table 3, and a summary of the chi-square test results about the relationship are presented in Table 4.

Table 3. Chi-Square Hypothesis Testing Results Between Service Type and Management Practices

Factor 1	Factor 2	<i>p</i> value	Significance	Reject Null Hypothesis?
Service Type	Use of IGEs by Service Type	0.0068	< 0.05	Yes
IGE	Use of IGEs for Contracts over \$100K	0.0002	< 0.05	Yes
Service Type	No. of Personnel Assigned to Contract	0.0449	< 0.05	Yes
Service Type	No. of Personnel Generating/Changing Requirements	0.0822	> 0.05	No
Service Type	No. of Personnel Assigned to Contract Management Oversight	0.1695	> 0.05	No
Service Type	Team Approach	0.3142	> 0.05	No
Service Type	Acquisition Lead	0.0076	< 0.05	Yes
Service Type	Contract Award Time	0.1127	> 0.05	No
Service Type	Documentation (Acquisition Plan)	0.5665	> 0.05	No
Service Type	Documentation (PWS/SOW)	0.6909	> 0.05	No
Service Type	Documentation (Pricing Analysis)	0.5391	> 0.05	No
Service Type	Documentation (PNM)	0.0871	> 0.05	No
Service Type	Documentation (QASP Plan)	0.0115	< 0.05	Yes
Service Type	Documentation (Closeout Letter)	0.4676	> 0.05	No



Table 4. Survey Data on Service Type and Management Practices

Management Practice	Service Type				Total
	D	J	R	S	
Use of IGEs by Service Type					
No	27	16	20	23	86
Yes	7	13	29	19	68
Total	34	29	49	42	154
Team Approach					
No	18	10	19	14	61
Yes	16	19	30	28	93
Total	34	29	49	42	154
No. of Personnel Assigned to Contract					
1	2	2	0	0	4
2	10	2	9	13	34
3	14	20	25	14	73
4	2		8	4	14
5	6	5	5	9	25
6	0	0	1	0	1
8	0	0	1	2	3
Total	34	29	49	42	154
Acquisition Lead					
Contract Specialist	2	5	0	1	8
Contract Lead	32	24	49	41	146
Total	34	29	49	42	154
No. of Personnel Generating/Changing Requirements					
1	7	6	4	3	20
2	26	16	40	32	114
3	1	7	5	6	19
8	0	0	0	1	1
Total	34	29	49	42	154
No. of Personnel Assigned to Contractor Oversight					
1	3	4	0	1	8
2	15	7	17	17	56
3	15	15	24	19	73
4	1	3	8	2	14
5	0	0	0	1	1
6	0	0	0	1	1
8	0	0	0	1	1
Total	34	29	49	42	154
Contract Award Time (meets PALT?)					
No	11	15	26	25	77
Yes	23	14	23	17	77
Total	34	29	49	42	154



Management Practice	Service Type				Total
	D	J	R	S	
Documentation (Acquisition Plan) Exists					
No	20	20	30	22	92
Yes	14	9	19	20	62
Total	34	29	49	42	154
Documentation (PW5) Exists					
No					
Yes	12	7	12	11	42
Total	22	22	37	31	112
Documentation (Pricing Analysis) Exists					
No	16	13	16	18	63
Yes	18	16	33	24	91
Total	34	29	49	42	154
Documentation (QA Plan) Exists					
No	27	18	22	21	88
Yes	7	11	27	21	66
Total	34	29	49	42	154
Documentation (Closeout Letter) Exists					
No	15	16	20	17	68
Yes	3	2	1	1	7
N/A	16	11	28	24	79
Total	34	29	49	42	154
Documentation (PNM) Exists					
No	19	22	26	18	85
Yes	8	4	18	14	44
N/A	7	3	5	10	25
Total	34	29	49	42	154

1. Use of Independent Government Estimates (IGE) and Use of IGE for Contracts Over \$100,000

The data indicate that the use of IGEs was low for all four types of services. The *p* value presented in Table 3 is less than 0.05; therefore, we reject the null hypothesis and disprove that there is no relationship between service type and the use of IGE. We find that about 56% of contracts for all service types did not have an IGE. As discussed earlier, this is troubling, since 68 out of 154 contracts were sole source.



