

**EXPLORING THE IMPACT OF NEARLY COMPLETE MARKET DATA ON
SMALL BUSINESSES IN THE GOVERNMENT
PROFESSIONAL SERVICES MARKET**

A Dissertation
Submitted to
the Temple University Graduate School

In Partial Fulfillment
Of the Requirements for the Degree
EXECUTIVE DOCTORATE OF BUSINESS ADMINISTRATION

by
Duane Kirk Little
May 2019

Review Committee Members:

Richard Y. Flanagan, Member, Adjunct Professor, Management Information Systems,
Fox School of Business, Temple University

David Schuff, Member, Professor, Management Information Systems, Fox School of
Business, Temple University

Elizabeth A. Gordon, Member, Associate Professor, Accounting, Fox School of Business,
Temple University

Susan Mudambi, External Reader, Professor, Marketing and Supply Chain
Management, Fox School of Business, Temple University

ABSTRACT

According to the United States Government's Federal Procurement Data System (FPDS), in 2016 the Government awarded contracts worth over \$472 billion. While the majority of these contracts were for products, the Government spends an average of over \$76 billion per year on professional services. Roughly 28 percent of these funds go to small businesses, as classified by the Small Business Administration.

Supporting Government contractors, several firms provide nearly complete market information on Federal Business (FedBiz) contract opportunities through Data as a Service (DaaS) offerings. Such services create a unique environment where nearly complete information about upcoming opportunities is available to anyone for a price. Businesses need to understand the value of such data services and ask questions about how best to use them. This gives businesses a very unique information resource in a very unique market and should cause firms to adapt by developing new and different ways to become more profitable.

The goal of this research is to provide conceptual insights into the impact of FedBiz DaaS on the Government marketplace itself and on the resource mix of Government contractors. The results of this research show that businesses that adopt FedBiz DaaS increase revenue and win more contracts. Implementation of FedBiz DaaS resources leads to an improved Competitive Position for a company; changes to staffing, roles, and processes for a company's Organizational Capabilities; and changes to the Competitive Intensity of the overall marketplace.

ACKNOWLEDGMENTS

It is often said that no one gets anywhere in life by themselves, we are all dependent upon the help and assistance of others. And this is certainly the case in my academic journey. I have been richly blessed to be guided and mentored by an outstanding dissertation advisor, Professor Richard Y. Flanagan. I am forever grateful to him for the patience he showed on numerous occasions as well as his keen insight in shepherding my exploration of the business development process and how new resources can have a significant impact on a firm's performance. While I truly respect him as a researcher and as a teacher, he has become much more than that to me—he has become a friend whom I feel free to debate with and share competing ideas and concepts.

It is also very important to me that I acknowledge the continuous support and encouragement I have received from my wife, Dasha E. Little. She has known of my desire to pursue academic research almost from the day we met, and her agreement to let me pursue this dream is a true indication of the love she has for me. Her positive outlook on the benefits of this research to her as a small business owner, and her willingness to allow me the time to accomplish it, have driven me to make the best use of my time and effort.

TABLE OF CONTENTS

	Page
ABSTRACT	ii
ACKNOWLEDGMENTS	iii
TABLE OF CONTENTS	iv
LIST OF TABLES	vii
LIST OF FIGURES	x
CHAPTER 1. INTRODUCTION	1
Research Motivation	2
CHAPTER 2. LITERATURE REVIEW	4
Government Consulting Marketplace	4
Business Development Process	6
Federal Business (FedBiz) Data as a Service (DaaS)	8
Resource-Based View (RBV) of the Firm	10
Resources	12
Connection Between Capabilities, Resources, and Competitive Advantage	12
Competitive Position	16
Organizational Capabilities	18
Competitive Intensity	21
Hypotheses and Conceptual Model	22
CHAPTER 3. PILOT STUDY ON DATA AS A SERVICE	28
Introduction	28
Methodology	29

Data Collection for Pilot Study	32
Data Analysis	35
Analysis of FedBiz DaaS Use	37
FedBiz DaaS and Competiveness	42
Competitive Position	42
Organizational Capabilities	49
Competitive Intensity	51
Discussion	52
Conclusions	56
CHAPTER 4. NEW RESEARCH ON DATA AS A SERVICE	58
Introduction	58
Conceptual Model and Hypotheses	58
Extracting Federal Data.....	59
Identified Survey Deficiencies Needing Correction	63
Data Analysis	65
Analysis of H1: Use of FedBiz DaaS is positively related to competitive position.....	70
Analysis of H2: Use of FedBiz DaaS is positively related to changes in an organization’s business development capabilities as represented by changes in staffing, roles, and processes.....	72
Analysis of H3: Use of FedBiz DaaS is positively related to competitive intensity in the Federal consulting marketplace.....	73
CHAPTER 5. ANALYSIS OF THE IMPACT OF NEARLY COMPLETE MARKET DATA	75

Introduction.....	75
Conceptual Model & Hypotheses	75
Data Collection	77
Demographic Information and Analysis.....	78
Sample Data Distributions and Analysis	80
Findings.....	97
Analysis of H1, Use of FedBiz DaaS is Positively Related to Competitive Position.....	97
Analysis of H2, Use of FedBiz DaaS is Positively Related to Changes in an Organization’s Business Development Capabilities as Represented by Changes in Staffing, Roles, and Processes	102
Analysis of H3, Use of FedBiz DaaS is Positively Related to Competitive Intensity in the Federal Consulting Marketplace	104
CHAPTER 6. CONCLUSIONS AND RESEARCH CONTRIBUTION	109
Contributions to Theory	113
Contributions to Practice.....	115
REFERENCES.....	118
APPENDIX A. INSTITUTIONAL REVIEW BOARD DETERMINATION.....	123
APPENDIX B. PILOT STUDY SURVEY INSTRUMENT.....	124
APPENDIX C. QUALTRICS SURVEY INSTRUMENT	128

LIST OF TABLES

Table	Page
Table 1. Government Acquisition Phases and Steps	4
Table 2. Deltek’s Competitive Acquisitions	10
Table 3. Literature Review Summary	25
Table 4. Primary NAICS Code for Respondent Organizations	35
Table 5. Organizational Performance, 2003-2017	36
Table 6. Use of Different FedBiz DaaS	37
Table 7. Impact of FedBiz DaaS on Competitive Position	45
Table 8. Paired Two Sample for Means t-Test	46
Table 9. Survey Revisions	62
Table 10. Measurable Capability, Operational Definitions, Supporting Literature, Data Source, Information, and Survey Questions	66
Table 11. Survey Panels and Release Dates	76
Table 12. Sample Size Adjustments	77
Table 13. Crosstab of Overall Use and Business Size	80
Table 14. Between-Subjects Effects for Dependent Variable S11	80
Table 15. Parameter Estimates for Dependent Variable Average Number of Offers	80
Table 16. Descriptive Statistics for Total FTE	82
Table 17. Business Size and Year Implemented	83
Table 18. Between-Subjects Effects for Business Size and Year Implemented	84
Table 19. Parameter Estimates for Business Size and Year Implemented	85
Table 20. Use of FedBiz DaaS in the Shipley Process	86

Table 21. Revenue for Prime Definitive Contracts.....	90
Table 22. Reduced Data Set for Revenue from Prime Definitive Contracts	92
Table 23. Log10 Reduced Data Set for Revenue from Prime Definitive Contracts.....	94
Table 24. Descriptive Statistics for Prime Log10 and Overall Use.....	96
Table 25. ANOVA ^a for Prime Log10 and Overall Use	97
Table 26. Tests of Between-Subjects Effects for Overall Use and Prime Log10.....	97
Table 27. Parameter Estimates for Overall Use and Prime Log10	97
Table 28. Between-Subjects Effects for Overall Use and Business Size	98
Table 29. Parameter Estimates for Overall Use and Business Size.....	98
Table 30. Between Subjects Effects for Prime Log10 and Frequency of FedBiz DaaS Use	98
Table 31. Parameter Estimates for Prime Log10 and Frequency of FedBiz DaaS Use....	99
Table 32. Between-Subjects Effects for Prime Log10 and Frequency of FedBiz DaaS Use and Business Size	99
Table 33. Parameter Estimates for Prime Log10 and Frequency of FedBiz DaaS Use and Business Size	99
Table 34. Paired Samples Test for Number of Contracts and Revenue.....	100
Table 35. Percent Increase	100
Table 36. Between-Subjects Effects for Overall Use and Changes to Staffing.....	101
Table 37. Parameter Estimates for Overall Use and Changes to Staffing	101
Table 38. Between-Subjects Effects for Overall Use and Changes to Roles.....	102
Table 39. Parameter Estimates for Overall Use and Changes to Roles	102
Table 40. Between-Subjects Effects for Overall Use and Changes to Processes	103

Table 41. Parameter Estimates for Overall Use and Changes to Processes.....	103
Table 42. Market Penetration for FedBiz DaaS, 2003-2017	105
Table 43. Between-Subjects Effects for Dependent Variable Average Number of Offers	106
Table 44. Parameter Estimates for Dependent Variable Average Number of Offers.....	107

