

## SEVEN YEARS OF U.S. DEFENSE ACQUISITION RESEARCH: ANALYSIS OF PROPOSALS AND PROJECTS

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**ABSTRACT.** In 2006, the U.S. Defense Acquisition Executive approved a program at the Naval Postgraduate School to solicit, evaluate, and fund proposals for innovative and scholarly acquisition research. This paper presents an exploratory analysis of proposals from 2007 to the present. It seeks to provide an understanding of the types and sources of research proposals, and the extent to which the program's goal has been achieved. Cluster and trend analyses classify and examine the data according to several key aspects, such as: topical area (e.g., contracting, logistics); research type (e.g., exploratory, hypothesis testing); research design (e.g., case study, experiment); and type of analysis (e.g., comparative, statistical). The results show positive trends, but the number of institutions with interest in defense acquisition remains low, suggesting that it remains a limited niche research topic.

### INTRODUCTION

In 2005, Jack Gansler and Bill Lucyshyn of the University of Maryland's Center for Public Policy and Private Enterprise made compelling arguments for the need for a focused program of research in defense acquisition (Gansler & Lucyshyn, 2005). Noting (1) the

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large resource investments typically consumed by military procurement; (2) recurring problems experienced by large weapons programs in terms of cost overruns, schedule delays, and performance shortfalls, despite numerous reform initiatives; (3) the rapidly changing political, technological, and economic aspects of the world's defense environment; and (4) the relative lack of scholarly research devoted to these topics, Gansler and Lucyshyn called for a "disciplined basic and applied research program [as] the only proven way to develop new theories and then use them to solve specific, practical questions within [the defense acquisition] knowledge domain" (Gansler & Lucyshyn, 2005).

Partly in response to this call, the Acquisition Executive for the U.S. Department of Defense (DOD) in 2006 approved a program to support relevant and innovative proposals for acquisition research projects. The Naval Postgraduate School's Acquisition Research Program (ARP), which had been in operation since 2003, was designated as the executive agent for this new program. Beginning in 2007 and each year since, the ARP has issued a call for research proposals, led a review and selection process, and coordinated awards of funding to support the approved research projects. As of December 2013, 319 proposals have been reviewed with 128 selected for award.

In this paper, we undertake an exploratory analysis of the proposals and awards that have been generated by this program in order to understand the nature of the larger scholarly environment that may support defense acquisition research. Specifically, we seek an understanding of the content of the proposals and their sources; that is, "What sort of research has been proposed, and who has proposed it?" We ask questions such as the following: What are the specific topics in which researchers have interest? What research designs, methodologies, and data are employed? What universities and other institutions have interest in acquisition research? The answers will provide information on the breadth and depth of the capacity for defense acquisition research, as well as indications as to whether the research program is accomplishing its objectives. Ultimately, the usefulness of the ARP and similar programs must be assessed in the extent to which they contribute to improvements in defense acquisition, but of course such assessments will not be possible for several years.

This paper makes several contributions to public procurement thought and practice. First, it sheds much-needed light on research in defense acquisition, a neglected but important area of public procurement (Albano et al., 2013). It also illuminates potential issues with public procurement research as they relate to public procurement's critical importance (Thai, 2001) and its status as an academic discipline (Rendon & Snider, 2010; Snider & Rendon, 2012).

We acknowledge this study's limitations. The proposals submitted to the ARP during this seven-year period may not be a representative sample of the universe of defense acquisition research efforts underway throughout the world. The proposals were submitted by researchers seeking monetary support for their projects, and the possibility must be admitted that the actual research performed does not always correspond to the research that was proposed. Finally, our methodology, which is described below, contains potential for coding errors and biases. Thus, our results and conclusions must be taken as merely suggestive of the state of defense acquisition research and, by extension, of public procurement research.

Following a brief background on defense acquisition research, we describe the annual process of solicitation, review, and selection of research proposals. We then review the methodology employed to categorize various aspects of the proposals. Data on research proposals and awards since 2008 are then presented in tabular and graphical form, and we note points of interest and significance. We conclude with a synthesis of the major findings, with implications for the ARP and for defense acquisition research in general.

### **BACKGROUND OF DEFENSE ACQUISITION RESEARCH**

The call by Gansler and Lucyshyn (2005) for attention to defense acquisition research reflects a long-standing recognition of its potential importance. Significant institutional interest in defense acquisition research has been evident for some forty-five years (Table 1).

The potential resource represented by university scholars has also been noted (Roback, 1975; Strayer & Lockwood, 1976). Perhaps more significant is the long-standing recognition that, despite these

**TABLE 1**  
**U.S. Defense Acquisition Research Initiatives**

Organization/Event	Year Established
Army Procurement Research Office	1969
Procurement Research Coordinating Committee	1971
Annual Federal Acquisition Research Symposium	1972
Air Force Business Research Management Center	1973
Federal Acquisition Institute	1977
Naval Center for Acquisition Research	1977

Source: Nissen et al. (1998, p. 95).

resources, acquisition research generally reflects a lack of both quantity (i.e., few researchers devote attention to it) and quality (i.e., the little work that is done is questionable in terms of methods, data, and rigor) (Strayer & Lockwood, 1976; Jefferies, 1977; Martin et al., 1978; Nissen et al., 2000).