Through further analysis of this data, we examined if there exists a relationship between the use of IGEs and the dollar value of the contracts. When testing the relationship between an IGE that was provided and the contract value, we determined that the p value was less than 0.05; therefore, we reject the null hypothesis. This p value suggests a relationship between the use of IGEs and contract value. Furthermore, based on our earlier analysis, we found that there is a relationship between contract dollar value and service type; therefore, the data also imply that there is an indirect relationship between service type and the use of IGEs. Per Army Regulation (AR) 70-13 (Department of the Army, 2010, p. 7), an IGE is required for all contracts that exceed the simplified acquisition threshold (SAT). At the time of our study, the simplified acquisition threshold was \$100,000 (which has since been increased to \$150,000). As shown in Table 5, 62% of the contracts over \$100,000, and only 32% of contracts under \$100,000, did have an IGE in the contract file. In either case, this percentage is low considering the requirement to provide an IGE per AR 70-13. We recommend MICC offices further analyze the causes for the lack of an IGE in contract files, and the potential impact on acquisition performance.

Table 5. Chi-Square Hypothesis Testing Results Between Use of IGE and Contracts Cost

Management Practice	Test p value	IGE Used?		
		No	Yes	Total
Use of IGEs and Contract's Cost	0.0002			
Under \$100K		62	29	91
Over \$100K		24	39	63
Total		86	68	154

2. The Number of Personnel Assigned to a Contract and the Number of Personnel Generating or Changing Requirements

We evaluated contract files to determine how many personnel were assigned to contracts, their positions, and which personnel generated requirements or changes to those requirements. Personnel included in our review were contracting officers, contracting specialists, customers, contracting officer representatives



(COR), and quality assurance evaluators (QAE). During our research, we observed that program managers were non-existent at all the MICC offices. A 2011 GAO report emphasized the need for the involvement of a program manager to initiate services acquisitions (GAO, 2011). The lack of program managers highlights potential problems, especially for large complicated services acquisitions that may develop into major issues in the future as the need for services in the DoD continues to grow. We wish to point out that it was difficult to discover exactly which personnel assigned to a contract evaluated the performance of the contractor, because each installation managed the filing and storing of contract documentation in different ways. For example, one office stored files electronically, while other offices that maintained hard-copy documentation did not organize and file documents in the same manner. Based on our data, we suggest that the contents of many contract files did not meet guidelines found in FAR (2011) part 4 (Administrative Matters), hindering our ability to objectively evaluate each file.

Based on the results of the chi-square test for this section, we reject the null hypothesis, which indicates that there is a relationship between service type and the number of personnel assigned to a contract. The average number of personnel assigned to contracts was high for service types R and S, which may have resulted from the fact that these services typically have longer durations and usually involve a much larger scope, such as for an entire installation. However, the number of personnel assigned to a contract also appeared to be driven by the standard practices of the MICC centers we observed. Typically, most centers followed a standard practice of assigning a contracting officer and contracting specialist to a requirement for pre-award activities, and a contracting officer, contracting specialist, and COR or customer for the post-award activities. Therefore, we argue that although service type does have a relationship with the number of personnel assigned, this number is strongly influenced by the standard practices of a particular contracting office.



Additionally, we performed a chi-square test to determine whether a relationship exists between service types and the number of personnel generating or changing requirements. The resulting p value was greater than 0.05; therefore, we could not reject the null hypothesis. Accordingly, we find that there exists no relationship between the two factors.

3. The Number of Personnel Assigned to Contract Management Oversight

Contract Management Oversight is defined as the duties and responsibilities assigned to personnel for post-award functions in an effort to monitor contractor performance and provide oversight of the contractor. The chi-square test results shown in Table 3 indicate that there is no relationship between the number of personnel assigned to contract management oversight and service type. This result is not surprising because we expect characteristics such as dollar value, complexity, and scope of the contract to determine the number of personnel assigned to contract management oversight.

