



ACQUISITION RESEARCH PROGRAM SPONSORED REPORT SERIES

Spend Analysis on Acquisition for Studies and Analysis in the U.S. Navy

December 2019

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Prepared for the Naval Postgraduate School, Monterey, CA 93943.



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ABSTRACT

The purpose of this research is to analyze the U.S. Navy’s procurement of studies and analysis to identify contracting offices, contractors, service categories, and contracting characteristics. Studies and analysis are services that influence Navy decision-makers and defense capabilities; therefore, it is vital to know how the Navy acquires study and analysis services. Knowledge from this analyzed spending data provides opportunities for decision-makers to see spending characteristics, efficiencies, and relationships between contracting offices, contractors, and study and analysis service categories. The results from this research also provides a foundation for strategic sourcing strategies to improve support of national defense strategies. This research reaches two recommendations concerning the limitation of the current taxonomy in place and the strategies that may be most beneficial to the various categories of services. The research also serves as a lead for further study on the adoption of new categorization tools, better understanding of what drives contracting officers to use category descriptions such as “Defense” or “Other,” and the effectiveness of the distribution of study and analysis services.



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LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|------------|---|
| A&AS | Advisory and Assistance Service |
| ASN (RD&A) | Assistant Secretary of the Navy, Research, Development, & Acquisition |
| BIC | Best in Class |
| BSO | Budget Submitting Office |
| CAGE | Commercial and Government Entity |
| CLIN | Contract Line Item Number |
| CMLC | Category Management Leadership Council |
| CO | Contracting Officer |
| CPFF | Cost Plus Fixed Fee |
| CY | Calendar Year |
| DAU | Defense Acquisition University |
| DOD | Department of Defense |
| DoN | Department of the Navy |
| DFAS | Defense Finance & Accounting Service |
| DLA | Defense Logistics Agency |
| DPAP | Defense Procurement and Acquisition Policy |
| DPC | Defense Pricing and Contracting |
| DUNS | Data Universal Numbering System |
| DTIC | Defense Technical Information Center |
| EDA | Electronic Document Access |
| FAR | Federal Acquisition Regulation |
| FFP | Firm-fixed Price |
| FFRDC | Federally Funded Research & Development Center |
| FSC | Federal Supply Classification |
| FPDS-NG | Federal Procurement Data System–Next Generation |
| FY | Fiscal Year |
| GAO | Government Accountability Office |
| GSA | General Services Administration |



| | |
|--------|---|
| IDIQ | Indefinite-Delivery/Indefinite-Quantity Contract |
| IDV | Indefinite Delivery Vehicle |
| IT | Information technology |
| KBS | Knowledge-Based Services |
| NAICS | North American Industry Classification System |
| NAFTA | North American Free Trade Agreement |
| NAVFAC | Naval Facilities Engineering Command |
| NAVSUP | Naval Supply Systems Command |
| NAVSEA | Naval Sea Systems Command |
| NDS | National Defense Strategy |
| NSS | National Security Strategy |
| NSWC | Naval Surface Warfare Center |
| OMB | Office of Management and Budget |
| ONR | Office of Naval Research |
| OSD | Office of the Secretary of Defense |
| PLAN | People's Liberation Army Navy (China) |
| PPI | Producer Price Index |
| PSC | Product Service Code |
| R&D | Research and Development |
| RFP | Request for Proposal |
| S&A | Studies and Analysis |
| SSPMO | Strategic Sourcing Program Management Office |
| SYSCOM | Systems Command |
| UNSPSC | United Nations Standard Products and Service Code |
| USN | United States Navy |



EXECUTIVE SUMMARY

On March 20, 2019, the Office of Management and Budget (OMB) issued memorandum M-19-13 directing government acquisition offices to apply category management through the practice of buying common goods and services as an enterprise. This created a need for the Navy to better understand the categories of goods and services it procures. A critical category of professional services that the Navy contracts for is study and analysis (S&A) services. These services influence Navy decision makers and shape future capabilities and national defense strategies. The results and recommendations from S&A services are also opportunities for contractors to have influence on the future of the Navy. Therefore, it is important that the Navy understands which contracting offices procure this service, who the contractors are, which areas of S&A services are being procured, and what the procurement characteristics are.

To answer these questions, we conducted a spend analysis. Spend analysis is a tool at the base of category management that analyzes historical spending data. The spending data used in this spend analysis was from the FPDS-NG database which is designated for use by Federal Acquisition Regulation (FAR). In our spend analysis, we retrieved historical contract data for the fiscal years of 2009–2018. The retrieved data was then cleaned and normalized for development of spending profiles on contracting offices, contractors, S&A service categories, and other contracting characteristics. Finally, we categorized the spending data and profiles to find answers to our research and recommendations on opportunities.

The results to our four research questions are as follows. First, the contracting office obligating the highest total dollar amount in the preceding ten-year period was Naval Surface Warfare Center Dahlgren. While the contracting office awarding the highest total number of S&A service contracts was the Office of Naval Research. For our second question, the Center for Naval Analyses Corporation was the contractor who received the most in terms of obligations and number of awards. Thirdly, the total obligations for S&A was over \$3 billion over the last ten years. These obligations were heavily concentrated in the two fields of Product Service Codes (PSC) B541–Special Studies/Analysis Defense



and B599–Special Studies/Analysis Other, which account for 73% of the total dollar value. Finally, while the majority of awards for studies & analysis services in the past decade were of the Firm Fixed Price type, the Cost-Plus Fixed Fee contract type was the contracting vehicle that the Navy obligated the most money towards. There also appears to be a decrease in the overall acquisition of studies & analysis services and the level of competition occurring. The use of Indefinite Delivery Vehicles has remained relatively constant with about 78% of new awards being issued under them. There is also a peak in end of fiscal year spending occurring. Overall there is a preponderance of use of the most generic forms of PSC (“Defense” and “Other”) and this inhibits efforts for implementing category management.

In our conclusion, there appears to be some consolidations occurring in some studies & analysis categories. When looking at contracting offices based on the amount of contract actions, the consolidated categories are PSC B525–Natural Resource, B541–Defense, and B521–Historical. From the contracting office approach based on the obligated amount, the consolidated categories are PSC B525–Natural Resource, B541–Defense, and B504–Chemical/Biological. From the contractor approach based on the received obligation amount, the consolidated categories are PSC B504–Chemical/Biological, B542–Educational, B550– Org/Admin/Personnel, and PSC B541–Defense. There appears to be opportunities for the Navy to conduct strategic sourcing on other S&A service categories to improve efficiencies and leverage buying power.

Finally, we provide two recommendations. First, our spend analysis research is dependent upon the taxonomy currently used and the integrity of the FPDS-NG database. Even though there can be many different studies & analysis service categories in a contract, government-contracting professions can only input one PSC for each contract in the FPDS-NG database. This may be the reason for the use of the most generic forms of PSC (“Defense” and “Other”). The use of the most generic forms inhibit efforts for implementing category management. A recommendation would be to implement a more robust taxonomy structure, such as the United Nations Standard Products and Service Code (UNSPSC), for more specific categorization of the underlying requirements. For the second recommendation, there is a continuum of number of contractors differing between PSC categories from fewer contractors to many; therefore, each category of S&A services



should have its own strategy. The array of mixed strategies from the “understanding cost drivers” strategy for the category with fewer contractors to the “prequalifying contractors” or “Best in Class” strategy for categories with many contractors should be applied accordingly.



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I. INTRODUCTION

The purpose of this chapter is to introduce and provide relevant background into our examination of the U.S. Navy's acquisition of studies and analyses (S&A) services. This research's purpose is to identify how the U.S. Navy is currently contracting for S&A and to obtain conclusions upon which recommendations can be based for leveraging buying power, improving efficiencies, and managing consumption of these services across the entire Navy. This chapter contains background information, the project's purpose, research questions, possible benefits and limitations of this research, methodology, and the organization of this report. A summary at the end of the chapter recaps its contents.

A. BACKGROUND

In an expansion of its efforts to develop government-wide procurement strategy, the White House renamed the Strategic Sourcing Leadership's charter into the Category Management Leadership Council (CMLC) on October 14, 2015. The CMLC divided categories of the government's commonly purchased items into 10 super categories (Rung & Sharpe, 2015). Then on March 20, 2019, the Office of Management and Budget (OMB) issued memorandum M-19-13 mandating the implementation of category management for government-wide contracts to remove the burden of unnecessary, redundant activities, and to deliver more value and savings through the government's acquisitions (Weichert, 2019). This memorandum canceled OMB memorandum M-13-02 (*Improving Acquisition through Strategic Sourcing*) and initiated the concept of "standardizing sharing of prices paid, terms and conditions, and best operational practices within a category of spend" (OMB, 2019, p.12). These developments influenced an increased emphasis on understanding the underlying procurement characteristics of the categories of products acquired by the Navy.

Among the various categories of spending, Knowledge-Based Services (KBS) are among the fastest-growing services acquired by the Department of Defense (DOD) and are often some of the most difficult to manage (Hawkins, Nissen, & Rendon, 2014). To contend with global threats and protect its citizens and interests, the government requires complex information (Taylor, 2019). The acquisition of S&A services could be considered as one of the means in which crucially technical information is transferred between



government agents and private actors or contractors (Taylor, 2019). The resulting information from S&A services is provided to government decision-makers and ultimately has influence on the decisions they make (DFAR, 2019). As decisions become more complex, the importance of acquiring information also increases.

Studies, analyses, and evaluations services are those that support policy development, decision-making, management, or administration by providing ordered, analytical assessments of a critical area for which greater knowledge is useful. These services included “studies in support of R&D activities, acquisitions of models, methodologies, and related software supporting studies, analyses or evaluations” (FAR, 2019a, para. 2.101). S&A services are one category of Program Management Services—a subdivision of KBS or Advisory and Assistance Service (A&AS) acquisitions (Defense Acquisition University [DAU], n.d.). The value of new knowledge gained from S&A cannot be understated. For years, the Government Accountability Office (GAO) has pointed out that the acquisition of knowledge-based services does have an impact on improving the DOD’s program outcomes (Government Accountability Office [GAO], 2019). Effective knowledge management and acquisition of KBS by an agency can lead to competitive advantages (Hawkins et al., 2014). For the U.S. Navy to compete with its near peers like the People’s Liberation Army Navy (PLAN) and the Russian Navy, it must consistently outpace the peers’ combat knowledge. Acquiring KBS via S&A service contracts with field-expert contractors enables faster expansion of knowledge. The recommended results from S&A services provide support to the Navy’s strategic decisions, which are based on the U.S. National Security Strategy (NSS). Through the expansion of the U.S. Navy’s knowledge base and procurement of further KBS, the Navy can provide improved service to the nation (Rusly, Sun, & Corner, 2015).

Applying the mandated implementation of category management to this growing category of KBS poses unique challenges. Different organizations within the Navy have different strategies toward acquiring information for the decision they make, and advances in technology also create greater specialization and dispersion in the types of these critical S&A. The dispersion also complicates the effective categorization of types of S&A into similar types of services. Combining with varying levels of knowledge of contracting officers (CO) in category taxonomy and the vaguely categorizing taxonomy structure in



the Federal Procurement Data System— Next Generation (FPDS-NG) database creates more challenges to the categorization of S&A services.

To address these matters, understanding the current characteristics of knowledge being contracted is critical. A spend analysis of one agency’s contracting information can identify the types (or category) of KBS procured (Hawkins et al., 2014). Conducting a spend analysis on the acquisition data for S&A service has the purpose of identifying who issued the most S&A service contracts, how much the Navy spent on major categories, what the contracts were for, and which contractors have the majority of S&A service contracts.

Spend analysis is a starting block at the foundation of strategic sourcing and category management. Figure 1 shows this overall process, with a spend analysis providing the framework for developing a strategic sourcing strategy and ultimately effectively implementing category management. The category management approach uses strategic sourcing as a critical practice, of which a spend analysis is a tool to systematically analyze the clusters of similar items in the historical spend data of the organization (Defense Pricing and Contracting [DPC], 2018). This is done through supplier (contractor) hierarchies, commodity alignment, and dollar amounts to provide clusters to be strategically sourced (Pandit & Marmanis, 2008).

Further analysis of these data clusters provides information on the relevant buyers, contractors, and associated dollar values for particular products and services, so that opportunities for leveraged buying to save money and improve performance can be identified (GAO, 2015). The strategic sourcing process sets goals and monitors critical metrics to ensure utilization and identify that benefits are being achieved (GAO, 2015). An organization as a whole must act as a team to analyze and use what is found in order to improve buying power, market position, market knowledge, capabilities, and business decisions (DPC, 2018). This process consolidates similar items into a category to create a single procurement, which reduces time and redundancy (Pandit & Marmanis, 2008).



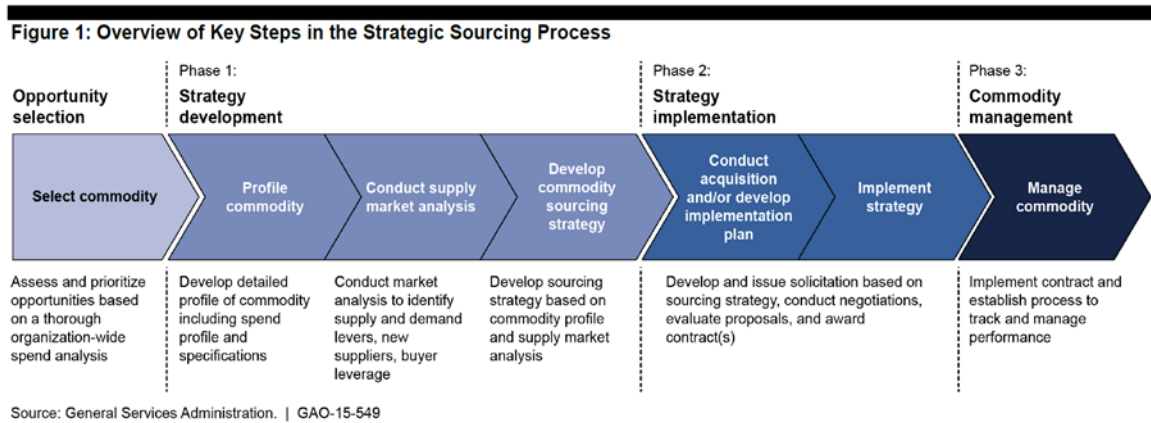


Figure 1. Overview of Key Steps in the Strategic Sourcing Process. Source: General Accountability Office, GAO-15-549 (2015).