LIST OF FIGURES

Figure	Page
Figure 1. Shipley Phases and Gates	7
Figure 2. Conceptual Model	26
Figure 3. Organizational Role.....	35
Figure 4. Frequency of Use of FedBiz DaaS	38
Figure 5. Uses of FedBiz DaaS by Organization.....	39
Figure 6. Organizational Score By Use	41
Figure 7. Perceived Change in Organization's Win Rate With FedBiz DaaS.....	42
Figure 8. Correlation of FedBiz Use and Organizational Revenue	43
Figure 9. Correlation of FedBiz Use and Organizational Revenue for SMEs.....	44
Figure 10. Organizational Changes Since Implementing a FedBiz DaaS	49
Figure 11. Perceived Competitive Intensity in the Marketplace	50
Figure 12. Increase in the Average Number of Offers Received.....	51
Figure 13. Conceptual Model	58
Figure 14. Annotated Conceptual Model.....	65
Figure 15. Conceptual Model	75
Figure 16. Establishment Date for Participating Companies.....	78
Figure 17. State of Incorporation.....	79
Figure 18. Primary NAICS Codes	81
Figure 19. Summary of FedBiz DaaS Applications.....	83
Figure 20. Year Implemented and Business Size	84
Figure 21. FedBiz DaaS Usage.....	85

Figure 22. Use of FedBiz DaaS in the Shipley Process	87
Figure 23. Changes to Staffing	88
Figure 24. Changes to Roles	88
Figure 25. Changes to Processes.....	89
Figure 26. Revenue from FPDS Database for Prime Definitive Contracts	90
Figure 27. Q-Q Plot of Total Prime Revenue from FPDS Database	91
Figure 28. Revenue from FPDS Database for Prime Definitive Contracts	92
Figure 29. Q-Q Plot of Total Prime Revenue Using Reduced Data Set	93
Figure 30. Log10 Total Prime Revenue Using Reduced Data Set	95
Figure 31. Q-Q Plot of Log10 Total Prime Revenue Using Reduced Data Set.....	96
Figure 32. Increase in the Average Number of Offers Received.....	104
Figure 33. Increase in the Average Number of Offers Received and FedBiz DaaS Growth	106

EXPLORING THE IMPACT OF NEARLY COMPLETE MARKET DATA
ON SMALL BUSINESSES IN THE GOVERNMENT
PROFESSIONAL SERVICES MARKET

CHAPTER 1. INTRODUCTION

The U.S. Government's Federal Business (FedBiz) marketplace is extremely large and very unique. Competitors in the FedBiz marketplace range from one-person companies to multi-billion dollar conglomerates, with the Government buying both goods and services. All acquisitions are monitored to ensure the Government fairly shares its requirements among all interested vendors. The Federal Funding Accountability and Transparency Act of 2006 (FFATA) requires Government contract awards of more than \$25,000 be posted to an accessible Government website (USASpending.gov). The Government awarded over \$472 billion in FedBiz contracts in Fiscal Year (FY) 2016, with over \$76 billion per year on professional services. This makes the FedBiz marketplace a highly competitive environment, resulting in a variety of capabilities within rival organizations. The high value of contracts attracts many to compete in the Government marketplace.

The Federal Acquisition Regulations (FAR) mandate a deliberate, measured process to ethically and responsibly award and monitor contracts. According to the website InsideGov.com, there are over 492,912 organizations that have a contractual relationship with the United States Government, many of them Small and Medium Enterprises (SMEs). Of those companies, 356,999 are identified as small meaning that the competition for Government contracts is very strong. Most of these small contractors do not have the finances and personnel to make use of a sophisticated data resource.

Organizations performing Government contract work require unique resources to manage their costs; for example, Government-approved accounting methods that are unique to Government contracting organizations. One such unique resource is the recent development of Data as a Service (DaaS) offerings that provide prospective bidders with a nearly complete picture of all FedBiz opportunities through historical data and basic analysis, yielding early notification of pending contract solicitations. This DaaS resource is frequently derived from the purchase of a subscription service to provide this information. Such services have been embraced by many FedBiz organizations in hopes that they will provide a competitive advantage in this highly competitive marketplace as suggested by Pavlou and El Sawy's (2010) finding that the use of information technology (IT) may either stimulate or facilitate competitive dynamics in organizations. While FedBiz DaaS systems are becoming commonplace, little research has been done to determine how extensively such systems are used and whether or not they bring value to the organization. The use of FedBiz DaaS to identify potential opportunities, and the development of new capabilities to support its use, may give organizations a competitive advantage through a nearly complete picture of opportunities that should be reflected in the value or number of contracts awarded to the organization.

Research Motivation

Acknowledging that the Government marketplace is a highly competitive and unique environment leads to the interest in examining the variety of capabilities within rival FedBiz organizations. Looking through the filter of a Resource Based View (RBV) of the firm, the use of FedBiz DaaS when it was first developed (as a Valuable, Rare, Inimitable, and Non-substitutable (VRIN) resource) would logically appear to support the

development of new capabilities and use of FedBiz DaaS should give organizations a competitive advantage (Barney, 1991). However, what might be considered a VRIN resource when it is implemented may not last forever, since any organization with the financial capability can buy the resource if they perceive it will provide a solid return on investment. Therefore, the dimension of “rare” may be temporary as might any competitive advantage provided by the resource. To determine whether or not FedBiz DaaS has this impact, quantitative and qualitative research methods will be used to answer the following questions to support the Conceptual Construct:

- R1. How does the use of the FedBiz DaaS improve competitive position?
- R2. How does the existence of the FedBiz DaaS change the marketplace?

CHAPTER 2. LITERATURE REVIEW

Government Consulting Marketplace

The FedBiz acquisition process is very different from how goods and services are procured in the commercial sector. Extensive laws and regulations govern this process, enforced by both criminal and civil penalties. National priorities, funding obligations, and economic conditions can lead to either a low or high velocity FedBiz marketplace. To ensure equitable treatment, the FedBiz acquisition process is highly structured and guided by the requirements specified by the FAR. All Government contracting requests are posted to a single website, Federal Business Opportunities, frequently referred to as FedBizOps (fbo.gov).

Government contractors bid in a very competitive market, driven by providing quality services at an economical price with very narrow profit margins. Because the Government is focused on fairness, information is publically shared with all parties involved. According to the FAR, the Government awards contracts by executing three phases (Planning, Development, and Execution) comprised a total of seven steps.

Table 1. Government Acquisition Phases and Steps

Phase	Task	Activities
I Planning	Step 1 Form the Team	The Project Manager establishes a multi-functional team of appropriate individuals who understand the requirement, understand how the requirement relates to the mission, and are able to put an executable strategy together in support of the mission (Defense Acquisition Guidebook, Chapter 10-3.1.1)
	Step 2 Review Current Strategy	This step begins the process of identifying the risks associated with the acquisition and how they will be addressed through planning. Stakeholders are interviewed to capture their concerns, priorities, and projected requirements that will impact the acquisition (Defense Acquisition Guidebook, Chapter 10-3.1.2)
	Step 3 Market Research	Project the technical requirements (supplies and services) and associated funding needs; issue either a Request for Information (RFI) or a Sources Sought Notice per FAR Part 10 (Defense Acquisition Guidebook,

Table 1. Government Acquisition Phases and Steps

Phase	Task	Activities
		Chapter 10-3.1.3)
II Development	Step 4 Requirements Definition	Requirements definition is a difficult and critical part of acquisitions. It may include the development of a risk analysis, performance objectives, quality assurance procedures, and an independent government cost estimate. A decision is made about which North American Industry Classification System Code (NAICS) should be used to establish small business size standards (Defense Acquisition Guidebook, Chapter 10-3.2.1)
	Step 5 Acquisition Strategy	Development a complete Acquisition Plan identifying the technical requirement and funding needed per FAR Part 10 (Defense Acquisition Guidebook, Chapter 10-3.2.2)
III Execution	Step 6 Execute Strategy	Prepare a detailed solicitation document to facilitate the submission of responsive proposals from qualified offerors; the solicitation is officially issued through FedBizOps. The government receives the offerors' proposals to the solicitation and performs a full and fair assessment of each proposal; if necessary, negotiations are held between offerors found to be in the competitive range once the reviews are completed per FAR Parts 12, 13, 14, and 15 (Defense Acquisition Guidebook, Chapter 10-3.3.1)
	Step 7 Performance Management	Begins after the government has determined a successful offeror and prepares a final award determination where work is conducted in accordance with the contract's statement of work (SOW) or performance work statement (PWS) according to FAR Parts 12, 13, 14, 15, and 42 (Defense Acquisition Guidebook, Chapter 10-3.3.2)

While this process is clearly documented in Government regulations, there is limited literature or research from the perspective of the Government contractor. The Defense Acquisition University's scholarly peer-reviewed journal, Defense Acquisition Research Journal (ARJ), targets Defense acquisition officers (practitioners in their field). These articles are written primarily from the perspective of the Government. Unfortunately, this means there is very limited academic research on how Government contractors pursue success with their business models (dau.dodlive.mil/publication-guidelines).

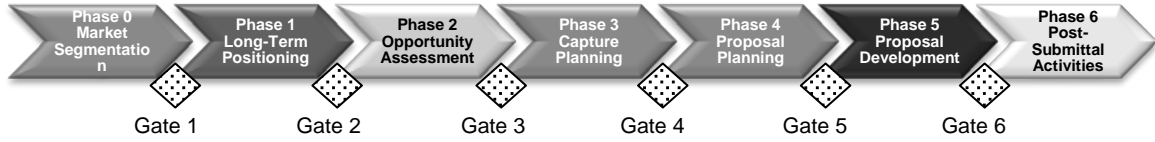
Business Development Process

A structured business development process allows organizations to eliminate confusion, identify the best opportunities and improve organizational efficiency. A flexible process can be adapted to different types of environments, markets, opportunities, and customer requirements. A scalable process can be adapted to differing sizes of opportunities, schedules, resources, and budgets.