4. Team Approach

We reviewed contract files to analyze whether a team approach was used in services acquisitions. We considered various factors, such as memorandums for record, signature blocks on documents, and documented email correspondence, to determine whether multiple parties were involved during pre-award and post-award activities and if these parties had an understanding of roles and responsibilities. The team-approach concept includes involvement of personnel from contracting, finance, legal, industry, and the requiring activity. As a best practice, , a team approach should be used, regardless of service type (Rendon & Snider, 2008). Based on the resulting chi-square test, we cannot reject the null hypothesis. Accordingly, we believe that there exists no relationship between service type and whether a team approach is used. The data show that only 93 out of the 154 contracts we evaluated had evidence of a team approach in the contract files, even though the use of a



team approach is required per AR 70-13 (Department of the Army, 2010, p. 1). This creates a cause for concern, since only 60% of the contract files were compliant with the best practice of using a team approach.

5. Acquisition Lead

As discussed earlier, a program manager was not identified in any of the reviewed contracts. At the operational level, the contracting officer is typically assigned or assumed to act as the acquisition lead because there is no one assigned to that responsibility. Out of the 154 contracts we evaluated, we clearly identified the contracting officer as the acquisition lead for 146 of the contracts, with the contracting specialist as the acquisition lead for the remaining eight. We rejected the null hypothesis for this comparison, which demonstrated a relationship between service type and the individual designated as the acquisition lead. Because there are very few, if any, program managers at the operational level, we expected this finding. However, if reliance on services continues to grow and as the DoD continues to seek ways to improve efficiency for services, including program managers at the installation level would be an important area of further research to determine the impact the position would have on the acquisition process.

6. Contract Award Time

The time it takes for a contracting office to award a contract after receipt of the purchase request is called the standard procurement administrative lead time (PALT). The PALT for this study is defined as awarding contracts within 60 days. Chi-square testing revealed no relationship between contract type and the PALT for the requirements evaluated. The data show that service type D met PALT 68% of the time, service type S met PALT 40% of the time, and service types J and R met PALT roughly 50% of the time. The lack of evidence to support a relationship between service type and PALT may be a result of manning issues, customer relationships, or not receiving timely inputs from customers. Other factors that are not related to service type may exist that potentially affect the award time for



contracts. For example, award times may be driven by such factors as the workforce workload and availability of funds, which are not related to service type.

7. Documentation

During the data-collection process, we determined whether the following contract documents were filed: acquisition plan, performance work statement (PWS) or statement of work (SOW), pricing analysis, price negotiation memorandum (PNM), quality assurance surveillance plan (QASP), and contract closeout letter. We performed a chi-square test for each document type, and the only document rejecting the null hypothesis and appearing to have a relationship with service type was the QASP. However, there was no indication of a relationship between the other documentation and service types. Figure 5 reveals that the majority of contract files we reviewed lacked the specific documentation noted above. For instance, out of 154 contracts, 73% included a PWS or SOW, and only 40% had an acquisition plan. Additionally, only 11% of the contracts that were closed out included a closeout letter. Presumably, due to time constraints and workload, the filing of a closeout letter was not a priority across the board. We suppose from these findings that important contract documents, which are standard requirements for contract files and are used to protect the government's interests (especially a service contract), was either missing or not completed.

Other factors may impact contract file documentation as well. For example, even though required, the QASPs may not be included in the contracting office's files, but may be maintained with the COR's or QAE's files. Therefore, MICC offices must emphasize pre-award and post-award documentation to satisfy all requirements, not just the procurement of the service, in order to protect the government's interests. This is an area of concern, and management should conduct further analysis to determine whether documentation is missing or incomplete and to ascertain its impact on the acquisition process.