Within the Navy, the Naval Supply Systems Command (NAVSUP) is the designated Department of the Navy (DoN) Strategic Sourcing Executive Agent (NAVSUP, 2010). Currently each Navy Acquisition Budget Submitting Office (BSO) at the Systems Command (SYSCOM) level is directed to “act for and exercise the authority of, the Navy Acquisition Executive to manage assigned programs and report directly to Assistant Secretary of the Navy, Research, Development, & Acquisition (ASN [RD&A]) for all matters pertaining to research, development, and acquisition” (Secretary of the Navy, n.d., p. 9). Currently, there are several offices within the Navy applying strategic sourcing practices; for example, NAVSUP has its Strategic Sourcing Program Management Office (SSPMO), and Naval Sea Systems Command (NAVSEA) has established the SeaPort Office (NAVSUP, n.d.; NAVSEA, 2001).

The growing importance of S&A services and the OMB-directed implementation of category management in procurement highlights the importance of obtaining a better understanding of this category of services. While the Navy has current efforts underway to accomplish the OMB directives, a spend analysis is pertinent to identifying where potential opportunities may exist for S&A procurement.

B. PURPOSE

The purpose of this research is to conduct a spend analysis to identify what the U.S. Navy is currently spending on S&A services. This will support recommendations focused



on leveraging the Navy's buying power, improving efficiencies, and managing its consumption of S&A services across the entire Navy.

C. RESEARCH QUESTIONS

The following are the primary research questions for this research.

1. Which U.S. Navy contracting offices are contracting for S&A services?
2. Which contractors are receiving these contracts?
3. How much has been spent on S&A by the U.S. Navy?
4. What are the characteristics of the S&A contracts issued by the Navy?

D. BENEFITS

The U.S. Navy can use the results of this research to understand the characteristics of the last 10 years of S&A service procurement. The knowledge gained from spend analysis results of S&A could be shared across the organization for better-integrated strategic sourcing, which ultimately supports the National Security Strategy. This increased category knowledge on S&A services has the potential to change how the Navy contracts for S&A services and to shorten the time requirement by removing extra steps in additional specifications and justifications for a new S&A requirement.

E. LIMITATIONS

A spend analysis and its results ultimately rely on the integrity of the underlying data. Our analysis is dependent on the data contained within the FPDS-NG database. The items affecting the accuracy of FPDS-NG data inputs are COs' experience, personnel turnover, sufficiency of requirement definition, communication between the government and the contractor during post-award, and limited lead time for the requirement (Hawkins & Muir, 2014). Further, the lexicons of FPDS-NG specific data fields and different levels of knowledge among users causes the misinterpretation of the meaning of codes and errors in use (Pandit & Marmanis, 2008). Defining the service of the S&A to a predefined nomenclature could be subjective to the CO and may result in different codes being used for contracts of the same type of S&A service.



COs may also procure S&A services as a Contract Line Item Number (CLIN). This action embeds spending for S&A services within a larger contract, which we cannot separately identify. Another limitation is that the actual amounts paid on contracts may differ from the obligated amounts after indirect rates are finalized or other administrative actions take place. This results in obligated amounts in FPDS-NG data possibly differing from the actual final amounts paid to contractors for S&A service contracts. Despite these limitations, our methodology is constructed to provide the most accurate information available.

F. METHODOLOGY

The research methodology involves conducting a spend analysis on relevant U.S. Navy contract actions obtained from FPDS-NG for the last 10 fiscal years. As a basis for conducting the analysis, we utilize information and knowledge contained in the Federal Acquisition Regulation (FAR), FPDS-NG manual, all pertinent acquisition websites, and academic literature. Our methodology addresses our selection criteria for identifying S&A contracts, cleansing of the database, and spend profiles from which we answer our research questions. The details of our methodology are expounded on in Chapter III of this research.

G. ORGANIZATION OF THE REPORT

This report comprises five chapters. Chapter I included the relevant background information, purpose, questions to be answered, benefits and limitations, and an introduction to our methodology. Chapter II contains a literature review of relevant academic articles. Chapter III outlines our methodology for collecting the data and conducting our spend analysis. In Chapter IV, we provide our spend analysis on the Navy's S&A service procurement. Chapter V completes this report and contains conclusions, recommendations, and areas for future research.

H. SUMMARY

This chapter provided relevant background on our examination into the characteristics of the U.S. Navy's acquisition of S&A services. It also introduced the project's purpose, research questions, possible benefits and limitations of this research,



methodology, and the organization of this report. The next chapter contains a literature review of academic work on the use of the FPDS-NG database, the uses of this database in spend analysis, strategic sourcing, and category management.



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II. LITERATURE REVIEW

This chapter provides the reader with scholastic work concerning the topics of S&A services (a subdivision of the KBS), category management, strategic sourcing, and spend analysis. First, we present the characteristics and reasoning behind the requirement for S&A. Then we explore the topics of category management, strategic sourcing, and spend analysis. Concluding this chapter are relevant current initiatives involving the DOD and potential future developments.

A. STUDIES AND ANALYSIS SERVICES

S&A services is a subdivision of KBS. The area of KBS is also commonly referred to as A&AS and are those services that necessitate a level of technical knowledge or professionalism in order for the results to be generated (DAU, n.d.). A&AS within the government taxonomy for products and services is a part of the super category for Professional Services.

Professional Services are defined as “services that are advisory, problem solving, and intellectual in nature and require advanced subject matter knowledge” (GSA, 2019a). A&AS are “those services provided under contract by nongovernmental sources to support or improve: organizational policy development; decision-making; management and administration; program and/or project management and administration; or R&D activities” (FAR, 2019a, para. 2.101). In addition, it also defined as “the furnishing of professional advice or assistance rendered to improve the effectiveness of Federal management processes or procedures (including those of an engineering and technical nature)” (FAR, 2019a, para. 2.101). As mentioned in Chapter I, S&A services are services which provide knowledge to support decision-making at a particular level. Acquiring new knowledge is often necessary to improve insight and increase capabilities. We discuss acquiring two types of knowledge, through tacit knowledge and explicit knowledge, in the next paragraph.

Tacit knowledge grows within an organization very slowly through experience and learning, but explicit knowledge can be achieved broadly and quickly through reading



material or by obtaining it from an external organization (Nissen, 2006). Ultimately, conducting an action and experiencing the associated learning with trial and error achieves more robust knowledge. However, the need to gain knowledge at a faster pace when faced with accelerated competition from a near-peer threat requires acquisition of S&A services for explicit knowledge. Although, organizations relying on explicit knowledge for a competitive advantage could be easily imitated by their competitors (Hawkins & Muir, 2014). The U.S. national security community observed that future weaponries must be greatly varied and complex to retain the U.S. domination of its military (Taylor, 2019). Creating varied and complex weaponries requires multiple fields of complex knowledge. To achieve this demand for explicit knowledge, the DOD has historically obligated more spending toward KBS than on major weapons systems (Sablan, 2011). To aid this increase in KBS spending, we discuss some of the organizations the DOD uses for S&A services.

Each branch of the military currently has its own efforts for obtaining external S&A services for its organizations. One such effort is through Federally Funded Research and Development Centers (FFRDCs), which are operated by universities, other not-for-profit, or nonprofit organizations. The DOD sponsors 10 FFRDCs. Within those 10 FFRDCs, it designates three FFRDCs as research and development labs. These three labs uphold continuing proficiencies of critical technology areas. The DOD also sponsors two systems engineering and integration FFRDCs and five S&A FFRDCs in addition to these labs (National Science Foundation, 2019). In fiscal year (FY) 2017, the Army invested \$53.7 million and the Air Force put forth \$32.9 million towards lab recapitalization projects, while Navy labs invested \$7.3 million (GAO, 2018). For the DOD, the five FFRDCs for S&A services are shown in Table 1.



Table 1. Federally Funded Research and Development Centers for Studies and Analysis. Adapted from National Science Foundation (2019).

| Name | Administrator | Location | Sponsor |
|-------------------------------------|--------------------------------|------------------|--|
| Systems and Analyses Center | Institute for Defense Analyses | Alexandria, VA | Office of the Under Secretary of Defense for Acquisition and Sustainment |
| National Defense Research Institute | RAND Corp. | Santa Monica, CA | Office of the Under Secretary of Defense for Acquisition and Sustainment |
| Project Air Force | RAND Corp. | Santa Monica, CA | Department of the Air Force |
| Arroyo Center | RAND Corp. | Santa Monica, CA | Department of the Army |
| Center for Naval Analyses | The CNA Corporation | Arlington, VA | Department of the Navy |

Beyond these FFRDCs, the military services each contract out to private companies to conduct S&A services. The GAO recommended in March 2014 that the DOD should officially manage their annual research requests by establishing a mechanism that requires the military services and other departmental offices to follow a standard procedure (GAO, 2017). This effort would reduce the S&A service overlap and duplication in research activities. While the DOD designated specific offices to formally manage research requests within each service, there is not always a requirement to coordinate among the designated offices (Cobert, 2014).

Some decision makers and organizations are able to facilitate consolidation of interests to avoid overlap and combine efforts to reach a shared organizational objective (Cobert, 2014). Despite the origination of the S&A requirement, finalized reports and studies are meant to be available through the Defense Technical Information Center (DTIC) for the entire DOD. The broad range of KBS and further S&A type requirements still makes it difficult to categorize them into like groups accurately in FPDS-NG data, which prevents external organizations from correctly identifying reports which may be useful to them. One significant difficulty in identifying the historical requirements for S&A services is the limitations of our current coding of requirements. In the next sections, we review the levels of the item categorizing process from top to bottom with category



management as the approach, strategic sourcing as the practice, and spend analysis as the tool.

B. CATEGORY MANAGEMENT

Category management is an approach of buying goods and services as one entity to remove duplicated efforts and ineffectiveness (OMB, 2019). According to the OMB, when the government is purchasing traditional requirements needed to meet common mission goals, it should operate on an enterprise level in place of hundreds of individual commands (OMB, 2019). Two major concerns regarding category management are categorizing taxonomy and limited competition.

To implement the view of the government being one enterprise requires stakeholders (from the spend data entry personnel at numerous agencies to multiple levels of strategic decision-makers) who use the FPDS-NG database to have one-enterprise understanding on the taxonomy used in categorization. Per Pandit and Marmanis (2008), the lexicon or taxonomy can be comprised of the concepts, instances, or relationship involved in the underlying product or service. Concepts are nomenclatures, qualifiers, attributes, units of measure, etc. Instances are combinations of elements of concepts into descriptions. Relationships are ordering of elements of concepts (Pandit & Marmanis, 2008). Pandit and Marmanis (2008) provided an example with the different meanings of two requirements, “Plasma Monitor” and “Monitor Plasma.” It is difficult for government agents and contractors who have different education, community focus, and variable background in taxonomy to have the exactly same interpretation of concepts, instances, and relationships when they categorize, input, or read the FPDS-NG data.

There are five stakeholder groups identified by GSA. They are personnel in the following groups: 1) government executive leadership and policy, 2) category management contributors, 3) agencies, 4) suppliers and industry, and 5) program oversight. Within each of these stakeholder groups, there are multiple layers of stakeholders. Appendix A displays stakeholders inside and outside of the government regarding category management (GSA, 2019a). Different stakeholders have different interpretations of taxonomy. For example, a description containing the acronym of “SCR” could be interpreted as “a screw, a silicon-



controlled rectifier, a satellite channel router, a single cable router, or several other items” (Pandit & Marmanis, 2008, p. 20–21). For stakeholders to classify “SCR” correctly, they must have intimate knowledge of the underlying industry to associate a full term to this abbreviation (Pandit & Marmanis, 2008).

Another consequence of category management implementation is its effect on competition. Over time the government has been procuring more services than goods from contractors (Taylor, 2019). This transition to information services, like S&A services, increases the relationship between the government agents and contractors from a short-transactional basis to a longer ongoing transactional relationship (Taylor, 2019). The long-term relationship trends toward using only a group of best in class (BIC) companies listed on the GSA website (GSA, 2019b). This long-term relationship based on BIC qualification limits the quantity of companies offering competitive bids (Rueda-Benevides & Ginsberg, 2014). An example of a complaint on the limited competition that results from the implementation of category management was from Beth Strum, Vice President of Business Development, IT WORKS. She testified to the House of Representatives that the BIC acquisition process did not assure full and fair competition and did not follow requirements in the FAR and Small Business Act, resulting in blocking thousands of small businesses from government contract opportunities guaranteed by Public Law 95-507 (*The impact of category management*, 2018). In the complaint, only around 200 out of 25,000 small businesses have IT service contracts that qualify as BIC. This BIC implementation within category management locks out 99% of small businesses from prime contractor competitive opportunities and results in damage on the small business industrial base (*The impact of category management*, 2018).

Conversely, the GSA noted in category management “Talking Points for the Small Business Community” that category management would not change the federal government’s commitment to meeting small business goals, which is a high priority, and is one of the key metrics that OMB and GSA use in assessing the program success (GSA, n.d.). Another counter to the limited competition complaint was that category management would not make pricing competition more difficult for small businesses because category management focuses on sharing of best practices, not specifically low pricing. Early identification of BIC contracts was largely the result of strong contract management



strategies being used. The resulting designations are further the result of contract outcomes as payments are made, performance is measured, and information regarding contract vehicles for a specific product or service type is made readily available (OMB, 2019). A contract solution qualifying as a BIC solution must meet a stringent set of standards that demonstrate that the strategies used are aligned with category and performance management and are validated by a third party (OMB, 2019). Ultimately, a category manager and the CMLC must provide recommendation of candidates of a prospective BIC contract for approval to the OMB based upon a collaborative, peer-reviewed, and consensus-driven process (OMB, 2019). The intent of BIC solutions is not to be applicable to all agencies or mandatory for use when making an acquisition strategy decision (OMB, 2019). In the end, the category management approach breaks down goods and services into categories to manage and uses strategic sourcing practices to allocate an organization's resources strategically to procure each category of goods and services.

C. STRATEGIC SOURCING

Strategic sourcing is a proactive procurement practice in supply management. In a 2005 article in the *Journal of Contract Management*, Associate Professor of Acquisition Management at the U.S. Naval Postgraduate School Rene G. Rendon explains that strategic sourcing serves to transition an organization's procurement strategy from a transaction-oriented approach to a strategic-oriented approach. He states that it has the goal to further the organization's competitive strategy by selecting the best contractors in each category of goods or services "whose costs, qualities, technologies, timeliness, dependability, and service align with the organization's needs" (Rendon, 2005, p. 9). As explained in the article, a sourcing strategy is not all-encompassing for every category of goods or services an organization procures, but it has unique characteristics that shape its own sourcing strategy.