Founded in 1972, Shipley Associates is the leading business development consulting company for Government contracting organizations. Beginning in the late 1990's, Shipley Associates identified a full lifecycle model for business development. It has evolved, becoming widely supported and adapted by business consulting organizations and adopted by many FedBiz and general commercial organizations. This Shipley Business Development Lifecycle Process (commonly referred to as the Shipley Process) is shown in detail in Figure 1, Shipley Phases and Gates (Shipley, 2011). In many ways, the Shipley Process is very similar to the Stage-Gate Theory identified by Robert G. Cooper (1986). Stage-Gate Theory is normally associated with new product development, using multiple "stages" (Scoping, Development, Testing, etc.) to shepherd a new product to the market. To advance, a project must pass through a "gate" designed to ensure that it remains viable. The first two gates, Gate 1 and Gate 2, are geared to long-term, strategic objectives of the organization in the marketplace, while the subsequent four gates are focused on tactical execution in pursuit of the contract award. Multi-functional teams must complete a prescribed set of related cross-functional tasks in each stage to proceed to the next stage of product development (Trott, 2012). At any

stage, a project can be terminated or modified. The Stage-Gate Theory usually describes a funneling process that aims to filter out all but the best new products.

Figure 1. Shipley Phases and Gates



Shipley Phases	Shipley Activities	Stage-Gate	Stage-Gate Activities
0 - Market Segmentation	Explore and target potential markets, customers, and competitors; the overall aim is to identify the segments likely to be the most profitable or that have growth potential	1 – Discovery	Generate strategic ideas: technical, marketing, etc.
1 - Long-Term Positioning	Establish the organization’s presence and capabilities to identify leads or opportunities	2 – Scoping	Strategic concept development and scoping: technical, marketing, production
2 - Opportunity Assessment	Newly identified opportunities are assessed to determine the company’s interest and whether they are winnable	3 - Build Business Case	Build tactical business case: technical, marketing, production
3 - Capture Planning	Individuals in government technical organizations are influenced to prefer the company’s solution and organization; detailed planning is performed to analyze the government technical customer, conduct a competitive analysis, develop a capture strategy for the specific opportunity, and produce action plans for individual execution	4 - Development	Create the product: technical (R&D), production, marketing
4 - Proposal Planning	The proposal effort is planned while sales efforts continue and the capture strategy morphs into the proposal strategy to produce a credible offer and increase the probability of contract award	5 - Testing & Validation	Field trials, customer tests, trial operations: technical (R&D), production, marketing (sales)
5 - Proposal Development	The proposal is prepared, approved, and submitted	5 - Testing & Validation (Continued)	Field trials, customer tests, trial operations: technical (R&D), production, marketing (sales)
6 - Post-Submittal Activities	The government may choose to conduct discussions with companies before making a final award decision; these may lead to proposal modifications (called Final Proposal Revisions (FPR) by the government).	6 - Product Launch	Start production and selling; product production and marketing/sales improvements

In a similar fashion, the Shipley Process is comprised of 96 steps divided into 7 phases. Each phase ends at a gate where a decision is made to continue to invest in the specific opportunity or stop the pursuit. While Stage-Gate Theory normally applies to new product development, its tasks and “gates” are very similar to Shipley’s that are used for business development purposes for delivery of either services or products (Cooper, 2008; Shipley, 2011).

Federal Business (FedBiz) Data as a Service (DaaS)

The term “as a service” is attached to many different functions, such as “software” or “infrastructure.” When attached to “data” it connotes that the desired data can be provided remotely to the user efficiently and effectively. The development of DaaS was pioneered by the company StrikeIron (now Informatica) that helped organizations provide rich data to their customers (WRAL TechWire, 2014). The use of FedBiz DaaS offerings has quickly expanded over the last two decades. For purposes of this research, the focus will be on the impact of nearly complete FedBiz information on Government contractors and the marketplace itself, not on the actual digital services involved. Thus, FedBiz DaaS refers to a generic class of services that provide Government contractors with data, research, and analytical services information on business opportunities. For the purposes of this research, the following definition is used:

Federal Business Data as a Service (FedBiz DaaS) – The resource, usually a subscription service, that provides an organization nearly complete market data to inform business development decisions and functions.

Founded in 1983, Deltek Systems, Inc., originally was a provider of software resources compliant with strict Government cost accounting requirements. Its customer base includes leading federal information technology contractors, architectural and

engineering firms, information technology services companies, and aerospace and defense organizations. Through a number of acquisitions, it is now the leading provider of FedBiz DaaS services to organizations contracting to the Government.

The Deltek FedBiz DaaS operating division is branded as GovWin IQ and has a customer base of over 4,500 Government contracting customers, including 98 of the top 100 Government contractors, and providing coverage of over \$2 trillion in Government contracts annually. FedBiz DaaS services provide Government contractors several potential competitive advantages:

- It provides contractors the ability to identify and assess business opportunities and requirements prior to the release of formal Government Requests for Proposal (RFP). Because of the duration of Government contracts (generally 3 to 5 years and infrequently up to 20 years), organizations might not be aware of a pending re-competition of a contract because they lack visibility into the historical data. Therefore, they may not project future milestones based upon that data, since Government postings to its own FedBizOps.gov website normally occur no more than a year in advance.
- It allows organizations to “advertise” their interest to potential competitors and potential teammates in performing work on a particular contract as either a Prime Contractor or a Subcontractor. This is particularly useful to a small business because it may only have narrowly focused, niche capabilities and need to partner with a larger business that has a broader portfolio capability to address all required tasks. Prime contractors also team with sub-contractors to assist the

larger business in meeting its required Government goals for subcontracting to small businesses within various socio-economic categories.

- It allows contractors to rapidly produce their response to an RFP.
- It provides insights into the opportunities that may increase the possibility of a favorable award decision.

Deltek’s GovWin is the de facto FedBiz DaaS market leader; this is supported by the website Federal-Contracting.com survey of current users (federal-contracting.com, 2018). Deltek, GovWin’s creator, entered into the FedBiz DaaS marketplace with its \$60M acquisition of INPUT in 2011 (washingtontechnology.com, 2010). Deltek then solidified its position by acquiring multiple significant competitors over the past several years.

Table 2. Deltek’s Competitive Acquisitions

Year	Action
1984	Deltek established as a Government accounting and project management solution
2004	Deltek introduced the first comprehensive software management tool to help Government contractors better compete, win and retain Government contracts
2010	Deltek acquired INPUT, Inc., then the market’s leading FedBiz DaaS application
2011	Deltek acquired FedSources, Inc, and FedSources Consulting
2013	Deltek acquired Centurion Research
2017	Deltek acquired Onvia

Resource-Based View (RBV) of the Firm

The RBV of the firm is a well-established theoretical framework for understanding competitive advantage and how firms sustain that advantage (Barney, 1991; Eisenhardt & Martin, 2000; Nelson, 1991; Peteraf, 1993; Teece, et al, 1997; Wernerfelt, 1995). RBV asserts that firms can be thought of as bundles of resources and

that these resources are heterogeneously distributed across firms. RBV also assumes resource differences persist over time (Amit & Schoemaker, 1993; Eisenhardt & Martin, 2000; Wernerfelt, 1984). Significant research has identified that firms can achieve sustainable competitive advantage if they have resources that are VRIN. When new strategies focused on the marketplace are put in place, these VRIN resources cannot be easily duplicated by competing firms (Barney, 1991; Conner & Prahalad, 1996; Eisenhardt & Martin, 2000; Nelson, 1991; Peteraf, 1993; Wernerfelt, 1984).

While FedBiz DaaS could certainly be considered a VRIN resource when it was first implemented, it no longer is “rare” because it is readily available as a commercial service to any organization willing to purchase it and many have over the last 15 years. However, even as it has evolved over time it remains “valuable, inimitable, and non-substitutable.” So while it meets three of the four VRIN criteria, the competitive advantage it provides by being rare may be negated by its commercial nature. Eisenhardt and Martin (2000) support this by arguing that RBV misses the strategic role of time; they state that RBV’s emphasis on long-term competitive advantage is often unrealistic in high-velocity markets and that short-term, unpredictable advantage is more the norm; therefore, the most useful performance metric is growth rather than profit.

Ray et al. (2004) point out that firms failing to do an effective job of incorporating their resources and capabilities into their operations cannot expect to realize the potential competitive advantage of these resources. While these resources may retain the potential for generating competitive advantage, that potential is realized only if they are used in an organization’s business processes because it is through these processes that the resources and capabilities are exposed to the marketplace.

Resources

Prior research shows that a combination of IT-related resources can form an information systems capability that meets the VRIN definition (Mata, Fuerst, & Barney, 1995). Taking this perspective, information systems capability can be defined as “the ability to mobilize and deploy IT-based resources in combination with other resources and capabilities” (Bharadwaj, 2000). Pavlou and El Sawy (2006) point out that information systems capability has been viewed as a complex, multi-dimensional construct and research has proposed several specific IT-related resources that combine to form an information systems capability.

Connection Between Capabilities, Resources, and Competitive Advantage

Research differs on the connection between capabilities and resources with competitive advantage. Some view successful dynamic capabilities as having harmonious effects across organizations in terms of prime attributes. They point out that it is a mistake to identify the long-term competitive advantage of VRIN dynamic capabilities in dynamic markets. Therefore, they believe dynamic capabilities contravene the RBV assumption of constant variety across organizations (Priem & Butler, 2001). Another position is that dynamic capabilities are not themselves sources of long-term competitive advantage even though it is obvious that organizations with more effective dynamic capabilities will probably have competitive advantages (Eisenhardt & Martin, 2000).

