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MBA PROFESSIONAL REPORT

A Critical Analysis of the Acquisition Review Journal: Are We in Step with the Field?

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December 2006

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13. ABSTRACT (maximum 200 words)

The purpose of this study is to provide contributing authors with an understanding of the trends in article submission to the *Acquisition Review Journal* (*ARJ*) with regard to the types of research performed, research design, and data analysis. This research will provide future contributors with insight that will improve both the quality of the *ARJ* and future research for the Acquisition Corps. It will also provide guidance and recommendations for future research articles within the *ARJ*.

This study analyzed and classified 233 articles that were published in the *ARJ* over the last 13 years (1994-2006). Content and statistical analyses were performed on the themes, research types, research designs, and data analysis methods employed. Moreover, trends such as educational and institutional affiliations of contributing authors were also reviewed.

The *ARJ* has shown some distinctive trends, which are reflected in its publication of a number of qualitative studies; however, it has also shown progress in the number of published quantitative studies. The academe and practitioners' contributions remained steady, while civilian contributions have been rising. These trends are in line with current recommendations of the research community. For a relatively new journal, such trends are a good representation of a growing community.

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A CRITICAL ANALYSIS OF THE ACQUISITION REVIEW JOURNAL: ARE WE IN STEP WITH THE FIELD?

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LIST OF SYMBOLS, ACRONYMS, AND ABBREVIATIONS

ACSC	Air Command Staff College
AFIT	Air Force Institute of Technology
ANOVA	Analysis of Variance
AI	Artificial Intelligence
ARJ	Acquisition Review Journal
ARQ	Acquisition Review Quarterly
AT&L	Acquisition, Technology, and Logistics
AWC	Air War College
CAIV	Cost as an Independent Variable
CESA	COTR Expert System Aid
COTR	Contracting Officer's Technical Representative
COTS	Commercial Off the Shelf
CV	Coefficient of Variance
DAB	Defense Acquisition Board
DAU	Defense Acquisition University
DAWIA	Defense Acquisition Workforce Improvement Act
DCMC	Defense Contract Management Command
DoD	Department of Defense
DoDAF	Department of Defense Architecture Framework
DSMC	Defense Systems Management College
EAC	Estimate at Completion
EVM	Earned Value Management
GAO	General Accounting Office
GOV	Government
ICAF	Industrial College of the Air Force
IPPD	Integrated Product and Process Development
IPT	Integrated Product Team
IT	Information Technology
JSF	Joint Strike Fighter
NASA	National Aeronautics and Space Administration
NAVAIR	Naval Air Systems Command
NDI	Non-Developmental Item
NPS	Naval Postgraduate School
NWC	Naval War College
OSD	Office of the Secretary of Defense
PBL	Performance-Based Logistics
PEO	Program Executive Office/r
QA	Quality Assurance
RDT&E	Research, Development, Testing, and Evaluation
RFP	Request for Proposal
SAR	Selected Acquisition Report
SE	Systems Engineering

SoS	System of Systems
SPO	Systems Program Office
TOC	Total Ownership Cost
TPRI	Technical Performance Risk Index
TRI	Technical Risk Index
USA	United States Army
USAF	United States Air Force
USD	Under Secretary of Defense
USMC	United States Marine Corps
USN	United States Navy

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I.   INTRODUCTION

A.   BACKGROUND

1.   History of Acquisition Reform

In 1961, Secretary of Defense Robert S. McNamara attempted to revamp the procurement system.[1] From 1961 on, several acquisition reform initiatives followed as shown in Figure 1.

Year	Initiative
1961	McNamara initiatives
1970	Fitzhugh Commission
1972	Commission on Government Procurement
1976	OMB Circular A-109
1978	Defense Science Board Acquisition Cycle Study
1979	Defense Resources Management Study
1981	Defense Acquisition Improvement Program
1983	Grace Commission
1986	Packard Commission
1986	Goldwater Nichols
1989	Defense Management Review

Figure 1.   Reform Initiatives[2]

These reform efforts emphasized streamlining the weapons acquisition process, improving cost estimating practices, and changing personnel procedures to produce more qualified contracting staff. Recommendations have included:

- eliminating needless legal encumbrances on contracting procedures;
- empowering program managers;
- establishing clear lines of authority;
- simplifying the source selection process;

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[1] Deborah Frank, "A Theoretical Consideration of Acquisition Reform," *Acquisition Review Quarterly*, Summer 1997, p. 281.

[2] Ibid.

- reducing technical criteria;

- re-codifying federal laws governing procurement;

- employing more frequent product testing and competitive prototyping;

- improving the pay, training, and career options for personnel; and

- multi-year congressional funding.[3]

The efforts mentioned above are themes that have been expressed throughout the articles and issues of the *Acquisition Review Journal* (*ARJ*). The *ARJ* was intended for the following purpose:

> . . . Acquisition Corps members and other readers from government, Congress, industry and academe are encouraged to use the *Acquisition Review Quarterly* (*ARQ*), now *ARJ*, as their professional forum for discussion and exchange of policies, research, information, and opinion.[4]

2.   Relevance of the *ARJ*

The *ARJ* encourages articles on policy, scholarly research, opinions, and anything else that affects the acquisition community. Acquisition is a very broad term, which is why the *ARJ* welcomes articles in all areas such as contracting, logistics, management, and technology. For example, in February 2006, Lieutenant General Donald J. Hoffman, United States Air Force (Military Deputy, Office of the Assistant Secretary of the Air Force for Acquisition) stated the following: "I stand by my earlier comments on the quality of our military hardware, but you have all read the headlines about acquisition reform and the biggest driver is the need to control cost and schedule."[5] His viewpoint is reflected in this study's results as Cost, Schedule, and Performance is the second highest theme category of the *ARJ*, with Technology being number one.

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[3] Lauren Holland, "The Weapons Acquisition Process: The Impediments to Radical Reform," *Acquisition Review Quarterly*, Spring 1998, p. 235.

[4] *Acquisition Review Quarterly*, Editorial Mission, Summer 1994, no page number noted.

[5] Lieutenant General Donald J. Hoffman, United States Air Force, "The Way Ahead," February 2006, https://www.safaq.hq.af.mil/news/february2006/hoffman.html, last accessed on 29 November 2006.

B.   HISTORY OF THE *ARJ*

One of the two publications by the Defense Acquisition University (DAU), aside from the *Acquisition*, *Technology*, *and Logistics* (*AT&L*) magazine, is the *ARJ*, which has consistently published articles for both academe and practitioners with a particular interest in the acquisition community. During its 13-year life span, it has published 42 issues and 233 articles, not including editorial and special edition introductions and books reviews. A total of 325 authors have published articles in the *ARJ* (see Appendix A). The *ARQ* was renamed the *ARJ* for Issue 35 (2004), concurrent with a decrease in the number of issues published per year from four to three. Although this publication experienced a name change, the content, intent, and mission did not change. The *ARJ* was designed to address the needs of professionals across the defense acquisition spectrum. Its editorial mission is to:

> . . . provide practicing acquisition professionals with relevant management tools and information based on recent advances in policy, management theory, and research. The *ARQ* (*ARJ*) addresses the needs of professionals across the full spectrum of defense acquisition, and is intended to serve as the mechanism for fostering and disseminating scholarly research on acquisition issues, for exchanging opinions, for communicating policy decisions, and for maintaining a high level of awareness regarding acquisition management philosophies. In addition to the acquisition professional, the *ARQ* (*ARJ*) provides insight to others in the Department of Defense (DoD), Congress, industry and academe who have significant interest in how the DoD conducts its acquisition mission. Acquisition Corps members and other readers from government, Congress, industry and academe are encouraged to use the *ARQ* (*ARJ*) as their professional forum for discussion and exchange of policies, research information, and opinions.[6]

Based on the editorial mission statement, the *ARJ* should serve as a forum for the exchange of opinions, communicating policy decisions, and for maintaining awareness for acquisition management philosophies. Not only should it be a forum for the community, but it should also be used as a means for communication, both for the members of the acquisition community, and to all those that have an expressed interest in

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[6] *Acquisition Review Quarterly*, Editorial Mission, Summer 1994, no page number noted.

the DoD's acquisition mission.[7]   Members of the Acquisition Corps and other communities (e.g., logistics, contracting, end user, etc.) are encouraged to use the *ARJ* as a professional platform for information exchange among community members. Gerald E. Knightley, the Executive Director at the time of its inception, believes that the *ARJ's* target audience is senior members of the Acquisition Corps.[8]

The *ARJ* has had four editors over its 13-year existence (see Table 1). In Table 1, Norene Taylor is referred to as an editor; however, in Issue 32 (published in summer 2003) the position of editor was disseminated among three positions and she was designated as Managing Editor (lead editor).

Time Period	Issues	Editor
Winter 1994-Spring 1995	5	Robert W. Ball
Summer 1995-Fall 1997	6	James Kurt Wittmeyer
Winter 1997-Summer 2000	10	Deborah L. Gonzalez
Fall 2000-Present (2006)	21	Norene L. Taylor (Formally Blanch and Fagan-Blanch)

Table 1.   *ARJ* Editors

At the end of each issue of the *ARJ*, there is a section called "Guidelines for Authors," which specifies the *ARJ*'s criteria for manuscript submission. In the 1994 winter edition, for example, the *ARJ* was interested in articles that

> . . . represent scholarly examination, disciplined research, and supported empirical experience in the fields of defense systems management and acquisition management. . . . Manuscripts supporting the Defense Acquisition University (DAU) commitment to improve the acquisition process and the professionalism of the acquisition workforce are particularly welcome.[9]

While articles related to acquisition were preferred, other fields of management would not be omitted.

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[7] Gerard E. Knightley, "Acquisition Review Quarterly," Memorandum for Defense Acquisition Professionals, *Acquisition Review Quarterly*, Winter 1994.

[8] Ibid.

[9] *Acquisition Review Journal*, "Guidelines for Authors," Winter 1994, p. 84.

The summer 1995 issue experienced a cover change, but it also had an addendum to the "Guidelines for Author" section in regard to the types of manuscripts it desired to publish: "The *ARJ* welcomes manuscripts from anyone interested in the defense acquisition process."[10] Further change occurred in the winter 1997 issue, which explicitly defined defense acquisition ". . . as the conceptualization, initiation, design, development, logistics support, modification, and disposal of weapons and other systems, supplies, or services to satisfy Defense Department needs, or intended for use in military missions."[11] The next noticeable change was in the summer 1999 issue, in which authors were asked to include a photograph of themselves and their email address, to be placed with their biography. In Issue 37, in the "Guidelines for Authors" section, the *ARJ* began to publish planned issue themes and publication schedules. In this section, they displayed the due date and publication date; however, in order to learn the themes, prospective authors needed to view the DAU's Website (http://www.dau.mil). Another change, made in Issue 39, added themes to the "Guidelines for Authors" section, right under the due date and publication date.

Over the years, the *ARJ* evolved in order to better serve the acquisition community. Chapter II begins to explore the trends, categories, and themes that were gathered from reading the articles that have been published since its inception.

C. PURPOSE OF STUDY

1. Research Statement

Prior to 2005, a study of the *ARJ* had not been conducted. However, in 2005, Elder did a thesis on the *ARJ*. In his study, he reviewed all the articles published in the *ARJ* up to Issue 36 (released in 2004), which provided him with a total of 193 articles after he excluded editorial and special edition introductions and book reviews. This study will include the articles that Elder reviewed plus the remaining ones to date, providing us with a grand total of 233 articles.

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[10] *Acquisition Review Journal*, "Guidelines for Authors," Summer 1995, back cover.

[11] *Acquisition Review Journal*, "Guidelines for Authors," Winter 1997, p. 127.

The purpose of this study is to provide contributing authors with an understanding of the trends in article submission to the *Acquisition Review Journal* (*ARJ*) with regard to the types of research performed, research design, and data analysis. This research will provide future contributors with insight that will improve both the quality of the *ARJ* and future research for the Acquisition Corps. It will also provide guidance and recommendations for future research articles within the *ARJ*.

The intentions of this study are: (1) to replicate Elder's thesis and compare the two sets of results; (2) to analyze the remaining articles to date and determine if there has been any noticeable changes in trends in the types of articles, the themes, and the characteristics of the contributing authors; and (3) to analyze these trends over the past 13 years within the acquisition community. Replicating Elder's thesis and conducting a second content analysis of the *ARJ* will provide confirmation of its focus on Acquisition Reform and if it truly provides a forum for the acquisition community as described in the *ARJ* mission.

Other research communities have performed studies on research that has been done in their respective communities. An example of this type of study was performed by two Supply Chain Management professors, Craig R. Carter and Lisa M. Ellram, who published the article, "Thirty-Five Years of the Journal of Supply Chain Management: Where Have We Been and Where are We Going?" In their study, they reviewed all the articles within the *Journal of Supply Chain Management* and noted the following information:

- The editors over the existence of the journal
- The authors
  - Their educational background
  - Their institutional affiliation
- The article's subject categories
- The type of research performed
- The type of research design
- The type of data analysis

Once all the information was collected, they completed a content analysis of the data and noted any trends that existed. Their research was well designed and so comprehensive that the Acquisition Community felt it would be both interesting and beneficial to conduct a similar study on the *ARJ*.

This study is a replication of the content analysis of the *ARJ* using two coders (researchers). The two coders have the same professional background and educational experience. The present endeavor compares the results of the two independent studies. In addition, the two coders separately analyzed the articles published in the *ARJ* through 2006. A third coder was used as an arbitrator to resolve any differences in analysis.

2.   Research Questions

Having read the *ARJ's* editorial mission, the following questions were structured.

- How does the *ARJ* contribute to the acquisition community as a forum for intellectual exchange?

- Who is publishing the articles in the *ARJ*?

- What determines the caliber of the articles published and why are those articles chosen over others?

3.   Investigative Questions

Based on Carter and Ellram's content analysis methodologies, the coders developed similar research questions to guide their primary research.

- What subject matters or themes have been addressed in the *ARJ*?

    o   Do the subject matters or themes enable the readers to gain new insight about a particular acquisition issue; develop new concepts or theoretical perspectives about acquisition; or discover problems and/or solutions to particular issues?

- How have the themes been explored or written in the past 13 years?

  o What research methodologies have been employed in the journal? What is the most commonly employed research methodology?

  o What type of data collection and data analysis did the authors use to support their research/contribution? From among the different types of data analysis, which appears to be most common?

  o Are there trends in the type of articles, research categories, or data analysis over the years? Do the types differ across time?

  o What does this analysis suggest about the study of acquisition reform in the *ARJ*?

- What types of authors have contributed articles to the *ARJ*?

  o Are they academe or practitioners?

  o What are their institutional affiliations? Do the authors come from military or civilian institutions?

  o What is the trend on the number of authors per article over the years? Did the number of authors per article change across time? Are the authors encouraged to collaborate with other authors?

  o Do the articles published to this point appear relevant with on-going acquisition reform?

D.   ORGANIZATION OF RESEARCH

The study is organized into four chapters. Chapter I provides an introduction and overview of the study. Chapter II describes the methodology, including the processes and techniques used to acquire and analyze the data. Chapter III provides an in-depth analysis of the data, including the results from the replication of Elder's study. Finally, Chapter IV summarizes the conclusions and provides recommendations for future study.

II.   RESEARCH METHODOLOGY

The study focused on classifying 233 articles that were published in the *ARJ* over the last 13 years. The coders read all the articles published since the journal's inception in 1994, with the exception of editorial and special edition introductions and book reviews. In this chapter, we will discuss the methodology used to classify the articles in order to discuss different aspects of the *ARJ*. The methodology includes types of research performed, types of research design, and types of data analysis, statistical methods, and themes.

A.   DATA COLLECTION

To gather all the data required for the analysis, the coders first created an Excel spreadsheet to capture all the areas relevant to achieving the answers to the research questions. The coders performed a content analysis of the themes, research types, research designs, and data analysis methods employed. A number of other authors have conducted studies of this stature within their respective communities such as:

- Carter and Ellram
- Das and Hanfield
- Williams and Oumlil
- Mentzer and Kahn

The study performed a content analysis of the themes, research types, research designs, and data analysis methods employed.

In order to collect the data, the process required both coders to read articles independently, while simultaneously filling in two data spreadsheets. Upon completion of the articles published in 1994 and 1995, a meeting of the coders was held to compare results. The reason for the meeting was to ensure that both individuals had similar interpretations of the definitions they applied to the articles, respectively. Each article was discussed individually and an exchange of the themes and categories took place. The articles on which the coders were in 100 percent agreement were noted and upon completion of all 233 articles, a reliability rate was calculated. The reliability rate

consists of the total number of articles that were in 100 percent agreement divided by the total number of articles (233), which resulted in a 91 percent agreement rate. This percentage is known as the inter-coder agreement, in which an agreement rate of 70 percent[12] or higher is favorable. For those articles about which there was not 100 percent agreement, a third coder was used to settle any discrepancies. The purpose of the third coder was to read the articles and perform the same assessment, which was used to adjudicate any disagreements. For instance, if the first coder assigned a Normative review, while the second assigned a Literature review, the disagreement was broken by the categorization of the third coder. The importance of the third coder was to ensure that a one-to-one ratio was maintained for each category per article.

In the beginning, the coder meetings were critically important since the definitions of the categories were being refined for proper interpretation by both individuals. According to Rust and Cooil, reliability can be improved in many ways. One good option is to add more coders, but this option is not always feasible. Another option, to make it more practical and to improve the quality of the judging itself, is to make the instructions clearer and/or improve the methodology. Additionally, better reliability can be achieved through inter-coder agreement; here the coders provide information and rationale rather than random guesses.[13] The coders focused on following a clear methodology, which led to high inter-coder agreement.