Faculty members at the DOD's two graduate schools—Air Force Institute of Technology (AFIT) and Naval Postgraduate School (NPS)—have vested interests in acquisition research, because they educate students to take leadership and management positions in the DOD's acquisition workforce. Accordingly, much extant research emanates from the faculty and students at these institutions. In 1997, faculty members at NPS issued a call for papers for a special issue of *Acquisition Review Quarterly*, a peer-reviewed journal published by the Defense Acquisition University. The call targeted scholars in universities and other research institutions “to engage their interest in defense acquisition as a primary area of research” [Nissen et al., 1998, p. 89]. Response to the call was, however, “underwhelming” (p. 102), generating only one of the seven accepted articles. (The others were generated from personal solicitations from the special issue guest editors.) The guest editors concluded that, if there exists an untapped pool of potential defense acquisition researchers, there is “no effective formalized mechanism for bringing their work to bear” on acquisition matters (p. 103).

A program with precisely this intent was established at NPS in 1998 by direction of then Defense Acquisition Executive Gansler. Dubbed the External Acquisition Research Program (EARP) to reflect

its focus on non-DOD (external) researchers and institutions, the program provided funding for fifteen research projects beginning in 1999 until its termination in 2001 due to budgetary constraints (Nissen et al., 2000). The EARP essentially served as a predecessor for the ARP, which, as mentioned in the introduction, was initiated in 2006 and is the subject of this present study.

### **Execution of the Research Program**

In this section, we describe the ARP's annual process of soliciting, reviewing, and selecting defense acquisition research proposals for award.

Each year, the ARP publishes an open solicitation at a central web portal called Grants.gov. The solicitation is also distributed to hundreds of contacts in the ARP's mailing list, and it is also publicized at the ARP's annual research conference. The primary objective of the solicitation is to attract outstanding researchers and scholars to investigate topics of interest to the defense acquisition community.

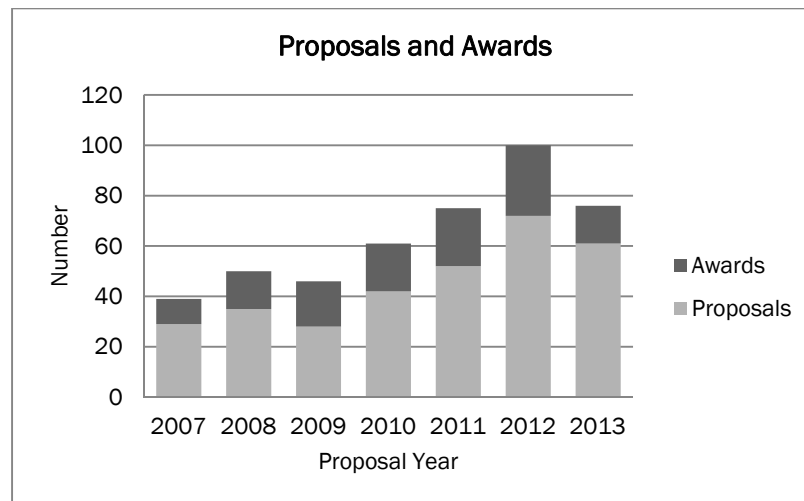
The solicitation specifically solicits proposals for "defense acquisition management and policy research," which refers to investigations in all disciplines, fields, and domains that (1) are involved in the acquisition of products and/or services for national defense, or (2) could potentially be brought to bear to improve defense acquisition. These include but are not limited to economics, finance, financial management, information systems, organization theory, operations management, human resources management, and marketing, as well as the "traditional" acquisition areas such as contracting, program/project management, logistics, and systems engineering management. The solicitation requests projects of 12 months duration with budget ceilings of \$100,000 in the first year and then increasing slightly each year thereafter; the 2013 ceiling was \$120,000.

The solicitation remains open for eight weeks. Proposals are then collected and distributed to the review and evaluation committee, which typically includes six representatives from DOD research and academic organizations. The committee convenes to discuss and rank the proposals according to (1) overall scientific and technical merits; (2) offeror's capabilities, related experience, and past performance; and (3) project cost. Awards are made starting with the

top-ranked proposal and then proceeding to lower ranked proposals until the budget ceiling has been reached.

Figure 1 shows the generally upward trend in both proposals and awards through 2012. The drop-off in proposals in 2013 was likely due to the annual conference's cancellation caused by heightened DOD restrictions on conducting conferences—thus limiting the extent of the solicitation's distribution—while the reduced number of awards in 2013 was most likely due to the effects of sequestration in the DOD.