Pavlou and El Sawy (2011) define sensing capability as the capacity to recognize, comprehend, and follow opportunities in the marketplace, exactly what FedBiz DaaS does in the Government contracting marketplace. To accomplish reconfiguration of

operational capabilities, organizations must continuously survey market trends and new technologies to sense and capitalize on new opportunities. They identify three basic modes of the sensing capability as: (i) initiating market intelligence, (ii) distributing market intelligence, and (iii) reacting to market intelligence.

Initiating market intelligence means identifying customer requirements (Teece, 2007), being reactive to market activities (Amit & Schoemaker, 1993), recognizing market opportunities (Day, 1994), identifying inflexibilities (Sinkula, 1994), and discerning unique resource groupings (Galunic & Rodan, 1998). In terms of FedBiz DaaS, this might mean acquiring a service and using it to identify upcoming opportunities in Stage 3 of the Shipley Process (Shipley, 2011). Sharing market intelligence means understanding what is happening, appraising the market situation, and exploring new options (Teece, 2007 and Kogut & Zander, 1996). This relates to the market segmentation and long term positioning identified in Stages 1 and 2 of the Shipley Process (Shipley, 2011). Reacting to information about the market correlates to taking advantage of market intelligence (D'Aveni, 1994) and also to pursue new opportunities by pursuing specific market segments (Teece, 2007). In terms of the Shipley Process, this would be Stages 4 through 6 (Shipley, 2011).

The effects of market vitality on dynamic capabilities have several connotations (Eisenhardt & Martin, 2000). The sustainability of capabilities themselves varies with the dynamism of the market; for example, in a stable, moderately dynamic market, dynamic capabilities are truly routines (Nelson & Winter, 1982; Zollo & Winter, 1999; Winter, 2003). Capabilities rely extensively upon existing knowledge, linear execution, and slow evolution over time even though the capabilities are complicated, predictable,

analytic processes (Eisenhardt & Martin, 2000). They point out that as managers gain experience exercising these capabilities and as codification takes place, they become ingrained in the organization, which makes them sustainable. These routines become established and sustainable through formal procedures or technology integration (Argote, 1999).

With regard to sensing and shaping opportunities and threats, Teece (2007) asserts that opportunities open up for both newcomers and incumbents, putting the profit streams of incumbent enterprises at risk. Teece, et al. (1997) states that while some emerging marketplace trends are easily discerned, emerging trends are frequently hard to recognize. Identifying and profiling new prospects are very much a scrutinizing, fashioning, discovering, and understanding activity. Teece identifies that dynamic capabilities provide agility through

“the capacity (1) to sense and shape opportunities and threats, (2) to seize opportunities, and (3) to maintain competitiveness through enhancing, combining, protecting, and, when necessary, reconfiguring the business enterprise’s intangible and tangible assets” (2007, 1319).

Dynamic capabilities include hard to reproduce capabilities needed to adapt to shifting opportunities (Teece, 2007). Teece, et al. (1997) notes, “The ability to calibrate the requirements for change and to effectuate the necessary adjustments would appear to depend on the ability to scan the environment, to evaluate markets and competitors, and to quickly accomplish reconfiguration ahead of competition” (521).

In a study conducted of 230 German technology ventures, Gruber, Heinemann, Brettel, and Hungeling (2010) looked at resources and capabilities to determine how those resources and capabilities impact organizational performance in order to specify the crucial link between resources and value creation. They identified four resource and

capability configurations, but only two led to superior performance outcomes. In line with traditional RBV positions, they found that organizations using poor or mediocre quality resources generally performed poorly. However, they noted that some organizations were “efficiency-centrics” and, using less costly resources, these organizations performed equally as well as organizations using more costly resources. This led to the conclusion that efficient resource configurations (e.g., low cost) do not necessarily lead to lower performance and may instead lead to positive outcomes compared to using higher cost resource solutions.

Teece and Pisano (1994) propose three organizational and managerial processes as core elements of dynamic capabilities: coordinating and integrating, learning, and reconfiguring. Coordination and integration refer to a manager’s ability to arrange and incorporate both internally and externally. Learning is the process by which repetition and experimentation allow for tasks to be completed more effectively and more efficiently, including both organizational and individual learning. Reconfiguration is the ability to sense the environment and determine when structures need to be transformed both internally and externally. They believe these processes are a subset of the processes that support sensing, seizing, and managing threats and further suggest that together they might be thought of as asset “orchestration” processes.

Eisenhardt and Martin believe long-term competitive advantage “lies in using dynamic capabilities sooner, more astutely, or more fortuitously than the competition to create resource configurations that have that advantage” (2000, 1117). Enduring competitive advantage lies in the resource arrangements organizations create using dynamic capabilities, not necessarily with the capabilities themselves. While not the only

requirement, effective dynamic capabilities are necessary conditions for competitive advantage (Eisenhardt & Martin, 2000).

Teece (2007) views “dynamic capabilities as the foundation of enterprise-level competitive advantage in regimes of rapid (technological) change” (1341). He offers a capabilities framework that recognizes that enterprises can even shape their environment and their future as they attempt to achieve competitive advantage. The framework indicates the extent to which an enterprise develops and employs superior (non-imitable) dynamic capabilities, will determine the nature and amount of intangible assets it will create and/or assemble, and the level of economic profits it can earn. The framework also emphasizes that the past will impact current and future performance. However, while this may be true, Teece points out that there is a great deal that management can do to simultaneously design processes and structures to support innovation while freeing the enterprise from dysfunctional processes and structures designed earlier.

Competitive Position

A business definition of the word “competition” comes from Merriam-Webster (2018): “the effort of two or more parties acting independently to secure the business of a third party by offering the most favorable terms.” Simply put, marketplace competition means competing organizations are trying to provide the same goods or services in exchange for consideration (money) from a customer seeking the best value.

Multiple studies have shown that profits correlate positively to market share (Szymanski, et al. (1993). But as Armstrong and Green (2007) point out, that does not mean that higher market share necessarily improves profits; it is more logical to interpret that organizations offering better goods or services tend to have a larger share of the

marketplace. Based upon this, the most commonly used metric to measure Competitive Position is market share, generally regarded as the portion (percentage) of the market attributed to a specific organization. This percentage can be measured in multiple ways, but the most common are either units sold or revenue (gross or net) for the organization compared to the overall market (Farris, et al, 2010).

The marketplace for goods and services created by the U.S. Government generates vigorous competition, with over \$472 billion in contracts awarded in a given year. The Government has established a transparent purchasing system that relies upon the sharing of information and open bids to promote competition for each contract (Federal Acquisition Regulation, 2005). To ensure transparency in contractual actions and ensure compliance with the Federal Funding Accountability and Transparency Act of 2006 (fars.gov), the Government established the Federal Procurement Database System (fpds.gov). Each Government transaction is reported in FPDS, including the key fields related to successful competitiveness: the number of competitors for the award, the dollar value of the award, and the name of the winning competitor. The FPDS database provides clear insight into the competitiveness of the Government marketplace and provides nearly complete historical information to inform competitors. Relying upon Farris' previously identified metrics regarding market share and looking at the Government marketplace in comparison to the overall commercial marketplace, contracts are equivalent to units sold, revenue is equivalent to revenue, and the number of offers for each contract is not readily available in the overall commercial marketplace. From this perspective, we can operationally define Competitive Position as:

Competitive Position – The number of contracts won in a year, the total

revenue awarded in those contracts, and an organization's annual average revenue.

Organizational Capabilities

A great deal of research has been conducted to determine the impact of capabilities within the conceptual framework of RBV. Dutta, Narasimhan, and Rajiv (1999) proposed a conceptual model that used a theoretical foundation to explain differences in profitability among high technology markets, based upon functional capability differences. They identified that interactions among Organizational Capabilities are "important determinants of relative financial performance within the industry" (547). In a similar vein, Kamboja, Goyalb, and Rahmanc (2015) proposed a model of functional capabilities of the firm, emphasizing superior financial performance based upon marketing capabilities instead of solely relying upon operational capabilities.

Eisenhardt and Martin (2000) identify there are two types of capabilities, depending upon their operating environment. In a normal environment, capabilities are the equivalent of consistent patterns that are stable and predictable. Dynamic capabilities influence resource configurations. These tools may be used to enhance existing resource configurations or to strengthen an organization, using RBV's path-dependent strategic logic of leverage, to gain a long-term competitive advantage. However, it makes sense strategically to use dynamic capabilities in dynamic markets to generate new resource configurations supporting competitive positions, where the objective is a series of temporary competitive advantages (Karim & Mitchell, 2000).

Academic scholars believe dynamic markets require a combination of strategic logics; the nature of the dynamic market and temporary competitive advantages also protect the effectiveness of the RBV of the firm (Eisenhardt & Martin, 2000; Lengnick-

Hall & Wolff, 1999; Priem & Butler, 2001). Eisenhardt & Martin (2000) point out managers must cope with both the external challenge of competition and also with the internal challenge of potentially collapsing dynamic capabilities. They further identify that RBV's path-dependent strategic "logic of leverage" lacks an essential "logic of change" that is necessary in dynamic markets, while potentially under-estimating the length of the current advantage and incorrectly predicting the sources of future advantage.

In a rapidly changing marketplace (a "high-velocity market"), Eisenhardt and Martin (2000) point out that improvisational capabilities are required to build upon one another, to innovate, and may be dependent upon other processes while producing inconsistent results. Because resources are added, recombined, and dropped with regularity (Galunic & Rodan, 1998), RBV's assumption of the organization as a "bundle of resources" doesn't meet this criterion, since resources are constantly changing in this type of environment. Therefore, if resources are too tightly bundled it can be problematic. Eisenhardt and Martin (2000) concede that in a rapidly changing marketplace environment, it may be hard to maintain dynamic capabilities; they prefer to refer to them as "improvisational processes."