In order to perform the categorical and statistical analyses, both researchers were responsible for counting the number of categories chosen for each research type within their own spreadsheet. Each coder used a different method to conduct a count of the categories: one coder used Excel to sort and count (histogram and count-if functions), while the other coder counted manually. The two methods derived the exact same results. Afterward, the two coders compared their count results to see if they were both in agreement, then they calculated the frequencies for each of the three types.

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[12] John C. Nunnally and Ira Bernstein, *Psychometric Theory*, McGraw Hill, 1994, p. 265.

[13] Roland T. Rust and Bruce Cooil, "Reliability Measures for Qualitative Data: Theory and Implications," *Journal of Marketing*, February 1994, p. 2.

B.   TYPE OF RESEARCH PERFORMED

The type of research performed was one of the three areas identified for each of the 233 articles. In order to classify each article, the coders used Mentzer and Khan's topology.[14] The types and the definitions that were used to categorize each article are displayed in Table 2. The frequency column in Tables 2, 3, and 4 displays the percentage of times that the respective category was chosen among the 233 articles. The categories were noted and tabulated, after all disagreements were settled, and then the total number of articles per category was divided by 233 (the total number of articles). The frequency tells the community the number of times that a particular category has been used in the *ARJ*.

The agreement rate between the two coders was 96 percent—considerably above the 70 percent minimum inter-coder agreement rate and better than the 85 percent coefficient of agreements[15] recommended by Harold Kassarjian in 1977. As mentioned in Section A, a third coder and meetings were used to adjudicate any disagreements.

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[14] John Mentzer and Kenneth A. Khan, "A Framework of Logistics Research," *Journal of Business Logistics*, Vol. 16, No. 1, 1995, p. 241.

[15] Harold H. Kassarjian, "Content Analysis in Consumer Research," *Journal of Consumer Research*, Vol. 4, No. 1, 1997, pp. 8-18.

Category	Definition	Frequency
Normative Review	"Research that examines what ought to be and what individuals and organizations ought to do."[16] Literature might be cited in the article, but the point of the inclusion of this literature is to support the opinions/assertions of the author. Normative research aims at improvements, which means that it includes *evaluation* of the present state of things and also of the direction of future development.	28.3%
Literature Review	This type is a review and synthesis of existing literature, the result of which is the development of a framework, propositions, or normative prescriptions grounded on existing literature.	19.3%
Exploratory Study	This research makes observation of [Acquisition] for the purposes of developing theories, but leaves the testing of the theories for other studies."[17] It means that the researcher starts by gathering as much information about the [subject] and jotting everything down until he gets a better picture of what is necessary (theory). There is no formal hypothesis, its purpose is to explore some areas more thoroughly to develop some specific hypothesis or prediction than be tested in future research.[18]	26.6%
Methodology	It is a review of research methodologies used in the field of [Acquisition], typically in "how-to" form. It introduces an academic research methodology as well as a practitioner methodology.	15.9%
Hypothesis Testing	When a researcher wants to test, the researcher starts with a hypothesis. A hypothesis is a specific statement of prediction[19]	9.9%

Table 2.   Type of Research Performed[20]

The most common type of research performed was Normative review. "Civil-Military Integration: The Context and Urgency" (Article #102, Appendix A) by

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[16] John Mentzer and Kenneth A. Kahn, "A Framework of Logistics Research," *Journal of Business Logistics*, Vol. 16, No. 1, 1995, pp. 240-241.

[17] Ibid.

[18] William M. K. Trochim, "Deductive and Inductive Thinking," http://www.socialresearchmethod. net/kb/dedind.htm, 20 October 2006, last accessed on 12 December 2006.

[19] William M. K. Trochim, "Hypotheses," http://www.socialresearchmethod.net/kb/hypothes.htm, 20 October 2006, last accessed on 12 December 2006.

[20] Craig Carter and Lisa Ellram, "Thirty Five Years of the Journal of Supply Chain Management: Where Have We Been and Where are We Going?," *Journal of Supply Chain Management*, Spring 2003, p. 31.

William B. Scott, which talked about the need for a strong industrial base to maintain our economic and military strength, is an example of Normative review. A thin line appears to exist between Normative and Literature reviews. In the case of Dr. William Washington, the coders classified some of his articles as Normative review, while others were classified as Literature review. With contracting as the main theme for all of his contributions, Dr Washington performed Literature reviews on the comparison of Competition and Sole Source Procurement processes (Articles #50, Appendix A) and Subcontracting (Article #107, Appendix A). His Normative contributions include articles on approaches to "Reward Contracting" (Article #57, Appendix A) and "Participatory Contracting" (Article #114, Appendix A).

Only 1.3 percent separated Normative Literature from Exploratory Studies. Mr. Richard Sylvester and Mr. Joseph Ferrara's contribution in the winter 2003 issue, "Conflict and Ambiguity Implementing Acquisition," explored the struggles of implementation due to policy ambiguity that drove organizational conflict (Article #164, Appendix A). In Table 2, Hypothesis Testing was the least common research type. Examples include studies on cost overruns, estimate at completion (EAC) discussions, lean strategies, and acquisition reform initiatives.

C.   TYPES OF RESEARCH DESIGN

In Table 3, the types of research designs identified in this study are noted, along with their respective frequency of usage The agreement rate for this section was 96 percent, with the use of a third coder and discussion to settle any disagreements. Based on the frequency, the majority of the articles were categorized as Case Studies. Some authors did Case Studies on particular systems such as Joint Stars (Airborne Standoff Target Acquisition Recognition System),[21] M102 Howitzers,[22] Naval Air Systems Command (NAVAIR) team and F/A-18 integrated product teams

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[21] Article #12, "Coming Up Golden: Defense Acquisition Board Review Guide for Program Offices," Appendix A.

[22] Article #30, "The Impact of Technical Data Transfers Problems during a Transition of Weapons System Production between Nations," Appendix A.

(IPT),[23] the Defense Contract Management Command (DCMC)[24] in Sealy, Texas, the DAU consortium,[25] and Marine Corps Maintenance Center.[26] Not far behind Case Studies were Topic Presentations. Experiments and Simulation, as well as Mathematical Models, were tied for the least common type of research design. In "Acquisition Reform Theory and Experimental Evidence for Tournament Sponsors," the four authors performed an experiment suggesting that carefully designed research tournaments can be highly effective at promoting research efforts.[27] Dr. Mark Nissen, the author of "Reengineering the RFP Process through Knowledge-Based Systems," illustrated "the use and utility of a knowledge-based systems to support process redesign are demonstrated, and insight is provided into the potential of [Artificial Intelligence] (AI)-based technologies to dramatically improve military procurement."[28] The last category in this section, the Mathematical Model, was represented by two authors who co-wrote two sequels to a specific issue on risk. In 2003, Mr. Paul Garvey and Mr. Chien-Ching Cho wrote an article titled "An Index to Measure a System's Performance Risk" (Article 174, Appendix A) and in 2006, it was followed by "An Index to Measure a System-of-System's Performance Risk" (Article 225, Appendix A). Both mathematically-oriented, these two articles showed computations of the technical risk index (TRI) to improve technical performance by lessening risk. Additionally, the articles were almost identical, except that the second article added focus on system-of-systems (SoS).

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[23] Article #72, "Team-Based Redesign as Large-Scale Change: Applying Theory to the Implementation of Integrated Product Teams," Appendix A.

[24] Article #77, "Concept of Operations and Implementation Plan for Industry Integrated Logistics System (I2LS)," Appendix A.

[25] Article #83, "A Case Study for the Systems Approach for Developing Curricula: 'Don't Throw Out the Baby with the Bath Water,'" Appendix A.

[26] Article #187, "Applying Theory of Constraints Principles and Lean Thinking at the Marine Corps Maintenance Center," Appendix A.

[27] Article #95, "Acquisition Reform Theory and Experimental Evidence for Tournament Sponsors," Appendix A.

[28] Article #41, "Reengineering the RFP Process Through Knowledge-Based Systems," Appendix A.

Category	Definition	Frequency
Archival Data	Data that already exist and that have been collected by others. This archival data is the simplest kind of data to gather because someone else has already done the work.	9.9%
Case Study	In-depth data are gathered pertaining to a program or event.	39.9%
Experiment and Simulation	Data collected through an experimental process or through a simulation process. Due to the infrequent occurrences, we combine them into one category.	3.9%
Interviews	Data collected through conduct of interviews.	9.9%
Mathematical Model	Data collected and explained using a mathematical model.	3.9%
Surveys	Data collected through surveys.	7.3%
Topic Presentation	No discernable design methodology.	25.3%

Table 3.   Types of Research Design[29]

These results indicate that of the 233 articles, approximately 60 percent have been qualitative studies and not quantitative- a figure that agrees with Elder's study.

D.   TYPES OF DATA ANALYSIS

Table 4 has a list of the types of data analysis that the coders used to describe each of the articles. The coders were in agreement 92 percent of the time. Again, a third coder was used to assist with any disagreements between the primary coders.

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[29] Mitchell J. Elder, Capt, USAF, "An Eleven-Year Retrospective of Acquisition Review Journal," Master's thesis, Air Force Institute of Technology, 2005, p. 12.

Category	Definition	Frequency
Anecdotal Evidence	It is an informal account of evidence in the form of an anecdote or hearsay. It is based on incidental observations on reports rather than on systematic evaluation. The argument draws a conclusion from cases specifically chosen to support the conclusion.	10.7%
Comparison Analysis	This type compares two or more things (e.g., DoD versus commercial organizations).	29.2%
Content Analysis	When we say content analysis, the researchers use detailed systematic evaluation of a particular body of material for the purpose of identifying patterns, themes, or biases.[30]	35.2%
No Analysis	No particular analysis for the article.	15.5%
Statistical Analysis	To analyze the data, researches use statistical models and techniques. This category may include correlation, regression, descriptive statistics, and means testing.	9.4%

Table 4.   Types of Data Analysis[31]

Content Analysis was the most frequent type of analysis at 35.2 percent, and is apparent in several articles in Appendix A. Comparison and Content Analysis comprise approximately 65 percent of articles that were published in the *ARJ*. This again suggests that this study is still performing more qualitative, rather than quantitative, analysis. Statistical Analysis is the least preferred method noticed in the *ARJ*. Statistical Analysis includes various techniques such as Analysis of Variance (ANOVA), empirical analysis, descriptive statistics, and means testing. ANOVA was employed by the authors of "Investigating the Integration of Acquired Firms in High-Technology Industries" (Article #178, Appendix A) "to identify the significance and individual level of variance of the different variables based on a firm's environment and the timing of acquisition."[32] A Descriptive Statistics example is the article on the "Relationship of Cost Growth and Schedule Growth" (Article 169, Appendix A), where the data points from the RAND Cost Growth, Selected Acquisition Report (SAR) were analyzed using the mean, standard

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[30] Mitchell J. Elder, Capt, USAF, "An Eleven Year Retrospective of Acquisition Review Journal," Master's thesis, Air Force Institute of Technology, 2005, p. 13.

[31] Ibid., p. 14.

[32] John Driessnack and David King, "Investigating the Integration of Acquired Firms in High-Technology Industries," *Acquisition Review Journal*, Summer 2003, p. 269.

deviation, coefficient of variance (CV), and the percentiles. The article concluded by finding no correlation between cost and schedule growth.[33] In the article "The Use of Performance Incentives in DoD Contracting" (Article 75, Appendix A), the authors employed empirical analysis to establish the relationship between the performance achieved by contractors and certain variables such as cost sharing ratio, cost, and target profit.

E.   STATISTICAL METHODS

The Ch-Squared Test provides a technique to test the significance of the respective categorical analysis across time periods. This is achieved by calculating expected values using the proportionality method in which the number of a certain category (i.e., type of research design) in a certain time period is assumed to be proportional to the amount of the total number of that same category in the total time of the publication. Because the Chi-Squared Tests become unstable when categories contain few counts, three time periods were used rather than the standard four time periods used throughout the rest of the analysis in order to achieve a larger sample size per category, thus enabling the analysis.

F.   THEMES

In order to create a consolidated list of major themes for the *ARJ*, both coders took note of what they felt the theme(s) were for each of the 233 articles. The themes were extracted from the main Excel spreadsheet, assigned to a single cell, and sorted alphabetically to determine recurring themes. At first, the list consisted of 216 themes, but through further discussion was eventually reduced to a list of 27. Themes of a similar nature were grouped together. A list of the theme categories and subcategories are listed in Table 5. Each one of the 233 articles was assigned to one of the 27 theme categories. Figure 1 in Chapter III shows the frequencies of the themes over the 13-year existence of the *ARJ*.

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[33] Richard L. Coleman, Jessica R. Summerville, and Megan E. Dameron, "The Relationship between Cost Growth and Schedule Growth," *Acquisition Review Journal*, Spring 2003, p. 120.

Themes	Subcategories
Technology	Anti-tamper, Information Technology, Innovation, Knowledge management, Net-Centric
Acquisition Reform	Continuous Improvement, Restructuring, Downsizing, Transformation
Contracting	Auctions, Buyer-Seller Relationship, Contracting Officer's Technical Representative (COTR) Expert System Aid (CESA), Contract Management, Support, Contractor Performance, Contract Types, Incentives, Price-Based Acquisition, Request for Proposal, Service-Level Agreements, Sole Source, Subcontracting, Competition
Cost, Schedule, Performance	Management, Estimation, Activity-Based Costing, Budget, Cost as an Independent Variable (CAIV), Cycle-time, Estimate at Completion (EAC), Earned Value Management (EVM), Total Ownership Cost (TOC), Management Reserve
Organizational Behavior	Cultural Change, Human Resources Management, Leadership, Organization Dynamics, Radical Change, Trust, Workforce
Education and Training	Defense Acquisition Workforce Improvement Act (DAWIA), Advanced Education, Certification, Community of Practice, Instructional System Design
Logistics	Electronic Business, Depots, Life-Cycle, Logistics Reform, Supply Chain, Performance-Based Logistics (PBL), Technical Performance Risk Index (TPRI)
Risk	Management, Risk Models, Metrics, Cost, Schedule, Performance, Technology
Software	Cyber warfare, Development, Metrics, Modularity, Standardization
Streamlined Acquisition	Consolidation, Restructuring
Research, Development, Test, and Evaluation	Technical Performance Measures, Test and Evaluation, Technical Evaluation
Systems Engineering	DoD Architecture Framework (DoDAF), Enterprise Architecture, Integration, Quality Assurance, Quality Improvement, Trade-Off
Laws, Policies, and Regulations	Buy America Act, Copyright, National Security
Management	Management Related Items
Change	Dynamics
Defense Industry	Budget, Security, Aircraft, Commercial Off the Shelf (COTS), Non-Developmental Items (NDIs), Small Business, Weapon System Acquisition
Procurement	Purchasing
Decision Making	Decision-Making Process, Quantitative Decision Analysis, Strategic Planning
International	Cooperative Acquisition, Foreign Military Sales, Globalization, Transatlantic
Program Management	Program Executive Office/r (PEO), Defense Acquisition Board (DAB)
System of Systems	Interoperability
DoD Framework	DoD 5000
Lean Implementation	Lean Six-Sigma
Industry	Industrial and Commercial Capability
Modeling and Simulation	Simulation-Based Acquisition
Evolutionary Acquisition	Spiral Development

Table 5.   Theme Categories

In the winter 1997 issue, after approximately four years of publication, Defense Acquisition was defined as:

> . . . the conceptualization, initiation, design, development, logistics support, modification, and disposal of weapons and other systems, supplies, or services to satisfy Defense Department needs, or intended for use in military missions.[34]

Another substantial factor that could have an overall impact on the themes started with Issue 38, when the *ARJ* began concentrating on themed issues. Some of those themes include Change, Risk Management, and Transformation.

Based on the data collected, the coders were able to perform various analyses (which are presented in Chapter III), including the results of the comparison to Elder's thesis as well as any changes that occurred between 2004 and 2006.

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[34] *Acquisition Review Journal*, "Guidelines for Authors," Winter 1997, p. 127.

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III.   RESEARCH ANALYSIS

A.   THEMES

The first item of interest is the identification of themes throughout the existence of the *ARJ*. Analysis was performed to determine if trends were formed based on "hot issues" within the Acquisition community. Part of this analysis was to discover if there were any "hot button" issues discussed over time. How much has been written about Acquisition reform? How prominent were schedule slips and budget issues within the publication? Are the themes very specific or very broad across the articles published in the *ARJ*? Which areas of the Acquisition community are under-represented or under-explored?