According to a 2013 GAO report, there are four general strategic sourcing tactics in procurement and they are leveraging scale, standardizing requirements, prequalifying suppliers (contractors), and understanding cost drivers. The GAO recognized that the four tactics are primarily based upon the complexity of the requirement and whether there are few contractors or many contractors, but may be used across categories. It explains that



private companies prequalify suppliers (contractors) for KBS that have many suppliers (contractors), while when there are limited suppliers it is more important to understand the cost drivers for a particular KBS. The report provides examples of KBS with many contractors, such as the areas of information technology, legal, and financial services. For KBS with few contractors, examples are engineering, management support, and research and development services. Figure 2 adapted from the 2013 GAO report provides more detail of the strategies for KBS. In the application of these strategies, three challenges are attaining reliable data for examination of spending in detail, obtaining leadership support, and applying strategic sourcing into procurement (GAO, 2013).

| Knowledge-based services | |
|---------------------------------|---|
| Few suppliers | <ul style="list-style-type: none"> • Understand individual element cost drivers to negotiate better rates • Streamline requirements to reduce complexity • Recruit skilled procurement talent • Increase senior management visibility to ensure progress against goals and metrics • Target executive-level relationships with suppliers to improve influence and collaboration • Develop new suppliers • Utilize third-parties to benchmark supplier rates against comparable suppliers |
| Many suppliers | <ul style="list-style-type: none"> • Prequalify suppliers by skill-level, risk, and rates to eliminate non-competitive companies • Prioritize suppliers based on effectiveness and efficiency to maintain informed database and obtain better rates • Collaboratively determine point at which reduction in price may diminish quality of performance • Continually measure, track, and manage suppliers to ensure optimal performance |

Source: GAO analysis based on company interviews.

Note: Some tactics may be used across multiple categories.

Figure 2. Strategic Sourcing Tactics for Knowledge-Based Services.
Source: Government Accountability Office, GAO-13-417 (2013).

Ultimately, the strategic sourcing strategy adopted by the DOD should aim to support some element of the strategy outlined in the National Defense Strategy (NDS). In the next section, we focus on the main tool of this research, Spend Analysis.



D. SPEND ANALYSIS

As defined by the GAO, a spend analysis “is a tool that provides knowledge about who are the buyers, who are the contractors, how much is being spent for what goods and services, and where are the opportunities to leverage buying power” (GAO, 2004). Spend analysis is the foundation of strategic sourcing in practice. Based on Figure 1 in Chapter I, spend analysis is the first two steps of strategic sourcing, which is the process of gathering and analyzing historical expenditure data to provide a comprehensive view of the organization’s spending behavior. This enables the organization’s decision-makers to see whether the character of spending supports or furthers the organizational strategy (Taylor, 2019). Defense Acquisition University (DAU) breaks down a spend analysis into a two-phase process, as shown in Figure 3.

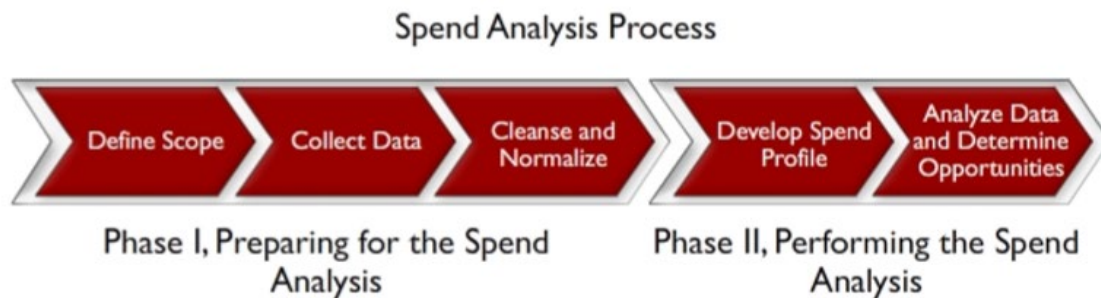


Figure 3. Spend Analysis Process. Source: DAU (2019).

The purpose of a spend analysis is to identify supplies or services where the organization could reduce costs through strategic sourcing efforts (Bunting, 2013). After Congress authorizes and appropriates funding to agencies, the contracting offices within the agencies obligate funds by entering into contracts for goods and services. The COs report these obligations in the FPDS-NG database. Expenses on government contracts occur when Defense Finance and Accounting Services (DFAS) issue Treasury checks, a CO approves electronic fund transfers, or Disbursing Officers disburse cash. The decision-makers in all Navy organizational levels and in the legislative branch use the FPDS-NG data to plan for future budgeting, identify benefits, explore opportunities, select best practices, and minimize challenges before developing the enterprise’s strategic sourcing

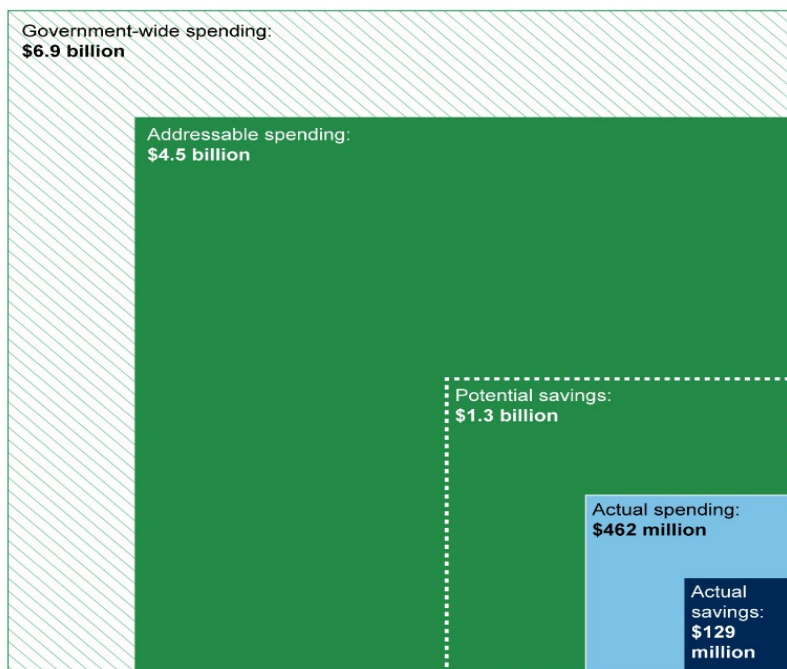
plans (Schwartz, Sargent, & Mann, 2015). The following sections present some of the benefits, best practices, and challenges in conducting a spend analysis.

1. Benefits

There are four main benefits of the use of spend analysis. They are cost-effectiveness, cycle-time, process efficiency, and staff productivity (Partida, 2012). The spending data of all contracts could be categorized to help decision-makers in all levels of the government to understand characteristics of past procurement and to adopt strategies in future procurement. Some integral enterprise-level benefits are the ability to identify unit performance variations, trends, cross-unit comparisons, and opportunities for leverage buying power that will result in greater process understanding, ability to see threats, and continuous improvement (Ger, 2012). Bunting (2013) provided an example of the U.S. Navy procurement of Microsoft software licenses. With the signing of this agreement, it is conceivable that the DOD will negotiate a single license for Microsoft software as well. An enterprise license of this scale would allow the DOD to drive down purchase prices “as one of the largest enterprises in the world using Microsoft operating systems and software” (Bunting, 2013, p. 567).

In April 2013, the GAO observed that major corporations’ procedures that minimize costs and maximize the value of services have applicability to be implemented by federal agencies. In the same 2013 report, they commented that government entities such as the DOD that make large procurements use strategic sourcing to only leverage a small portion of their buying power. They went on to note that agencies like the DOD faced significant challenges in obtaining “reliable data on spending, securing leadership support, and applying this approach to acquiring services” (GAO, 2013). Further, in 2018, the GAO highlighted the opportunity that exists across the entire government for \$1.3 billion in savings (as shown in Figure 4) if they were able to conduct accurate spend analysis for implementation of strategic sourcing vehicles (GAO, 2018).





Source: GAO analysis of General Services Administration data. | GAO-18-627

Figure 4. 2015 Actual and Potential Spending and Savings through Strategic Sourcing Vehicles. Source: GAO (2010).

2. Best Practices

Based on the GAO’s finding on KBS with many and few contractors, the two common strategies in dealing with these two characteristics are prequalifying contractors and understanding cost drivers. Therefore, we would home in on best practices of prequalifying contractors and understanding cost drivers for KBS or S&A services in particular.

For the prequalifying contractor strategy, the OMB uses the BIC acquisition designation. The selected contractors on the BIC list went through demanding criteria, including demonstrated use of category and performance management strategies and third-party validation (OMB, 2019). BIC organizations not only follow the normal steps shown in Figure 3 for the spend analysis process, but also use spend analysis as a projecting measure to improve spending compliance and reduce supplier (contractor) risk through market and supplier (contractor) data (Limberakis, 2012).



The understanding of cost driver strategy has two phases, in pre-award environment as industry engagement and post-award environment as contractor management (OMB, 2019). Tactics in pre-award environment proceed by industry engagement, market research, market intelligence, and use of industry days or forums or requests for proposals (RFPs) to solicit industry feedback (OMB, 2019). Tactics in post-award environment are ongoing engagement with contractors and other government agencies. The following section addresses the challenges in implementing spend analysis.

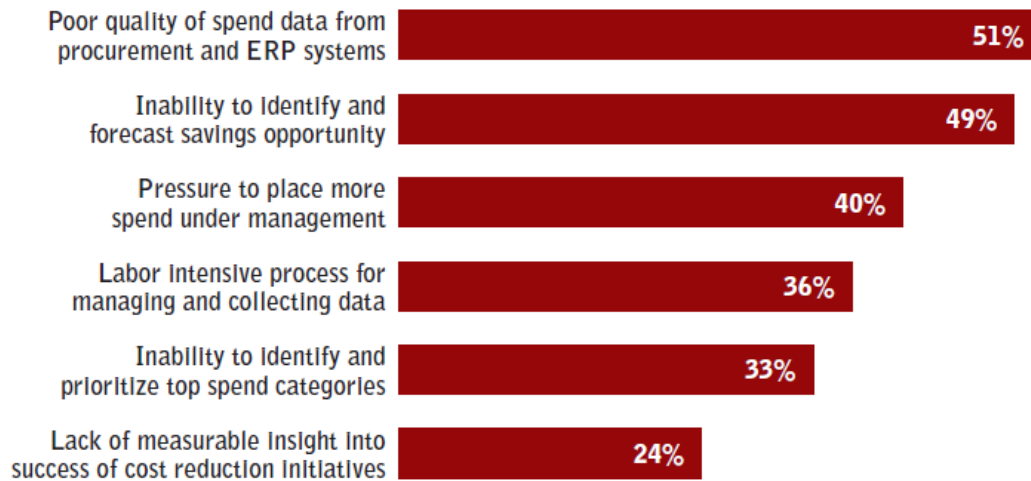
3. Challenges

Contractors have been conducting spend analysis for decades; however, many still struggle to gain the enterprise-level spend visibility because of their inability to accurately manipulate and interpret the data they have available (Bush, 2017). Similarly, this is a challenge for the DOD because of the accuracy and limitations of FPDS-NG data. This data in practice is accurate in recognizing wide-ranging trends and rough assessments (Schwartz et al., 2015). Three major concerns about the FPDS-NG data are: 1) consistency and accuracy of the data can vary (Bunting, 2013; Schwartz et al., 2015), 2) only one main FSC/PSC can be posted in FPDS-NG for complex requirements (Bunting, 2013), and 3) slightly different query's boundaries or parameters of the data will provide different results, which affect decision-makers' understanding of each spend analysis (Schwartz et al., 2015).

It has also been noted that when private companies utilize more than three systems for generating spend data, the quality of data is poor (Limberakis, 2012). Having multiple data sources results in data incompatibility, which impedes an accurate spend analysis, so improving the process of data integration for extracting data is of critical importance for a spend analysis (Limberakis, 2012). Figure 5 lists some of the other top pressures for organizations in conducting an accurate spend analysis.



Top Pressures for Spend Analysis Initiatives



Source: Aberdeen Group, September 2011

Figure 5. Top Pressures for Spend Analysis Initiatives. Source: Aberdeen Group (2011).

E. SUMMARY

This chapter presented background based upon scholastic work concerning the topics of S&A services (a subdivision of the KBS), category management, strategic sourcing, and spend analysis. Presented were the characteristics and reasoning behind the requirement for S&A and then the topics of category management, strategic sourcing, and spend analysis. The next chapter presents a discussion of our methodology for conducting our spend analysis.



III. METHODOLOGY AND DATA ANALYSIS

The purpose of this chapter is to explain the methods used to obtain data and our procedures used in conducting the research. We collected our data from the FPDS-NG databases utilizing the Product Service Codes (PSC) to identify the product, and also by the North American Industry Classification System (NAICS) that designated the industry as being relevant to S&A services. The scope of our research is defined at the organizational level as the DoN, and our portfolio scope is identifying the spend involving S&A. This chapter outlines how we collected the data, our process for cleaning and categorizing the data for the creation of portfolio groups based upon certain codes, an overview of the metadata, and the spend profile categories that are analyzed in Chapter IV.

A. DATA COLLECTION

In order to conduct a spend analysis and answer our research questions, we need to retrieve historical contract data. There are multiple acquisition-related databases designed to facilitate acquisitions through the various stages of planning, solicitation, award, administration, and contract closeout (GAO, 2012). For the purposes of our research, we are trying to answer questions involved with contract award data. The Federal Acquisition Regulation (FAR) designates FPDS-NG as the system of record for federal procurement data, and FAR 4.603(b) (FAR, 2019b) states,

Executive agencies shall use FPDS to maintain publicly available information about all unclassified contract actions exceeding the micro-purchase threshold, and any modifications to those actions that change previously reported contract action report data, regardless of dollar value.

In addition, FPDS-NG is the reporting database from which presidential and congressional reports retrieve data for use in measuring the effectiveness of federal contracting (FAR 4.602(a)) (FAR, 2019c). In line with this regulation, we use the FPDS-NG database for retrieval of data for our analysis. For our data analysis, the term *contract action* represents any unique issuance including modifications, awards, and indefinite-delivery contracts. When referring to contract awards, modifications and ordering vehicles are excluded to identify unique awards. Using the FPDS-NG database, we extracted all



contract actions executed by the Navy during the 10 years from the beginning of FY2009 to the end of FY2018. These actions were identified by the agency code of 1700, which represents the DoN as either the contracting office or the funding agency.

B. SELECTION CRITERIA FOR PORTFOLIO GROUPS

There are multiple coding requirements used to assist the federal government in identifying and classifying the products and services contracted. In order to answer our research questions regarding how the Navy contracts for S&A services, we need to be able to identify the underlying product or service being acquired. The three primary classification systems used by the federal government to identify and classify a contract action and its associated business sector according to economic activity are 1) the Federal Supply Classification (FSC) for supplies, 2) Product Service Codes (PSCs) for services, and 3) North American Industry Classification System (NAICS) for the business sector (Bunting, 2013). For purposes of conducting a spend analysis, the spend data is categorized in the FPDS-NG database by the FSC/PSC and NAICS classification codes (Bunting, 2013). As S&A contracts are a service, we extracted contracts identified by PSC and NAICS as being relevant to S&A services.