**FIGURE 1**  
Proposals (n=319) and Awards (n=128) through the Acquisition Research Program 2007–2013



#### METHODOLOGY

We conducted a systematic review of research proposals received over the last seven years using content analysis to identify patterns and themes. Specifically, we replicated the methodology used in three prior studies. Carter and Ellram (2003) analyzed articles published in *Journal of Supply Chain Management*, and Elder (2005) and Miranda and Spann (2006) conducted separate analyses of articles in *Acquisition Research Journal*.

We independently reviewed the text of each research proposal to identify major characteristics of each. These characteristics were taken from those identified in the prior studies (Carter & Ellram, 2003; Elder, 2005): research subject category (Table 2), type of research (Table 3), research design (Table 4), and type of data analysis (Table 5). We separately coded and then compared scorecards, with conflicts resolved through subsequent discussion and mutual agreement. We also gathered demographic, institutional (e.g., university, researcher's departmental affiliation, for-profit or nonprofit institution), and funding data from the proposals.

**TABLE 2**  
**Proposal Subject Categories**

<b>Subject Categories</b>	<b>Definition</b>
Acquisition Strategy	Big picture views in acquisition strategy such as outsourcing, privatization, and cooperative acquisition
Analysis & Decision Making	Analysis models in decisions, cost analysis, and budgeting
Contracting	Auctions, buyer-seller relationship, contract management, contingency contracting, source selection, acquisition planning, contract incentives, etc.
Cost, Schedule, Performance	Management, estimation, activity-based costing, budget, cycle-time, estimate at completion, earned value management, total ownership cost, performance measurement and metrics, better buying power, efficiency, productivity, etc.
Defense Industry	Budget, security, aircraft, commercial off-the-shelf, non-developmental items, small business, weapon system acquisition, commercial issues with an industry base focus, etc.
International	Cooperative acquisition, foreign military sales, globalization, transatlantic, etc.
Interoperability	DOD Architecture Framework, enterprise architecture, integration, quality assurance, quality improvement, technology integration, information technology, systems-of-systems, and design

TABLE 2 (Continued)

Subject Categories	Definition
Logistics	Electronic business, depots, life-cycle, logistics reform, supply chain, performance-based logistics, technology performance risk index, etc.
Management & Organizational	Leadership/management theory, organizational reconstruction, organizational strategy, workforce development, etc.
Policy & Regulations	Encompasses acquisition regulation and public policy issues, etc.
Risk Management	Field testing, battle labs, technical performance measures, etc. Risk, risk models, metrics, test and evaluation, technical evaluation
Technology	New research endeavors not directly related to interoperability or program fielding. These include: anti-tamper, information technology, innovation, knowledge management, net-centric

Source: From Elder (2005); Miranda and Spann (2006).

TABLE 3  
Types of Research

Research	Definition
Exploratory	Research that makes observations for the purposes of developing theories, but leaves testing of the theories for other studies.
Hypothesis	Research that introduces and then tests research hypotheses or propositions.
Literature	Research that reviews and synthesizes existing literature, the result of which is the development of a framework, propositions, or normative prescriptions grounded in existing literature.
Methodology	Research which reviews methodologies in the field. A "how-to" proposal.
Normative	Research where literature might be cited, but the point of the inclusion is to support the opinions/assertions of the author.

Source: From Carter and Ellram (2003).



**TABLE 4**  
**Types of Research Design**

Research Design	Definition
Archival	Research is designed with the primary use of data that already exists and has been collected by others.
Case Study	Research is designed to use in-depth data gathered from a specific program or event.
Experiment	Research is designed to collect data through an experimental process.
Interviews	Research is designed to collect data through interviews with subject matter experts.
Modelling	Research involves proposing or developing a simplified framework designed to illustrate complex processes, often but not always using mathematical techniques.
Surveys	Research is designed to collect data through the use of surveys.
Topic Presentation	There is no discernable research design methodology.

Source: From Elder (2005).

**TABLE 5**  
**Types of Data Analysis**

Data Analysis	Definition
Anecdotal	Based on incidental observations or reports rather than a systematic evaluation
Comparative Analysis	Utilizing comparison as a method of analysis (e.g., outlining results with a comparison between DOD restricting to that of a civilian organization)
Content Analysis	A detailed systematic evaluation of a particular body of material for the purpose of identifying patterns, themes, or biases
No Analysis	No discernible analysis proposed
Statistical Analysis	Uses statistical methods to analyze data. These methods include ANOVA, correlation analysis, regression analysis, descriptive statistics, and factor analysis.

Source: From Elder (2005).