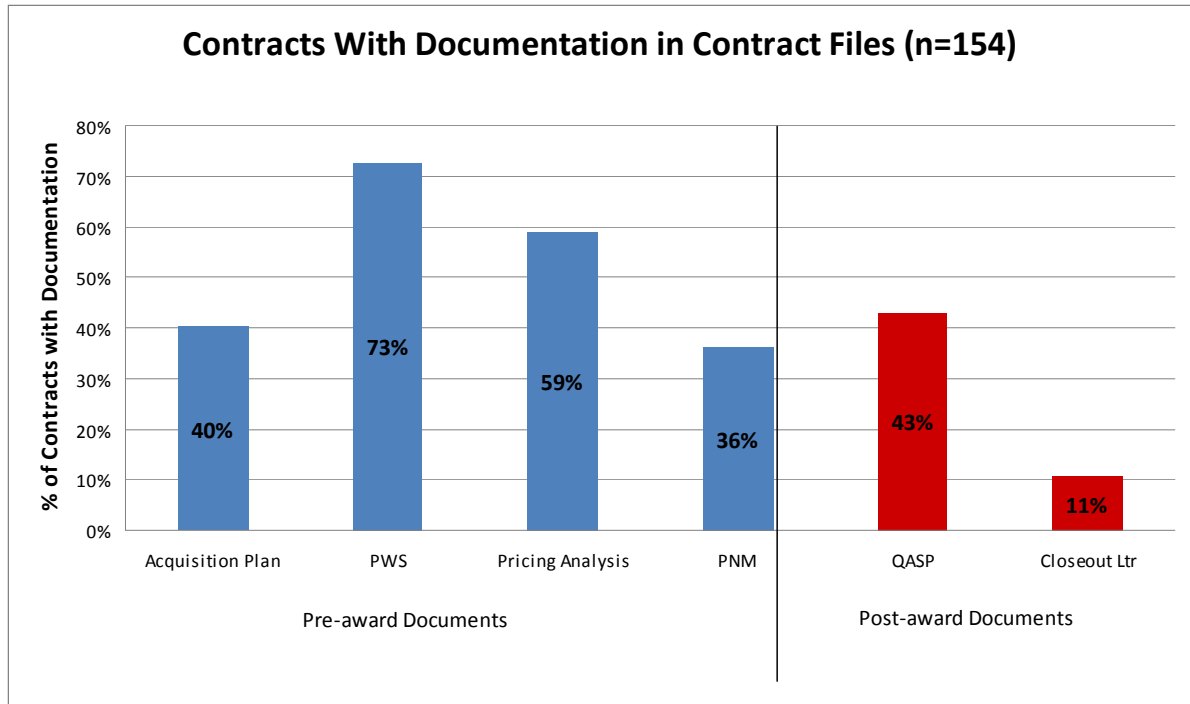


Figure 5. Percentage of Contract File Documents Found in Contract Files

A. Capacity and Management Practices

In assessing our third and final research question, we focused on whether the capacity for carrying out acquisition-related work affects the management practices the MICC offices employ. To have effective capacity, an organization needs an appropriate number of billets that are filled with personnel that are properly trained. It is important for organizations to ensure that the personnel filling the billets are well trained and not simply ensuring that all billets are filled. Effective capacity is not realized if billets are filled with personnel that are not properly trained. Without effective capacity, an organization may neither get the best value in its contracts, nor achieve adequate protection of the government’s interests.

In order to determine whether a relationship exists between capacity and management practices, we used Part II of the data collection form to collect administrative data from all offices. Of the eight offices visited for this study, one office, MICC Office B, was unable to provide the data requested for this section.



Thus, we were able to collect data from seven MICC offices. Because of the small sample size, we used descriptive statistics to assess the relationship between capacity and management practices. The capacity categories examined were

- the dollar value by service type;
- the number of billets for contracting officers, contracting specialists, program managers, and COR/QAE-authorized and number of filled billets;
- the Defense Acquisition Workforce Improvement Act (DAWIA) certification levels for the acquisition workforce;
- the number of years of experience of the acquisition workforce; and
- the average number of contracts the acquisition workforce managed.