The themes collected across the years were tabulated to account for their frequency of usage and to explore any patterns. Although several of the articles had multiple themes and could be assigned to more than one theme category, it was decided to assign each article to one theme category—that which best exemplified its main focus. Some similarities exist between this study's list of themes and Elder's list, but not unexpectedly, the lists were not exact replicas of each other. Twenty-seven categories were agreed upon by the two researchers, while Elder's list was comprised of 15 themes. Doubling the number of bins available, this study has more flexibility to spread out its articles more specifically than Elder's categorical themes. In Appendix E, Reform Initiatives was his most common theme versus this study's category of *Technology*. In this study, the theme of *Cost*, *Schedule*, *and Performance* is ranked second. Referring back to Appendix E, when *Cost and Schedule* combines with *Performance and Management*, Elder's number is very close to what this study arrived at. Looking for more similarities, the number of occurrences for Elder's *Reform Initiatives* theme is equal to the number of occurrences for the current study's *Acquisition Reform* and *Streamline Acquisition* themes. Figure 1 shows the number of articles contained within each theme category in descending order. As a final means of studying the themes in the *ARJ*, a

sampling of articles is provided in Appendix B to better illustrate the themes selected for categorization.
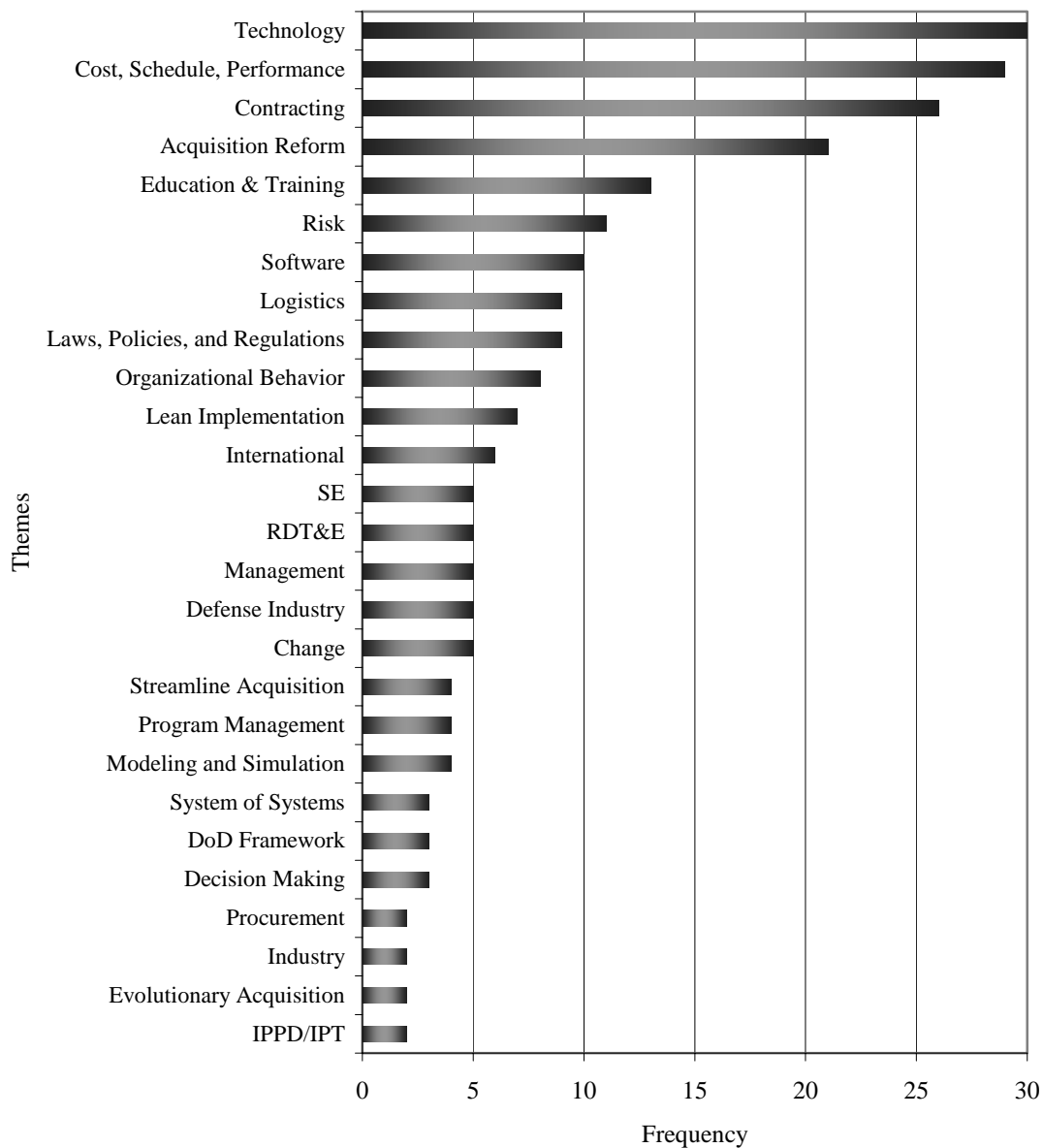
Figure 1.   Themes Categories

Technology is the most common theme thus far in the *ARJ*, with *Cost*, *Schedule*, *and Performance* close behind. Although Issue 38 started dedicating themes to each issue, neither T*echnology* nor *Cost*, *Schedule*, *and Performance* were one of those issues, leading to the belief that themed issues have yet to impact the trends presented thus far.

Starting in 2005, all *ARJ* issues were assigned a specific theme for the authors to concentrate on in order to be published. If the *ARJ* continues to publish issues based on these themes, then, in the long run, this decision will have an impact on the categorization of themes.

Elder broke his pool of 193 articles into three periods in order to search for trends over time. His analysis shows *Management and Organizational Behavior* and *Interoperability* increased across the time periods, while a majority of the other categories show either a decrease or a steady number of articles across periods. The difference in categories were apparent; however, the researchers believed it was based on the methodology used to derive their top theme categories, which were primarily based on interpretation and probable differences in their professional background and educational experience.

Figure 2 shows the cumulative frequency of the occurrences of the 233 themes in the different time periods. Themes represented consistently across time periods include *Technology*; *Cost*, *Schedule*, *and Performance*; *Contracting*; *Acquisition Reform*; *Education and Training*; and *Risk*. Less than a third of the themes were localized to one time period. For example, although the concept of lean implementation has been important in recent years, authors did not start writing about it until after 2004. On the other hand, the Federal Acquisition Streamlining Act was enacted in 1994, and articles about *Streamlining Acquisition* are found exclusively in time period 1, which ended in 1997. *Laws*, *Policies*, *and Regulations* were written most extensively during the first four years of the 13-year time period. The bulk of *Risk* occurred in time period 3 and *Logistics* in time period 4. *Evolutionary Acquisition* and *System-of-systems* emerged as topics during the third period, suggesting their increased importance in defense acquisition. *Acquisition Reform* decreased as a theme with each subsequent time period. Perhaps this is because acquisition reform is now being tailored to specific areas; therefore, it may not be prevalent as the main theme, but it still exists within the community. *DoD Framework* and *Decision Making* were topics of choice in period 1; both of which are making a comeback in period 4.
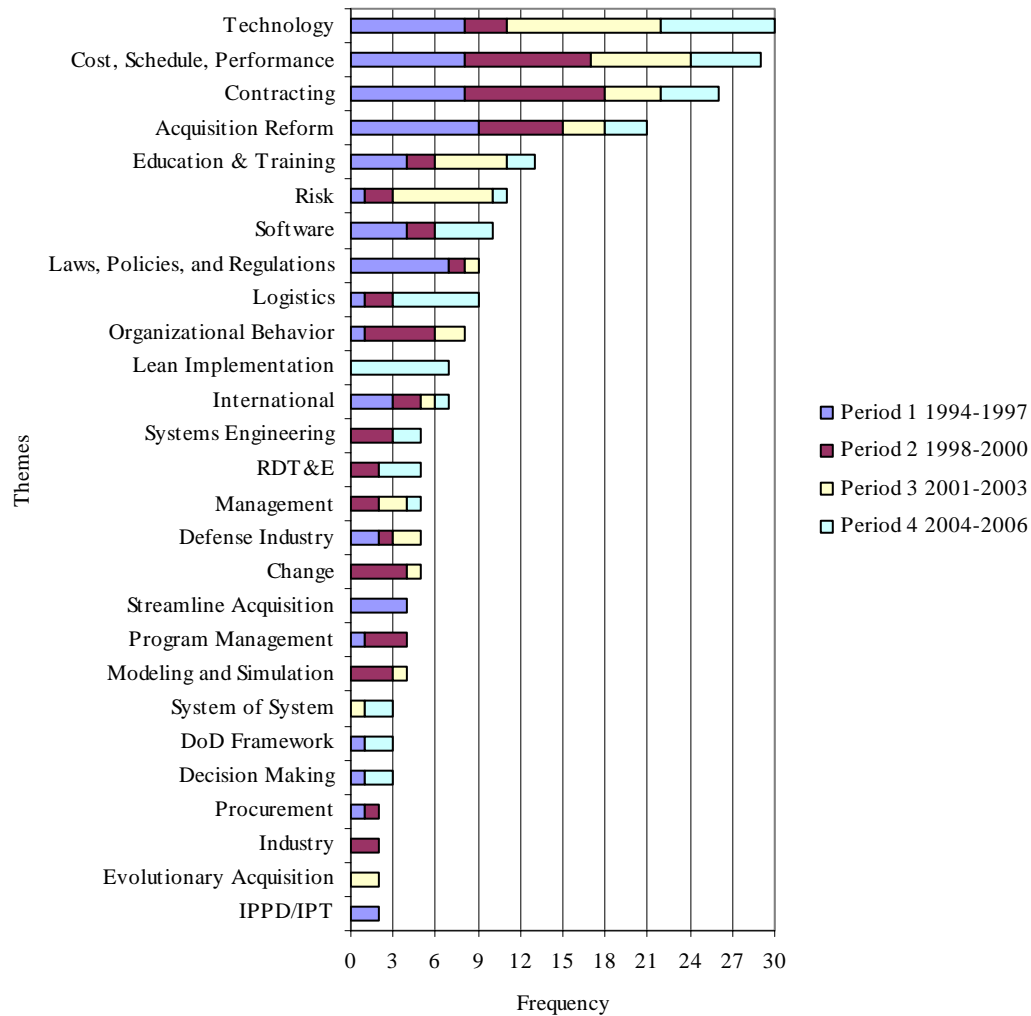
Figure 2.   Themes in Time Periods

Figure 2 depicts a picture of the themes per individual time period. The most frequently-occurring theme was *Technology* during period 3. In period 2, *Contracting* was the most recurring theme, thus ranking second across all four time periods. *Logistics* consistently increased over the time periods, as there was one article in period 1, after which the number of articles doubled in period 2, and then tripled as the theme made a comeback in the fourth time period.

B.   CONTRIBUTING AUTHORS

The researchers felt it necessary to give credit to the authors who have contributed to the *ARJ*. First, the study revealed that a total of 325 authors have contributed articles to the *ARJ*. Based on the number of articles contributed by each author, 90 percent contributed only one article. Table 6 is a list of top contributors for 193 articles, which reflects three percent of the authors and matches the sample size in Elder's thesis, thus allowing direct comparisons. These totals do not reflect special issue introductions and editorial editions.

Author(s)	Contributions
Christensen, David S.	7
Washington, William N.	6
Alford, Lionel D.	4
Nissen, Mark E., Dr.	4
Graham, Robert	3
Linster, Bruce G.	3
Pollock, Neal	3
Templin, Carl	3

Table 6.   Top Contributors for 193 Articles

Compared to Elder's thesis, there were a few minor differences which are believed to be due to data collection methodology. In the current study, the two researchers each maintained a separate, single spreadsheet. Each author and co-author occupied an individual cell, allowing the researchers to perform a sort function in Excel, which provided them with an accurate count of the authors. Since the researchers maintained their own spreadsheets, the chance of error was decreased. Upon completion of the sort function, the results were identical. The researchers suspect Elder might have used a manual count method, leading to the slight differences in totals. Some of the leading authors were co-authors in a few articles, so the chance of overlooking those authors is highly possible. Elder's results can be viewed in Appendix D. Several observations were as follows. Dr. David Christensen was the top contributor according to both studies. However, notice that this study counted seven articles for this author, while Elder found six articles in which included an issue introduction.

Dr. William Washington contributed six articles according to this study; but according to Elder's, he contributed five articles. On the other hand, this study showed four article contributions for Dr. Mark Nissen, while Elder noted five contributions. The contributions of Lt Col Lionel Alford (four articles), Lt Col Bruce Linster, Mr. Neal Pollock, and Dr. Carl Templin (three articles) agreed in both studies. Mr. Robert Graham was included among the top contributors because of his submission of three articles. Elder's list of top contributors included the following authors: Maj Joseph Besselman, Lt Col Driessnack, Dr. Keith Snider, Mr. Ashish Arora, and Mr. Patrick Larkey; however, they are not reflected in the current list. All authors mentioned were noted with three articles in Elder's study, but only two articles were found for each author in this study.

The number of authors that contributed to the *ARJ* did not change substantially from 2004 to 2006. Table 7 represents the Top Contributors for 233 articles. Daniel J. Sherman joined Mark E. Nissen and Lionel D. Alford in the top four authors, but otherwise the list was unchanged from Table 6.

Author(s)	Contributions
Christensen, David S.	7
Washington, William N.	6
Alford, Lionel D.	4
Nissen, Mark E., Dr.	4
Sherman, Daniel J.	4
Graham, Robert	3
Linster, Bruce G.	3
Pollock, Neal	3
Templin, Carl	3

Table 7.   Top Contributors for 233 Articles

Table 8 shows the number of authors per article per time period. An overall picture shows that roughly 60 percent of the articles were written by a single author. Twenty-two percent of the articles were tendered by two authors, 15 percent had three authors, and the remaining had four or more authors counting one article out of 233 that had five authors. The mean (average number) of the authors per article was calculated based on the number of contributing authors and the number of articles

published each year. For example, in 1994, 21 authors contributed to the *ARJ* and 18 articles were published; therefore, there were 1.17 authors per article. Prior to 2001, the number of articles written by one author remained steady. In 2002, it dropped by more than half and there was an increase in the number of two or more authors per article. Elder's results up until 2004 were relatively similar to these results.

Year	No. of Authors	No. of Articles	Mean	One Author	Two Authors	Three Authors	Four + Authors
1994	21	18	1.17	83.3%	16.7%	0.0%	0.0%
1995	14	10	1.40	70.0%	20.0%	10.0%	0.0%
1996	13	11	1.18	81.8%	18.2%	0.0%	0.0%
1997	44	25	1.76	60.0%	8.0%	28.0%	4.0%
1998	32	20	1.60	60.0%	25.0%	10.0%	5.0%
1999	38	24	1.58	62.5%	20.8%	12.5%	4.2%
2000	39	22	1.77	63.6%	13.6%	9.1%	13.6%
2001	18	14	1.29	78.6%	14.3%	7.1%	0.0%
2002	42	19	2.21	31.6%	26.3%	31.6%	10.5%
2003	30	17	1.76	52.9%	17.6%	29.4%	0.0%
2004	27	13	2.08	23.1%	46.2%	30.8%	0.0%
2005	50	28	1.79	46.4%	35.7%	10.7%	7.1%
2006	17	12	1.42	58.3%	41.7%	0.0%	0.0%

Table 8.   Authors per Article per Time Period

As found in Carter and Ellram's article, the "significantly greater number of authors per article over time is similar to the pattern that has been documented in other academic discipline."[35] According to them, researchers' thought process is the level of productivity is greater when the responsibility is shared by fellow researchers.[36]

An analysis of the number of contributing authors per article during the *ARJ's* 13-year existence followed using ANOVA and the Chi-Squared Test. The researchers maintained Elder's breakdown of four time periods. For both techniques, the hypotheses were:

H_0: No difference exists in the number of authors per article across time periods.

H_1: A difference exists in the number of authors per article across time periods.

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[35] Craig R. Carter and Lisa M. Ellram, "Thirty-Five Years of the Journal of Supply Chain Management: Where Have We Been and Where are We Going?," *Journal of Supply Chain Management*, Spring 2003, pp. 37-38.

[36] Ibid., p. 38.

For the ANOVA technique, the dependent variable was the number of authors per article, while the independent variable was the time periods ranging from time period 1 = 1994-1997, period 2 = 1998-2000, period 3 = 2001-2003, and period 4 = 2004-2006. Appendix H supports the null hypothesis; there is not enough evidence to say differences exist in the number of authors per article across time periods (p = 0.1115 and F = 2.0228).

On the other hand, the Chi-Squared Test revealed a different result. For the expected frequencies, the researchers made an assumption that the number of one-authored articles in a particular time period is proportional to the number of one-authored articles in the total number of articles for all time periods. For example, 64 one-authored articles out of 233 total articles yield 27.5 percent. If this assumption were true, then in time period 1, 27.5 percent of the 136 articles (total for time period 1) yields 37 expected one-author articles. With a p-value of 0.0099, the researchers have enough evidence to reject the null hypothesis, meaning there is a difference in the number of authors across time periods (Appendix K).

Again, this study is interested in whether its findings agreed with Elder's findings. Elder's study was replicated by dividing the present data into identical time periods in line with his time period divisions, which consisted of a four-, three-, and four-year breakdown. Time periods were period 1 = 1994-1997, period 2 = 1998-2000, and period 3 = 2001-2004.

Referring to Appendix L, for the identical time period, the ANOVA analysis exposed a difference in the number of authors per article per time period (p = 0.0341). While Elder's p-value was 0.0205, he also had the same findings- that the results suggest a statistically significant overall difference across time periods. The difference in p-values probably relates to a minor counting difference in the number of authors; recall that this study's count of leading authors differed from Elder's count and those differences might reflect a common cause of slightly different counts for numbers of authors. Both findings discovered a similar upward trend, as did Carter and Ellram's in their study of the *Journal of Supply Chain Management*, where the mean of authors per article increased over time.

Furthermore, we examined the difference between the results of the ANOVA for the articles through part of year 2004 (Elder's sample) and the articles until year 2006. Referring back to Table 8, the means were elevated: of 2.21 for 2002 and 2.08 for 2004. These two means joined together in the same time period (2001-2004), as replicated from Elder's study) elevated the mean for the second (through 2004) ANOVA analysis. In part one (until 2006), where 233 articles were counted, the two means were spread out in two time periods of three and four. Therefore, the variability was spread out thinner across six years.