1. Product Service Codes

PSCs are four-digit alphanumeric codes managed by the GSA specifically for reporting in FPDS-NG. The first alphabetic digit of a PSC categorizes services procured by the government, such as those beginning with B are for “Special Studies and Analyses—Not R&D” (GSA, 2019). For our research, this most clearly identifies the contracts falling into our desired category for analysis.

Further, GSA provides a government-wide taxonomy for aligning PSCs to specific categories. There are 10 government-wide categories designated for services designed to create a structure for implementation of category management processes. Within this taxonomy, the code containing S&A falls under the code 2.3 for Professional Services—Management Advisory Services. Beyond containing all B codes (except B548—Special Studies/Analysis—Trade Issue, which is in 2.7 for Trade Policy Services), this also includes codes beginning with letter A and ending with a 6 (A__6) and 14 codes beginning with R



(GSA, 2019). Appendix 1 lists all 161 PSC codes with their description contained in Professional Services—Management Advisory Services.

2. North American Industry Classification System (NAICS)

NAICS is an industry classification system used by North American Trade Agreement (NAFTA) countries to group establishments into consistent categories based upon the similarity of their economic activity to collect and analyze information (OMB, 2017). The first two digits in the NAICS structure represented the economic sector. Subsequent digits represent subsectors for more specific industry groups (OMB, 2017). To answer our research questions, we identified four industry groups whose classification designates them as applicable. Of these, we omitted contract actions with an all-numeric PSC/FSC, as this designated them as being for a supply.

Sector 541 is for Professional, Scientific, and Technical Services. Within this sector, we chose the following industry groups, as their description most clearly identifies them as being in an industry capable of conducting studies and analysis (OMB, 2017):

| | |
|--------|---|
| 5413** | Architectural, Engineering, and Related Services |
| 5416** | Management, Scientific, and Technical Consulting Services |
| 5417** | Scientific Research and Development Services |
| 54199* | Other Professional, Scientific, and Technical Services |

With this selection criterion, we now provide a description of the metadata and some of the characteristics that will influence the database we use in our analysis in Chapter IV.

C. CHARACTERISTICS OF METADATA

The Navy issued 5,074,157 contract actions representing \$1,012,347,042,109 in obligations (net de-obligations) in the last 10 years across all 10 common government spending categories. For the purposes of our research, we extracted those contract actions to acquire S&A based upon their reported PSC or NAICS as previously discussed.

The PSC data set for Management Advisory Services (2.3) included 119,969 contract actions. According to their description, the three distinct letter codes in this



taxonomy reflect unique types of Management Advisory Services, which are a type of KBS. The A__6 PSC are management support of research and development efforts and the selected R codes fall under the broader category of all other management support. Further, those actions represented by the selected R PSC made up 92,434 or 77% of the total PSC dataset, and any combined analysis would be skewed by these contract actions.

The selected NAICS data set included 679,872 contract actions. Within the NAICS database, only 89,992 contract actions contained our selected PSC for Management Advisory Services, representing only 13% overlap. The remaining 87% of this NAICS data set included contract actions from a wide variety of PSC classifications most clearly not applicable toward S&A based upon their descriptions. Therefore, analysis from the industry perspective by NAICS is deemed unable to provide a detailed enough focus for our research.

After analysis of the metadata, we determined that the focus of the research would be done on the contract data represented by the PSC B dataset. This data set contained 20,229 contract actions. The 45 PSCs in this data set most clearly reflect S&A in their descriptions, which is the target of our research purposes. While we acknowledge that there is likely some spend in the other PSC categories toward types of S&A, including them would provide too broad of a category to answer our research questions accurately. We use the PSC B dataset to answer our research questions, and tables for the results from the other data sets can be found in Appendix B.

D. DESCRIPTION OF MEASURES

To answer our research questions, we measure the contracting offices and contractors by two measures, first, by obligated amounts in terms of dollars and second, by number of awards. To obtain the number of awards, we filtered out all modifications and indefinite delivery vehicles (IDV) so that these totals included only individual awards and task orders. Obligation totals include all modifications, as modifications often add or deduct obligations to a contract award. Further, it is noted that when looking at obligated amounts for a given time period, it will be toward contracts awarded in prior or current years and only reflect the year they were obligated. In comparing obligations by year, we



adjusted dollar amounts for inflation utilizing the Producer Price Index (PPI) by Commodity for Professional Services: Management, Scientific, and Technical Consulting Services (WPU454). The PPI data was obtained from the Economic Research Division of Federal Reserve Bank of St. Louis.

Last, in identifying unique contractors we used the data field for their Data Universal Numbering System (DUNS). In looking at the metadata, there were inconsistencies in other fields identifying the contractor by name or Commercial and Government Entity Code (CAGE) that made them unreliable for analysis. By utilizing the DUNS number, we were able to categorize contract actions to a specific entity despite changes in name or address over the 10-year time frame of our dataset.

E. SUMMARY

In this chapter, we explained how the data was collected, selected, and organized for analysis. Our data was selected based upon relevant PSC and NAICS codes that identify them as being within our scope of S&A services and extracted from the FPDS-NG database. Within the DoN, our analysis of the metadata determined the focus of our research will be on the portfolio with a PSC of B. Finally, this chapter explained measures for analysis as they are used in Chapter IV, which presents our results and the findings of this analysis.



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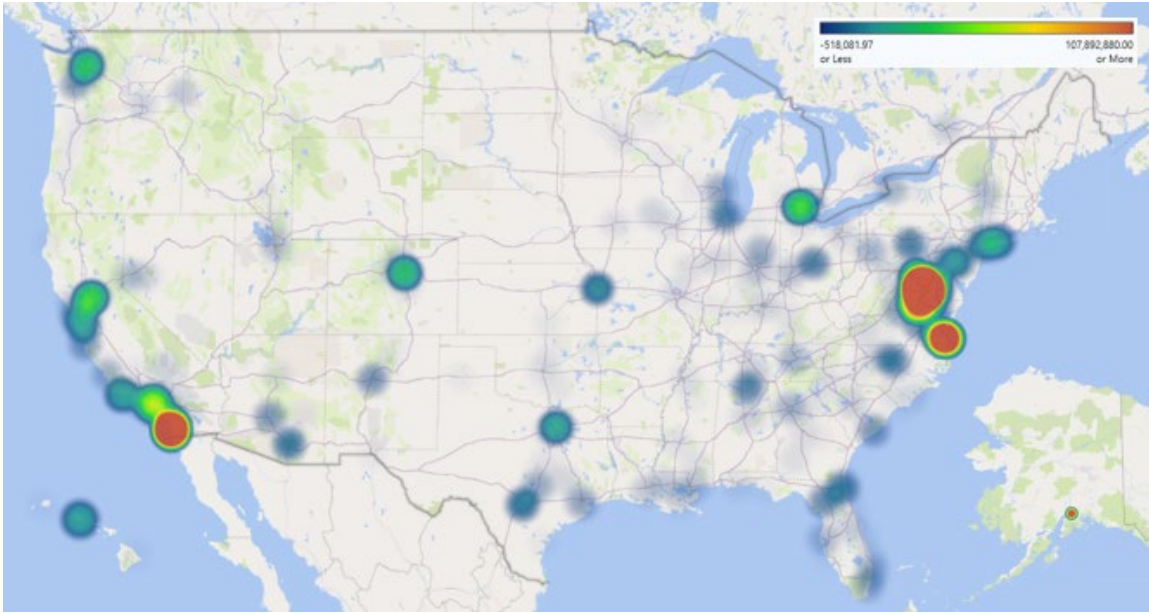
IV. RESULTS AND ANALYSIS

The purpose of this chapter is to present the results of the spend analysis on the Navy's S&A contract data utilizing the methodology discussed in Chapter III. This chapter is organized by presenting the results of analysis through a general analysis and from the perspective of the contracting offices, contractors, spending by S&A types, and overall characteristics. It concludes with a discussion of the results.

A. GENERAL ANALYSIS

The PSC B category includes 46 distinct service codes specifically for special S&A. One special S&A code, B548—Trade Issues, was not included in this data set as it is not included in the government-wide Category Management Taxonomy for Professional Management Services. Further, the Navy contracting offices did not use two PSC B codes over the last 10 fiscal years. They were B520—Grazing/Range and B530—Seismological. The most prevalently used codes are B54—Defense and B599—Other. These two codes contributed to 73.25% of the total obligations. The geographic locations of performance in terms of obligated amounts are also centered around the Washington, DC, Norfolk, VA, and San Diego, CA, areas, as depicted in the heat map shown in Figure 6.





Map created in Microsoft Excel with data retrieved from FPDS-NG, August 9, 2019, <https://www.fpds.gov/>.

Figure 6. Place of Performance Heat Map by Obligation

B. CONTRACTING OFFICES

The top 10 contracting offices for S&A services accounted for 87.89%, or \$2,668,229,487 of the overall total obligated amount in the past decade. NSWC Dahlgren and the Office of Naval Research (ONR) were the two leading contracting offices in terms of obligated amounts. The NSWC Dahlgren contracting office obligated \$1,058,707,644, or 34.88% of the total spending on S&A. NSWC Dahlgren’s top five awarded contractors were BAE Systems Technology Solutions & Services, Lockheed Martin Integrated Systems, WFI Government Services Incorporated, Tatitlek Training Services, and Science Applications International Corporation. These five contractors received 58% of the obligated amount from NSWC Dahlgren, or \$621,602,042 out of \$1,058,707,644. With almost the same amount, the ONR obligated \$978,708,726 or 32.24% on S&A services. However, the ONR’s obligations were highly concentrated, with 98.8% of its obligations going to the CNA Corporation, which is a Federally Funded Research & Development Center (FFRDC).

Together the top two contracting offices were responsible for over 65% of S&A spending, while no other contracting office obligated more than 5% of the Navy’s spending

on S&A. Table 2 shows the top 10 contracting offices by obligated amounts, with their overall percentage of the total obligated amount.

Table 2. Obligations by Top 10 Contracting Offices

| Contracting Office | Total Obligated Amount | % of Obligated Total |
|---|------------------------|----------------------|
| N00178–NSWC DAHLGREN | \$1,058,707,644 | 34.88% |
| N00014–OFFICE OF NAVAL RESEARCH | \$978,708,726 | 32.24% |
| N62473–NAVFAC SOUTHWEST | \$133,600,205 | 4.40% |
| N00189–NAVSUP FLT LOG CTR NORFOLK | \$111,487,345 | 3.67% |
| M00264–COMMANDER [MARINE CORPS BASE QUANTICO REGIONAL CONTRACTING OFFICE] | \$107,249,372 | 3.53% |
| N00039–NAVAL INFORMATION WARFARE SYSTEMS | \$84,166,234 | 2.77% |
| N00024–NAVSEA HQ | \$57,357,683 | 1.89% |
| N68936–NAVAL AIR WARFARE CENTER | \$55,846,532 | 1.84% |
| N62470–NAVAL FAC ENGINEERING CMD ATLANTIC | \$43,240,577 | 1.42% |
| W91C9G –W2R2 USA ENGR R AND D CTR | \$37,865,163 | 1.25% |

Data retrieved from FPDS-NG, August 9, 2019, <https://www.fpds.gov/>.

In terms of the number of new awards, the top 10 contracting offices issued 3,211 contracts, or 75.24% of the Navy’s total S&A contracts. While NSWC Dahlgren spent the most on S&A services, the ONR was the contracting office that issued the greatest number of contract awards on S&A services. The ONR issued almost one third of all S&A contract awards over the last 10 years. Similarly to their obligations, the awards by the ONR were heavily concentrated, with the CNA Corporation receiving 98.2% of contract awards issued.

Table 3 below shows that there was a significant gap between the ONR and the other contracting offices in terms of number of new awards. Naval Facilities Engineering Command (NAVFAC) Southwest issued the second most awards, with 14.01% in the past decade. The top five contractors of NAVFAC Southwest were Far Western Anthropological Research Group, Tierra Data Incorporated, ASM Affiliates, HDR Environmental Operations and Construction, and Jones and Stokes Associates. These five



contractors received 53.8% of NAVFAC Southwest contract awards. It was noteworthy that within the top 20 contracting offices, there were 10 NAVFACs.

Table 3. Number of Awards by Top 10 Contracting Offices

| Contracting Office | Number of Awards | % of Total Awards |
|---|------------------|-------------------|
| N00014–OFFICE OF NAVAL RESEARCH | 1414 | 33.13% |
| N62473–NAVFAC SOUTHWEST | 598 | 14.01% |
| N00189–NAVSUP FLT LOG CTR NORFOLK | 376 | 8.81% |
| M00264–COMMANDER [MARINE CORPS BASE QUANTICO REGIONAL CONTRACTING OFFICE] | 156 | 3.66% |
| N62742–NAVFAC PACIFIC | 144 | 3.37% |
| N68936–NAVAL AIR WARFARE CENTER | 136 | 3.19% |
| N00178–NSWC DAHLGREN | 123 | 2.88% |
| N00173–NAVAL RESEARCH LABORATORY | 101 | 2.37% |
| N62470–NAVAL FAC ENGINEERING CMD ATLANTIC | 87 | 2.04% |
| N40083–NAVFAC MIDWEST | 76 | 1.78% |

Data retrieved from FPDS-NG, August 9, 2019, <https://www.fpds.gov/>.

The top 10 contracting offices in Table 2 worked with 426 contractors in total. The contracting offices shared only 17 out of 426 contractors in the past 10 years, and each of these 17 contractors had four or fewer contracts with the top 10 contracting offices. Next, we will analyze this from the perspective of the contractors conducting S&A services.

C. CONTRACTORS

The top 10 contractors for S&A services received 58.96% or \$1,790,077,047 of the overall total obligated amount in the past decade. The CNA Corporation received the majority by a wide margin, accounting for 31.87% of the Navy’s obligations for S&A services. BAE Systems Technology Solutions & Services had the second largest S&A obligations with 6.54%. For a majority of the contractors receiving the most in terms of obligations, this only represents a small number of contract awards. For the companies in the top 10, seven of them conduct almost all of their S&A services on contracts issued by NSWC Dahlgren. Table 4 shows the top 10 contractors by obligated amount along with their percentage of the total obligations.