A total of \$1.795 billion was obligated in FY2010 by these seven offices for the four service contract types observed in this study, a significant dollar amount for seven out of 36 MICC offices and Directorates of Contracting (DOC) across the country. Service type R (Professional, Administrative, and Management Support Services) and service type S (Utilities and Housekeeping Services) accounted for 87.4% of the total contracts. As we discussed earlier, the four PSCs selected for this study accounted for over 60% of the service contracts utilized across Army installations. The high percentage for service types R and S indicates a significant reliance on these two particular service types. This high percentage also implies that the majority of resources the acquisition workforce spent revolved around R and S type service contracts, which we view as vital components to daily operations across Army installations. For the four service types observed in this study, Table 6 shows the total dollar value, the total number of contracts awarded, and the average service contract dollar value for each MICC office.



Table 6. FY2010 Service Contracts Awarded

	MICC Office A	MICC Office C	MICC Office D	MICC Office E	MICC Office F	MICC Office G	MICC Office H
Total Dollar Value of Service Contracts Awarded (R, D, S, & J)	\$17,435,363	\$38,361,394	\$931,231,325	\$316,000,000	Data Not Available	\$293,000,000	\$301,000,000
Total Number of Service Contracts Awarded (R, D, S, & J)	76	766	542	226		350	804
Average Dollar Value per Service Contract	\$229,413	\$50,080	\$1,718,138	\$1,398,230		\$838,000	\$374,000

Based on our data, with the number of dollars obligated by these offices, the majority of offices do not appear to have the necessary number of contracting officers and contracting specialists authorized to handle this sizable workload. The billets for warranted contracting officers and contracting specialists averaged an 89% fill rate, with a range of 57–100%. For contracting specialists, the average fill rate was 81%, with a range of 47–117%. While some MICC offices have the authorized number of personnel filling these acquisition roles, the majority does not. Based on the number of filled billets and the number of contracts obligated, acquisition personnel are individually managing 7.8 service contracts, on average. If authorized billets were maintained at a 100% fill rate, individual acquisition personnel would manage approximately 6.5 service contracts, on average. In this study, we focused on four specific service types and did not account for all procurement requirements the MICC offices handled. Therefore, this fill rate indicates that the MICCs are managing substantial workloads with limited personnel.

In addition, we looked at the number of acquisition personnel filling billets that required DAWIA Level I, II, or III certification, and whether or not certification was obtained. Out of the seven offices surveyed, only 31% of the acquisition personnel holding a billet requiring DAWIA Level I certification were certified at that level. Acquisition personnel holding a billet requiring DAWIA Level II and Level III certification maintained a 70% and 72% certification rate, respectively. The data suggest that the acquisition personnel in these MICC offices do not have the proper education, training, or experience for the positions they hold. Based on the workload



we observed for just four service types, and the shortage of personnel, we infer that certification may not have been achieved due to the time constraints placed on the current workforce, the vital nature of mission execution, and funding constraints. Also, the increase in the number of entrants to the DoD acquisition workforce and the amount of training required to reach Level I certification may also explain the low percentage of certified personnel.

Next, we observed the experience level of the contracting officers and contracting specialists in these MICC offices. In our questionnaire, we asked for the level of experience of these personnel based on the number of months worked in an acquisition position. The majority of MICC offices have a high percentage of personnel with at least three years of experience; however, in two offices the percentages were relatively low. Table 7 displays the results of the data collected regarding occupation of billets, certification levels, and experience levels of the acquisition workforce.