Figure 3 shows the number of articles published per year (year 2006 is not a complete year). It does not show a noticeable trend of increasing number of articles over time, although there were significant spikes from 1996 to 1997 and 2004 to 2005. There does not appear to be any relationship between the maturation of the *ARJ* and the number of articles being published.
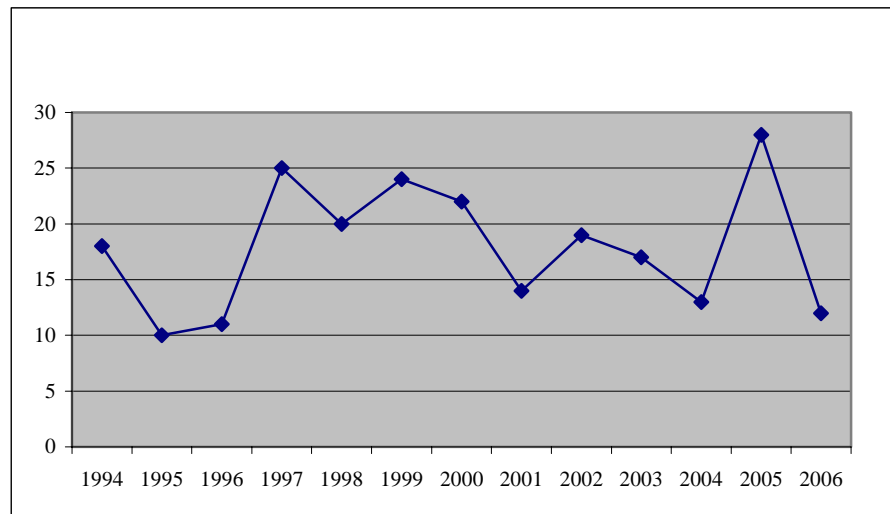
Figure 3.   Number of Articles per Year

1.   Author's Institutional Affiliation

ARJ solicits from any prospective authors who have published and have expertise in the subject and who are involved in the defense acquisition process. Table 9 shows the organizations included under each of the coder's final categories.

Institutional Category	Inclusion
Civilian Universities	All civilian academic universities and colleges, both graduate and post graduate levels
Civilian Organizations	Non-DoD and non-services organizations
Military Universities	Includes AFIT, NPS, USAF Academy, Naval Academy, Army Academy, and U.S. Military Academy
Other USA	Non-academic U.S. Army facilities and organizations i.e., Army Research Laboratory's Aerodynamics Branch, U.S. Army Corps of Engineer, and 1-36 Infantry
Other USAF	Non-academic U.S. Air Force facilities and organizations, i.e., F/A 22 Systems Program Office SPO, Joint Strike Fighter JSF SPO, and Special Operations Command
OSD	Office of Under Secretary of Defense, Acquisition, Technology, and Logistics (USD (AT&L)), Weapons Systems Cost Analysis Division, and Management Policy and Program Integration Division
ACSC/DSMC	Faculty and students of Air Command Staff College and Defense Systems Management College
Other DoD	Includes Ballistic Missile Defense Organization
DAU	Faculty and students of DAU
AWC/ICAF/NWC	Faculty and students of Air War College, Industrial College of the Armed Forces, and Naval War College
Other USN	Non-academic U.S. Navy facilities, i.e., Naval Center for Cost Analysis, Department of the Navy, Chief Information Office, and Office of Naval Operations
Other GOV	General Accounting Office, National Aeronautics Space Administration (NASA), and Atlantic Council of the United States
Other USMC	Non-academic U.S. Marine Corps facilities, i.e., Marine Corps Systems Command, Quantico, VA and Depot Maintenance Business Area, HQ Marine Corps
Civilian Research Institutions	Includes MITRE Corporation, International Research Institute, and Nichols Research Lab

Table 9.   Institutional Categories' Inclusions

Figure 4 shows that most contributors come from civilian universities, followed by civilian organizations. Military universities such as the Air Force Institute of Technology (AFIT), Naval Postgraduate School (NPS), Air Force Academy, and the Naval Academy made up 13 percent. Contributions from civilian research institutions

such as MITRE Corporation, Nichols Research Lab, and International Research Institute made up less than two percent. The United States Navy (USN) and the United States Marine Corps (USMC) contributed approximately two percent, six to ten percent lower than the United States Air Force (USAF) and United States Army (USA).

Institutional Categories
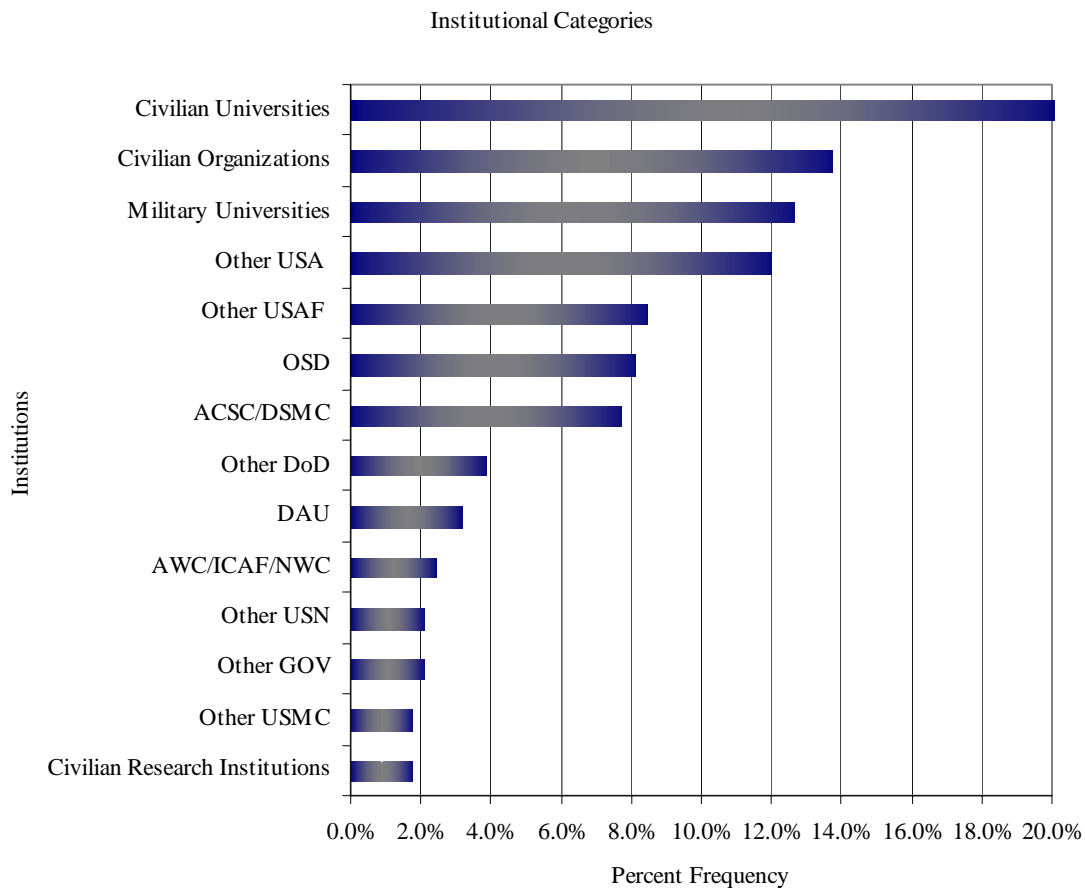
Figure 4.   Author's Institutional Affiliation

In Table 10, the researchers wanted to discover if there were evident trends based on the institutional affiliation of the contributing authors. (Note: Authors who have revealed their affiliation.)

Institutional Categories	Period 1 1994-1997	Period 2 1998-2000	Period 3 2001-2003	Period 4 2004-2006
Civilian Universities	10	25	12	17
Other USA	14	7	14	7
Military Universities	18	12	12	5
Civilian Organizations	10	14	3	11
Other USAF	2	16	4	10
Office of Secretary of Defense (OSD)	7	5	3	7
Air Command Staff College/Defense Systems Management College (ACSC/DSMC)	12	8	2	1
Other DoD	3	2	2	2
DAU	2	0	0	10
Air War College/Industrial College of the Air Force/ Naval War College (AWC/ICAF/NWC)	4	0	1	1
Other USN	2	3	2	0
Other Government (GOV)	1	1	1	1
Other USMC	1	2	0	3
Civilian Research Institutions	3	1	0	2

Table 10.   Institutional Categories Divided into Time Periods

The DAU had an increase in contributions during the fourth period. Military communities started off strong in the first three periods and then experienced a dramatic decrease, whereas the Civilian Universities were very dedicated contributors over all four periods. Catering to the higher level of the Acquisition Corps, it is ironic that DoD did not contribute many articles. Elder's findings display the same results and there are no significant discrepancies (see Appendix G).

2.   Author's Educational Affiliation

Out of the total number of authors, 243 revealed their highest degree of education: 122 authors have doctorates, 110 have master's degrees, and 11 have bachelor's degrees. In their analysis, the researchers also noted those authors with multiple degrees. Twenty-six authors have more than one master's degree, which is roughly 10.7 percent of the authors who noted their degrees.

Table 11 lists the Universities and Colleges of those authors who noted their highest academic degrees. Industrial College of the Armed Forces (ICAF) graduates have the largest contribution, followed by graduates of the Air Force Institute of Technology (AFIT) and the Naval Postgraduate School (NPS).

University/College/Institutions	Contribution
Industrial College of the Armed Forces	14
Air Force Institute of Technology	12
Naval Postgraduate School	12
University of California*	11
University of Southern California	11
George Washington University	9
Boston University	9
George Mason University	8
Defense Systems Management College	7
University of Alabama	7
Stanford University	6
Texas A&M University	6
University of Nebraska	6
Georgia Institute of Technology	5
Rennselaer Polytechnic Institute	5
University of Michigan	5
Arizona State University	4
Carnegie Mellon University	4
Massachusetts Institute of Technology	4
University of Maryland	4
University of Virginia	4

*Berkeley, Irvine, and Los Angeles campuses

Table 11.   Author's Educational Affiliation

The civilian educational institutions appear to be the front-runners for published articles in the *ARJ*, although the top three are military institutions.

3.   Academe or Practitioner

The *ARJ* welcomes authors from academe and those in practice. The authors were classified into categories that identify them as academe or practitioners within the defense acquisition industry. Consistent with the other elements of this study, the time periods were divided into three time periods and four time periods. Table 12 ends in

period 3, replicating Elder's thesis. His results are located in Appendix H. Table 13 shows the four time periods that extend to 233 articles.

Type	Period 1 1994-1997	Period 2 1998-1999	Period 3 2000-2004
Academe	44.8%	45.8%	43.0%
Practitioner	55.2%	54.2%	57.0%

Table 12.   Proportion of Academe and Practitioner Contributions (193 Articles)

On average, 55 percent of the contributors were practitioners. The results of this study were in line with Elder, who obtained a finding of 58 percent.

Type	Period 1 1994-1997	Period 2 1998-1999	Period 3 2000-2003	Period 4 2004-2006
Academe	44.8%	45.8%	45.1%	38.1%
Practitioner	55.2%	54.2%	54.9%	61.9%

Table 13.   Proportion of Academe and Practitioner Contributions (233 Articles)

Table 13 shows a predominance of practitioners over academe contributors. The increase in the magnitude of the difference in period 4 is inconclusive because 2006 is not representative of a full year's publication.

4.   Civilian or Government Contributions

Another investigative question this study attempted to answer is the frequency of civilian and government contributions. The *ARJ* is published by a defense university; however, it solicits articles from anyone interested in defense acquisition. Table 14 represents the proportion of civilian and government contributors based on 193 articles.

Type	Period 1 1994-1997	Period 2 1998-2000	Period 3 2001-2004
Civilian	25.0%	41.1%	49.5%
Government	75.0%	58.9%	50.5%

Table 14.   Proportion of Civilian and Government Contributions (193 Articles)

The proportion of civilian and government contributions aligned with Elder's results found in Appendix I. Government contributed three times the amount of civilian

contributions in the first four years of publication, but it appeared to diminish in the next time periods. Civilian contributions started to ramp up as the years went on. Table 15 shows that the additional time period for the overall study continued to exhibit decreasing contributions from the government.

Type	Period 1 1994-1997	Period 2 1998-2000	Period 3 2001-2003	Period 4 2004-2006
Civilian	25.0%	41.1%	43.7%	44.2%
Government	75.0%	58.9%	56.3%	55.8%

Table 15.   Proportion of Civilian and Government Contributions (233 Articles)

C.   CATEGORICAL ANALYSIS

Categorical Analysis consists of three parts. First, the researchers want to replicate Elder's thesis. After that, an independent analysis will be performed including the articles that have been published from 2004 to 2006. Finally, a statistical analysis will show the changes and trends discovered.

1.   Comparison with Elder's Thesis (2005)

The researchers divided the years in accordance to Elder's time periods in order to replicate his study. Table 16 illustrates the results of the type of research performed. Elder's results are found in Appendix M.

Type	Period 1 1994-1997	Period 2 1998-2000	Period 3 2001-2004
Normative Review	25.0%	28.8%	25.4%
Literature Review	20.3%	27.3%	14.3%
Exploratory Studies	28.1%	24.2%	23.8%
Methodology Review	20.3%	10.6%	19.0%
Hypothesis Testing	6.3%	9.1%	17.5%

Table 16.   Types of Research Performed

a. Type of Research Performed

Although the numbers between the two studies are not identical due to differences in the interpretation of the definitions (the educational and professional

background of the researchers perhaps contributed to the disparity) and individual bias, it did not prevent the noticing of similarities between the two. One similarity is that the research published in *ARJ* is primarily qualitative rather than quantitative research. Both studies show that roughly 45 percent of the type of research performed has been either Normative or Literature reviews, and another 48 percent has been Exploratory Research or Methodology reviews ("how-to" papers). Another similarity is that Hypothesis Testing has been the least common type of research performed. It is believed that there has been less quantitative research noted in the *ARJ* because over time there have been many themes represented in the journal; therefore, it has not been possible to reach a point where researchers can begin quantitative analysis. In other words, there is insufficient concentration on a specific area long enough to get enough data to conduct solid quantitative analysis.

b. Type of Research Design

After categorizing the types of research performed, the types of research designs are reflected in Table 17.

Type	Period 1 1994-1997	Period 2 1998-2000	Period 3 2001-2004
Survey	1.6%	13.6%	6.3%
Case Study	50.0%	36.4%	42.9%
Interviews	9.4%	7.6%	14.3%
Archival Study	3.1%	12.1%	12.7%
Experiment	0.0%	4.5%	4.8%
Simulation	1.6%	1.5%	0.0%
Mathematical Model	4.7%	4.5%	1.6%
Topic Presentation	29.7%	19.7%	17.5%

Table 17.   Types of Research Design

The results for the type of research design aligned with the results of the types of research performed. Both studies reported that qualitative analysis (Case Studies and Topic Presentation) made up substantially more than 50 percent of the articles that were published. These design types are used to inform about and introduce topics that need further research. It is interesting that both Case Studies and Topic Presentations

have been on a steady decline, offset by increases in interviews, but also in Surveys and Archival Studies, both of which can be more quantitative; a further increase in the quantitative areas could be apparent in the next few years. Elder's results can be viewed in Appendix M.

c. *Type of Data Analysis*

Type of Data Analysis is the third category of the content analysis and the results of the current study are shown in Table 18.

Type	Period 1 1994-1997	Period 2 1998-2000	Period 3 2001-2004
Anecdotal Evidence	7.8%	6.1%	14.3%
Statistical Analysis	1.6%	15.2%	11.1%
Content Analysis	29.7%	28.8%	49.2%
Comparison Analysis	48.4%	36.4%	12.7%
No Analysis	12.5%	13.6%	12.7%

Table 18. Types of Data Analysis

This study's results aligned with the results of the other two categories. Statistical Analysis did show an increase after 1998 (although a downturn in period 3 followed the upturn in period 2). The qualitative areas (Anecdotal Evidence, Content Analysis, Comparison Analysis, and No Analysis) dominate the *ARJ* thus far, as shown in both studies. Elder's results can be viewed in Appendix M.

In all three categorical areas, the trends are similar in both studies, but the numbers are not distributed evenly and this is conceivably due to differences in methods and interpretations. The two studies could have conducted their data collection differently and their process of settling any discrepancies could affect the overall outcome of the data. A possible methodological difference may be the manner in which the articles were read and categorized. The text of each article was reviewed by the two researchers that resulted in two different sets of results.