Table 4. Obligations Received by Top 10 Contractors

| Contractor | DUNS | Total Obligated Amount | % of Obligated Total |
|---|-----------|------------------------|----------------------|
| THE CNA CORPORATION | 622051969 | \$967,513,688 | 31.87% |
| BAE SYSTEMS TECHNOLOGY SOLUTIONS & SERVICES INC. | 103933453 | \$198,466,950 | 6.54% |
| LOCKHEED MARTIN INTEGRATED SYSTEMS, INC. | 780820002 | \$135,061,071 | 4.45% |
| KRATOS DEFENSE & ROCKET SUPPORT SERVICES, INC. (FORMERLY WFI GOVT SERVICES) | 786250902 | \$117,106,363 | 3.86% |
| TATITLEK TRAINING SERVICES, INC. | 789379406 | \$87,971,277 | 2.90% |
| BOOZ ALLEN HAMILTON INC. | 006928857 | \$72,359,126 | 2.38% |
| RGS ASSOCIATES, INC. | 180547119 | \$54,641,191 | 1.80% |
| SCIENCE APPLICATIONS INTERNATIONAL CORPORATION | 078883327 | \$54,390,100 | 1.79% |
| COMPUTER SCIENCES CORPORATION | 043991108 | \$52,329,875 | 1.72% |
| PAE NATIONAL SECURITY SOLUTIONS (FORMERLY A-T SOLUTIONS) | 106748192 | \$50,237,400 | 1.65% |

Data retrieved from FPDS-NG, August 9, 2019, <https://www.fpds.gov/>.

Corresponding to the CNA Corporation receiving the highest dollar value as a S&A service provider, it also received the largest number of awards by a wide margin. Out of the Navy's 4,268 S&A service contract awards, the CNA Corporation accounted for 1389 contracts or 32.54%. The second highest awardee was Far Western Anthropological Research Group, which received only 121 contracts or 2.84% of the entire Navy's S&A contracts. The remaining eight in the top 10 accounted for only 11.53% of the Navy's contracts in the same period. Table 5 displays the top 10 contractors by number of awards received.



Table 5. Number of Awards by Top 10 Contractors

| Contractor | DUNS | Award Count | % of Total Awards |
|---|-----------|-------------|-------------------|
| THE CNA CORPORATION | 622051969 | 1,389 | 32.54% |
| FAR WESTERN ANTHROPOLOGICAL RESEARCH GROUP, INC | 139768881 | 121 | 2.84% |
| ASM AFFILIATES INC | 115338600 | 78 | 1.83% |
| EPSILON SYSTEMS SOLUTIONS INCORPORATED | 035529804 | 77 | 1.80% |
| HDR ENVIRONMENTAL | 785918954 | 72 | 1.69% |
| TIERRA DATA INCORPORATED | 153911326 | 71 | 1.66% |
| JONES AND STOKES ASSOCIATES | 071555015 | 55 | 1.29% |
| PREVAILANCE, INC | 175311393 | 52 | 1.22% |
| SOUTHEASTERN ARCHAEOLOGICAL RESEARCH INC | 942054461 | 44 | 1.03% |
| PACIFIC CONSULTING SERVICES | 132917142 | 43 | 1.01% |

Data retrieved from FPDS-NG, August 9, 2019, <https://www.fpds.gov/>.

The contractors for S&A services in terms of both award count and obligations displayed a strong pairing characteristic with specific contracting offices, for example, the CNA Corporation with the ONR and BAE Systems Technology Solutions & Services with NSWC Dahlgren. The only contractor within the top 10 who received S&A contracts in significant amounts from multiple contracting offices was Booz Allen Hamilton. After looking at the spending from the contracting office and contractor perspective, we now look at it from the view of the different categories of S&A based on their PSC.

D. SPENDING ON CATEGORIES OF STUDIES AND ANALYSIS

The Navy contracts for various S&A services to receive an explicit type of knowledge that they have determined there is a need for and that they cannot develop on their own. In doing so, the contractor who performs this service gains a tacit knowledge with which they can gain a particular expertise in a particular type of S&A. In looking at the various types of S&A, there will naturally be different characteristics based upon the complexity and level of specialization required to conduct certain S&A services. Table 6 displays the top five contractors in terms of overall obligated amounts under each of the five largest types of S&A services acquired along with their overall percentage.



Table 6. Obligations for Top Five Contractors by Category

| PSC Description and Contractors awarded in Special Studies/Analysis | DUNS | Obligated Amount | Percent |
|---|-----------|------------------------|---------------|
| B541— DEFENSE | | \$1,855,838,472 | 61.14% |
| THE CNA CORPORATION | 622051969 | \$967,513,688 | 31.87% |
| LOCKHEED MARTIN INTEGRATED SYSTEMS | 780820002 | \$132,876,140 | 4.38% |
| WFI GOVERNMENT SERVICES INCORPORATED | 786250902 | \$116,089,535 | 3.82% |
| TATITLEK TRAINING SERVICES, INC. | 789379406 | \$87,971,277 | 2.90% |
| BAE SYSTEMS TECHNOLOGY SOLUTIONS | 103933453 | \$53,897,784 | 1.78% |
| B599— OTHER | | \$367,597,613 | 12.11% |
| GROUP W INC. | 143980741 | \$43,258,999 | 1.43% |
| BOOZ ALLEN HAMILTON INC | 006928857 | \$35,721,133 | 1.18% |
| SOUTHEASTERN COMPUTER CONSULTANTS | 074418872 | \$25,971,708 | 0.86% |
| NORTHROP GRUMMAN SPACE&MISSION | 152791505 | \$21,543,693 | 0.71% |
| EPSILON SYSTEMS SOLUTIONS MISSION SOLUTIONS GROUP, INC | 078319566 | \$16,867,898 | 0.56% |
| B504— CHEMICAL/BIOLOGICAL | | \$200,973,202 | 6.62% |
| BAE SYSTEMS TECHNOLOGY SOLUTIONS | 103933453 | \$144,569,166 | 4.76% |
| A-T SOLUTIONS, INC. | 106748192 | \$50,237,400 | 1.65% |
| C K ANALYTICS INCORPORATED | 874763345 | \$1,819,153 | 0.06% |
| EG&G TECHNICAL SERVICES, INC | 083070925 | \$1,492,000 | 0.05% |
| FAR WESTERN ANTHROPOLOGICAL RESEARCH | 139768881 | \$792,054 | 0.03% |
| B510— ENVIRONMENTAL ASSESSMENTS | | \$117,249,495 | 3.86% |
| TETRA TECH, INC. | 789111697 | \$42,091,581 | 1.39% |
| TETRA TECH, INC. | 045224250 | \$10,689,062 | 0.35% |
| HDR ENVIRONMENTAL INC. | 118805659 | \$7,732,327 | 0.25% |
| GEO-MARINE AND AECOM JOINT VENTURE | 078415576 | \$7,040,186 | 0.23% |
| ENGINEERING-ENVIRONMENTAL MGMT | 785918954 | \$6,149,680 | 0.20% |
| B550— ORG/ADMIN/PERSONNEL | | \$83,618,168 | 2.75% |
| RGS ASSOCIATES, INC. | 180547119 | \$54,641,191 | 1.80% |
| TECHFLOW, INC. | 014125442 | \$7,222,688 | 0.24% |
| BOOZ ALLEN HAMILTON INC | 006928857 | \$5,875,747 | 0.19% |
| BEARINGPOINT, INC | 014097146 | \$2,893,827 | 0.10% |
| II CORPS CONSULTANTS, INC. | 166755814 | \$2,169,652 | 0.07% |

Data retrieved from FPDS-NG, August 9, 2019, <https://www.fpds.gov/>.

There are 22 contractors represented in Table 6, and only two contractors are shown as major contractors for more than one type of S&A. These companies are BAE Systems Technology Solutions & Services, and Booz Allen Hamilton. BAE performed in B541 and B504. Booz Allen Hamilton had contracts in B599 and B550.

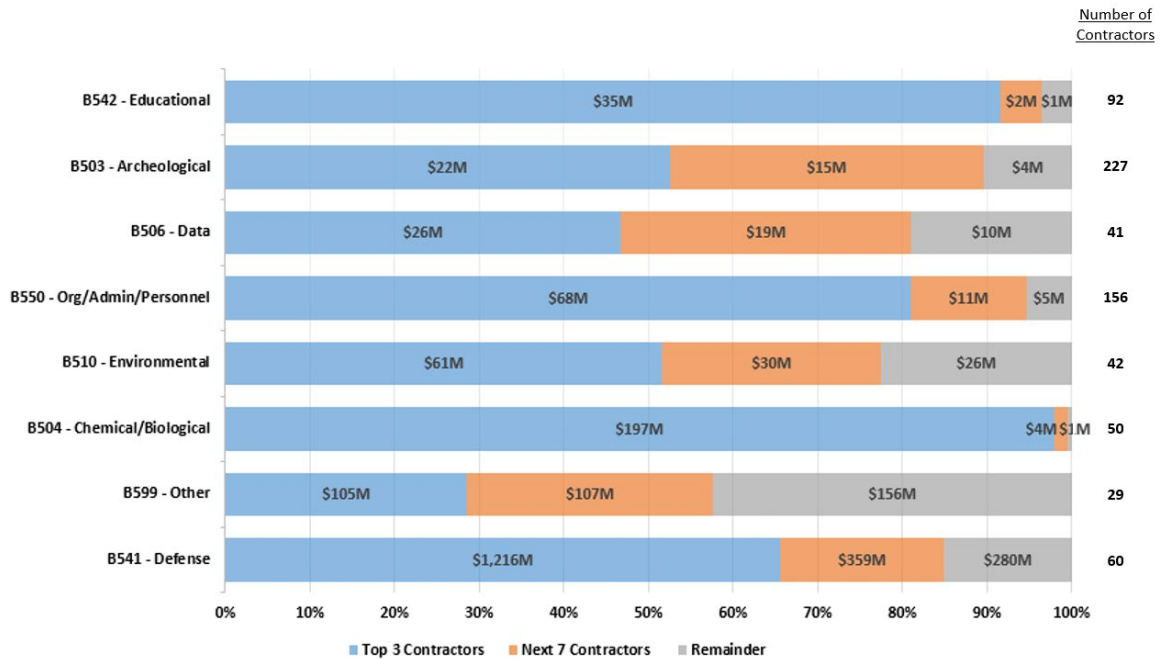


B541—Special Studies/Analysis Defense is the dominant category for S&A services, accounting for 61.14% of all the Navy’s S&A. This was largely accounted for by the contracts between ONR and the CNA Corporation as previously discussed. However, the imprecise description of “Defense” for this category makes it difficult to assume that all S&A in this field are comparable or in the same field of study. This is even more true for the second most used category in terms of obligated amount, B599—Special Studies/Analysis Other. This category for “Other” is a catch-all and therefore can be assumed to cover a wide segment of specialized S&A services for which a more precise category does not exist. For the companies we noted as appearing in more than one segment, the only other segment was one of these two imprecise categories.

There were companies such as Tetra Tech, which appears twice in PSC B510—Environmental Assessments. This is because these companies have two different DUNS numbers: 789111697 for their office in Virginia and 045224250 for their office in California. This is geographically aligned with the contracting offices from which they receive a majority of their contracts, being NAVFAC Atlantic and NAVFAC Southwest respectively. This intuitively makes sense for this category of S&A, which implies that to assess a local environment the contractor would need to be on site.

To identify opportunities for consolidation, we applied the concepts of rationalization to the largest contractors and contracting offices within the largest categories of S&A services. The following charts show this rationalization through the level of consolidation that currently exists. Figure 7 displays the top three contractors by obligation and then the next seven, followed by all others. This shows that some categories—such as B542—Educational, B550—Org/Admin/Personnel, and B504—Chemical/Biological—are heavily consolidated, with the top three contractors accounting for over 80% of the obligations. Conversely, B503—Archeological, B506—Data, B510—Environmental, and B599—Other would have fair opportunities for consolidation.



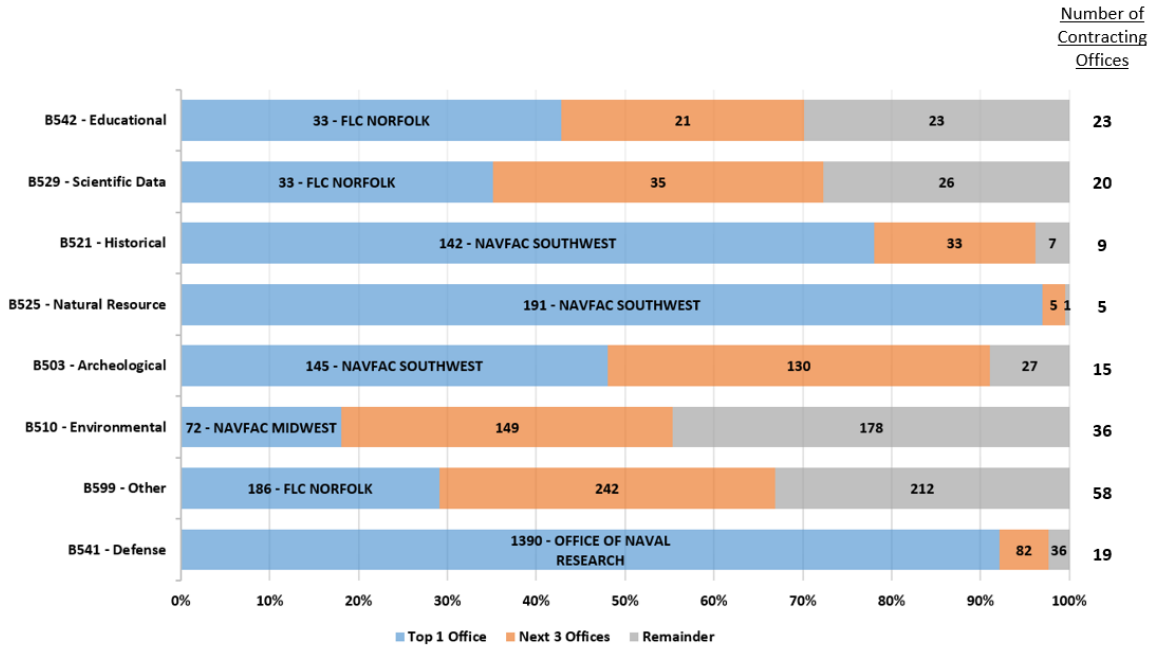


Data retrieved from FPDS-NG, August 9, 2019, <https://www.fpds.gov/>.

Figure 7. Obligations Rationalization by Contractor

Figure 8 shows the largest categories of S&A services by the contracting offices who issue the majority of contract awards. This figure is displayed on a different scale, with only the top one and then three broken out. This is because there is already a strong amount of consolidation, with the top four accounting for over 50% of awards in each of the largest categories. NAVFAC Southwest appears to have the consolidated aggregate demand for B521—Historical and B525—Natural Resource types of S&A. Conversely, the categories of B510—Environmental, B529—Scientific Data, and B542—Educational S&A services show characteristics of dispersion with at least 16 different contracting offices issuing almost 30% of the awards.