Table 7. Office Capacity of MICC Offices Observed

Capacity Category	Capacity Subcategories	MICC Office A	MICC Office C	MICC Office D	MICC Office E	MICC Office F	MICC Office G	MICC Office H
Billets	Warranted	100%	88%	83%	58%	100%	100%	100%
	Non-warranted	0%	84%	106%	47%	117%	86%	86%
Certification	DAWIA I	23%	13%	23%	8%	0%	2%	0%
	DAWIA II	162%	24%	16%	54%	66%	66%	68%
	DAWIA III	100%	27%	33%	118%	0%	32%	32%
Experience	< 1 year	18%	14%	7%	0%	14%	10%	4%
	1 - 2 years	18%	43%	12%	1%	23%	3%	2%
	2 - 3 years	10%	16%	7%	9%	34%	19%	21%
	> 3 years	55%	17%	74%	90%	29%	68%	73%

Although approximately 60% of the personnel have more than 36 months of acquisition experience, over 40% do not. This finding suggests that the workforce, from the Army installation perspective, does not have the level of experience necessary to properly manage the considerable workload imposed on these offices. However, as displayed in Table 7, there are instances in some MICC offices where



billet and certification percentages are greater than 100%, indicating excess personnel in that specific area.

Another area we looked at was the number of certified CORs and QAEs these offices managed; however, only two offices tracked this information. According to ACC Pamphlet 70-1 (U.S. Army Contracting Command [ACC], 2010), contracting officers are responsible for appointing properly trained CORs prior to awarding a contract. Additionally, they are required to track and evaluate the performance of CORs. The key role of the COR and QAE is to observe, document, inspect, and communicate contractor performance to both the contracting officer and contractor. The COR and the QAE are technical experts whose role is to ensure that the contractor meets all performance specifications. For example, the COR for an installation dining facility contract is typically an experienced food service technician who confirms whether the contractor is in compliance with dining facility operation regulations and guidelines. If a contract does not employ a COR with the proper technical background to manage the contract, then the government is not able to ensure that the contractor is in compliance with the terms and conditions of the contract, and, thus, the government's interests are not protected. The COR and QAE are vital to successful contract administration and serve as the eyes and ears of the contracting officer, and it is concerning that these pivotal personnel are not consistently tracked.



VI. Summary, Conclusion, and Recommendations

The purpose of this research was to understand the relationship between service types, contract characteristics, and management practices, in order to understand the drivers of acquisition practice and performance. Our three research questions are restated here and summarily answered in subsections below.

- Do the contract characteristics differ for different types of services?
- Do the types of services being acquired affect the management practices being used?
- Does the capacity for carrying out acquisition-related work affect the management practices being used?

Our research findings suggest a relationship between service type and three contract characteristics and between service type and five management practices, as shown in Figure 6.

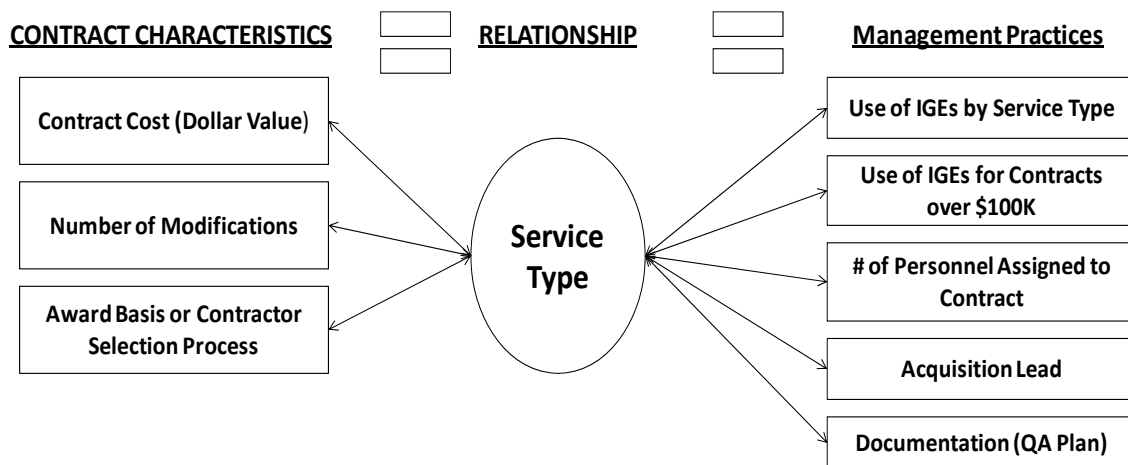


Figure 6. Summary of Findings From Data Analysis



A. Do the Contract Characteristics Differ for Different Types of Services?

The evaluation of the six contract characteristics revealed a relationship between service type and three of the contract characteristics displayed in Figure 6. Specifically, we find the following results:

- The average annual contract cost for service type S was significantly higher than for the other three service types evaluated.
- The number of modifications applied to service types R and S were considerably larger than for service types D and J.
- Service types D and J used LPTA contract award strategies approximately 50% of the time, while service types R and S awarded contracts more frequently based on a best value trade-off.

We also observed that every contract was awarded as FFP, only one contract utilized an incentive or award fee, and the use of competition in the solicitation process was not related to service type.

B. Do the Types of Services Being Acquired Affect the Management Practices Being Used?

The evaluation of the 14 management practices revealed a relationship between service type and five of the management practices, as shown in Figure 6. The findings indicate a relationship between service types and the following management practices:

- In the use of IGEs in contracts for the specific services, we found that over half of the contracts for all service types did not have an IGE. In addition, for the use of an IGE for contracts over the simplified acquisition threshold, only 32% of the contracts did have an IGE.
- The average number of personnel assigned to a contract does have a relationship with service type; specifically, the average number of personnel was high for service types R and S.



- We clearly identified the contracting officer as the acquisition lead for 146 of the 154 contracts we evaluated and the contract specialist as the acquisition lead for the remaining eight contracts.
- The quality assurance surveillance plan (QASP) was the only acquisition document that had a relationship with service type. Only 43% of contracts we evaluated had a QASP in the contract file.

Based on our research findings, it appears that factors other than service type may share a stronger relationship with the management practices, and this indicates a need to further research the topic.

C. Does the Capacity for Carrying out Acquisition-Related Work Affect the Management Practices Being Used?

Our research findings suggested that a relationship exists between capacity and management practices. Our findings revealed that offices lacked the requisite number of authorized personnel to perform acquisition functions, and a majority of the personnel on hand lacked proper training certifications. On average, these offices handled a significant number of service contracts, and, not factoring in other procurement requirements, the MICC acquisition workforce is managing substantial workloads with minimal personnel.

Our research findings also indicated that although standard practices for managing service contracts were common at all the MICC offices, most offices did not incorporate a standard contract filing system. Based on contract file reviews, we found that most offices continue to maintain hard-copy contract files, while only one office maintained digital files. Regardless of storage method, contract file documentation was either incomplete or absent from files at all locations.

D. Recommendations

Our research findings lead us to identify several specific recommendations to the U.S. Army Mission and Installation Contracting Command for managing contracts for these four specific service types. We recommend that MICC contracting offices



1. Further scrutinize the use of sole-source contracts to ensure that competition requirements are being met, and that fair and reasonable prices are being negotiated.
2. Evaluate the process of using independent government estimates (IGE) as a tool for ensuring fair and reasonable prices.
3. Explore using contract options or award term incentives in the procurement of recurring services to help streamline the contracting process and reduce the time required to award contracts.
4. Explore the acquisition planning and requirements management processes to identify the cause for the higher level of contract modifications for R and S type services. This factor results in an increased burden on the contracting workforce; hence, identifying and eliminating the cause will help lessen this unnecessary burden.
5. Consider using incentive and award fees in future services acquisition. Although using these fees may require additional administration effort on the part of the contracting office, the benefits resulting from higher contractor performance may outweigh the cost of administering the fees.
6. Insist on complete and accurate contract file documentation in the acquisition of services. FAR part 4 (2011) provides policy and regulations for contract file documentation that should be used to ensure government records are maintained appropriately.
7. Adopt a project management approach to the acquisition of services. This approach includes establishing project teams consisting of cross-functional representatives involved in services acquisition. This approach also includes a dedicated project manager to lead the acquisition effort, as well as established roles and responsibilities for each of the project team members.
8. Agencies should focus on increasing the fill rate of acquisition billets within the organization. This will ensure that there are sufficient project managers, contracting officers/specialists, and contracting officer representatives (CORs) available to manage services acquisitions.
9. In addition to having filled acquisition billets, emphasis should also be placed on ensuring that acquisition personnel are properly trained, educated, and experienced in their functional specialty areas, such as project management, contracting, and COR. Agencies should track the acquisition workforce's attainment of the required Defense



Acquisition Workforce Improvement Act (DAWIA) certification levels for each specialty area.