2. Aggregate Analysis of 233 Articles until 2006

This section reflects the results of 233 articles that have been published in the *ARJ*. As the publication went on beyond Elder's initial study, the researchers want to

determine if the trends remained or shifted in a different direction. In this section, due to the increase in the number of articles (233 articles), dividing into four time periods is more appropriate.

a. *Type of Research Performed*

Figure 5 shows the trends of the type of research performed based on 233 articles. Throughout the periods Normative review has dominated. The number of articles involved in Normative Review combined with those representing Literature reviews suggests that the articles published in the *ARJ* have a "large degree of substantive justification but little subsequent theory development and testing."[37] Although Hypothesis Testing has not been very popular over the periods, there was a definite increase in the third period,[38] followed by a dramatic decrease in the fourth period.
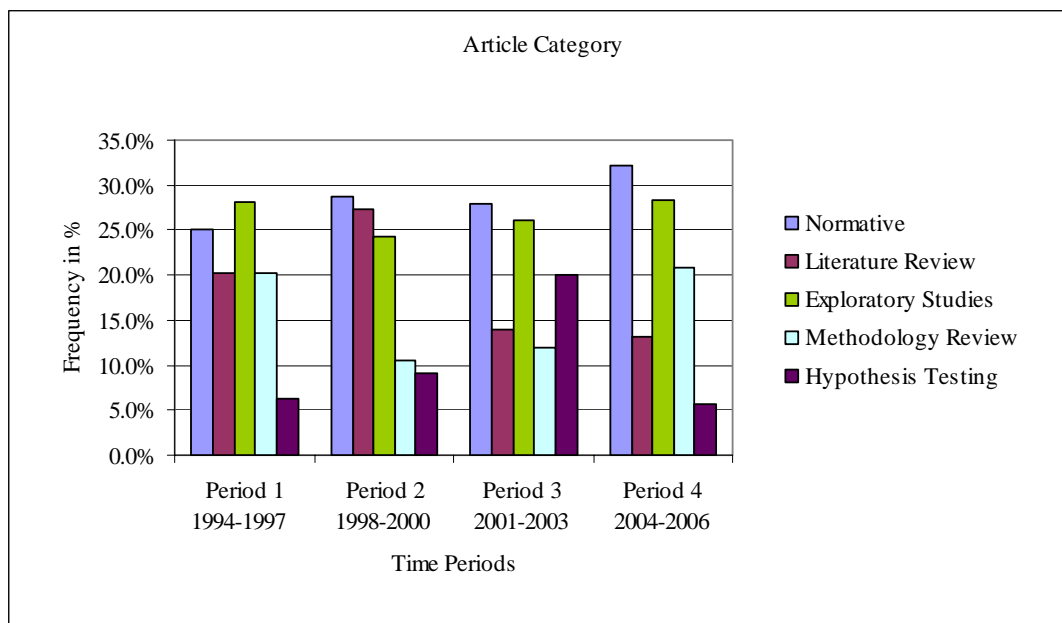
Figure 5.   Type of Research Performed

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[37] John Mentzer and Kenneth Kahn, "A Framework of Logistics Research," *Journal of Business Logistics*, Vol. 16, No. 1, 1995, p. 241.

[38] Consistent with Carter and Ellram's findings that the "use of hypothesis did indeed show a statistically significant increase over time."

b. *Type of Research Design*

In Figure 6, Case Studies are shown as the dominant research design across all four periods. The *ARJ* publishes articles that cover a wide array of topics from everyday issues to unique programs that survived the Acquisition Process. Archival Studies are the second most prominent research design in the *ARJ*. This emphasis on Case Studies especially aligns with the trend favoring qualitative data. Archival Studies are very useful in the Acquisition community because many practitioners learn best through past experiences. Since the *ARJ* was described as a forum to exchange opinions, communicate policy decisions, and maintain awareness for acquisition management philosophies, these trends are aligned with its mission. Consistent with both Carter and Ellram and Elder's findings, Experiments, Simulations, and Mathematical Modeling were less utilized.[39]
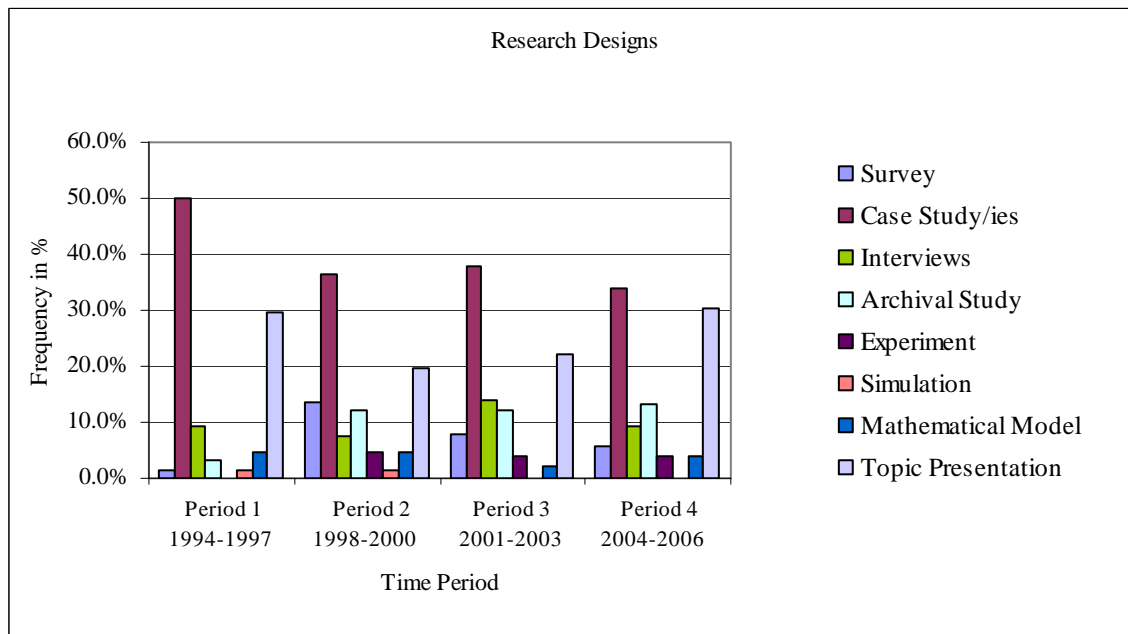
Figure 6.　　　Type of Research Design

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　　　[39] Craig Carter and Lisa Ellram, "Thirty Five Years of the Journal of Supply Chain Management: Where Have We Been and Where are We Going?," *Journal of Supply Chain Management*, Spring 2003, p. 32.

c.   *Type Data Analysis*

Figure 7 shows a marked decline in the use of Comparison Analysis, but Content Analysis has been consistent throughout the periods. Statistical Analysis is the least common throughout the periods; however, it has increased since the first period. Although the research in the *ARJ* has been more qualitative that quantitative, some evidence supports the argument that research published in the *ARJ* is moving in a quantitative direction.
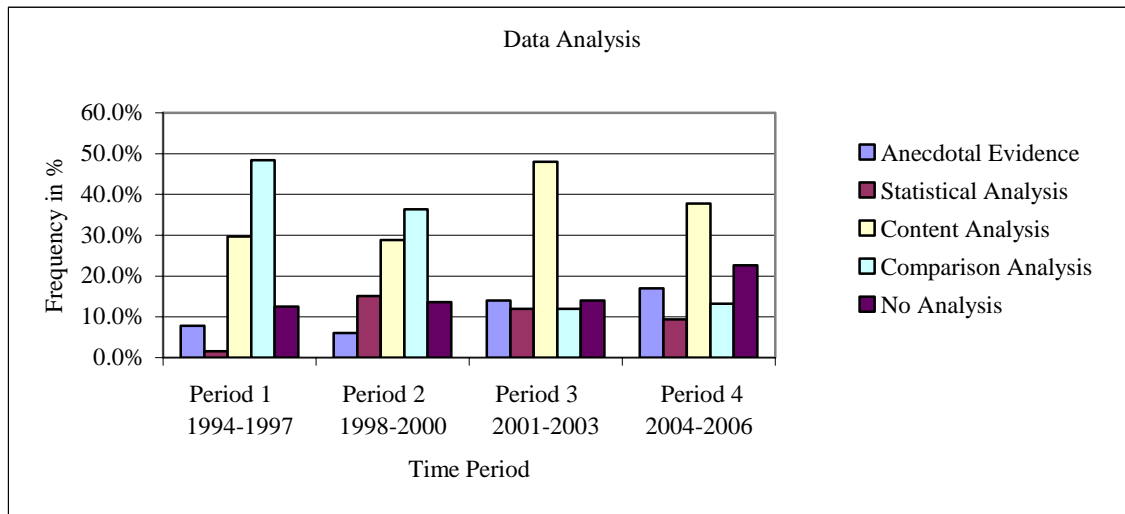
Figure 7.   Data Analysis Method

It is worth noting that using quantitative data does not automatically imply a quantitative data analysis.[40]

3.   Statistical Analysis of the Categories

Throughout this study, the 233 articles have been divided into four time periods for the aggregate study and divided into three time periods to do a fair comparison with Elder's thesis. In order to sufficiently aggregate the quantities within categories to permit categorical analysis, in this part of the research, the articles were divided into three time

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[40] Janet A. Harkness, Fons .J. R. van de Vijver, and Peter Mohler, *Cross-Cultural Survey Methods*, Wiley, Hoboken, NJ, 2003, p. 36.

periods. This is to achieve a better sample size (greater than five for each cell) in the category tables to perform a valid Chi-Squared Test. The Chi-Squared Test was performed to find differences, if any, in the number of respective types based on three separate categorical periods. The first time period consists of five years (1994-1998), the second time period consists of four years (1999-2002), and the third time period also consists of four years (2003-2006).

For all categories, this study assumes that there are no differences in the types of articles, types of research categories, and types of data analysis employed across time periods. The respective hypotheses are stated in each category.

a. Type of Research Performed

Tables 19 and 20 give the actual and expected frequencies for the type of research performed. The values in these tables were used to calculate the Chi-Squared Test.

H_0: No difference in the type of article category across time periods.

H_1: A difference in the type of article category exists across time periods.

Type	Period 1 1994-1998	Period 2 1999-2002	Period 3 2003-2006
Normative	22	21	23
Literature Review	19	15	11
Exploratory Studies	23	21	18
Methodology Review	15	9	13
Hypothesis Testing	5	22	5

Table 19.   Actual Frequency for Type of Research Performed

Type	Period 1 1994-1998	Period 2 1999-2002	Period 3 2003-2006
Normative	23	24	19
Literature Review	16	16	13
Exploratory Studies	22	23	18
Methodology Review	13	13	11
Hypothesis Testing	11	12	9

Table 20.   Expected Frequency for Type of Research Performed

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Employing the same assumption, the expected frequencies consistently use a proportionality method. When the null hypothesis is true, the observed results and the expected results should be similar. On the other hand, if the null hypothesis is not true, some of the observed and expected results will be different. The Chi-Squared Test resulted in a p-value of 0.0126. Therefore, the researchers can reject the null hypothesis; there is a difference in the type of article categories across time periods.

b.   Type of Research Design

Tables 21 and 22 give the actual and expected frequency for the type of research design. The values in these tables were used to calculate the Chi-Squared Test.

H_0: No difference in the type of research designs across time periods.

H_1: A difference in the type of research designs exists across time periods.

Type	Period 1 1994-1998	Period 2 1999-2002	Period 3 2003-2006
Survey and Interviews	12	17	11
Case Study/ies	40	28	25
Archival Study, Experiment, Simulation, and Mathematical Model	9	17	15
Topic Presentation	23	17	19

Table 21.   Actual Frequency for Type of Research Design

Type	Period 1 1994-1998	Period 2 1999-2002	Period 3 2003-2006
Survey and Interviews	14	14	12
Case Study/ies	34	32	28
Archival Study, Experiment, Simulation, and Mathematical Model	15	14	12
Topic Presentation	21	20	18

Table 22.   Expected Frequency for Type of Research Design

The p-value for this Chi-Squared Test is 0.2739, which is greater than 0.05. The researchers combined Archival Study, Experiment, Simulation, and Mathematical Modeling because the four research designs share a quantitative nature.

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Due to the similarities, they can be combined to produce a more valid test result. Regardless, the Chi-Squared Test concludes that there is no difference in the type of research categories across time periods.

c. Type of Data Analysis

Tables 23 and 24 give the actual and expected frequency for the type of data analysis. The values in these tables were used to calculate the Chi-Squared Test.

H_0: No difference in the type of data analysis across time periods.

H_1: A difference in the type of data analysis exists across time periods.

Type	Period 1 1994-1998	Period 2 1999-2002	Period 3 2003-2006
Anecdotal Evidence	7	6	12
Statistical Analysis	3	11	8
Content Analysis	23	32	27
Comparison Analysis	38	22	8
No Analysis	13	8	15

Table 23.   Actual Frequency for Type of Data Analysis

Type	Period 1 1994-1998	Period 2 1999-2002	Period 3 2003-2006
Anecdotal Evidence	9	8	8
Statistical Analysis	8	7	7
Content Analysis	30	28	25
Comparison Analysis	25	23	20
No Analysis	13	12	11

Table 24.   Expected Frequency for Type of Data Analysis

The Chi-Squared Test showed a p-value of 0.0003.   In period 1, Statistical Analysis was used in only three studies.[41] Although some statisticians prefer more than five frequencies in each cell, the required condition specifically applies to the expected frequencies.   The test performed in this section still fulfilled the required

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[41] The actual sampling distribution of the test statistic is discrete but it can be approximated by the chi-squared distribution provided that the sample size is large. The sample size must be large enough so that the expected value for each cell must be five or more. Gerald Keller, *Statistics for Management and Economics*, 7th Edition, Thomson/Brooks/Cole, 2005, pp. 554-555.

condition, despite the low actual count of Statistical Analysis in Period 1. Therefore, a conclusion can be drawn from the analysis that, based on this p-value, there is insufficient evidence to reject the null hypothesis.

This chapter provided an in-depth analysis of the data, to include the results of the replication of Elder's study. Chapter IV presents the conclusions of this study and provides recommendations for future studies.

IV.   CONCLUSIONS AND RECOMMENDATIONS

A.   CONCLUSIONS

The *ARJ* is described as a platform where

. . . . Acquisition Corps members and other readers from government, Congress, industry and academe are encouraged to use the *Acquisition Review Quarterly* (*ARQ*), now *ARJ,* as their professional forum for discussion and exchange of policies, research, information, and opinion.[42]

The research conducted in both studies suggests that the *ARJ* is accomplishing this mission. Acquisition Reform Initiatives date back to 1961 and are still occurring to date; this continuing in reform is reflected in the *ARJ*.

The *ARJ* has shown some distinctive trends based on the analysis described in Chapters II and III. The *ARJ* is still a new journal; therefore, the trends are a good representation of a growing community. The *ARJ* reflects a number of qualitative studies, but shows progress in the number of published quantitative studies. The trends in the types of research performed, research design, and data analysis are currently in line with the recommendations of the research community. So as long as the *ARJ* continues to publish articles of its current caliber, the acquisition community should only expect to see more quantitative research in future issues.

The research shows that both practitioners and academe are publishing articles in the *ARJ*. Practitioners' contributions are slightly greater in number than those of academe, but the difference is less than five percent. The results are comparable to the mission statement, which welcomes "Acquisition Corps members and other readers from government, Congress, industry and academe,"[43] which leads to the conclusion that the *ARJ* is capturing its intended audience. A majority of the articles thus far have been contributed by civilian universities and military organizations. Organizations such as the General Accounting Office (GAO), the military universities, and Canadian forces

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[42] *Acquisition Review Quarterly*, Editorial Mission, Summer 1994, no page number noted, editorial submission.

[43] *Acquisition Review Quarterly*, Editorial Mission, Summer 1994, no page number noted, editorial submission.

(international) were more appropriately classified under the military organizations umbrella. However, the military universities are trailing civilian organizations by less than one percent. Again, this is a reflection of the range of the *ARJ*'s audience and the fact that acquisition is of interest to not only military personnel, but to the Acquisition Corps.

Since 1997, the number of authors per articles has increased. It has moved away from just one and two authors per article and an influx of three and four authors per articles is apparent. This shows that collaboration is encouraged among authors.

Overall, the *ARJ* is meeting its published mission statement and in the upcoming issues we should see an increase in articles that discuss quality, quality assurance (QA), and configuration management because they have been topics of interest to the Acquisition Corps.

B.   LIMITATIONS OF THIS STUDY

Two main points that limited the reliability of this type of study are the human factors and the methodology. Human factors include the level of experience and interest of the researchers and the limited time frame of the study. Having done this for the first time, the quality of the coded judgments—despite pleasantly high inter-coder agreement—was not entirely dependable. The methodology from the literature reviews (article reading) to the coding process (categorical assignments) was subject to interpretations as well.

C.   RECOMENDATIONS FOR FUTURE RESEARCH

This study should be considered a stepping stone for future research on the *ARJ*. "An explicit description of the research process is needed in order to increase the reliability of the research in question so as to render it possible for other researchers to replicate the research and its findings."[44] Recommendations include:

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[44] Gyöngyi Kovacs and Karen .M. Spens, "A Content Analysis of Research Approaches in Logistics Research," *International Journal of Physical Distribution and Logistics Management*, Vol. 36, No. 5, 2006, p. 385.

1. Use a Group of Coders to Replicate the Study

Two important threats to the validity of qualitative conclusions are the selection of data that fit the researcher's existing theory or preconceptions and the selection of data that "stands out" to the researcher.[45] The group should represent a good sample size of the Acquisition Corps.

2. In-Depth Study of the Themes

Having read Elder's perception on the article submission, the researchers in some ways, agreed with him. Elder said, ". . . the type of article submitted for consideration for publication was driven primarily by potential authors aware of the journal."[46] In the fourth time period, the *ARJ* posted specific themes intended for the next issue's publication. This may change the course of article submission. If this requirement is maintained, article submission will be filtered in every issue.

Looking back to the definition of defense acquisition as "the conceptualization, initiation, design, development, test, contracting, production, deployment, logistics support, modifications, and disposal of weapons systems and other systems, supplies, or services . . ."[47] it can be safely assumed that these were adequately represented. As this study delved into the subject matter areas, it seemed that minimal research was devoted to quality and QA.

For the purpose of this study, one theme was assigned per article; however, some articles had more than one theme. A study of the themes will provide a more comprehensive list of the themes discussed in the *ARJ*.