Understanding the flow of strategy for high-velocity markets, it is imperative to leverage past results while looking to the future and to determine when, where, and how often to change (Eisenhardt & Brown, 1998). Eisenhardt and Martin (2000) state that, while RBV centers on relying upon a collection of resources to achieve enduring competitive advantage, in a high-velocity market, it is critical to embrace random

improvements through an agile, responsive organization. At this point, the strategy is to seize the opportunity and be responsive to when, where, and how often to change.

Eisenhardt and Martin (2000) further posit that RBV thinking overemphasizes the concept of leverage. While resource relationships may lead to long-term competitive advantage in some circumstances, they believe long-term competitive advantage is seldom achieved in dynamic markets. They state that competitive advantage is frequently short-term; because of this short-term nature, managers must seek a series of temporary advantages to be competitive. This points to marketplaces becoming more competitive, and in the construct of implementation of FedBiz DaaS resources, that the implementation of this capability may not lead to an obvious advantage in the long-term.

As a counter to the view of Eisenhardt and Martin (2000) that both dynamic and improvisational processes fall under the umbrella of dynamic capabilities, Pavlou and El Sawy (2010) refer to the first as dynamic capabilities and the second as improvisational capabilities. This differentiation between improvisational and dynamic capabilities parallels the analysis of Collis, who suggested three categories of capabilities.

- Operational capabilities are “those that reflect an ability to perform the basic functional activities of the firm” (Collis, 1994, 145).
- Learning capabilities show “the ability to learn, adapt, change, and renew over time” (Teece et al., 1994, 20).
- Improvisational capabilities recognize “the intrinsic value of other resources or novel strategies before competitors” (Collis, 1994, 145).

Pavlou and El Sawy (2010) believe that even though improvisational and dynamic capabilities are different, both capabilities emerge from innovation-based competition. This tracks with arguments made by Collis that improvisational and dynamic capabilities

both replace older operational capabilities (Collis, 1994). Based upon the above discussion, we can define Organizational Capabilities as:

Organizational Capabilities – How organizations change roles and processes to capture more value from new resources to improve the productivity of the organization and improve its effectiveness.

Competitive Intensity

The subject of Competitive Intensity cannot be addressed without referring to Porter's Five Forces. Porter identifies that the quantity of organizations within a specific market is a key discriminator in identifying the strength of competition (Porter, 1990). Wu & Pangarkar define Competitive Intensity as "the pressures that an organization's rivals exert on the focal organization, which, in turn, induce strategic behaviors" (2009, p. 510). They posit that Competitive Intensity is a significant influence on an organization and drives its Competitive Position and overall organizational performance. Barnett (1997) goes even further and relates Competitive Intensity, and the organization's ability to adapt, to its chances of survival.

However, looking at the sheer number of organizations in the marketplace may not reflect the true Competitive Intensity; therefore, it is important to look at the organization's market share within the marketplace to measure how competitive the market is (Wu & Pangarkar, 2009). One way to do this is to use the internationally recognized Herfindahl-Hirschman Index (HHI), used by both the United States and the European Union to prevent monopolies from occurring (Li et al., 2008; Vroom and Gimeno, 2007). In the HHI, the market shares of an industry are squared and the market shares result in fractions; this provides a result that is weighted by market share and it can range from 0 to 1.0, with increases in the index demonstrating a decrease in competition

while a decrease in the index indicates more Competitive Intensity (Jermias, 2006; Vroom and Gimeno, 2007; Bajtelsmit and Bouzouita 1998). The major drawback to the HHI is that, while relied upon to measure Competitive Intensity, it truly measures market concentration.

Another way of looking at Competitive Intensity is to examine the subject of market aggressiveness. Bengtsson et al. (2010) identify that Competitive Intensity may be associated with the level of aggressiveness or hostility displayed between competitors, therefore, Competitive Intensity is demonstrated by a “high degree of hostility.”

Lahiri (2013) conducted extensive research within the IT-enabled services (ITES) industry and found that Competitive Intensity is positively associated with the relationship between organizational resources and firm performance. His research pointed out that when Competitive Intensity is high, the relationship between organizational resources and firm performance becomes stronger. It can be extrapolated from Lahiri (2013) that as more firms adopt FedBiz DaaS, the resource becomes less rare, meaning decreasingly VRIN, and at the same time the marketplace’s Competitive Intensity increases. For this study we define Competitive Intensity as:

Competitive Intensity – The level of competition in the marketplace among peer competitors measured by competitive offers on Government contracts.

Hypotheses and Conceptual Model

Three hypotheses are related to assessing if FedBiz DaaS improves an organization’s Competitive Position, leads to the generation of new Organizational Capabilities, and increases the Competitive Intensity of the marketplace over time.

When initially introduced, FedBiz DaaS was a unique resource meeting the VRIN criteria associated with the RBV of the firm, meaning that it should have given early adopters a competitive advantage, leading to an improved Competitive Position for the organization. Ferrier, et al. (1999) suggests that when competitive actions work, they improve an organization's performance. In fact, Chi et al. (2008) point out through their empirical studies that effective leveraging of IT resources may create competitive advantage. Despite FedBiz DaaS' cost of thousands of dollars per year, over time, more and more organizations viewed it as a necessary resource. Its popularity within the Government contracting marketplace removed the "rare" and "inimitable" from the VRIN label; RBV theory suggests that it should become less and less impactful on a firm's Competitive Position. However, even though it is no longer rare or inimitable, with access to better information about the marketplace FedBiz DaaS subscribers may be able to identify and pursue better opportunities for their organization and thus maximize their results. Ascertaining whether or not FedBiz DaaS continued to offer competitive advantage over the 15 years of this study becomes our first hypothesis:

H1: Use of FedBiz DaaS is positively related to competitive position.

Resources are not specific to the firm and therefore tradable, while Organizational Capabilities are firm-specific since they are internal to the organization and ownership cannot be transferred. Porter (1991) identifies that resources are not valuable by themselves; however, they become valuable because they allow organizations to perform business processes that provide competitive advantage. Moreover, Organizational Capabilities are the ability of the firm to engage its resources in combination with its processes (Amit & Shoemaker, 1983; Makadok, 2001). Significant research shows that

resources are a source of competitive advantage only if used to enhance business processes (Stalk, et al, 1992). Business processes are actions firms engage in to accomplish some business purpose or objective; they are the routines or activities that a firm executes (Nelson & Winter, 1982; Porter, 1991).

If FedBiz DaaS allows organizations to generate new organizational capabilities, these authors suggest that this will be seen in changes to that organization's staff, roles, and processes. When an organization implements a FedBiz DaaS system, it may or may not adopt new Organizational Capabilities into its business development process, as seen in changes to its business development staff, roles, and processes. If so, FedBiz DaaS can be seen as generating new Organizational Capability and this leads to the second hypothesis:

H2: Use of FedBiz DaaS is positively related to the generation of organizational capabilities.

Literature suggests that a marketplace's Competitive Intensity influences organizational behavior in the areas of market offerings, pricing, business strategy, and resource implementation (Auh & Menguc, 2005; Cui et al., 2005; Wu & Pangarkar, 2009). Supporting this position is the organization's assessment of the resources it implements in the face of increasing Competitive Intensity (Eriksen & Knudsen, 2003; Spanos & Lioukas, 2001). As FedBiz DaaS systems become more prevalent, some organizations will identify previously unknown business opportunities to compete for, and by doing so the level of competition throughout the marketplace will increase. We suspect that by providing more complete market data to any potential competitor who subscribes, FedBiz DaaS will increase the Competitive Intensity of the Government marketplace. This results in the third hypothesis:

H3: Use of FedBiz DaaS is positively related to competitive intensity in the Federal consulting marketplace.

This review of pertinent literature sheds light on the differences between resources and capabilities, explains Stage-Gate Theory, defines DaaS, identifies business development processes, outlines the Government contracting process, characterizes the FedBiz DaaS industry, and examines Organizational Capabilities, Competitive Position, and Competitive Intensity in the overall marketplace. A summary table of the reviewed literature follows.