### Data Presentation

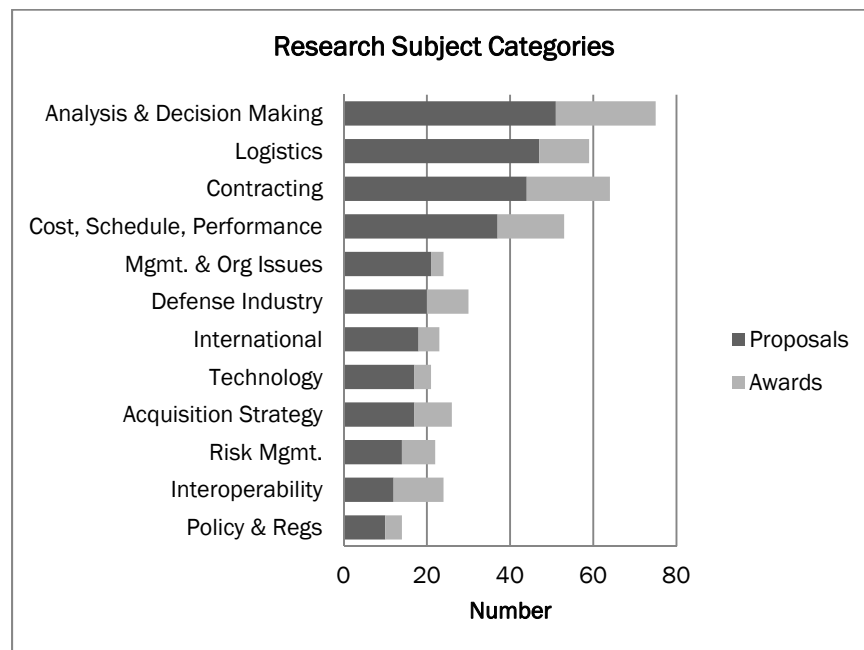
The following section gives top-level summary results of our analysis of proposals, along with comments on potentially significant points. We include comparisons with the findings of prior studies (Elder, 2005; Miranda & Spann, 2006) (hereafter referred to as “prior studies”) where appropriate.

### Proposal Content

Here we present results for research topics, types of research, research designs, and types of data analysis. For all of the figures below, the total number of proposals is 319 and the total number of awards is 128.

Figure 2 shows the frequency of proposals and awards by subject. Of note is the large number of proposals and awards in just four subjects; almost 60% of the proposals occur in 33% of the subjects.

**FIGURE 2**  
**Proposals and Awards by Research Subject Categories Proposed**  
**2007–2013.**

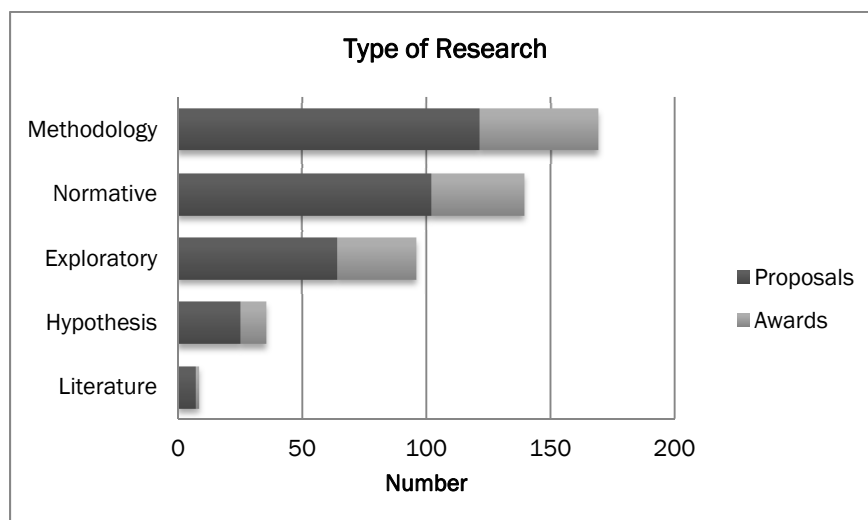


“contracting” and “logistics” are recognized as traditionally mainstream defense acquisition topics. The large number of proposals and awards in “analysis & decision making” and in “cost, schedule, performance” may reflect researcher and evaluator perceptions of perennially problematical outcomes in defense acquisition. Less frequent attention to niche topics such as “defense industry” and “international” possibly reflects a belief that acquisition’s problems lie mainly within the public sector and are mainly domestic in nature. These results have little in common with the findings of prior studies, in which “technology” and “acquisition strategy” were frequently occurring topics.

The large number of proposals in “contracting” may have significance for public procurement, as most would agree that contracting is the defense acquisition topic most closely related to public procurement. An interesting point is that almost half of the proposals in “Interoperability” received awards, indicating either the evaluators’ high levels of interest or the high level of quality of proposals in this area, or perhaps both.