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[45] Michael Huberman and Matthew B. Miles, *Qualitative Data Analysis*, 2nd Edition, Thousand Oaks, CA, 1994, p. 253.

[46] Mitchell Elder, Capt, USAF, "An Eleven Year Retrospective of the Acquisition Review Journal," Master's thesis, Air Force Institute of Technology, March 2005, p. 33.

[47] *Acquisition Review Quarterly*, "Guidelines for Authors," Winter 2002, p. 85.

3. Detailed Study of the Three Categories

Each article was assigned to one category for type of research performed, type of research design, and type of data analysis, when, in reality, each article could have more than one category for each of the three areas. In order to better understand the trends it is recommended that a study be done assigning more than one category to each article when applicable. Although more extensive, this will provide a clearer picture of the direction of not only the *ARJ*, but also the Acquisition Community.

Although 57 percent of Literature and Normative reviews about the concepts of acquisition were already submitted, the *ARJ* still needs to continue this trend, since this is a growing publication and there is always a benefit derived from the knowledge shared by these types of research.

The potential for different interpretations regarding the categories exists. In 2005, Karen Spens and Gyöngyi Kovács recommended some measures addressing the validity and reliability of Content Analysis. The following are taken from Table I of their Content Analysis written in 2006:

- Develop clear categorization schemes and decision rules for categorization

- Follow theoretical framework and pre-define categories for each variable

- Ensure mutual exclusiveness, independence, and exhaustiveness of categories

- Fine tune of category development during the coding process

- Ensure reliability of coding instrument

- Ensure the reliability of the coded data set through the use of multiple coders

- Assess measurement reliability

- Assess coding consistency and stability[48]

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[48] Gyöngyi Kovács and Karen M. Spens, "A Content Analysis of Research Approaches in Logistics Research," *International Journal of Physical Distribution and Logistics Management*, Vol. 36, No. 5, 2006, pp. 380-381.

Reflecting back on the data collection and coding process of this study, the two researchers made every effort to clearly establish unanimous interpretations of the categories. The regular discussions definitely helped to clear up confusion; however, there was always the potential for one researcher to influence the other, so consistency was not established. Since each article is not necessarily exclusive to only one set of categories, it was very difficult to come to an agreement. Compromise was necessary to assign categories to the articles.

4. Genealogy of Authors

This study provided different information about the contributing authors: their educational background and professional background at least. It showed that the majority of them came from civilian universities. In the future, research should be undertaken to study the valuable contributors in the acquisition field who are instrumental to the success of the *ARJ*.[49] Such a study will lead to an analysis of the productivity of contributing authors in the *ARJ* mainly to show that the field is growing like other related journals.

D. SUMMARY

This study has proven that ARJ has met its editorial mission and has published articles "in-sync" with the Acquisition Corps. Theme issues are the future of ARJ which could change the current trends presented in this study. If that should occur then the ARJ should revert back to casual models to increase quantitative studies.

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[49] Jack R. Meredith and Kwasi Amoako-Gyampah, "The Genealogy of Operations Management," *Journal of Operations Management*, Vol. 9, No. 2, pp. 146-167.

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APPENDIX A.   ARTICLE #, YEAR, AUTHOR(S), TITLE, AND THEMES OF ARTICLES INCLUDED IN THE RESEARCH

ART #	YEAR	AUTHOR(S)	TITLE	THEMES
1	1994	Preston, Colleen	Acquisition Reform: Making it a Reality	Acquisition Reform
2	1994	LaBerge, Walter B.	Restructuring DoD: Study the High-Tech Commercial World	Acquisition Reform
3	1994	Christensen, David S.	Cost Overrun Optimism: Fact or Fiction	Cost, Schedule, Performance
4	1994	Allen, Gail; Yoos II, Charles	Through a Glass Darkly: The Anomaly of Streamlined Management	Streamline Acquisition
5	1994	Morrison Jr., Robert	Mobilizing the Defense Contracting Process	Laws, Policies, Regulations
6	1994	Chambers, George	Variance Analysis Within C/SCSC Programs	Cost, Schedule, Performance
7	1994	Lynn, Larry	The Role of Demonstration Approaches in Acquisition Reform	Acquisition Reform
8	1994	Horton, Peter	Converting the Military-Industrial Complex: Why is it difficult	Defense Industry
9	1994	Templin, Carl	Defense Contracting Buyer-Seller Relationships: Theoretical Approaches	Defense Industry
10	1994	Shields, John T	Factors Affecting New Product Development	Procurement
11	1994	Pariseau, Richard; Oswalt, Ivar	Using Data Types and Scales for Analysis and Decision Making	Decision Making
12	1994	Greenburg, Harvey R.; Palley, Lynn B.	Coming Up Golden: Defense Acquisition Board Review Guide for Program Offices	Program Management
13	1994	Goodman, Sherri	The Lemon Juice Solution: Pollution Prevention and Acquisition Reform	Acquisition Reform
14	1994	Neilson, Robert	The Role of Information Technology in National Security Policy	Laws, Policies, Regulations
15	1994	Shebalin, Paul V.	Software Development Standards and the DoD Program Manager	Software
16	1994	Sutton, Jeanne C.	Marrying Commercial and Military Technologies: A New Strategy for Maintaining Technological Superiority	Technology
17	1994	Williams, Richard M.	Small Business Manufacturing: An Important Component of the U.S. Defense Industrial Base	Technology
18	1994	Glenn, Mark W.	Using Explicit Demand Curves in an Acquisition Strategy	Contracting
19	1995	Byrns Jr, Edward V.; Corban, J. Eric; Ingalls, Stephen A.	A Novel Cost-Benefit Analysis for Evaluation of Complex Military Systems	Logistics
20	1995	Wells, Rita Lappin	Contracting Readiness: Timely Support for Military Operations	Contracting
21	1995	Scott, William, et al.	Project Kaizen Looks at Congressional Oversight of Defense Acquisition Programs	Acquisition Reform
22	1995	Rhoads, Dusty	Is DAWIA worth it? An Approach to Analyzing the Impacts	Education and Training
23	1995	Haimes, Yacov; Chittister, Clyde	An Acquisition Process for the Management of Non-Technical Risks Associated with Software Development	Software
24	1995	Christensen, David; Ferens, Daniel	Using Earned Value for Performance Measurement on Software Development Projects	Software
25	1995	Cancian, Mark	Acquisition Reform: It's not as easy as it seems	Acquisition Reform
26	1995	Battershell, A. Lee	Technology Approach: DoD Versus Boeing (A Comparative Study)	Technology
27	1995	Kwatnoski, Richard	Cooperative Acquisition Projects in the Pacific Rim	International
28	1995	Dakin, Timothy	What Every Government Employee Should Know About Post-Federal Employment Restrictions	Laws, Policies, and Regulations
29	1996	Doton, Larry	Integrating Technology to Reduce Fratricide	Technology
30	1996	Schaller, Michael E.	The Impact of Technical Data Transfers Problems during a Transition of Weapons System Production between Nations	Technology
31	1996	Cothran, Julie	Battle Labs: Tools and Scope	Technology
32	1996	Wilson Jr., John R.	Battle Labs: What Are They, Where Are They Going?	Technology
33	1996	Hewitt, Clyde	Getting to the On-Ramp of the Information Highway	Technology
34	1996	LaBerge, Walter B.	Cycle Time: A Military Imperative As Well	Cost, Schedule, Performance
35	1996	Luman, Ronald R.; Scotti, Richard S.	The System Architect Role in Acquisition Program Integrated Product Teams	Acquisition Reform
36	1996	Snider, Keith F.	DAWIA and the Price of Professionalism	Education
37	1996	Ferrara, Joe	DoD's 5000 Documents: Evolution and Change in Defense Acquisition Policy	DoD Framework
38	1996	D'Agostino, Davi M.	Transatlantic Cooperative Weapons Development: How can we Better Ensure Success?	Integrated Product and Process Development/

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				Integrated Product Team (IPPD/IPT)
39	1996	Bregard, Richard W.; Chasteen, Taylor	Implementing Integrated Product Development: A Project Manager's Perspective	International
40	1997	Ciccotello, Conrad S.; Green, Steve G.; Hornyak, Martin	Rethinking Twenty-First Century Acquisition: Emerging Trends for Efficiency Ends	Laws, Policies, Regulations
41	1997	Nissen, Mark	Reengineering the RFP Process Through Knowledge-Based Systems	Contracting
42	1997	Ranquet, Robert	Think Tanks and the National Security Strategy Formulation Process: A Comparison of Current American and French Patterns	Laws, Policies, Regulations
43	1997	Haimes, Yacov; Chittister, Clyde; Schooff, Richard	A Holistic Management Framework for Software Acquisition	Software
44	1997	Steves, Michael R.	Addressing Risk Management in Non-Development Items Acquisition Programs	Risk
45	1997	Pinker, Aron, Smith; Charles G.; Booher, Jack W.	Selecting Effective Acquisition Process Metrics	Streamline Acquisition
46	1997	Chew, James S. B.	Commercial Best Practices and the DoD Acquisition Process	Streamline Acquisition
47	1997	O'Connor, Michael F.; Faris, Janine L.; Lovelace, Joan S.	A Decision Support Procedure for Best Value Source Selections	Contracting
48	1997	Peeler Jr., David L.	Applying Dialectic to Acquisition Strategy	Streamline Acquisition
49	1997	Rush, Benjamin C.	Cost as an Independent Variable: Concepts and Risks	Cost, Schedule, Performance
50	1997	Washington, William N.	A Review of the Literature: Competition Versus Sole Source Procurement	Contracting
51	1997	Anderson, Timothy P.; Cherwonik, Jeffrey S.	Cost Estimating Risk and Cost Estimating Uncertainty Guidelines	Cost, Schedule, Performance
52	1997	Barrick, Alan E.; Alberts, Henry C.	Acquisition of State-of-the-Art Logistics Combat Support System: The Joint Logistics Advanced Concept Technology Demonstration Program	Acquisition Reform
53	1997	Clark, Rolf	The Hidden Implications of Force Changes	Laws, Policies, Regulations
54	1997	Frank, Deborah	A Theoretical Consideration of Acquisition Reform	Acquisition Reform
55	1997	Garcia, Andrea; Keyner, Hugo; Robillard, Thomas; VanMullekom, Mary	The Defense Acquisition Workforce Improvement Act: Five Years Later	Education and Training
56	1997	Harman, Beryl	The Government Performance Act: Strategic Planning of the Future	Laws, Policies, Regulations
57	1997	Washington, William N.	Some New Approaches to "Reward Contracting"	Contracting
58	1997	Wollover, David R.	Quality Function Deployment as a Tool for Implementing Cost as an Independent Variable	Cost, Schedule, Performance
59	1997	Kankey, Roland D.; Muczyk, Jan P.; Ely, Neal M.	Focused Graduation Education: An Invisible but Real Competitive Edge	Education and Training
60	1997	Brower, Michael J.	Outland: The Vogue of DoD Outsourcing and Privatization	Contracting
61	1997	Hall, Mary-Jo	Changing the Way we Assess Leadership	Organizational Behavior
62	1997	Davis, Randy; Phillips, Bill; Vazquez, Bud	The Phoenix Rises	IPPD/IPT
64	1997	Bratt, Gary M.; Doganiero, Donna M.; Spencer, Clark O.	Estimating the Health Hazard Costs of Army Materiel: A Method for Helping Program Managers Make Informed Health Risks Decisions	Cost, Schedule, Performance
65	1998	Kock, Ned	Government Transformation and Structural Rigidity: Redesigning a Service Acquisition Process	Change
66	1998	Crecine, John P.; Salomone, Michael D.	A Multimedia Systems Approach to National Security Policy, Decision Making, and Intelligence Support	Technology
67	1998	Delano, Kenneth J.	Identifying Factors that Contribute to Program Success	Program Management
68	1998	Ignizio, James P.	Integrating Cost, Effectiveness, and Stability	Cost, Schedule, Performance
69	1998	Dobbins, James H.; Donnelly, Richard G.	Summary Research Report on Critical Success Factors in Federal Government Program Management	Program Management
70	1998	Roberts, Nancy C.	Radical Change by Entrepreneurial Design	Change
71	1998	Reardon, Kathleen K.; Reardon, Kevin J.; Rowe,	Leadership Styles for the Five Stages of Radical Change	Organizational Behavior

		Alan J.		
72	1998	Hocevar, Susan Page; Owen, Walter E.	Team-Based Redesign as Large-Scale Change: Applying Theory to the Implementation of Integrated Product Teams	Change
73	1998	Judith Gebauer; Carrie Beam; Arie Segev	Impact of the Internet on Procurement	Technology
74	1998	Scacchi, Walt; Boehm, Barry	Virtual Systems Acquisition: Approach and Transitions	Modeling and Simulation
75	1998	Hildebrandt, Gregory G.	The Use of Performance Incentives in DoD Contracting	Contracting
76	1998	Holland, Lauren	The Weapons Acquisition Process: The Impediments to Radical Reform	Organizational Behavior
77	1998	Boyd, James A.	Concept of Operations and Implementation Plan for Industry Integrated Logistics System (I2LS)	Logistics
78	1998	Ferreiro, Larrie D.	Organizational Trust in Naval Ship Design Bureaus: France, Great Britain, and the United States	Organizational Behavior
79	1998	McNally, William P.	Will Commercial Specifications Meet our Future Air Power Needs?	Acquisition Reform
80	1998	Muczyk, Jan P.	Generating Needed Modernization Funds: Streamlining the Bureaucracy - Not Outsourcing and Privatizing - is the Best Solution	Cost, Schedule, Performance
81	1998	Wong, Carolyn, Steinberg, Paul, Horn, Kenneth; Axelband, Elliot	An Approach for Efficiently Managing DoD Research and Development Portfolios	Research, Development, Testing, and Evaluation (RDT&E)
82	1998	Childress, Alan; Larson, James	A Case for International Cooperative Acquisitions: Lessons from Developing and Executing a Section 27 "Quayle" Authority Program	International
83	1998	Scafati, Anthony A.	A Case Study for the Systems Approach for Developing Curricula: "Don't Throw out the Baby with the Bath Water'"	Education and Training
84	1998	Christensen, David S.	The Cost and Benefits of the Earned Value Management Process	Cost, Schedule, Performance
85	1999	Pollock, Neal	International Cooperative Research and Development Programs	International
86	1999	Christensen, David S.; Searle, David A.; Vickery, Caisse	The Impact Of The Packard Commission's Recommendations on Reducing Cost Overruns on Defense Acquisition Contracts	Cost, Schedule, Performance
87	1999	Smyth, Joseph, Lt Col	The Impact of the Buy American Act on Program Managers	Laws, Policies, Regulations
88	1999	Parker, Tony	Logistics Test And Evaluation: An Overview	Logistics
89	1999	Christensen, David S.	Value Cost Management Report to Evaluate the Contractor's Estimate at Completion	Cost, Schedule, Performance
90	1999	Alford, Lionel D., Lt Col	The Problem with Aviation COTS	Defense Industry
91	1999	Washington, William N.	Depot Utilization and Commercialization	Industry
92	1999	Ainsley, Robert J.; Riordan, James	DoD and the Change Paradigm: Change Agents Versus Established Service Roles, Missions and Cultures	Change
93	1999	Raymond, Fred	Quantify Risk To Manage Cost and Schedule	Risk
94	1999	Alford, Lionel D., Knarr, Robert C.	General Flight Test Theory Applied to Aircraft Modifications	RDT&E
95	1999	Fullerton, Richard L.; Linster, Bruce G.; McKee, Michael; Slate, Stephen	Acquisition Reform Theory and Experimental Evidence For Tournament Sponsors	Contracting
96	1999	Traceski, Frank T.	Assessing Industrial Capabilities For Carbon Fiber Production	Industry
97	1999	Washington, William N.	Outsourcing Automatic Data Processing Requirements and Support	Contracting
98	1999	Besselman, Joe; Arora, Ashish; Larkey, Patrick	Purchasing Performance: A Public Versus Private Sector Comparison of Commodity Buying	Procurement
99	1999	Huber, Arthur F; Scott, Jennifer M	The Role and Nature of Anti-Tamper Techniques in U.S. Defense Acquisition	Technology
100	1999	Will, Edward	Paving the Way for Price-Based Acquisition	Contracting
101	1999	Nissen, Mark E.	SPs and Beyond: Innovating Acquisition Through Intelligent Electronic Contracting	Contracting
102	1999	Linscott, William B.	Civil-Military Integration: The Context and Urgency	Acquisition Reform
103	1999	Bushey, Douglas B.; Nissen, Mark E.	A Systematic Approach to Prioritizing Weapon Requirements and Military Operations Through Requisite Variety	Acquisition Reform
104	1999	Pinney, Charles W.	The USAF PEO/DAC/MAD Structure Successful Pattern for Future Weapon System Acquisition?	Program Management
105	1999	Hanratty, Michael J.; Lightsey, Robert H.; Larson, Arvid	Open Systems and the Systems Engineering Process	Systems Engineering (SE)
106	1999	Myers, Margaret	An Investment-Based Approach for Managing Software-Intensive System	Software