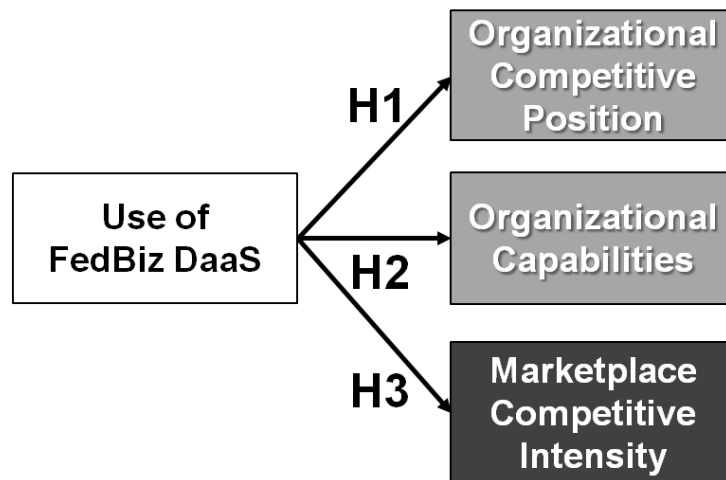
Table 3. Literature Review Summary

Topic	Type	Number	References
Resources	Journals	15	Amit & Schoemaker, 1993; Barney, 1991; Bharadwaj, 2000; Conner & Prahalad, 1996; Eisenhardt & Martin, 2000; Mata et al, 1995; Nelson, 1991; Pavlou & El Sawy, 2006; Pavlou & El Sawy, 2010; Pavlou & El Sawy, 2011; Peteraf, 1993; Priem & Butler, 2001; Ray et al, 2004; Wernerfelt, 1984; Wernerfelt; 1995
	Books	3	Argote, 1999; Nelson & Winter, 1982; Winter, 2003
Capabilities	Journals	4	Makadok, 2001; Teece, et al, 1997; Teece, 2007; Zollo & Winter, 1999
	Books	1	Cooper, R., 1986
Stage-Gate Theory	Journals	3	Cooper et al, 2002; Cooper, 2008; Trott, 2012;
	Websites	4	Deltek Systems, Inc; Federal-Contracting.com; Washington Technology; WRAL TechWire
Business Development	Books	2	D'Aveni, 1994; Kogut & Zander, 1996
	Journals	3	Day (1994); Galunic & Rodan (1998); Sinkula (1994)
	Practitioner Resources	1	Shipley Capture Guide, 2011
Government Contracting	Books	2	Defense Acquisition Guidebook (2017); Federal Acquisition Regulation
	Journals	1	Defense Acquisition Research Journal ;
	Websites	6	Federal Business Opportunities (fedbizops.gov); Federal Funding Accountability and Transparency Act of 2006 (fsrs.gov); Federal Procurement Database System (fpds.gov); GSA Federal Procurement Data System-Next Generation (FPDS-NG) Data Element Dictionary; System for Award Management (SAM.gov); North American Industrial Classification System Association
Competitive Position	Books	1	Farris et al, 2010
	Journals	4	Armstrong & Green, 2007; Chi et al, 2008; Ferrier et al, 1999; Szymanski et al, 1993
	Websites	1	Merriam-Webster Dictionary
Organizational Capabilities	Journals	13	Auh & Menguc, 2005; Cui et al, 2005; Collis, 1994; Dutta et al, 1999; Eisenhardt & Brown, 1998; Eriksen & Knudsen, 2003; Gruber et al, 2010; Kamboja et al, 2015; Karim & Mitchell, 2000; Lengnick-Hall & Wolff, 1999; Spanos & Lioukas, 2001; Stalk et al, 1992; Teece & Pisano, 1994
Competitive Intensity	Journals	10	Bajtelmsmit & Bouzouita, 1998; Barnett, 1997; Bengtsson et al, 2010; Jermias, 2006; Lahiri, 2013; Li et al, 2008; Porter, 1990; Porter 1991; Vroom & Gimeno, 2007; Wu & Pangarkar,

Topic	Type	Number	References
			2009

This research views FedBiz DaaS as a unique resource that has emerged in the Government marketplace over the last 15 years. As more organizations adopt a FedBiz DaaS resource, its impact should be seen both within the organization as well as within the marketplace. The following conceptual model identifies how the implementation and use of FedBiz DaaS may be associated within the individual organization through its Competitive Position and Organizational Capabilities, as well as Competitive Intensity in the overall marketplace.

Figure 2. Conceptual Model



CHAPTER 3. PILOT STUDY ON DATA AS A SERVICE

Introduction

The preceding literature review provides the foundation for a pilot study to explore three primary elements within the Government marketplace. The purpose of the pilot study is to lay the foundation for more extensive research into the impact of implementation of FedBiz DaaS on Competitive Position and Organizational Capabilities within the Government contracting marketplace, leading to a better understanding of overall marketplace Competitive Intensity. The pilot study's approach is to use a structured interview with organizational leaders, combined with data from Government databases like the System for Award Management (SAM) and the Federal Procurement Database System (FPDS), to determine how organizations use FedBiz DaaS and what the true impact of its implementation. For the purposes of this research, Competitive Position and Organization Capabilities are established as residing within the individual organization, while Competitive Intensity represents the marketplace overall. Interpreting and applying the extensive literature available, the following definitions are considered for this pilot study:

Competitive Position – The number of contracts won in a year, the total revenue awarded in those contracts, and an organization's annual average revenue.

Organizational Capabilities – How organizations change roles and processes to capture more value from new resources to improve the productivity of the organization and improve its effectiveness.

Competitive Intensity – The level of competition in the marketplace among peer competitors measured by competitive offers on Government contracts.

Methodology

To conduct this pilot study, the researcher collected primary data through administration of a structured interview with respondents representing a variety of service providers. A copy of the letter from the Temple University Institutional Review Board (IRB) dated 2 January 2018, is at Appendix 1 and indicates that IRB approval is not required for the purposes of the survey. Secondary data came from two Government databases, SAM and FPDS.

Initially designed as a survey it became apparent that the research needed a broader contextual understanding of each organization's experiences with FedBiz DaaS. This qualitative assessment provided context and understanding of answers and permit more exacting refinement of questions and answers. The structured interview focused on the organizational use of FedBiz DaaS, including whether or not an organization had implemented a system, and if a system was in place, what their organization's objectives were, and how much they used the system. Further questions asked the respondent's perception of the impact of FedBiz DaaS on their organization Organizational Capabilities and how it impacted their organization's Competitive Position, Finally, interviewees were asked how they viewed the Competitive Intensity changing over the years.

Simultaneous with the development of the structured interview survey, data was downloaded from the two primary Government databases, SAM and FPDS. These two databases provide complementary data. The SAM database is a registry of all organizations doing business with the United States Government. The FPDS database provides detailed information about every contract awarded by the Government. By

examining this information, specific organizational performance can be assessed as well as the overall Government contracting environment.

The first Government database used was the SAM database. It provided access to information about organizations providing goods and services to the Government, identifying their competitive size standard within each registered North American Industrial Classification System (NAICS) Code. All organizations doing business with the Government must register in the SAM database and provide information about their ownership, organizational structure, points of contact, organizational size based upon each registered NAICS Code, and certify their compliance with multiple acquisition clauses required by the Government. By requiring organizations to register in the SAM database, the Government has demographic data available for each organization that might bid on a contract offering; this required demographic data allowed the researcher to download primary data elements for the organizations for each survey respondent.

One of the registration steps for the SAM database is for each organization to be identified by a unique Data Universal Numbering System (DUNS) Number assigned by Dun and Bradstreet, Inc. (D&B). The DUNS Number is the primary means of identifying an organization within the Government contracting process. The DUNS Number is used in both the SAM and FPDS databases to identify organizations and was used in the structured survey for the same purpose.

When an organization registers in the SAM database to do business with the Government, it is required to identify the markets in which it will compete. These markets are categorized by the associated NAICS Code. The SAM database lists each NAICS Code in which an organization has registered as well as its Primary NAICS Code

that represents the firm's primary line of operation. It is not uncommon for an organization to have multiple NAICS Codes listed.

The SAM database also lists the size description of all registered firms. The SBA size standard varies for each NAICS Code based upon either annual receipts or number of employees.

- Receipts are averaged over an organization's latest three complete fiscal years to determine the average annual receipts. An organization compares their revenue size to the SBA size standard (i.e., if a NAICS Code has a size standard of \$15M, an organization with a three-year average of \$14M would be considered small in that specific NAICS Code).
- For NAICS Codes that may be labor intensive, an employee calculation is made based upon the average number of employees (including the employees of its domestic and foreign affiliates) based upon the numbers of employees for each of the pay periods for the preceding completed 12 calendar months. The organization determines their employee population and compares it to the NAICS Code (i.e., if a NAICS Code has a size standard of 1,000 employees, an organization is small in that specific NAICS Code if it has a three-year rolling average of 972 employees).

Because of the way the SBA size standards are applied, an organization can be small in some NAICS Codes and large in others. Thus an organization with \$100M of revenue and 900 employees may be "Large" in NAICS Codes using revenue standards, but "Small" in different NAICS Codes using employee size standards.

The second Government database used was the FPDS database. It records every contract action taken by the Government valued at \$3,500 or more, from contract award through any modifications that might occur over the course of the contract. The Government uses the information to determine and review the effect of procurement on the marketplace, study awards to businesses in various socioeconomic categories, recognize the result of “full and open” competition by large organizations on the contracting process, and deal with adjustments to acquisition policy. The following data from the FPDS database supported this pilot study:

- Contract Effective Date
- NAICS Code
- Number of Offers Received
- Data Universal Numbering System (DUNS) Number
- Base and All Options Value (Total Contract Value)

Government agencies collect and report data on federal acquisitions through the Federal Procurement Data System–Next Generation (FPDS-NG) website portal. The preceding data list was used to create a query request for each respondent organization for the 15-year period 2003-2017.

Data Collection for Pilot Study

Invitations to participate in the primary data collection went to 20 potential respondents, asking them to participate in an interview regarding their organization’s use of FedBiz DaaS. All participants solicited were employees of organizations providing a wide variety of services to the Government. No differentiation was made regarding organizational size nor how long they had been in business. This was not a random

sample of users, since each of the potential respondents was personally known by the researcher. However, the purpose in contacting these potential respondents was to obtain a high participation rate to gather information to better understand the primary research question and context; 10 respondents agreed to participate in the structured interviews. After receiving a respondent's agreement to participate, a convenient time was scheduled to complete a 15-minute telephonic interview. At the beginning of the interview, the respondent was informed about the purpose of the pilot study and a brief description of the definition of FedBiz DaaS, since the terminology used stems from an academic study and not a practitioner perspective. During the course of the interview, clarification was provided if the respondent did not understand the question and the respondent was permitted to provide contextual explanations to give details about the rationale for their answers.

Once respondents agreed to participate in the structured interview, information about their organization was downloaded from the SAM database. Three data elements were pulled from the SAM database.