The relative frequency of research proposal types (Figure 3) mirrors that found in the prior studies. Elder (2005) noted that

**FIGURE 3**  
Proposals and Awards by Type of Research Proposed 2007–2013.

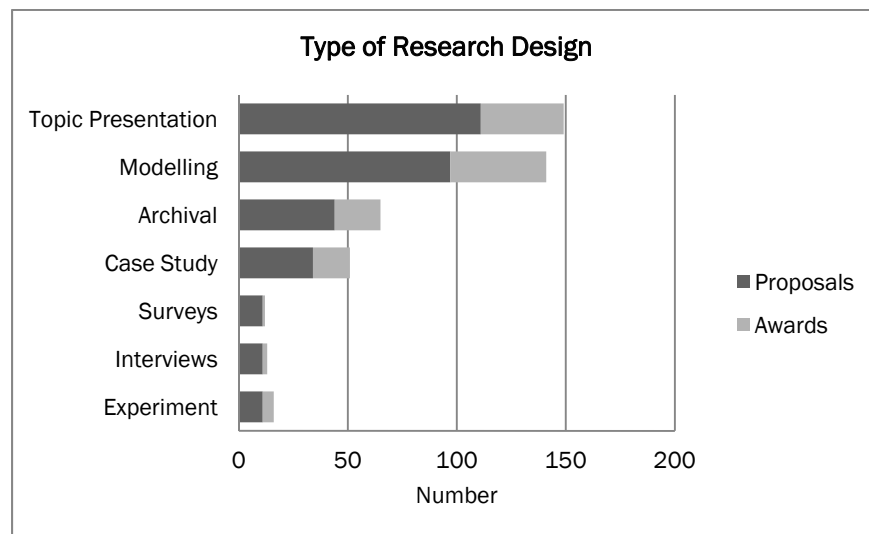


“methodology” and “normative” types represent practitioner-oriented research, while the other three types are typically associated with scholarly research. These results indicate a distinctly pragmatic bias towards investigations in defense acquisition.

The large number of proposals and awards in the “methodology” category reflect biases towards applied “how to” research to solve some acquisition-related problem. The high frequency of “Normative” proposals suggests that researchers have definite views on the problems to be solved and how to solve them. Interestingly, more awards were made for these two categories, suggesting that evaluators prefer proposals that seem to offer definitive answers to problems—what should be done and how to do it—over those with more scholarly rigor that seek foundational understandings.

The infrequency of proposals in the “hypothesis” and “literature” categories suggests a general paucity of data and scholarly literature in defense acquisition. Figure 4 shows that more proposals indicated no discernable research design than any other type, which corresponds to findings in the prior studies. Overall, this confirms a relative immaturity in the state of defense acquisition research. Still,

**FIGURE 4**  
Proposals and Awards by Type of Research Design Proposed 2007–2013



this category received the second-highest number of awards. This suggests that evaluators may be at least as interested in new ideas and approaches for addressing acquisition issues as in the scholarly rigor underlying those ideas and approaches.

Rigorous designs that might be most useful in generating new knowledge (e.g., surveys, interviews, and experiments) were proposed least frequently. This may also reflect a paucity of useful data for such designs or difficulties in gaining access to sources of defense acquisition data, which may be restricted due to security concerns.

Also of note is the high frequency of designs that involve modelling, which was not found in the prior studies. Many of these proposals sought to provide conceptual or analytical “frameworks” which would provide a basis for addressing some issue or solving some problem. Researchers often proposed to validate these models using some limited data, with the hope that, if the proposal was accepted for award, DOD agencies would be willing to use them more extensively. That the “Modelling” category received the most awards suggests that evaluators recognize that the DOD is searching for useful frameworks to understand and solve acquisition problems.