107	1999	Washington, William N.	"Subcontracting" as a Solution, Not a Problem, in Outsourcing	Contracting
108	1999	Graham, Robert; Hoffman, Eric,	Reengineering the Acquisition Process a Quantitative Example of Acquisition Reform Working for the Air Force's Launch Programs System Program Office	Contracting
109	2000	Strayer, Kenneth; Hoivik, Thomas; Hocevar, Susan Page	The Use of Advanced Warfighting Experiments to Support Acquisition Decisions	Risk
110	2000	Besselman, Joseph; Arora, Ashish; Larkey, Patrick	Measuring the Readiness Cost of One-Size-Shoe-Fits-All Public Policy: A Fact-Based Look at Cost-, Hybrid-, and Price-Based Purchasing	Cost, Schedule, Performance
111	2000	Brown, C. David; Grant, Gordon; Kotchman, Donald; Reyenga, Robert, Szanto, Terence	Building a Business Case for Modeling and Simulation	Modeling and Simulation
112	2000	McLlvaine, Paul J.	The Evolution of 21St Century Acquisition and Logistics Reform	Acquisition Reform
113	2000	Kaye, Michael A., Sobata, Mark S.; Graham, David R.; Gotwald, Allen L.	Cost As an Independent Variable: Principles and Implementation	Cost, Schedule, Performance
114	2000	Washington, William N.	Participatory Contracting	Contracting
115	2000	Christensen, David; Templin, Carl	An Analysis of Management Reserve Budget on Defense Acquisition Contracts	Cost, Schedule, Performance
116	2000	Eskew, Henry L.	Aircraft Cost Growth and Development Program Length: Some Augustinian Propositions Revisited	Cost, Schedule, Performance
117	2000	Struth, Robert G. Jr.	Systems Engineering and the Joint Strike Fighter: The Flagship Program for Acquisition Reform	SE
118	2000	Truckenbrodt, Yolanda B.	The Relationship Between Leader-Member Exchange and Commitment and Organizational Citizenship Behavior	Organizational Behavior
119	2000	Lloyd, Robert E.	Government Contracting Pathologies	Contracting
120	2000	Wong, Carolyn; Steinberg, Paul; Horn, Kenneth; Axelband, Elliot	Maintaining the Government's Ability to Buy Smart	Organizational Behavior
121	2000	Lightsey, Robert H.	Engineering Management Training: Comparing Experiential Versus Lecture Methods of Instruction	Education and Training
122	2000	Proctor, Michael; Lipinski, Michael J.	Technical Performance Measures and Distributed-Simulation Training Systems	Modeling and Simulation
123	2000	Jordon, Leland G.	Systemic Fiscal Optimism in Defense Planning	Cost, Schedule, Performance
124	2000	Love, James D.	Test and Evaluation Management Reform: Issues and Options	Management
125	2000	Pollock, Neal	Management: Towards a Unified Field Theory	Management
126	2000	Alford, Lionel D.	Cyber Warfare: Protecting Military Systems	Software
127	2000	Brown, C. David	Enterprise Architecture for DoD Acquisition	SE
128	2000	Liebowitz, Jay	CESA: The COTR Expert System Aid	Contracting
129	2000	Marshall, Michael L.; Hazell, Eric J.	Private Sector Downsizing: Implications for DoD	Acquisition Reform
130	2000	Olson, Craig	From Cradle to Save: Revolutionary Acquisition Force Structure Alternatives for the 21st Century	Acquisition Reform
131	2001	Gill, James H.	Crisis in the Acquisition Workforce: Some Simple Solutions	Organizational Behavior
132	2001	Kock, Ned	Changing the Focus of Business Process Redesign from Activity Flows to Information Flows: A Defense Acquisition Application	Change
133	2001	Ladymon, Joseph M.	Network-Centric Warfare and its Function in the Realm of Interoperability	Technology
134	2001	Zittel, Randy C.	The Reality of Simulation-Based Acquisition - and an Example of U.S. Military Implementation	Technology
135	2001	Angelis, Diana I.	Implementing Activity-Based Management in an Acquisition Organization	Cost, Schedule, Performance
136	2001	Watkins, Patrick N.	The Persistence of Learning and Acquisition Strategies	Technology
137	2001	Barzelay, Michael; Thompson, Fred	How the Acquisition Workforce Adds Value	Acquisition Reform
138	2001	Graves, Ralph H.	Seeking Defense Efficiency	Acquisition Reform
139	2001	Ciccotello, Conrad S.	Complexity: A Cognitive Barrier to Defense Systems Acquisition Management	Education and Training
140	2001	Deutch, John	Consolidation of the U.S. Defense Industrial Base	Defense Industry
141	2001	Fowler, David N.; Nissen, Mark E.	Innovating the Federal Acquisition Process Through Intelligent Agents	Technology
142	2001	Nichols, Camille;	The Role of Foreign Comparative Testing Programs in Army	Technology

		Grogan, Dan; Schmidt, Raef	Modernization	
143	2001	Bachman, David C.	Single Point Adjustments: A New Definition with Examples	Cost, Schedule, Performance
144	2001	Baker, Bud	Clipped Wings: The Death of Jack Northrop's Flying Wing Bombers	Management
145	2002	Anderson, Warren M.; McGuiness, John; Spicer, John	And the Survey says…The Effectiveness of DoD Outsourcing and Privatization Efforts	Contracting
146	2002	Christensen, David; Templin, Carl	EAC Evaluations Methods: Do They Still Work?	Cost, Schedule, Performance
147	2002	Greiner, Michael A.; Dooley, Kevin J; Shunk, Dan L; McNutt, Ross	An Assessment of Air Force Development Portfolio Management Practices	Management
148	2002	Linster, Bruce G; Slate, Stephen; Waller, Robert L.	Consolidation of the U.S. Defense Industrial Base: Impact on Research Expenditures	Defense Industry
149	2002	Sullivan, Shannon	Globalized Security: An Allied Industrial Base for the 21st Century	International
150	2002	Brantley, Mark W.; McFadden, Willie J.; Davis, Mark J.	Expanding the Trade Space: An Analysis of Requirements Tradeoffs affecting System Design	Modeling and Simulation
151	2002	Hamilton, John A., Summers, Paul A., Rosen, J. David	An Interoperability Road Map for C4ISR Legacy Systems	System of Systems
152	2002	Manz, Paul C., Zelenka; Michael, Wittig; Raymond S.; Smith, Sally	Protecting Government Works: The Copyright Issue	Laws, Policies, and Regulations
153	2002	Pollock, Neal	Knowledge Management in Acquisition and Program Management (KM in the AM and PM)	Technology
154	2002	Snider, Keith; Barrett, Frank J.; Tenkasi, Ramkrishnan V.	Considerations in Acquisition Lessons Learned Systems Design	Technology
155	2002	Johnson, Wayne M.; Johnson, Carl O.	The Promise and Perils of Spiral Acquisition: A Practical Approach to Evolutionary Acquisition	Evolutionary Acquisition
156	2002	Polydys, Mary Linda	Interoperability in DoD Acquisition Programs Through Enterprise "Architecting"	Technology
157	2002	Linster, Bruce G.; Mullin, David R.	Auctions in Defense Acquisition: Theory and Experimental Evidence	Contracting
158	2002	Siemsen, Tom	Just Contracting Parties or Partners as Well?	Organizational Behavior
159	2002	Ceylan, B. Kagan; Ford, David N.	Using Options to Manage Dynamic Uncertainty in Acquisition Projects	Risks
160	2002	Gaudette, Kevin; Sweeney, Kevin	Price Enumerations and Probabilistic Evaluation in Systems Acquisition	Contracting
161	2002	Agripino, Mario; Cathcart, Tim; Mathaisel, Dennis	A Lean Sustainment Enterprise Model for Military Systems	Cost, Schedule, Performance
162	2002	Nichols, Camille, LTC	SCIENTIFIC WARRIORS: Do They Have a Place in the 21st Century Army?	Education and Training
163	2002	Myers, Dominique	Acquisition Reform- Inside the Silver Bullet: A Comparative Analysis - JDAM Versus F-22	Acquisition Reform
164	2003	Sylvester, Richard K.; Ferrara, Joseph A.	Conflict and Ambiguity: Implementing Evolutionary Acquisition	Evolutionary Acquisition
165	2003	Sherman, J. Daniel	Patriot PAC-2 Development and Deployment in the Gulf War	Technology
166	2003	Molzahn, Wendy	The CIA's In-Q-Tel Model its Applicability	Technology
167	2003	Gould, Jay W. III	Program Planning of Asynchronous On-Line Courses: Design Complexities and Ethics	Education and Training
168	2003	Bennett, John, Bunker; Ellen, Rowley, Kurt	Managing the Development of Technology-based Courses: Success Factors from Eight Government Training Courses	Education and Training
169	2003	Coleman, Richard L.; Summerville, Jessica R.; Dameron, Megan	The Relationship Between Cost Growth and Schedule Growth	Cost, Schedule, Performance
170	2003	Shepherd, Bill	Managing Risk in a Program Office Environment	Risk
171	2003	Bolles, Mike	Understanding Risk Management in the DoD	Risk
172	2003	Roberts, Barney; Smith, Clayton; Frost, David	Risk-Based Decision Support Techniques for Programs and Projects	Risk
173	2003	Conrow, Edmund H.	Development of Risk Management Defense Extensions to the PMI Project Management Body of Knowledge	Risk

174	2003	Garvey, Paul R.; Cho, Chien-Ching	An Index to Measure a System's Performance Risk	Risk
175	2003	Murnyak, George; Leggieri, Michael J.; Roberts, Welford C.	The Risk Assessment Process Used in the Army's Health Hazard Assessment Program	Risk
176	2003	Waller, Robert L.	The Use of Offsets in Foreign Military Sales	Cost, Schedule, Performance
177	2003	Graham, Robert	The Transformation of Contract Incentive Structures	Contracting
178	2003	King, David R.; Driessnack, John D.	Investigating the Integration of Acquired Firms in High-Technology Industries Implications for Industrial Policy	Technology
179	2003	Proctor, Michael D.; Posey-Macalintal, Amy; Kulonda, Dennis	Why the "T" in Smart: A Constructive Synergy	Education and Training
180	2003	Sherman, Daniel J.	Lessons Learned from the Early Stages of Development of the Guardrail Common Sensor for the Radical Reduction of Cycle Time	Cost, Schedule, Performance
181	2004	Morell, Jonathan A.	Evaluating the Impact of Electronic Business Systems: Lessons Learned from Three Cases at the Defense Logistics Agency	Logistics
182	2004	Alford, Lionel D.	How Compensation in Test and Evaluation Affects Aircraft Acquisition	RDT&E
183	2004	Rogers. Edward W.; Birmingham, Robert P.	A Ten-Year Review of the Vision for Transforming the Defense Acquisition System	Acquisition Reform
184	2004	Driessnack, John D.; King, David R.	An Initial Look at Technology and Institutions on Defense Industry Consolidation	Technology
185	2004	Sipple, Vince; White, Edward; Greiner, Michael A.	Surveying Cost Growth	Cost, Schedule, Performance
186	2004	Brown, Steve; Miller, Scott; Schvaneveldt, Kent	Recommendations on Coaching Strategies for Implementing Lean	Lean Implementation
187	2004	Srinivasan, Mandyam; Jones, Darren; Miller, Alex	Applying Theory of Constraints Principles and Lean Thinking at the Marine Corps Maintenance Center	Lean Implementation
188	2004	Rebentisch, Eric; Jobo, Ronald	Lean Now - Using a Research Community to Understand Change in the Acquisition Enterprise	Lean Implementation
189	2004	Veech, David S.	A Person-Centered Approach to Sustaining a Lean Environment - Job Design for Self-Efficacy	Lean Implementation
190	2004	Joyce, Michael; Schechter, Bettina	The Lean Enterprise - A Management Philosophy at Lockheed Martin	Lean Implementation
191	2004	Ott, David D.; Davis, James B	T-38C Transition to Lean	Lean Implementation
192	2004	Blair, Bob; McKenzie, Jon W.	Raytheon- New Challenges, New Solutions, and Documented Results	Lean Implementation
193	2004	Searcy, Dewayne; Greene, Brad; Reeve, James	Taming the Aerospace Supply Chain - A Case Study in Organizational Integration	Logistics
194	2005	Friar, Allen	Why Training for Service Contract Management is Mission Essential	Contracting
195	2005	Schilling, Melissa A.; Paparone, Christopher	Modularity an Application of General Systems Theory to Military Force Development	Technology
196	2005	Edison, Tom	Social Networking Analysis: One of the First Steps in Net-centric Operations	Technology
197	2005	Giammarco, Kristin; Carlomusto, Michael; Lock, J.D.	Development and Analysis of Integrated C4ISR Architectures	SE
198	2005	Eiband, David	Innovative Procurement Strategies	RDT&E
199	2005	Dillard, John T.	Toward Centralized Control of Defense Acquisition Programs	Acquisition Reform
200	2005	Brown, Mary Maureen; Flowe, Rob	Joint Capabilities and System-of-Systems Solutions	Acquisition Reform
201	2005	Switzer, Sandra P.; Stropku, Michael A.	Effects of Defense Globalization: An Examination of Current and Future Command and Control Collaborations	International
202	2005	Monaco, James V.; White, Edward D. III	Investigating Schedule Slippage	Cost, Schedule, Performance
203	2005	Greene, Harold; Mendoza, Robert	Lessons Learned from Developing the ABCs 6.4 Solution	System of Systems
204	2005	Zenishek, Steven G.; Usechak, David	Net-Centric Warfare and its Impact on Systems-of-Systems	System of Systems
205	2005	Farr, John V.; Johnson, William R.; Birmingham, Robert P.	Multitiered Approach to Army Acquisition	DoD Framework

206	2005	Hickok, John, USN (ret)	Knowledge Sharing , Communities of Practice, and Learning Asset Integration - DAU's Major Initiatives	Education and Training
207	2005	Garcia, Jill; Dorohovich, Michael;	The Truth about Building and Maintaining Successful Community of Practice	Education and Training
208	2005	Dickover, Noel	Supporting Community of Interest in a Net-Centric Investment Environment	Technology
209	2005	Perino, George H.	Toward More Innovative Program Management	Decision Making
210	2005	Garner, James; Bundy, Mark; Pomey, Albert; Roy, Walter	Tank Gun Barrel Reshaping - Concept to Implementation	Management
211	2005	Weber, Katherine L.; Huckeby, Michael	Maintaining a Viable Energy Savings Performance Contract	Cost, Schedule, Performance
212	2005	Graham, Robert	An Introduction to Government Technical Valuations - A Contracting Officer's Perspective	Contracting
213	2005	Boudreau. Mcihael; Naegle, Brad R.	Total Ownership Cost Considerations in Key Performance Parameters and Beyond	Cost, Schedule, Performance
214	2005	Devries, Hank J.	Performance Based Logistics - Barriers and Enablers to Effective Implementation	Logistics
215	2005	Berkowitz, David; Gupta, Jatinder N.D.; Simpson, James T.; McWilliams, Joan B.	Defining and Implementing Performance-Based Logistics in Government	Logistics
216	2005	Mahafza, Sherry; Componation, Paul; Tippett, Donald	A Performance-Based Technology Assessment Methodology to Support DoD Acquisition	Technology
217	2005	Gaines, Leonard T.; Michael, James Bret	Service Level Agreements as Vehicles for Managing Acquisition of Software -Intensive Systems	Software
218	2005	Starks, Glenn L.	Public and Private Partnerships in Support of Performance-Based Logistics Initiatives- Lessons Learned from Defense Logistics Agency Partnership	Logistics
219	2005	Friar, Edward Allen	Performance-Based Service Acquisition (PBSA), A-76 and Personal Services - A Cautionary Note	Cost, Schedule, Performance
220	2005	Cavadias, John	Contract Administration in Performance-Based Acquisition Environment is Serious Business	Contracting
221	2005	Barnette, Gregory L.	Test and Evaluation in a Dynamic Acquisition Environment	RDT&E
222	2006	Flood, Scott; Richard, Paul	An Assessment of the Lead Systems Integrator Concept as Applied to the Future Combat System Program	SE
223	2006	Lechner, David; Kaiser, Harold	The Fortress and the Bazaar: Open-Source and DoD Software	Software
224	2006	Cottengim, David	Irreducible Truths of Software-Intensive Program Management	Software
225	2006	Garvey, Paul R.; Cho, Chien-Ching	An Index to Measure and Monitor a System-of-Systems Performance Risk	Risk
226	2006	Paparone, Christopher R.; Crupi, James A.	Rubric Cubed: Are We Prisoners of Orsa-Style Decision Making	Decision Making
227	2006	Sherman, Daniel J.	Lessons Learned from the Development of the Fiber Optic Guided Missile (FOG-M)	Contracting
228	2006	Wissler, John B.	Technology Transition: A More Complete Picture	Technology
229	2006	Moretto, Stephen J.	Technology Management Best Practices: Reducing Technology Identification, Evaluation, and Selection Costs	Technology
230	2006	Andresen, Jon	UID: Building the Permanent Foundation	Logistics
231	2006	Mukherjee, Mrinal K.	Technical Evaluation of Military Ground Systems for Export Licensing: A Metric Approach	Technology
232	2006	Reiffer, Donald J.; Boehm, Barry W.	Providing Incentives for Spiral Developments: An Award Fee Plan	Software
233	2006	Sherman, Daniel J.	Lessons Learned from the Development of the Joint Stand-Off Target Attack Radar System Common Ground Station	DoD Framework

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APPENDIX B.   RESEARCHERS' ARTICLE SAMPLING FOR THE THEMES

Refer to Appendix A for the articles used in this sampling.

Technology: *Battle Labs: Tools and Scope* (Article #32): This is a tool for the rapid insertion of new technology into weapons systems.