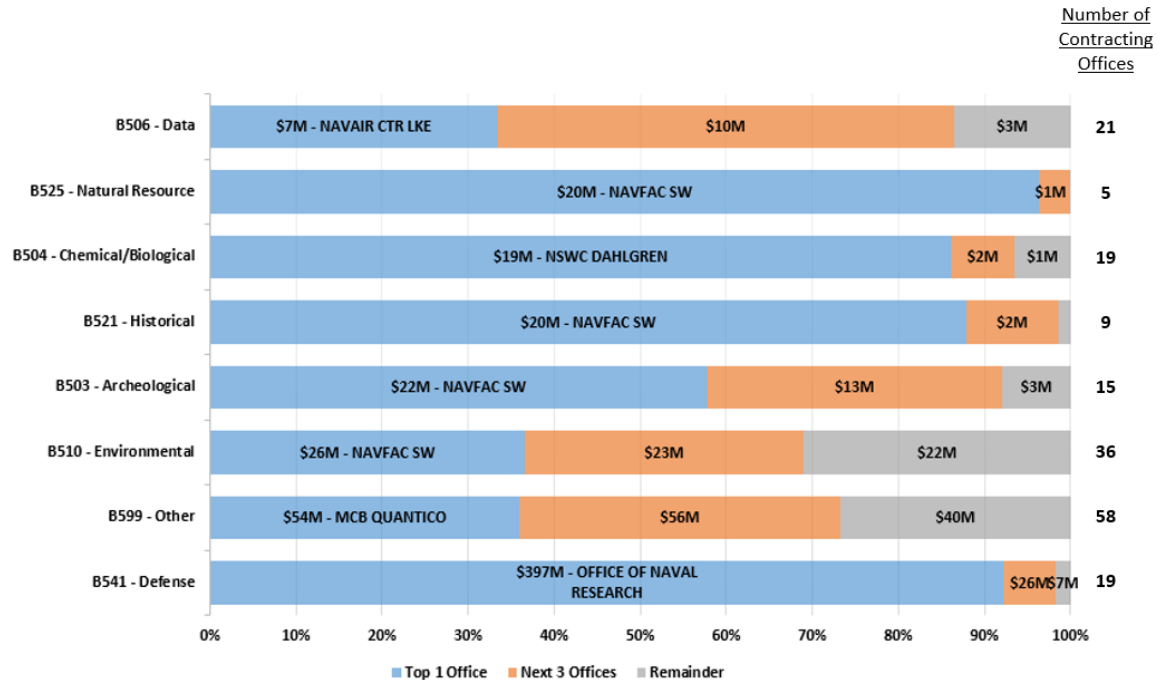


Data retrieved from FPDS-NG, August 9, 2019, <https://www.fpds.gov/>.

Figure 8. Awards Rationalization by Contracting Office

Figure 9 shows the rationalization of spending by contracting offices on only new awards for comparison with Figure 8. For the categories of S&A services appearing in both figures, there are similar levels of consolidation occurring in terms of number of awards and obligations for awards, further demonstrating that there are opportunities for consolidation both in terms of award workload and obligations for the categories of B510—Environmental and B503—Archeological S&A services.





Data retrieved from FPDS-NG, August 9, 2019, <https://www.fpds.gov/>.

Figure 9. Obligations Rationalization by Contracting Office Awards

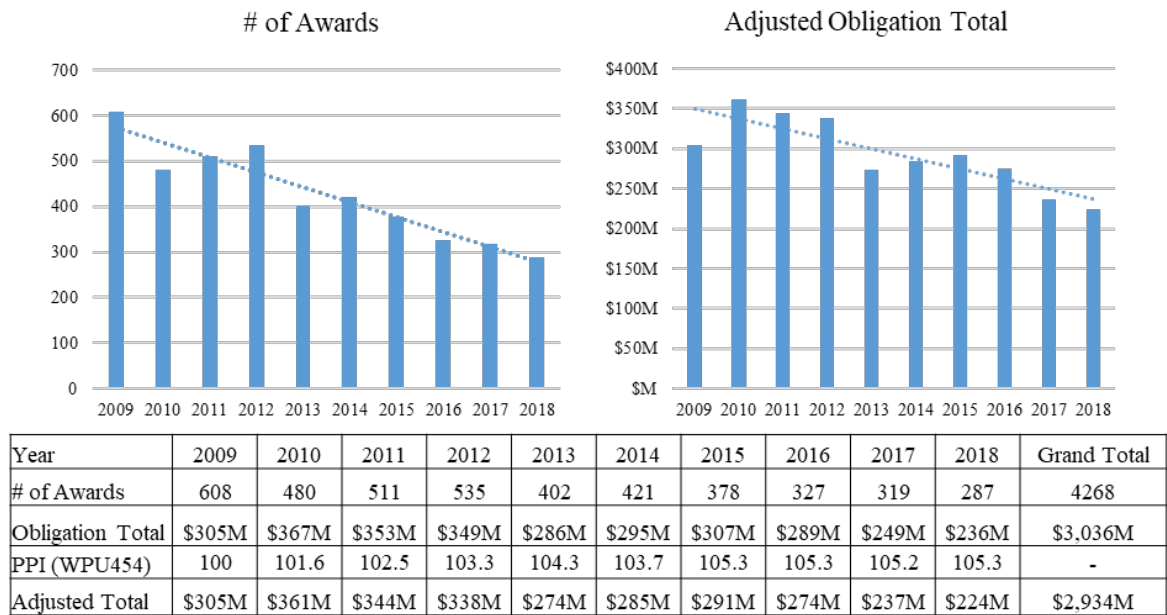
The preceding sections looked at the acquisition from the different viewpoints of the contractors, contracting offices, and the different types of S&A services. The next section looks at various characteristics of the contracts used to gain a better understanding of how the Navy is acquiring S&A services.

E. CONTRACT CHARACTERISTICS

The acquisition of S&A services is unique from the process to acquire services that are more easily defined or tangible. As shown in Figure 10, over the last 10 fiscal years there has been a decline in the amount of S&A services acquired, both in quantity of awards and overall obligated amounts. This decline in S&A services spending is in line with overall DOD spending due to sequestration and spending cuts associated with the Budget Control Act of 2011 (Taylor, 2019). It should be noted that the obligated amounts are net of modifications that both obligate and de-obligate funding and do not necessarily occur in the same year an award was made. After adjusting for inflation, the downward trend in obligations was slightly increased. While the downward trend in both obligations and



number of awards suggests that consolidation could be occurring, it is not conclusive as to the exact reasons for the decline.



Data retrieved from FPDS-NG, August 9, 2019, <https://www.fpds.gov/>.

Figure 10. Trend of Awards and Total Obligations by Fiscal Year

Table 7 identifies obligations for S&A services throughout the year by the quarter in which they were made. This table shows a strong impact of the government’s fiscal year running from October to September. There are significantly fewer obligations occurring in the first quarter and more than double that amount occurring in the final quarter of the fiscal year. The sharp increase in the occurrence of obligations for S&A services at the end of the fiscal year suggests that the acquisition of S&A services may be an area where contracting offices often look to spend excess funding they may have.



Table 7. Obligations by Quarter

| Row Labels | Sum of Obligated Amount |
|------------|-------------------------|
| OCT–DEC | \$449 million |
| JAN–MAR | \$664 million |
| APR–JUN | \$676 million |
| JUL–SEP | \$1,246 million |

Data retrieved from FPDS-NG, August 9, 2019, <https://www.fpds.gov/>.

The level of competition found in the acquisition of S&A services over the last decade is shown in Table 8. These are shown as a percentage of the total awards for that year. When looking at the trends over the last decade, it appears that overall the level of competition is decreasing. The totals for the three types of competition in 2010 were 51% of awards, but in 2018 these totals accounted for only 34% of awards. This trend further demonstrates that there is possibly consolidation occurring in the acquisition for S&A services.

Table 8. Level of Competition by Awards

| Year | Full & Open | Not Available for Competition | Not Competed | Full & Open After Exclusion | Competed under Simplified Acquisition Procedures | Not Competed Under Simplified Acquisition Procedures |
|-------|-------------|-------------------------------|--------------|-----------------------------|--|--|
| 2009 | 36% | 34% | 16% | 14% | – | – |
| 2010 | 41% | 36% | 9% | 6% | 4% | 3% |
| 2011 | 34% | 7% | 41% | 7% | 6% | 4% |
| 2012 | 41% | 7% | 32% | 7% | 7% | 6% |
| 2013 | 33% | 4% | 37% | 9% | 11% | 7% |
| 2014 | 19% | 2% | 38% | 16% | 16% | 9% |
| 2015 | 19% | 2% | 46% | 9% | 15% | 10% |
| 2016 | 17% | 5% | 47% | 8% | 15% | 9% |
| 2017 | 12% | 4% | 54% | 11% | 11% | 8% |
| 2018 | 9% | 4% | 55% | 6% | 19% | 7% |
| Total | 28% | 12% | 35% | 9% | 9% | 6% |

Data retrieved from FPDS-NG, August 9, 2019, <https://www.fpds.gov/>.

The use of IDVs in procurement for S&A services over the past 10 fiscal years is shown in Table 9. Despite changes noted in the level of competition and overall number of



new awards, on average the percentage use of IDVs has remained relatively constant around 79%. While the number of task orders and stand-alone contracts slowly decreased from 2009 to 2018, the decrease of both has been relationally the same.

Table 9. Use of IDV by Awards

| Year | IDV Task Order | Stand Alone | IDV Task Order % | Stand Alone % |
|-------|----------------|-------------|------------------|---------------|
| 2009 | 485 | 123 | 80% | 20% |
| 2010 | 375 | 105 | 78% | 22% |
| 2011 | 412 | 99 | 81% | 19% |
| 2012 | 425 | 110 | 79% | 21% |
| 2013 | 307 | 95 | 76% | 24% |
| 2014 | 323 | 98 | 77% | 23% |
| 2015 | 280 | 98 | 74% | 26% |
| 2016 | 254 | 73 | 78% | 22% |
| 2017 | 256 | 63 | 80% | 20% |
| 2018 | 234 | 53 | 82% | 18% |
| Total | 3351 | 917 | 79% | 21% |

Data retrieved from FPDS-NG, August 9, 2019, <https://www.fpds.gov/>.

The contract types in terms of awards issued for S&A services is shown by fiscal year in Table 10. Of the 4,268 S&A contracts the Navy awarded in the past decade, Firm Fixed Price (FFP) contracts accounted for 2,435 contract awards, or 57% of the overall total. The number of FFP contracts has declined by year, but on a percentage basis of the total, there is no definitive trend. The same is true for cost type contracts, although there is a shift from award fees to fixed fees. There is also a significant association with the type of S&A service acquired and the contract type. A vast majority of the cost type contracts (roughly 93%) are for S&A services identified as B541–Other and B599–Defense. Conversely, the fixed price contracts are dispersed widely across S&A categories, with no single code accounting for more than 10% of the total fixed price contracts.



Table 10. Awards by Contract Type

| Contract Type | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | Grand Total |
|---------------------------|------|------|------|------|------|------|------|------|------|------|-------------|
| J—Firm Fixed Price | 301 | 277 | 288 | 370 | 253 | 260 | 216 | 175 | 158 | 137 | 2435 |
| U—Cost Plus Fixed Fee | 69 | 52 | 198 | 155 | 134 | 158 | 148 | 141 | 152 | 147 | 1354 |
| R—Cost Plus Award Fee | 196 | 133 | 12 | – | 1 | – | 1 | 4 | – | – | 347 |
| S—Cost No Fee | 9 | 9 | 7 | 7 | 9 | 2 | 6 | 2 | 7 | 2 | 60 |
| Y—Time and Materials | 12 | 7 | 5 | 2 | 1 | | 3 | 1 | 1 | 1 | 33 |
| 2—Combination of types | 21 | – | – | – | – | – | – | – | – | – | 21 |
| V—Cost Plus Incentive Fee | – | – | – | – | 4 | 1 | 2 | 4 | – | – | 11 |
| Z—Labor Hours | – | 1 | 1 | – | – | – | – | – | 1 | – | 3 |
| B—Fixed Price LOE | – | – | – | 1 | – | – | 2 | – | – | – | 3 |
| L—Fixed Price Incentive | – | 1 | – | – | – | – | – | – | – | – | 1 |

Data retrieved from FPDS-NG, August 9, 2019, <https://www.fpds.gov/>.



Table 11 shows the contract types by total obligated amounts. Out of over \$3 billion in obligations for S&A services by the Navy, 63% were toward Cost Plus Fixed Fee (CPFF) contracts, while 46% of the CPFF obligations were accounted for by S&A services for B510 for Defense. Although FFP contracts were the largest number of awards, with 58% of the total in terms of obligations, they are only 16% of the total.

Table 11. Contract Type by Obligation

| Type of Contract Pricing | Sum of Obligated Amount |
|---------------------------|-------------------------|
| U—Cost Plus Fixed Fee | \$1,923,020,815 |
| J—Firm Fixed Price | \$496,272,979 |
| R—Cost Plus Award Fee | \$263,301,611 |
| V—Cost Plus Incentive Fee | \$137,423,883 |
| S—Cost No Fee | \$108,390,659 |
| Y—Time and Materials | \$58,015,324 |
| 2—Combination of types | \$29,262,628 |
| B—Fixed Price LOE | \$14,903,371 |
| Z—Labor Hours | \$4,168,633 |
| L—Fixed Price Incentive | \$32,882 |

Data retrieved from FPDS-NG, August 9, 2019, <https://www.fpds.gov/>.

To summarize, the various characteristics shown in this section displayed a decline in the overall number of awards issued and obligations. There was a slight decline in the level of competition, but the use of IDVs and contract types has remained relatively steady although fluctuating. Lastly, while the majority of awards are of Firm Fixed Price contract type, the vast majority of obligations are towards CPFF contracts.

F. RESULTS

After analyzing the data set from the perspective of the contracting offices, contractors, types of S&A services, and overall characteristics, we have provided the answers to our research questions. The following summarizes the dominant characteristics of these answers.



a. *Which contracting offices are contracting for studies and analysis services?*

The contracting office obligating the highest total dollar amount in the preceding 10-year period was NSWC Dahlgren. The contracting office awarding the highest total number of S&A service contracts was the ONR.

b. *Which contractors are receiving these contracts?*

Both in terms of obligations and number of awards, the CNA Corporation received the most.

c. *How much has been spent on studies and analysis?*

The total obligations for S&A was over \$3 billion over the last 10 years. These obligations were also heavily concentrated in the two fields of PSC B54–Special Studies/Analysis Defense and B599–Special Studies/Analysis Other, with 73% of the total dollar value.

d. *What are the characteristics of the studies and analysis contracts issued by the Navy?*

While the majority of awards for studies and analysis services in the past decade were the Firm Fixed Price type, the CPFF contract type was the contracting vehicle that the Navy obligated the most money toward. There also appears to be a decrease in the overall acquisition of S&A services and the level of competition occurring, while the use of IDVs has remained relatively constant. There is also an end of fiscal year spending peak that appears to be occurring.

G. DISCUSSION

Our research resulted in two main findings. These two findings concern the limitation of current taxonomy in place and the strategies that may be most beneficial to the various categories of S&A services.