**FIGURE 5**  
Proposals and Awards by Type of Data Analysis Proposed 2007–2013

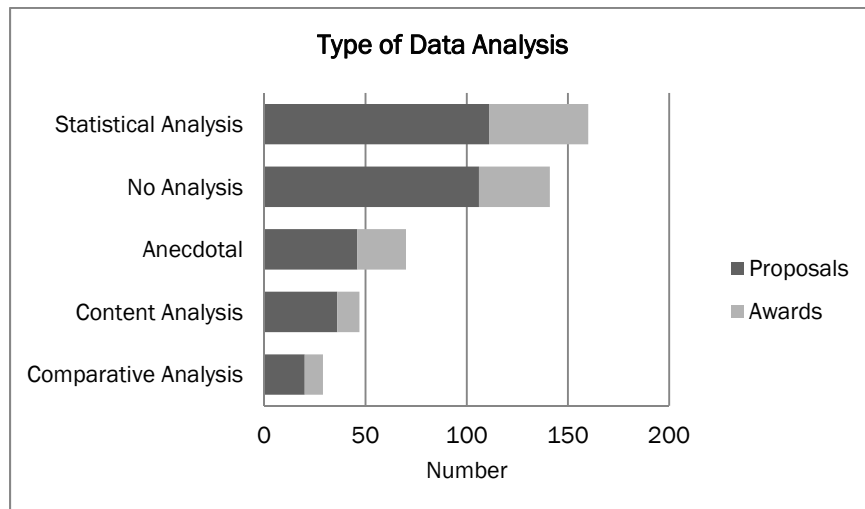
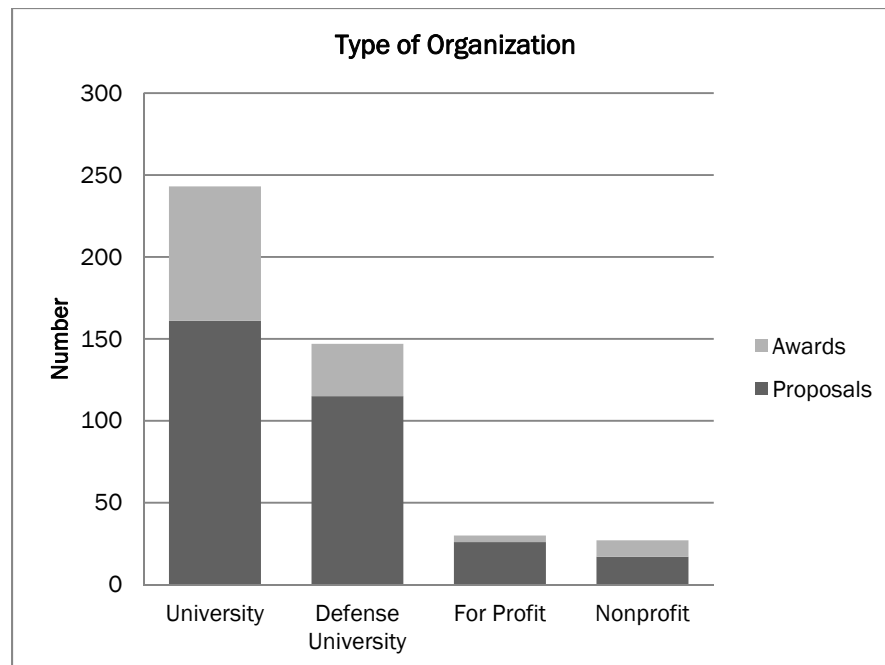


Figure 5 above depicts the frequency of proposals and awards according to type of data analysis. At first glance, the large number of proposals and awards in the category of “Statistical Analysis” may appear contrary to trends identified up to this point, which indicate a predominance of practitioner over scholarly research orientations. This category includes, however, simple descriptive and graphical analysis as well as sophisticated regression and ANOVA techniques; thus, this category may not be a good discriminator of research rigor. A stronger indication may be given by the combined frequencies of proposals in the categories of “Anecdotal” and “No Analysis.” These two categories suggest less rigorous scholarship and thus a stronger practitioner orientation. Still, evaluators valued these proposals; roughly one of every four was awarded.

**FIGURE 6**  
**Type of Institutions Proposing Research 2007–2013.**



Note: Defense universities submitting proposals included the following: in the USA, the Naval Postgraduate School, the Air Force Institute of Technology, the Air Force Academy, and Defense Acquisition University;

in the UK, the Defense Academy of Cranfield University; and in Germany, the Bundeswehr University Munich.

### **Sources of Proposals**

Here we present results for institutions that submitted research proposals in response to the annual solicitation. Figure 6 above shows the distribution of proposals for various types of institutions. As the DOD sponsor had hoped, civilian universities—known as standard-bearers for high-quality scholarly research—are by far the largest contributors of proposals. Defense universities were robustly represented, mainly because they all have faculty members who are intimately involved in research and education activities related to defense acquisition.

Of the total proposals from civilian universities, a large proportion came from only a few schools (Figure 7). This suggests that defense acquisition is something of a niche topic of interest to only a few institutions; similar statements have been made about public procurement as a topic of research interest (Snider & Rendon, 2012).