Cost, Schedule, and Performance: *The Cost and Benefits of the Earned Value Management Process* (Article #84): This literature review talks about the how the cost, schedule, and performance using a work breakdown structure help in the management process. Additionally, it talks about the benefits of the indices.

Contracting: *The Transformation of Contract Incentive Structures* (Article #177): An acquisition and operations contract combines an award fee and success fee to include a cost mitigation approach. The incentive program asks for government and contractor share to succeed.

Acquisition Reform: *Towards Centralized Control of Defense Acquisition Programs* (Article #199): The new acquisition framework has more phases and added more reviews.

Education & Training: *Engineering Management Training: Comparing Experiential versus Lecture Methods of Instruction* (Article #121): He claims that the experiential method of instructions is more effective in learning and soliciting student's reaction.

Risk: *Understanding Risk Management in the DoD* (Article #171): The current risk management framework does not adequately emphasize the interface between risk management and contract administration.

Software: *Irreducible Truths of Software-Intensive Program Management* (Article #224): It argues that software-intensive program do not automatically make a program manager achieve the goals and objectives established in the acquisition program baseline.

Logistics: *Defining and Implementing Performance- Based Logistics in Government* (Article #215): This article talks about Performance-Based Logistics (PBL)'s implementation, benefits, and infrastructure changes required.

Laws, Policies, and Regulations: *What Every Government Employee Should Know about Post-Federal Employee Restrictions* (Article #28): The article talks about three contradictory principal laws about post-federal employment restrictions on acquisition Government personnel.

Organizational Behavior: *Crisis in the Acquisition Workforce: Some Simple Solutions* (Article #131): The author here suggests some approaches to deal with loss due to retirement and attrition since the military workforce is important to develop weapons systems.

Lean Implementation: *A Person-Centered Approach to Sustaining a Lean Environment—Job Design for Self-Efficacy* (Article #189): Toyota is used to demonstrate the success of the lean concept. It explores relationships between corporate beliefs, employee satisfaction, and self-efficacy.

International: *International Cooperative Research and Development Programs* (Article #85): A literature review on International Cooperative R&D Programs gives advice on how to succeed logistically and economically.

Systems Engineering: *Systems Engineering and the Joint Strike Fighter: The Flagship Program for Acquisition Reform* (Article #117): The article shows how JSF uses Systems Engineering process as an acquisition reform initiative to achieve its warfighting capability while satisfying the needs of the Navy, Air Force, Marines, and the United Kingdom.

Research, Development, Test, Evaluation: *General Flight Test Theory Applied to Aircraft Modifications* (Article #94): The article talks about the use of fly-by-wire technology on the C-130. Small modifications need extensive testing as well.

Management: *An Assessment of Air Force Development Portfolio Management Practices* (Article #147): Decision makers need to weigh benefits and cost against the mission needs for different weapons systems programs.

Defense Industry: *Consolidation of the U.S. Defense Industrial Base: Impact on Research Expenditures* (Article #148): The article talks about the merging of the defense contractors and the reduction in R&D expenditures.

Change: *Changing the Focus of Business Process Redesign from Activity Flows to Information Flows: A Defense Acquisition Application* (Article #132): This is an action research study of a business process redesign that supports that information flow instead of activity flow should the focus of the business redesign process.

Streamline Acquisition: *Commercial Best Practices and the DoD Acquisition Process* (Article #46): The article uses the best practices of the American automobile industry (Chrysler) to streamline the DoD acquisition process.

Program Management: *Identifying Factors that Contribute to Program Success* (Article #67): Good program management can prevent cost overruns, substandard performance, schedule delays, and also cancellations of programs.

Modeling and Simulation: *Building a Business Case for Modeling and Simulation* (Article #111): It provides a framework for program managers within DoD to know when to apply M&S to programs.

System of Systems: *Net-Centric Warfare and its Impact on Systems-of-Systems* (Article #204): Air Force Distributed Common Ground System Block 10.2 is fielding systems of systems net-centric, service-oriented architecture for intelligence, surveillance, and reconnaissance.

DoD Framework: *DoD's 5000 Documents: Evolution and Change in Defense Acquisition Policy* (Article #37): This article presents a historical progression of the DoD 5000 series and documents.

Decision Making: *Using Data Types and Scales for Analysis and Decision Making* (Article #11): It exposes data scales and numerical manipulations to help decision makers choose among different alternatives and make decisions on the allocation of scarce resources.

Procurement: *Purchasing Performance: A public Versus Private Sector Comparison of Commodity Buying* (Article #98): The article compares DoD and commercial spending and acquisition. Careful research is needed to benefit from the purchasing reform.

Commercial Industry: *Assessing Industrial Capabilities for Carbon Fiber Production* (Article #96): Commercial industries play an important role in the production and manufacturing of defense aerospace systems.

Evolutionary Acquisition: *Conflict and Ambiguity Implementing Evolutionary Acquisition* (Article #164): Evolutionary acquisition is the new preferred approach in acquiring defense systems as the Secretary of Defense announced in 2000. This article features the struggles and challenges of policy implementation.

IPPD/IPT: *The Phoenix Rises* (Article #62): This article shows how a program went from possible extinction to a respective model based on the ability to reduce cost and schedule yet still come out ahead through the use of integrated product teams (IPT).

APPENDIX C.   ELDER'S THESIS TOP CONTRIBUTORS[50]

Elder's Top Contributors

Authors	Contributions
Christensen, David, Dr.	6*
Nissen, Mark E., Dr.	5
Washington, William	5
Alford, Lionel D., Lt Col, USAF	4
Arora, Ashish	3
Besselman, Joseph, Maj, USAF	3
Driessnack, John D., Lt Col, USAF	3
Larkey, Patrick	3
Linster, Bruce G.	3
Pollock, Neal	3
Snider, Keith F., Dr.	3
Templin, Carl, Dr.	3

*Note: This includes an issue introduction.
Reproduced from Elder's thesis (2005).

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[50] Mitchell Elder, Capt, USAF, "An Eleven Year Retrospective of the Acquisition Review Journal," Master's thesis, Air Force Institute of Technology, March 2005, p. 27.

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APPENDIX D.   ELDER'S TABLE FOR AUTHORS PER ARTICLE[51]

Table 11. Authors per Article

Year	Mean	One Author	Two Authors	Three Authors	Four Authors
1	1.16667	83.3%	16.7%	0.0%	0.0%
2	1.25	72.7%	18.2%	9.1%	0.0%
3	1.18182	81.8%	18.2%	0.0%	0.0%
4	1.76	60.0%	8.0%	28.0%	4.0%
5	1.66667	57.1%	23.8%	14.3%	4.8%
6	1.65217	56.5%	26.1%	13.0%	4.3%
7	1.68182	68.2%	9.1%	9.1%	13.6%
8	1.28571	78.6%	14.3%	7.1%	0.0%
9	2.21053	31.6%	26.3%	31.6%	10.5%
10	1.76471	52.9%	17.6%	29.4%	0.0%
11	2.15385	23.1%	38.5%	38.5%	0.0%

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[51] Mitchell Elder, Capt, USAF, "An Eleven Year Retrospective of the Acquisition Review Journal," Master's thesis, Air Force Institute of Technology, March 2005, p. 28.

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APPENDIX E. ELDER'S SUBJECT (THEME) CATEGORIES[52]

Subject Categories
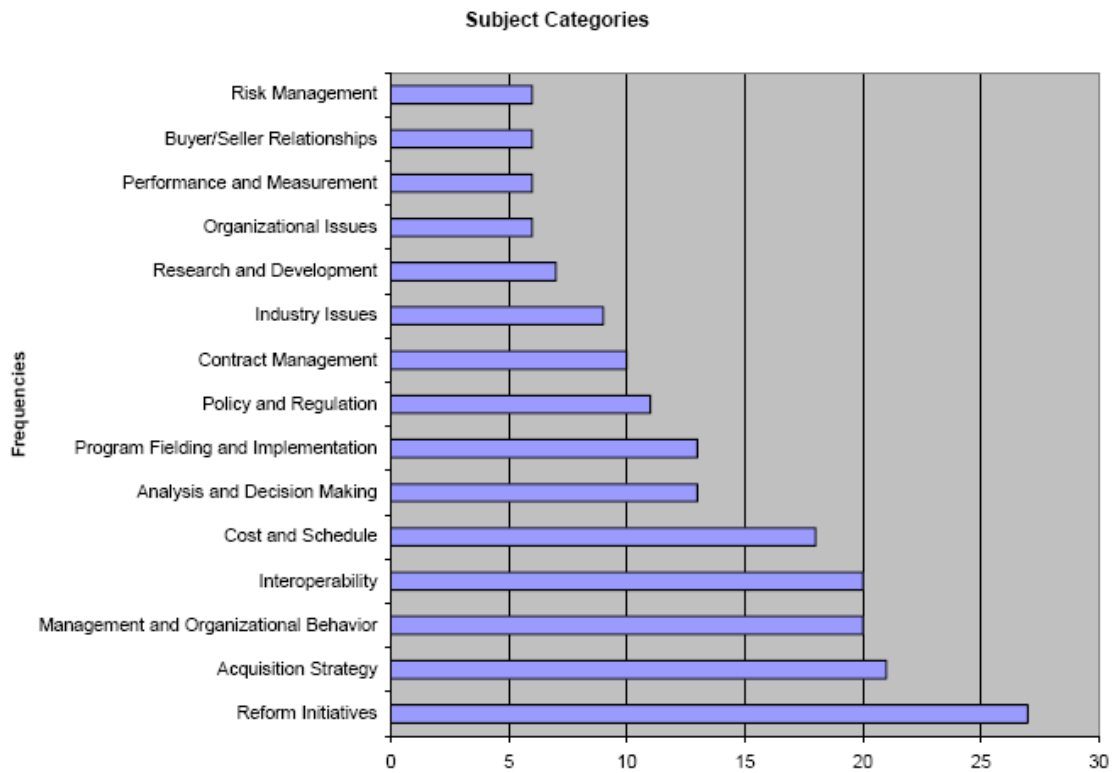
[52] Mitchell Elder, Capt, USAF, "An Eleven Year Retrospective of the Acquisition Review Journal," Master's thesis, Air Force Institute of Technology, March 2005, p. 19.

65

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APPENDIX F.   ELDER'S FREQUENCY AND PROPORTION OF SUBJECT CATEGORY PER PERIOD[53]

	1	2	3			1	2	3
Reform Initiatives	9	11	7	27	Reform Initiatives	13.8%	16.9%	11.1%
Acquisition Strategy	6	9	6	21	Acquisition Strategy	9.2%	13.8%	9.5%
Management and Organizational Behavior	3	7	10	20	Management and Organizational Behavior	4.6%	10.8%	15.9%
Interoperability	4	6	10	20	Interoperability	6.2%	9.2%	15.9%
Cost and Schedule	7	7	4	18	Cost and Schedule	10.8%	10.8%	6.3%
Analysis and Decision Making	6	6	1	13	Analysis and Decision Making	9.2%	9.2%	1.6%
Program Fielding and Implementation	4	5	4	13	Program Fielding and Implementation	6.2%	7.7%	6.3%
Policy and Regulation	9	2	0	11	Policy and Regulation	13.8%	3.1%	0.0%
Contract Management	5	2	3	10	Contract Management	7.7%	3.1%	4.8%
Industry Issues	2	1	6	9	Industry Issues	3.1%	1.5%	9.5%
Research and Development	3	2	2	7	Research and Development	4.6%	3.1%	3.2%
Organizational Issues	2	3	1	6	Organizational Issues	3.1%	4.6%	1.6%
Performance and Measurement	2	2	2	6	Performance and Measurement	3.1%	3.1%	3.2%
Buyer/Seller Relationships	2	2	2	6	Buyer/Seller Relationships	3.1%	3.1%	3.2%
Risk Management	1	0	5	6	Risk Management	1.5%	0.0%	7.9%
	65	65	63					

[53] Mitchell Elder, Capt, USAF, "An Eleven Year Retrospective of the Acquisition Review Journal," Master's thesis, Air Force Institute of Technology, March 2005, p. 20.

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APPENDIX G.   ELDER'S PROPORTION OF
CONTRIBUTING INSTITUTIONS[54]

	1	2	3
Civilian Universities	14.1%	24.0%	28.6%
DSMC/DAU	19.7%	12.0%	10.4%
Civilian Research Firm/ Defense Contractor	9.9%	12.0%	19.5%
Other USAF	1.4%	16.0%	10.4%
Other USA	12.7%	6.7%	7.8%
ICAF	12.7%	2.7%	2.6%
NPS	4.2%	8.0%	3.9%
AFIT	9.9%	2.7%	2.6%
SECDEF	5.6%	5.3%	1.3%
USAFA	4.2%	1.3%	3.9%
Other USN	1.4%	5.3%	2.6%
Other DoD	2.8%	0.0%	1.3%
National Defense University	1.4%	0.0%	1.3%
ACSC	0.0%	1.3%	1.3%
Air War College	0.0%	1.3%	0.0%
Other Gov	0.0%	1.3%	0.0%
USMA	0.0%	0.0%	1.3%
Naval War College	0.0%	0.0%	1.3%

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[54] Mitchell Elder, Capt, USAF, "An Eleven Year Retrospective of the Acquisition Review Journal," Master's thesis, Air Force Institute of Technology, March 2005, p. 29.

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APPENDIX H.   ELDER'S PROPORTION OF PRACTITIONERS VS. ACADEMICS[55]

Table 14.   Proportion of Practitioners vs. Academics

Contributor Type	1	2	3
Practitioners	66.2%	53.3%	55.8%
Academics	33.8%	46.7%	44.2%

[55] Mitchell Elder, Capt, USAF, "An Eleven Year Retrospective of the Acquisition Review Journal," Master's thesis, Air Force Institute of Technology, March 2005, p. 30.

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APPENDIX I.   ELDER'S PROPORTION OF CIVILIAN VS. GOVERNMENT ORGANIZATIONS[56]

Table 13. Proportion of Civilian vs. Government Organizations

Contributor Type	1	2	3
Civilian Organizations	23.9%	36.0%	48.1%
Military Organizations	76.1%	64.0%	51.9%

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[56] Mitchell Elder, Capt, USAF, "An Eleven Year Retrospective of the Acquisition Review Journal," Master's thesis, Air Force Institute of Technology, March 2005, p. 30.

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APPENDIX J.   ANOVA TEST FOR THE AUTHORS PER ARTICLE (233 ARTICLES)

Anova: Single Factor

SUMMARY

Groups	Count	Sum	**Average**	Variance
1994-1997	64	92	1.4375	0.59921
1998-2000	66	109	1.65152	0.99977
2001-2003	50	90	1.8	0.89796
2004-2006	53	94	1.77358	0.67852

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	4.82333	3	1.60778	2.02277	**0.1115**	**2.64402**
Within Groups	182.018	229	0.79484			
Total	186.841	232				

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APPENDIX K. CHI-SQUARED TEST FOR AUTHORS PER ARTICLE (233 ARTICLES)

ACTUAL FREQUENCY

No. of Authors/Article	One Author	Two Authors	Three + Authors
Period 1 (1994-1997)	46	9	9
Period 2 (1998-2000)	41	13	12
Period 3 (2001-2003)	26	10	14
Period 4 (2004-2006)	23	21	9
	136	53	44

EXPECTED FREQUENCY

No. of Authors/Article	One Author	Two Authors	Three + Authors
Period 1 (1994-1997)	37	15	12
Period 2 (1998-2000)	39	15	12
Period 3 (2001-2003)	29	11	9
Period 4 (2004-2006)	31	12	10
	136	53	43

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APPENDIX L.   ANOVA TEST FOR THE NUMBER OF AUTHORS PER ARTICLE (193 ARTICLES TO COMPARE WITH ELDER'S THESIS)

Anova: Single Factor

SUMMARY

Groups	Count	Sum	Average	Variance
Column 1	64	92	**1.4375**	0.59921
Column 2	66	109	**1.65152**	0.99977
Column 3	63	117	**1.85714**	0.8341

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	5.59232	2	2.79616	3.43977	**0.03408**	3.04347
Within Groups	154.449	190	0.81289			
Total	160.041	192				

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APPENDIX M.   ELDER'S CATEGORIES[57]

Article Categories　　　　**Elder (2005)**

Type	Period 1	Period 2	Period 3
Normative	44.6%	46.2%	33.3%
Literature Review	3.1%	1.5%	3.2%
Exploratory	16.9%	15.4%	19.0%
Methodology	32.3%	33.8%	38.1%
Hypothesis	3.1%	3.1%	6.3%

Research Designs　　　　**Elder (2005)**

Type	Period 1	Period 2	Period 3
Surveys	1.5%	10.8%	4.8%
Case Study/ies	13.8%	13.8%	22.2%
Interviews	6.2%	3.1%	6.3%
Archival Study	29.2%	21.5%	22.2%
Experiment	0.0%	3.1%	3.2%
Simulation	N/A	N/A	N/A
Topic Presentation	49.2%	47.7%	39.7%
Mathematical Model	0.0%	0.0%	1.6%
N/A = Not Applicable.			

Article Categories　　　　**Elder (2005)**

Type	Period 1	Period 2	Period 3
Anecdotal Evidence	26.2%	20.0%	22.2%
Statistical	6.2%	21.5%	20.6%
Content Analysis	15.4%	7.7%	11.1%
Comparison Analysis	7.7%	9.2%	4.8%
No Analysis	44.6%	41.5%	41.3%

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[57] Mitchell Elder, Capt, USAF, "An Eleven Year Retrospective of the Acquisition Review Journal," Master's thesis, Air Force Institute of Technology, March 2005, pp. 23-24, 26.

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