S&A services provide complex knowledge-based information to provide information for Navy decision-makers to act on. While the same could be said for the analysis we conducted, our spend analysis research is dependent upon the taxonomy



currently used and the integrity of the FPDS-NG database. Contracting office personnel who input PSC and contract information in the FPDS-NG database may be inconsistent across the Navy. However, there appears to be some opportunities to improve procurement efficiency by consolidation of some categories of S&A services. A recommendation would be to implement a more robust taxonomy structure for more specific categorization of the underlying requirements. Even though there can be many different S&A service categories in a contract, government-contracting professions can only input one PSC for each contract in the FPDS-NG data. There appears to be a preponderance of use of the most generic forms of PSC (“Defense” and “Other”), and this inhibits efforts for implementing category management. Contracting organizations should validate and record justification before inputting these generic PSCs in the FPDS-NG data. This is to deter inertia and to encourage the use of clearly identified categories. One possible avenue for doing this is adopting the United Nations Standard Products and Service Code (UNSPSC), which is used globally and provides greater detail.

The number of contractors in PSC categories ranges from few to many. While there are 41 contractors for the PSC B506—Data category, on the other end of the continuum, there are 227 contractors for the PSC B503—Archeological category. The different number of contractors pertaining to categories requires a different strategy for each category. The GAO recommended using the “understanding cost drivers” strategy for the category with fewer contractors, and the “prequalifying contractors” or BIC strategy for categories with many contractors. Currently it appears that some S&A service categories are already heavily consolidated. For the most extreme, such as PSC B504—Chemical/Biological, the top three contractors out of 50 have earned 97% out of the whole spending in this category. Therefore, the next strategy to use in this category should be the “understanding of cost drivers.” Another example is the PSC B542—Educational, within which the top three contractors out of 92 already earned \$35 million, or over 90% out of \$38 million spending in this category. This means that the “prequalifying contractors” or BIC strategy has been applied to this category. However, applying the “understanding cost drivers” strategy on \$38 million of the PSC B542 may not have worthy returns in comparison to application of the same strategy in the PSC B541—Defense category, where the top three contractors earned \$1,216 million out of \$1,855 million, or 65%. This research does not provide



enough detail to conclude that leveraging of buying power has been accomplished in the PSC B541—Defense, and further research may be needed. Thus, the obligation rationalization of certain S&A services is heavily concentrated among a small number of contractors and contracting offices. There is also a strong linkage between contractors and one particular contracting office. This suggests the Navy possibly already achieved some of the goals of category management for certain S&A service categories. With this it is important that the various contracting offices share their lessons learned or products of S&A services to ensure there is not a duplication of effort.

H. SUMMARY

This chapter provided the results of the spend analysis on the Navy’s S&A contract data. This chapter began by presenting the results through a general analysis and from the angle of the contracting offices, contractors, spending by S&A types, and characteristics. It concluded with a discussion based upon the results of the research. The final chapter provide a summary of the research, conclusions, and areas for further research.



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V. SUMMARY, CONCLUSION AND AREAS FOR FURTHER RESEARCH

This chapter provides a summary of our research, answers to the research questions, and recommendations for areas of further research.

A. SUMMARY

In today's rapidly changing environment, the Navy needs complex information and advanced technology in a fast pace to outperform its adversaries. Expansion of the Navy's knowledge through S&A services provides opportunities for contractors to have an impact on the decision-making process. Therefore, it is vital to know which contracting offices are conducting S&A service procurement, which contractors are providing services, the types of S&A services the Navy is procuring, and what the characteristics are of the Navy's S&A service procurement. In this research, we used spend analysis to find answers to those aforementioned questions.

Studies and Analysis Service is a subcategory of Advisory and Assistance Service or Knowledge-Based Service. In turn, Advisory and Assistance Service is a subcategory of the super category Professional Service, as defined by the CMLC. Spend analysis is the tool used to analyze historical spending data on these S&A services by categorizing the services an organization bought. The results of spend analysis are used to conduct strategic sourcing that supports the organization's strategies. Each category of goods or services has its own strategy, which is planned and conducted by a category manager. The category managers also coordinate strategies together to procure as one organization to reduce redundancy and cost. We conducted literature reviews to learn about current circumstances and recommendations before conducting our own spend analysis on the historical-spending data of the S&A service category.

The historical data of spending to be used in our spend analysis was retrieved from the FPDS-NG database, which is required by FAR to be the source of data for government entities to analyze. The historical data in our scope was from 2009 to 2018. We focused



our analysis on the PSC B data because of its concise description of S&A services in support of policy development, decision-making, management, or administration.

B. CONCLUSION

In conclusion, the following are consolidated answers to our four research questions on the Navy's S&A service procurement.

a. Which contracting offices are contracting for study and analysis services?

The top 10 contracting offices in S&A service procurement obligated 87.89% of the entire Navy's spending for S&A services. The top two contracting offices, NSWC Dahlgren and the ONR, spent roughly 67% of the whole S&A service obligation in the past 10 years. The 10 offices obligated funding to 426 contractors; however, they had only 17 contractors in overlap. These 17 contractors had four or fewer contracts with the 10 offices.

When considering the number of contracting actions, a different set of the top 10 contracting offices issued approximately 75% of the Navy's S&A service contracting actions. The ONR received the most number of contracting actions at 33.13%. The second leading in actions was NAVFAC Southwest at 14%. All other offices' actions make up no more than 10% of the total.

b. Which contractors are receiving these contracts?

The top 10 contractors received 58.96% of the total obligations for S&A service procurement. CNA Corporation led the top 10 contractors in terms of the obligated amount (\$967,513,688) and the number of contracting actions (1,389). While CNA Corporation received 31.87%, the second place BAE Systems Technology Solutions & Services received only 6.54% of the obligated funding. In regards to obligations, seven of the top 10 contractors received all of their obligations from NSWC Dahlgren.

While CNA Corporation was the leader in the number of contracting actions by a significant amount with 1,389, Far Western Anthropological Research Group in second place had only 121 S&A service contracts, or 2.84% of all the Navy's S&A service awards. For the remainder of the top 10 contractors, each had less than 2% market share of the



Navy's S&A service contract awards. Those below the top 10 had 1% or less in market share of the Navy's S&A service contract awards. The only contractor within the top 10 who received contracts from multiple contracting offices was Booz Allen Hamilton.

c. How much has been spent on studies and analysis?

The top five categories hold 86.48% or \$2.6 billion in obligation for studies and analysis services. Those categories or PSCs are B541—Defense at 61.14%, B599—Other at 12.11%, B504—Chemical/Biological at 6.62%, B510—Environmental Assessments at 3.86%, and B550—Org/Adm/Pers at 2.75%. BAE Systems Technology Solutions & Services, EG&G Technical Services, and Booz Allen Hamilton performed more than one category of studies and analysis services. The PSC B541—Defense and B599—Other have vague descriptions, which should be further analyzed in future research. B542—Educational, B550—Org/Adm/Pers, and B504—Chemical/Biological are heavily consolidated with the top three contractors accounting for over 80%. B503—Archeological, B506—Data, and B510—Environmental have fair opportunities for category managers to conduct proper strategies, such as understanding cost drivers, or prequalifying contractors.

d. What are the characteristics of the studies and analysis contracts issued by the Navy?

There has been a declining trend for S&A services acquired both in quantity of awards and overall obligated amounts since 2010. Annually, the obligation for S&A service contracts peaked from July to September and bottomed out from October to December. In regarding to the level of completion, it appears that overall the level of competition was decreasing, which showed the possibility of consolidation or the use of the BIC format in acquisition.

The use of IDVs had been relatively constant at 79% annually. Firm Fixed Price (FFP) contracts accounted for 2,435 contract awards, or 57% of the overall total, but only 16% of the total in terms of total obligations. Out of over \$3 billion in obligations for S&A services by the Navy, 63% were towards CPFF contracts. Roughly 93% of the cost type contracts are for S&A services identified as B541—Other and B599—Defense. The 46% of the CPFF obligations were accounted for by S&A services for B510—Defense.



C. AREAS FOR FURTHER RESEARCH

The accuracy of any analysis is heavily dependent on the underlying data. Recommended areas for further research include identifying and implementing more robust taxonomy, developing a greater understanding of the generic categories of S&A services, and investigating the resulting products or effectiveness of S&A services.

(1) Adoption of new categorization tools

The limited capability of the current PSC taxonomy has been highlighted in this report. There are several areas that should be researched as possible avenues that would provide greater flexibility in categorizing and also improve the integrity of the overall FPDS-NG database. One such possible avenue is the adoption of machine learning technology to standardize the use of specific codes based upon what is written within the statement of work. This would remove the subjective judgement of individuals on the applicability of specific codes and universalize it across organizations. A second avenue is the adoption of a new taxonomy, such as the United Nations Standard Products and Services Code (UNSPSC). The UNSPSC has been argued to be more robust because of its more hierarchical nature (Bunting, 2013). The adoption of either a new machine learning tool or the UNSPSC taxonomy are areas that would benefit from further research into their potential for implementation.

(2) Greater understanding of S&A services for Defense and Other

Our research revealed that the preponderance of contracts both in terms of dollar value and number of awards for S&A services were categorized as being for “Defense” or “Other.” A greater understanding of these two categories would necessitate further research into what drove the contracting officers to use these codes and whether there could have been a more descriptive alternative. These contracts also represented some of the largest dollar values and an analysis into the scope of S&A services they provided and overall accuracy of utilizing only one PSC for a variety of services that may have been conducted at the contract line item number (CLIN) level.



(3) The effectiveness of S&A services and distribution of their products

We have discussed why S&A services are important, but the scope of our research did not allow us to follow the actual deliverable item of the contract's purpose. It would be beneficial for further research to look into whether the products of S&A services are actually being shared across the Navy so there is not a duplication of efforts occurring. Also, S&A services are ultimately intended to support some decision at a higher level. Research into how effective the Navy is at leveraging the knowledge gained through its S&A service contracts would provide insight into how effective we are in leveraging this knowledge towards its intended purpose.



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APPENDIX A. LIST OF PSC IN GOVERNMENT-WIDE CATEGORY FOR PROFESSIONAL MANAGEMENT ADVISORY SERVICES

| PSC Code (Description) |
|---|
| AA16 (R&D—Agriculture: Insect and Disease Control (Management/Support)) |
| AA36 (R&D—Agriculture: Production (Management/Support)) |
| AA96 (R&D—Agriculture: Other (Management/Support)) |
| AB16 (R&D—Community Svc/Develop: Crime Prevention/Control (Management/Support)) |
| AB26 (R&D—Community Svc/Develop: Fire Prevention/Control (Management/Support)) |
| AB36 (R&D—Community Service/Development: Rural (Management/Support)) |
| AB46 (R&D—Community Service/Development: Urban (Management/Support)) |
| AB96 (R&D—Community Service/Development: Other (Management/Support)) |
| AC16 (R&D—Defense System: Aircraft (Management/Support)) |
| AC26 (R&D—Defense System: Missile/Space Systems (Management/Support)) |
| AC36 (R&D—Defense System: Ships (Management/Support)) |
| AC46 (R&D—Defense System: Tank/Automotive (Management/Support)) |
| AC56 (R&D—Defense System: Weapons (Management/Support)) |
| AC66 (R&D—Defense System: Electronics/Communication Equipment (Management/Support)) |
| AC96 (R&D—Defense System: Miscellaneous Hard Goods (Management/Support)) |
| AD16 (R&D—Defense Other: Ammunition (Management/Support)) |
| AD26 (R&D—Defense Other: Services (Management/Support)) |
| AD36 (R&D—Defense Other: Subsistence (Management/Support)) |
| AD46 (R&D—Defense Other: Textiles/Clothing/Equipage (Management/Support)) |
| AD56 (R&D—Defense Other: Fuels/Lubricants (Management/Support)) |
| AD66 (R&D—Defense Other: Construction (Management/Support)) |
| AD96 (R&D—Defense Other: Other (Management/Support)) |
| AE16 (R&D—Economic Growth: Employment Growth/Productivity (Management/Support)) |
| AE26 (R&D—Economic Growth: Product/Service Improvement (Management/Support)) |
| AE36 (R&D—Economic Growth: Manufacturing Technology (Management/Support)) |
| AE96 (R&D—Economic Growth: Other (Management/Support)) |
| AF16 (R&D—Education: Educational (Management/Support)) |
| AG16 (R&D—Energy: Coal (Management/Support)) |
| AG26 (R&D—Energy: Gas (Management/Support)) |
| AG36 (R&D—Energy: Geothermal (Management/Support)) |
| AG46 (R&D—Energy: Wind (Management/Support)) |
| AG56 (R&D—Energy: Nuclear (Management/Support)) |



| PSC Code (Description) |
|--|
| AG66 (R&D—Energy: Petroleum (Management/Support)) |
| AG76 (R&D—Energy: Solar/Photovoltaic (Management/Support)) |
| AG86 (R&D—Energy: Conservation (Management/Support)) |
| AG96 (R&D—Energy: Other (Management/Support)) |
| AH16 (R&D—Environmental Protection: Pollution Control/Abatement (Management/Support)) |
| AH26 (R&D—Environmental Protection: Air Pollution (Management/Support)) |
| AH36 (R&D—Environmental Protection: Water Pollution (Management/Support)) |
| AH46 (R&D—Environmental Protection: Noise Pollution (Management/Support)) |
| AH96 (R&D—Environmental Protection: Other (Management/Support)) |
| AJ16 (R&D—General Science/Technology: Physical Sciences (Management/Support)) |
| AJ26 (R&D—General Science/Technology: Mathematical/Computer Sciences (Management/Support)) |
| AJ36 (R&D—General Science/Technology: Environmental Sciences (Management/Support)) |
| AJ46 (R&D—General Science/Technology: Engineering (Management/Support)) |
| AJ56 (R&D—General Science/Technology: Life Sciences (Management/Support)) |
| AJ66 (R&D—General Science/Technology: Psychological Sciences (Management/Support)) |
| AJ76 (R&D—General Science/Technology: Social Sciences (Management/Support)) |
| AJ96 (R&D—General Science/Technology: Other (Management/Support)) |
| AK16 (R&D—Housing: Housing (Management/Support)) |
| AL16 (R&D—Income Security: Employment (Management/Support)) |
| AL26 (R&D—Income Security: Income Maintenance (Management/Support)) |
| AL96 (R&D—Income Security: Other (Management/Support)) |
| AM16 (R&D—International Affairs and Cooperation (Management/Support)) |
| AN16 (R&D—Medical: Biomedical (Management/Support)) |
| AN26 (R&D—Medical: Drug Dependency (Management/Support)) |
| AN36 (R&D—Medical: Alcohol Dependency (Management/Support)) |
| AN46 (R&D—Medical: Health Services (Management/Support)) |
| AN56 (R&D—Medical: Mental Health (Management/Support)) |
| AN66 (R&D—Medical: Rehabilitative Engineering (Management/Support)) |
| AN76 (R&D—Medical: Specialized Medical Services (Management/Support)) |
| AN86 (R&D—Medical: Aids Research (Management/Support)) |
| AN96 (R&D—Medical: Other (Management/Support)) |
| AP26 (R&D—Natural Resource: Land (Management/Support)) |
| AP36 (R&D—Natural Resource: Mineral (Management/Support)) |
| AP46 (R&D—Natural Resource: Recreation (Management/Support)) |
| AP56 (R&D—Natural Resource: Marine and Oceanographic (Management/Support)) |
| AP66 (R&D—Natural Resource: Marine Fisheries (Management/Support)) |
| AP76 (R&D—Natural Resource: Atmospheric (Management/Support)) |