**FIGURE 7**  
**Top Proposing Universities 2007–2013**

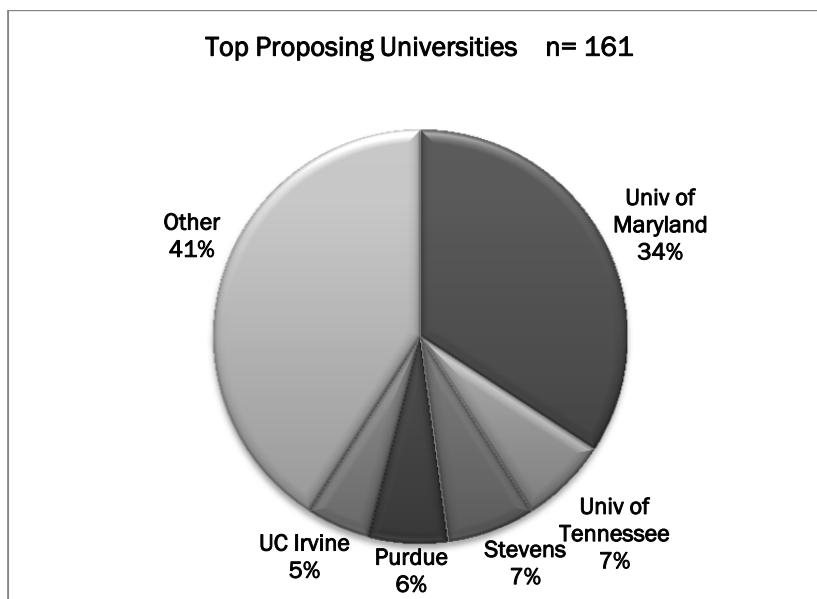
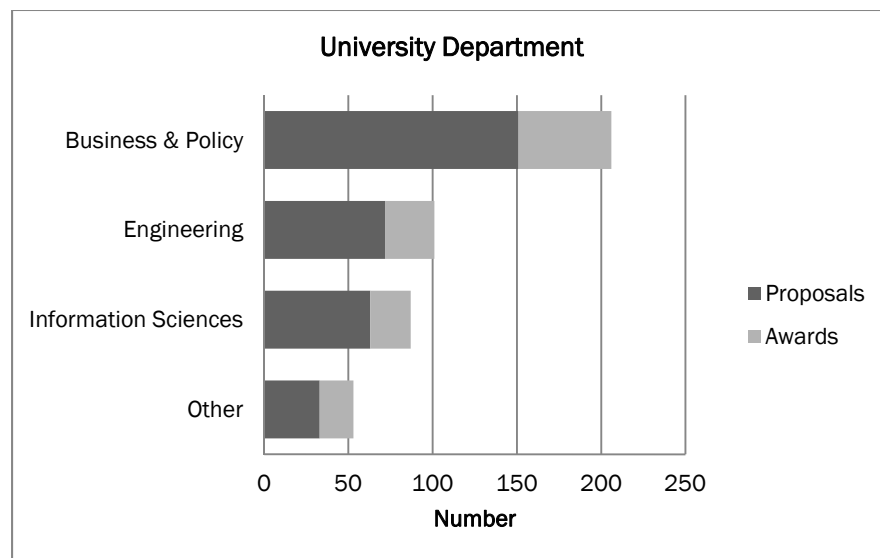


Figure 8 gives the distribution of proposals by university researchers' departmental or school affiliation. Considering that the annual solicitations sought proposals for "management and policy research," this distribution is not surprising. The number of proposals from engineering and information sciences departments suggests that management is a significant sub-discipline within those departments (e.g., engineering management, information technology management).

**FIGURE 8**  
**University Department of Lead Researchers (Including both**  
**Universities and Defense Universities 2007–2013)**



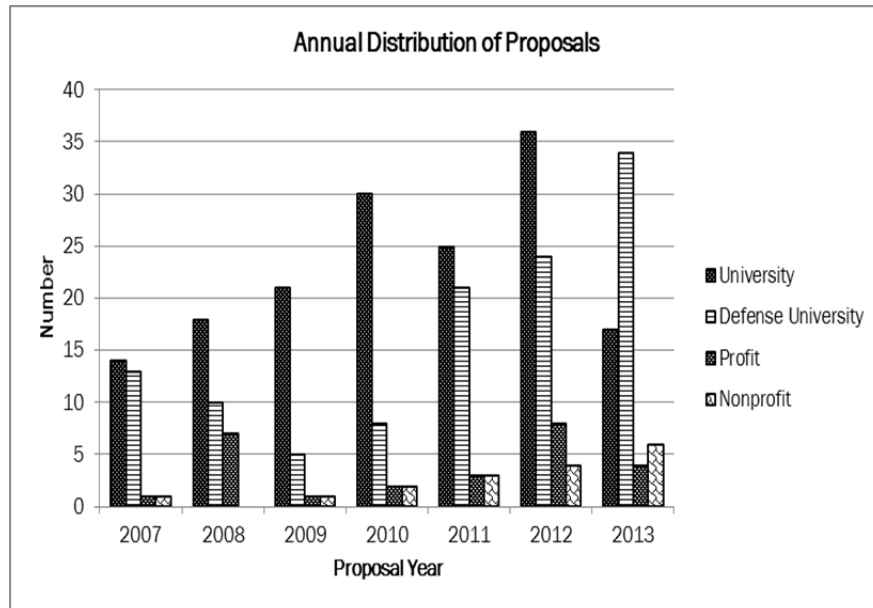
Note. The "Other" category includes non-university institutions.

Figure 9 depicts the annual distribution of proposals according to their sources. The generally increasing trend of university proposals (except for 2013, which perhaps is an anomaly, as discussed earlier) indicates that the program is accomplishing its objective of stimulating research interest outside of DOD. The predominance of university proposals over those from for- and non-profit entities is also a positive sign.