- Data Universal Numbering System (DUNS) Number assigned by D&B to identify unique business entities
- Primary NAICS Code
- Size Standard in the Primary NAICS Code

There was no delineation between whether an organization was considered to be a large business or a small business according to the size standards associated with NAICS Codes or how long the organization had been in existence (the date of establishment was

necessary to examine pre and post results after an organization implemented a FedBiz DaaS system).

The FPDS database provided a significant number of details about every Federal contract. This resulted in the following variables being used from the FPDS database:

- Procurement Instrument Identifier PIID (contract identifier)
- DUNS Number
- Award or IDV (Individual Delivery Vehicle) Type
- Number of Offers Received
- Prime Definitive Contract Value

The Government makes many types of contract awards, including an IDV Type known as “Indefinite Delivery/Indefinite Quantity” (ID/IQ) awards that may be made to multiple organizations at the same time; each ID/IQ award has a “ceiling” amount awarded, but because the winning organizations must bid on subsequent task orders to receive any funding, the award information can be very misleading. Therefore, after multiple attempts at analysis, it was determined that only “Definitive Contracts” would be analyzed because they are awarded to a single organization for a single purpose.

Second, when looking at only Definitive Contracts, it was important to only analyze “Modification 0,” which records the initial award amount. Subsequent modifications may occur that either increase or decrease the amount of award based upon exercise of option years, changing requirements, administrative changes, and multiple other reasons.

To examine Competitive Intensity, the number of offers received for each contract were limited to between 1 and 30 (the numbers “99” and “999” are commonly used by

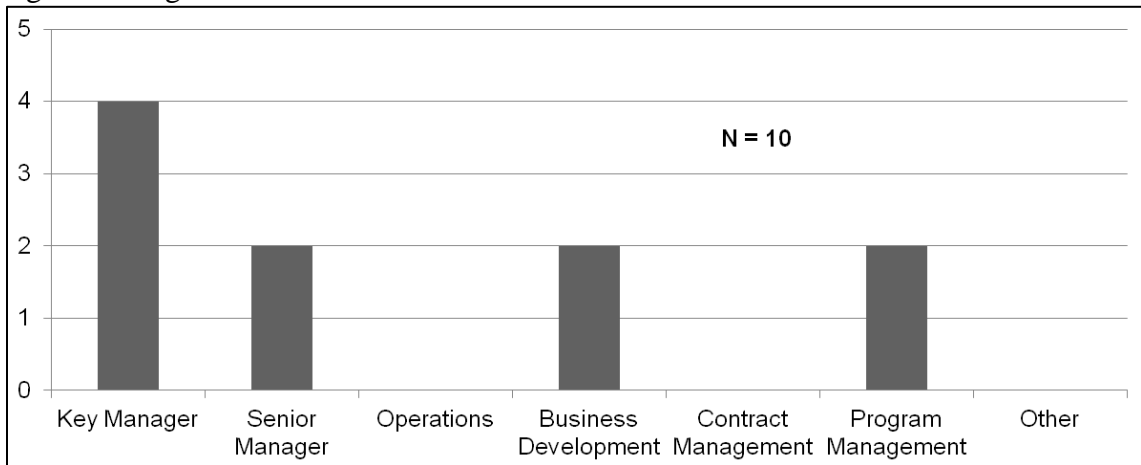
the Government to indicate an unknown quantity). If a contract award is made to only one competitor, by definition competition did not occur, therefore data was filtered for the number of competitors, removing those with only one competitor to ensure all contracts were actually competed, this decision was made for ease of analysis and will be reviewed prior to conducting the final research study.

Finally, Government contracting rules for awarding contracts differ at certain financial thresholds. Most notably, a Government contracting officer may make an award with no competition and limited justification under what are termed “Simplified Acquisition Procedures” (SAP). SAPs are contracting methods designed to simplify the acquisition process, reduce paperwork, and lower costs for both the contractor and the Government. From 1995 to 2010, the maximum threshold for SAP contracts was \$100,000; in 2010 it was increased to \$150,000. Because there is no competition for contracts awarded under SAP, a filter was implemented for a minimum contract award of \$100,000; at the same time, to reduce the severe skewing associated with overly large contract awards, any contract that exceeded \$500M was filtered out.

Data Analysis

Respondents were asked to identify their role in the organization. A wide variety of roles were represented in the responses and they are described below. Data received for this question showed that 4 of the respondents were Key Managers (CEO or President) while Senior Management (COO or Vice President), Business Development, and Program Management were each represented by 2 respondents.

Figure 3. Organizational Role



The 10 respondents agreeing to participate in this pilot study represented 7 different types of professional services, as represented by the Primary NAICS Code they registered with the Government in the SAM database.

Table 4. Primary NAICS Code for Respondent Organizations

Companies	NAICS	SBA Size Standard	NAICS Code Description
2	541330	\$15M	Engineering Services
2	541611	\$15M	Administrative Management and General Management Consulting Services
2	541715	1,000 Employees	Research and Development in the Physical, Engineering, and Life Sciences (except Nanotechnology and Biotechnology)
1	541519	\$27.5M	Other Computer Related Services
1	541511	\$27.5M	Custom Computer Programming Services
1	561612	\$20.5M	Security Guards and Patrol Services
1	611710	\$15M	Educational Support Services

The following table shows each organization’s size (as identified by the SBA and reported in the SAM database), along with data from FPDS including Total Prime Definitive Contract Value (value of base period and all options), Total Number of Prime Definitive Contracts Won, Average Annual Prime Definitive Contract Value, and average number of offers received by the Government for each contract award over the past 15 years (2003-2017).

Table 5. Organizational Performance, 2003-2017

Company	SBA Size	SAM Primary NAICS Code	Year FedBiz DaaS Implemented	Total Prime Definitive Contract Value	Total Number of Prime Definitive Contracts Won	Average Annual Prime Definitive Contract Value
A	Small	541519	2016	\$0	0	\$0
B	Small	541611	N/A	\$0	0	\$0
C	Large	541330	N/A	\$7,685,075,818	158	\$48,639,720
D	Small	541330	2008	\$14,100,530	3	\$4,700,177
E	Small	541611	2006	\$519,273,606	6	\$86,545,601
F	Small	541715	2009	\$1,848,389,545	10	\$184,838,955
G	Large	611710	2013	\$37,067,010	6	\$6,177,835
H	Small	541715	2010	\$722,243,858	6	\$120,373,976
I	Small	541511	2017	\$4,553,528	3	\$1,517,843
J	Large	561612	2010	\$133,523,402	12	\$11,126,950

Note. Reflects only definitive contract awards regardless of NAICS Code and does NOT include ID/IQ task order awards

The FPDS database identifies the winning primary contractor, known as the prime contractor, but not its subcontractors nor any revenue they might receive. Therefore, an organization that works only as a subcontractor to other organizations will never appear in FPDS. Information about the subcontract award is not available since the relationship is between the two organizations and not the Government. Company B fits this description because it only performs in a subcontracting role.

Analysis of FedBiz DaaS Use

Each respondent was asked if they used a FedBiz DaaS and, if so, which one. The results show the most common FedBiz DaaS was Deltek’s GovWin, with 8 of the 10 respondents using it (80%). Three organizations used Bloomberg, and one each said they used Salesforce or other tools. There was only one respondent whose organization did not use a FedBiz DaaS application; the rationale provided was that “the activities I am

pursuing are based upon my base of experience and unique mission areas/customer relationships and not dependent upon marketing.” While acknowledging his organization relied upon “word of mouth and prior relationships” provided strength in their proposals as a subcontractor, he also admitted that “when contracts wrap up, the cupboard starts to get bare.”

Of the 9 respondents that use a FedBiz DaaS, the earliest organization (Company E) started 12 years ago in 2006 and the most recent implementation by an organization was in 2017. One respondent did not know when FedBiz DaaS was implemented within their organization and one organization did not use a FedBiz DaaS application. The most common year to have started using a FedBiz DaaS was 2011.