| PSC Code (Description) |
|---|
| AP96 (R&D—Natural Resource: Other (Management/Support)) |
| AQ16 (R&D—Social Services: Geriatric Other Than Medical (Management/Support)) |
| AQ96 (R&D—Social Services: Other (Management/Support)) |
| AR16 (R&D—Space: Aeronautics/Space Technology (Management/Support)) |
| AR26 (R&D—Space: Science/Applications (Management/Support)) |
| AR36 (R&D—Space: Flight (Management/Support)) |
| AR46 (R&D—Space: Operations, Tracking and Data Acquisition (Management/Support)) |
| AR66 (R&D—Space: Station (Management/Support)) |
| AR76 (R&D—Space: Commercial Programs (Management/Support)) |
| AR96 (R&D—Space: Other (Management/Support)) |
| AS16 (R&D—Modal Transportation: Air (Management/Support)) |
| AS26 (R&D—Modal Transportation: Surface Motor Vehicles (Management/Support)) |
| AS36 (R&D—Modal Transportation: Rail (Management/Support)) |
| AS46 (R&D—Modal Transportation: Marine (Management/Support)) |
| AS96 (R&D—Modal Transportation: Other Modal (Management/Support)) |
| AT16 (R&D—Other Transportation: Highways, Roads, And Bridges (Management/Support)) |
| AT26 (R&D—Other Transportation: Human Factors Concerning Transportation (Management/Support)) |
| AT36 (R&D—Other Transportation: Navigation and Navigational Aids (Management/Support)) |
| AT46 (R&D—Other Transportation: Passenger Safety and Security (Management/Support)) |
| AT56 (R&D—Other Transportation: Pipeline Safety (Management/Support)) |
| AT66 (R&D—Other Transportation: Traffic Management (Management/Support)) |
| AT76 (R&D—Other Transportation: Tunnels and Other Subsurface Structures (Management/Support)) |
| AT86 (R&D—Other Transportation: Transporting Hazardous Materials (Management/Support)) |
| AT96 (R&D—Other Transportation: Other General (Management/Support)) |
| AV16 (R&D—Mining: Subsurface Mining Equipment (Management/Support)) |
| AV26 (R&D—Mining: Surface Mining Equipment (Management/Support)) |
| AV36 (R&D—Mining: Subsurface Mining Methods (Management/Support)) |
| AV46 (R&D—Mining: Surface Mining Methods (Management/Support)) |
| AV56 (R&D—Mining: Mining Reclamation Methods (Management/Support)) |
| AV66 (R&D—Mining: Mining Safety (Management/Support)) |
| AV76 (R&D—Mining: Metallurgical (Management/Support)) |
| AV96 (R&D—Mining: Other Mining Activities (Management/Support)) |
| AZ16 (R&D—Other Research and Development (Management/Support)) |
| B502 (Special Studies/Analysis—Air Quality) |
| B503 (Special Studies/Analysis—Archeological/Paleontological) |



| PSC Code (Description) |
|---|
| B504 (Special Studies/Analysis—Chemical/Biological) |
| B505 (Special Studies/Analysis—Cost Benefit) |
| B506 (Special Studies/Analysis—Data (Other Than Scientific)) |
| B507 (Special Studies/Analysis—Economic) |
| B509 (Special Studies/Analysis—Endangered Species: Plant/Animal) |
| B510 (Special Studies/Analysis—Environmental Assessments) |
| B513 (Special Studies/Analysis—Feasibility (Non-Construction)) |
| B516 (Special Studies/Analysis—Animal/Fisheries) |
| B517 (Special Studies/Analysis—Geological) |
| B518 (Special Studies/Analysis—Geophysical) |
| B519 (Special Studies/Analysis—Geotechnical) |
| B520 (Special Studies/Analysis—Grazing/Range) |
| B521 (Special Studies/Analysis—Historical) |
| B522 (Special Studies/Analysis—Legal) |
| B524 (Special Studies/Analysis—Mathematical/Statistical) |
| B525 (Special Studies/Analysis—Natural Resource) |
| B526 (Special Studies/Analysis—Oceanological) |
| B527 (Special Studies/Analysis—Recreation) |
| B528 (Special Studies/Analysis—Regulatory) |
| B529 (Special Studies/Analysis—Scientific Data) |
| B530 (Special Studies/Analysis—Seismological) |
| B532 (Special Studies/Analysis—Soil) |
| B533 (Special Studies/Analysis—Water Quality) |
| B534 (Special Studies/Analysis—Wildlife) |
| B537 (Special Studies/Analysis—Medical/Health) |
| B538 (Special Studies/Analysis—Intelligence) |
| B539 (Special Studies/Analysis—Aeronautical/Space) |
| B540 (Special Studies/Analysis—Building Technology) |
| B541 (Special Studies/Analysis—Defense) |
| B542 (Special Studies/Analysis—Educational) |
| B543 (Special Studies/Analysis—Energy) |
| B544 (Special Studies/Analysis—Technology) |
| B545 (Special Studies/Analysis—Housing/Community Development) |
| B546 (Special Studies/Analysis—Security (Physical/Personal)) |
| B547 (Special Studies/Analysis—Accounting/Financial Management) |
| B549 (Special Studies/Analysis—Foreign/National Security Policy) |
| B550 (Special Studies/Analysis—Organization/Administrative/Personnel) |
| B551 (Special Studies/Analysis—Mobilization/Preparedness) |
| B552 (Special Studies/Analysis—Manpower) |
| B553 (Special Studies/Analysis—Communications) |



| PSC Code (Description) |
|--|
| B554 (Special Studies/Analysis—Acquisition Policy/Procedures) |
| B555 (Special Studies/Analysis—Elderly/Handicapped) |
| B599 (Special Studies/Analysis—Other) |
| R405 (Support—Professional: Operations Research/Quantitative Analysis) |
| R406 (Support—Professional: Policy Review/Development) |
| R408 (Support—Professional: Program Management/Support) |
| R410 (Support—Professional: Program Evaluation/Review/Development) |
| R423 (Support—Professional: Intelligence) |
| R427 (Support—Professional: Weather Reporting/Observation) |
| R428 (Support—Professional: Industrial Hygienics) |
| R429 (Support—Professional: Emergency Response/Disaster Planning/Preparedness Support) |
| R497 (Support—Professional: Personal Services Contracts) |
| R499 (Support—Professional: Other) |
| R704 (Support—Management: Auditing) |
| R707 (Support—Management: Contract/Procurement/Acquisition Support) |
| R710 (Support—Management: Financial) |
| R799 (Support—Management: Other) |

Adapted from Government-Wide Category Management Taxonomy, GSA, June, 20,2019,
<https://hallways.cap.gsa.gov/app/#!/gateway/category-management>



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APPENDIX B. TABLES FOR OTHER DATA SETS

Table 12. PSC A__6 Obligations by Top 10 Contracting Offices

| Contracting Offices | Sum of obligated amount | % of Total |
|--|-------------------------|------------|
| N00178 - NSWC DAHLGREN | \$430,992,203 | 34.57% |
| N00014 - OFFICE OF NAVAL RESEARCH | \$131,680,998 | 10.56% |
| N00024 - NAVSEA HQ | \$126,955,200 | 10.18% |
| N00421 - NAVAL AIR WARFARE CENTER AIR DIV | \$76,628,037 | 6.15% |
| M67854 - MARINE CORPS SYSTEMS COMMAND CODE (00Y) | \$46,460,166 | 3.73% |
| N00019 - NAVAL AIR SYSTEMS COMMAND | \$46,345,042 | 3.72% |
| N66001 - NIWC PACIFIC | \$45,041,566 | 3.61% |
| N65236 - NIWC ATLANTIC | \$42,793,480 | 3.43% |
| N00039 - NAVAL INFORMATION WARFARE SYSTEMS | \$36,252,875 | 2.91% |
| N00189 - NAVSUP FLT LOG CTR NORFOLK | \$35,817,912 | 2.87% |

Data retrieved from FPDS-NG, August 9, 2019, <https://www.fpds.gov/>.

Table 13. PSC R Obligations by Top 10 Contracting Offices

| Contracting Offices | Sum of obligated amount | % of Total |
|--|-------------------------|------------|
| N00024 - NAVSEA HQ | \$4,647,104,126 | 16.99% |
| N00189 - NAVSUP FLT LOG CTR NORFOLK | \$4,339,981,692 | 15.87% |
| N00421 - NAVAL AIR WARFARE CENTER AIR DIV | \$2,059,322,016 | 7.53% |
| N00039 - NAVAL INFORMATION WARFARE SYSTEMS | \$1,954,012,852 | 7.15% |
| M67854 - MARINE CORPS SYSTEMS COMMAND CODE (00Y) | \$1,842,986,485 | 6.74% |
| M00264 - MARINE CORPS BASE QUANTICO REGIONAL CONTRACTING OFFICE | \$1,518,261,810 | 5.55% |
| N66604 - NUWC DIV NEWPORT | \$1,039,317,531 | 3.80% |
| N65236 - NIWC ATLANTIC | \$665,975,715 | 2.44% |
| N39430 - NAVAL FACILITIES ENGINEERING AND EXPEDITIONARY WARFARE CENTER | \$657,044,637 | 2.40% |
| N00014 - OFFICE OF NAVAL RESEARCH | \$593,981,440 | 2.17% |

Data retrieved from FPDS-NG, August 9, 2019, <https://www.fpds.gov/>.



Table 14. PSC R Obligations Received by Top 10 Contractors

| Contractors | DUNS | Sum of obligated amount | % of Total |
|---|-----------|-------------------------|------------|
| Booz Allen Hamilton Inc. | 006928857 | \$2,214,352,367.22 | 8.10% |
| Alion - IPS Corporation | 146483164 | \$826,898,342.25 | 3.02% |
| J Walter Thompson Company (8860) | 073424434 | \$663,870,805.96 | 2.43% |
| General Dynamics Information Technology (Anteon Corp) | 067641597 | \$659,434,921.49 | 2.41% |
| URS Federal Services, Inc. | 961530545 | \$557,945,993.49 | 2.04% |
| CACI Technologies, Inc. | 057364507 | \$497,155,623.61 | 1.82% |
| EG&G Technical Services | 083070925 | \$448,268,993.54 | 1.64% |
| BAE System Applied Technologies | 103933453 | \$439,940,046.78 | 1.61% |
| Smartronix | 965091606 | \$406,994,099.31 | 1.49% |
| CACI Inc. Federal | 114896066 | \$386,364,801.35 | 1.41% |

Data retrieved from FPDS-NG, August 9, 2019, <https://www.fpds.gov/>.

Table 15. Top 10 Contracting Offices by Number of Awards with NAICS 541

| Contracting Offices | Sum of Awards | % of Total |
|--|---------------|------------|
| N65236 - NIWC ATLANTIC | 22209 | 17.21% |
| N66001 - NIWC PACIFIC | 12485 | 9.67% |
| N00189 - NAVSUP FLT LOG CTR NORFOLK | 7171 | 5.56% |
| N00014 - OFFICE OF NAVAL RESEARCH | 6144 | 4.76% |
| N00024 - NAVSEA HQ | 5794 | 4.49% |
| N40085 - NAVAL FAC ENGINEERING CMD MID LANT | 5111 | 3.96% |
| N62473 - NAVFAC SOUTHWEST | 4771 | 3.70% |
| N00178 - NSWC DAHLGREN | 4603 | 3.57% |
| N68335 - NAVAIR WARFARE CTR AIRCRAFT DIV LKE | 4496 | 3.48% |
| N00421 - NAVAL AIR WARFARE CENTER AIR DIV | 3414 | 2.65% |

Data retrieved from FPDS-NG, August 9, 2019, <https://www.fpds.gov/>.



Table 16. Top 10 Contracting Offices by Obligated Amount with NAICS 541

| Contracting Office | Total Obligated Amount | % of Obligated Total |
|--|------------------------|----------------------|
| N00024 – NAVSEA HQ | \$27,512,143,111 | 15.34% |
| N65236 – NIWC ATLANTIC | \$16,705,266,822 | 9.32% |
| N00421 – NAVAL AIR WARFARE CENTER AIR DIV | \$13,036,813,772 | 7.27% |
| N00019 – NAVAL AIR SYSTEMS COMMAND | \$9,559,012,086 | 5.33% |
| N00189 – NAVSUP FLT LOG CTR NORFOLK | \$8,208,218,312 | 4.58% |
| N00014 – OFFICE OF NAVAL RESEARCH | \$7,354,501,708 | 4.10% |
| N66001 – NIWC PACIFIC | \$7,314,233,208 | 4.08% |
| N00039 – NAVAL INFORMATION WARFARE SYSTEMS | \$7,223,910,274 | 4.03% |
| N00030 – STRATEGIC SYSTEMS PROGRAMS | \$7,011,636,993 | 3.91% |
| N00178 – NSWC DAHLGREN | \$5,951,210,684 | 3.32% |

Data retrieved from FPDS-NG, August 9, 2019, <https://www.fpds.gov/>.

Table 17. Top 10 Contractors by Obligated Amount with NAICS 541

| Contractors | DUNS | Sum of obligated amount | % of Total |
|--|-----------|-------------------------|------------|
| Johns Hopkins University | 040549461 | \$5,731,646,776 | 3.20% |
| BAE Systems Applied Technologies | 103933453 | \$5,385,388,447 | 3.00% |
| Booz Allen Hamilton Inc. | 006928857 | \$4,707,682,942 | 2.63% |
| Science Applications International Corporation | 078883327 | \$3,682,072,211 | 2.05% |
| Anteon Corporation | 067641597 | \$3,268,671,479 | 1.82% |
| Leidos, Inc. | 833063055 | \$2,782,971,838 | 1.55% |
| United Technologies Corp | 001447952 | \$2,725,107,474 | 1.52% |
| Raytheon Company | 184724797 | \$2,659,218,162 | 1.48% |
| Computer Sciences Corporation | 043991108 | \$2,144,359,465 | 1.20% |
| Charles Stark Draper Laboratory | 066587478 | \$2,125,571,508 | 1.19% |

Data retrieved from FPDS-NG, August 9, 2019, <https://www.fpds.gov/>.



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