The increasing numbers of DOD university proposals since 2009 likely reflect a procedural change more than any substantive trend. Prior to 2009, NPS researchers submitted their proposals in response to a separate solicitation, and after that date, they submitted proposals in response to the annual BAA.

**FIGURE 9**  
Annual Distribution of Proposals by Institution Type 2007–2013



### DISCUSSION

On balance, these results present a mixed picture of the state of defense acquisition research. While trends seem generally positive in terms of numbers and awards, they represent a fairly limited number of institutions. Seven institutions represent 60% of proposals and 70% of awards. This suggests that acquisition is a limited niche research topic.

In the section that follows, we explore some possible reasons for this condition. We perceive that defense acquisition has unique

characteristics that may separate it from the mainstream of academe, and thus also from the mainstream of scholarly research.

### **Acquisition as a Military Function**

It may be argued that acquisition—at least in the United States—is primarily a military rather than a technical or managerial administrative activity. Acquisition is controlled by the military and is configured as a distinctly military function in at least two significant ways. First, for the most part, the locus of acquisition is within the DOD and the Departments of the Army, Navy, and Air Force. Second, the majority of key program managers are uniformed military officers (Snider, 2011). The most common explanation for this is that the operational experience of the uniformed officer enables him or her to understand and respond to the needs of the operational user (Lockwood, 1985).

### **Acquisition as an Interdisciplinary Activity**

Second, as an interdisciplinary activity, defense acquisition lacks a central defining scholarly discipline: Is it mainly for study by engineers, management theorists, or political scientists? Acquisition is often organizationally associated with research and technology activities. For example, Pentagon acquisition executives also have responsibilities for their services' research and development activities, hence, titles such as Assistant Secretary of the Navy (Research, Development, and Acquisition) and Under Secretary of Defense (Acquisition, Technology, and Logistics). Most writers locate the roots of contemporary defense acquisition in the management of large complex weapons projects, such as the Manhattan Project and aerospace projects, during and following World War II (Acker, 1993, pp. 4-5; Przemieniecki, 1993, p. 13). Regarding management, the DOD's general preference for managerial and business approaches in acquisition has been well documented (Jefferies, 1977). The DOD's requirements for qualification in certain acquisition career fields include at least 24 semester credit hours in business-related subjects (DAWIA, 1990). Fox (1974) has noted, however, that acquisition's historical preference for technical disciplines may have overshadowed attention to business concerns. Finally, Mayer and Khademian (1996) note the strong political dimension of defense acquisition, partly because of the huge number of dollars at stake. It

thus continues to attract the attention of political scientists as an object of research (for example, see (Mayer, 1991)).

An interdisciplinary bias is indicated by graduate degree programs for acquisition officers. Each year, the services pay for a certain number of officers to attend graduate school on a full-time basis to obtain master's degrees in a variety of disciplines. In fiscal year 2008, for example, the Army sent about 75 of its acquisition officers to graduate school to pursue degrees in engineering, computer science, information systems, business, and management (USAASC, 2008).

While acquisition's interdisciplinary character may be an advantage in terms of effective practice, it may have drawbacks in terms of research. If one discipline doesn't "own" acquisition, a critical mass of disciplinary scholarship will be lacking.

#### **Acquisition: Training, not Education**

After World War II, as Cold War weapons programs grew in scope, complexity, and cost, the DOD recognized the need for specialized management skills among its officers and civilian members. Eventually this led to the establishment of professional training programs in functional areas such as contracting, logistics, production management, and project management. In 1990, as part of DAWIA, the Defense Acquisition University was established and given responsibilities for the professional development of the acquisition workforce. By far, most activity to date has occurred in the area of training. Much less attention has gone to acquisition education and research. There are a few textbooks dedicated to defense acquisition, and both the Navy and the Air Force have instituted acquisition management curricula at their respective graduate schools. Acquisition and procurement research has received some attention over the years (Babione, 1975; Lorette, 1977; Martin et al., 1978), but there is little evidence of interest in developing what might be called "acquisition theory."

To summarize, defense acquisition proceeds largely as an interdisciplinary field of professional practice with neither an explicit underlying theory nor much evident interest in the development of theory. The result is a general lack of any activities that could lead to an understanding of the important questions and enduring themes that might define acquisition as a unique area of research.

### CONCLUSION

We conclude with several questions that remain unanswered from this analysis. Has the Acquisition Research Program accomplished its goals? Has scholarly interest in defense acquisition actually been stimulated, both among faculty and graduate students at academic institutions? Is there now a wider scholarly network of interest in acquisition research? Has new and useful knowledge been generated, and if so, is it being applied to solve acquisition problems? Most importantly, have the outcomes of defense acquisition been improved through research?

### ACKNOWLEDGEMENTS

The authors acknowledge the support of the Acquisition Research Program, Naval Postgraduate School, in the preparation of this paper. The views expressed in this document are those of the authors and do not reflect the official policy or position of the Department of Defense or the U.S. Government.

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