10. To maintain a competent and capable workforce, agencies should improve their effort in the recruitment, retention, and professional development of the acquisition workforce.



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2003 - 2012 Sponsored Research Topics

Acquisition Management

- Acquiring Combat Capability via Public-Private Partnerships (PPPs)
- BCA: Contractor vs. Organic Growth
- Defense Industry Consolidation
- EU-US Defense Industrial Relationships
- Knowledge Value Added (KVA) + Real Options (RO) Applied to Shipyard Planning Processes
- Managing the Services Supply Chain
- MOSA Contracting Implications
- Portfolio Optimization via KVA + RO
- Private Military Sector
- Software Requirements for OA
- Spiral Development
- Strategy for Defense Acquisition Research
- The Software, Hardware Asset Reuse Enterprise (SHARE) repository

Contract Management

- Commodity Sourcing Strategies
- Contracting Government Procurement Functions
- Contractors in 21st-century Combat Zone
- Joint Contingency Contracting
- Model for Optimizing Contingency Contracting, Planning and Execution
- Navy Contract Writing Guide
- Past Performance in Source Selection
- Strategic Contingency Contracting
- Transforming DoD Contract Closeout
- USAF Energy Savings Performance Contracts
- USAF IT Commodity Council
- USMC Contingency Contracting



Financial Management

- Acquisitions via Leasing: MPS case
- Budget Scoring
- Budgeting for Capabilities-based Planning
- Capital Budgeting for the DoD
- Energy Saving Contracts/DoD Mobile Assets
- Financing DoD Budget via PPPs
- Lessons from Private Sector Capital Budgeting for DoD Acquisition Budgeting Reform
- PPPs and Government Financing
- ROI of Information Warfare Systems
- Special Termination Liability in MDAPs
- Strategic Sourcing
- Transaction Cost Economics (TCE) to Improve Cost Estimates

Human Resources

- Indefinite Reenlistment
- Individual Augmentation
- Learning Management Systems
- Moral Conduct Waivers and First-term Attrition
- Retention
- The Navy's Selective Reenlistment Bonus (SRB) Management System
- Tuition Assistance

Logistics Management

- Analysis of LAV Depot Maintenance
- Army LOG MOD
- ASDS Product Support Analysis
- Cold-chain Logistics
- Contractors Supporting Military Operations
- Diffusion/Variability on Vendor Performance Evaluation
- Evolutionary Acquisition



- Lean Six Sigma to Reduce Costs and Improve Readiness
- Naval Aviation Maintenance and Process Improvement (2)
- Optimizing CIWS Lifecycle Support (LCS)
- Outsourcing the Pearl Harbor MK-48 Intermediate Maintenance Activity
- Pallet Management System
- PBL (4)
- Privatization-NOSL/NAWCI
- RFID (6)
- Risk Analysis for Performance-based Logistics
- R-TOC AEGIS Microwave Power Tubes
- Sense-and-Respond Logistics Network
- Strategic Sourcing

Program Management

- Building Collaborative Capacity
- Business Process Reengineering (BPR) for LCS Mission Module Acquisition
- Collaborative IT Tools Leveraging Competence
- Contractor vs. Organic Support
- Knowledge, Responsibilities and Decision Rights in MDAPs
- KVA Applied to AEGIS and SSDS
- Managing the Service Supply Chain
- Measuring Uncertainty in Earned Value
- Organizational Modeling and Simulation
- Public-Private Partnership
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