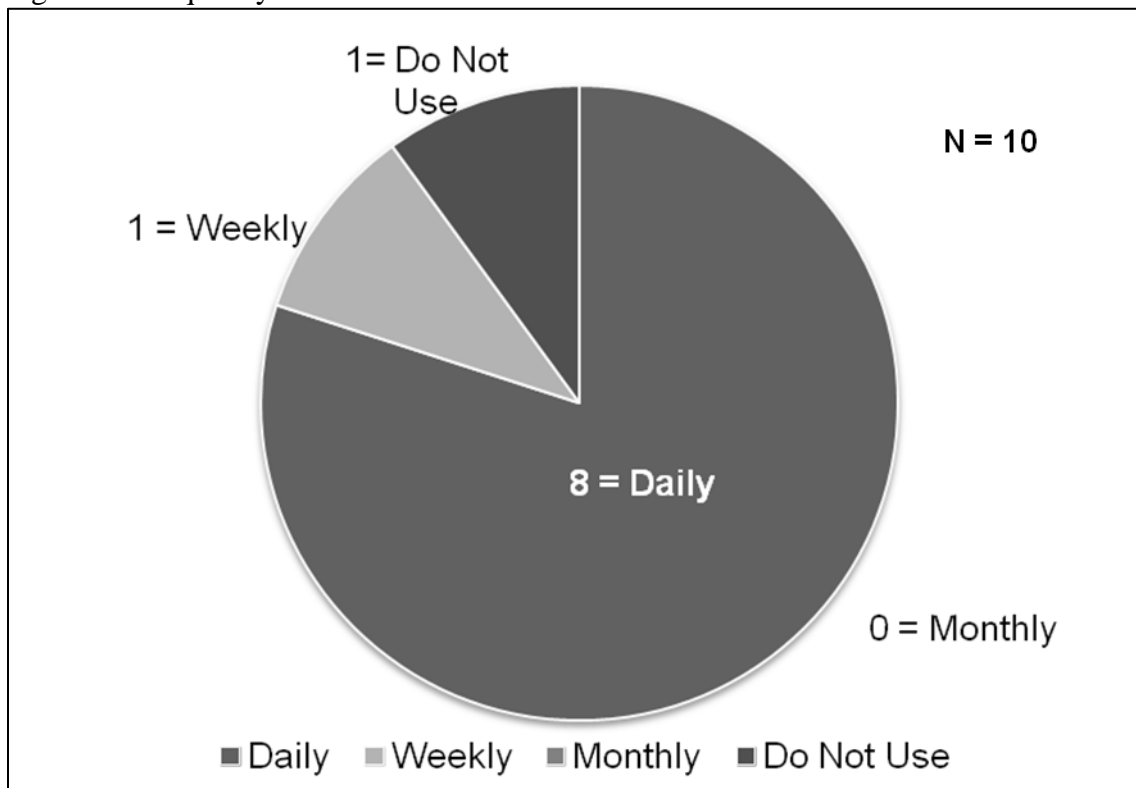
Table 6. Use of Different FedBiz DaaS

FedBiz DaaS Used	Number of Users
GovWin	8
Bloomberg	3
Salesforce	1
Other	1
None	1
Epipeline	0
EZGovOpps	0
Fedmine	0
Govini	0
Onvia	0

During the structured interview, the company that claimed to use Salesforce actually used it for features not associated with FedBiz DaaS and therefore inappropriately labeled it as a FedBiz DaaS. SalesForce is more correctly referred to as customer relationship management (CRM) software. In addition, between the development of the survey instrument and its execution, GovWin bought its competitor, Onvia.

Eight out of nine respondents reported using FedBiz DaaS on a daily basis, while the remaining respondent said they used their FedBiz DaaS on a weekly basis. No respondent reported using a FedBiz DaaS on a monthly basis. In follow-up discussions with the respondents, several indicated that they use their FedBiz DaaS application more frequently than just daily, depending upon their reason for using the application.

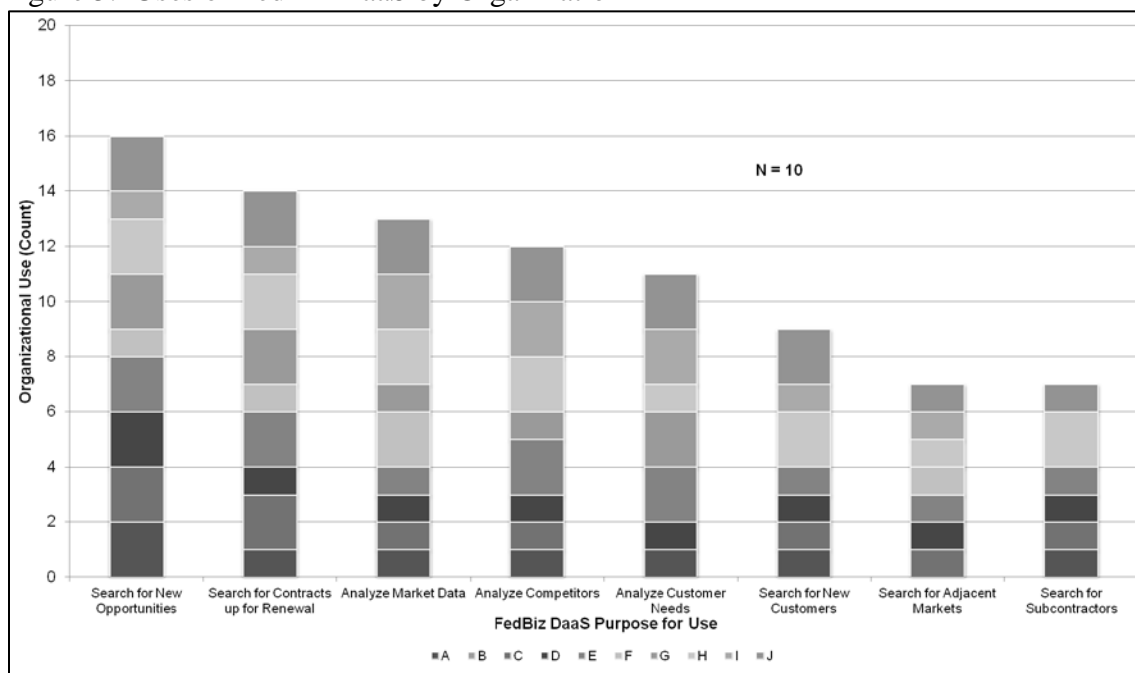
Figure 4. Frequency of Use of FedBiz DaaS



While the majority of organizations used a FedBiz DaaS on a daily basis, the respondents for each of the organizations showed a wide-variety of complementary reasons for using FedBiz DaaS. Their actual objective in using the application was primarily for short-term tactical advantage versus long-term strategic positioning. Searching for new opportunities received the highest score, followed by looking for contracts that were coming up for rebid. Organizations also placed a strong reliance on

their ability use FedBiz DaaS to analyze data regarding competitors, the marketplace, and customers. From a strategic perspective, there was limited use of FedBiz DaaS functions for seeking out new customers, exploring adjacent market spaces, or searching for subcontracting partners. Respondents expressed comments that some of these categories seemed to overlap and in some cases the categories were confusing to them because of the terminology used.

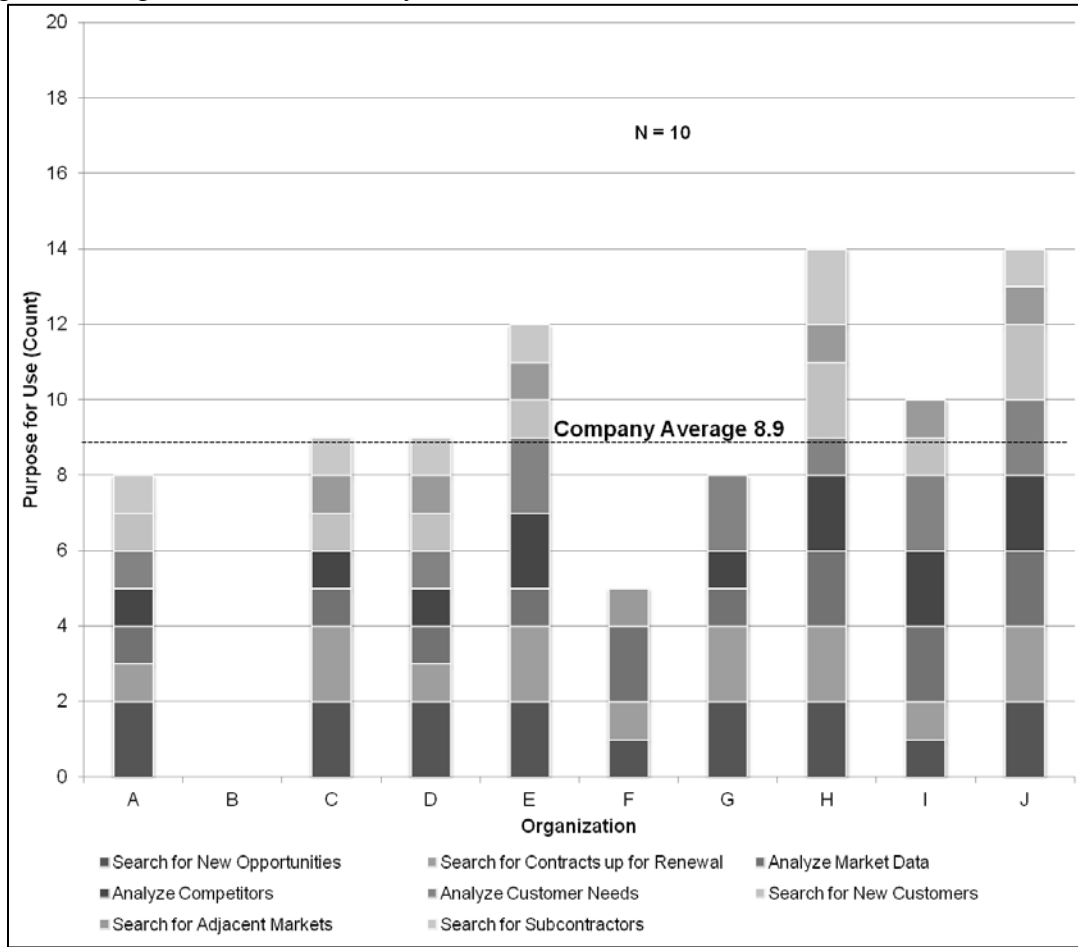
Figure 5. Uses of FedBiz DaaS by Organization



Examining this same data from an organizational perspective, the total FedBiz DaaS use was summed for each organization by adding the score for each functional category. This shows the extent to which each organization is using FedBiz DaaS in their operations, ranging from a theoretical low of 0 for “Do Not Use At All” to a possible high of 16 for “Use It Frequently” for all eight purposes. Two companies achieved a score of 14 out of 20 and one received a minimum score of 0 by not using FedBiz DaaS for any purpose.

Some respondents were confused when presented with the question about their use of FedBiz DaaS to explore adjacent markets. Primarily, this could be attributed to the fact that their organization only provided services to the Government whom they looked at as a single customer/market. Therefore, they did not look at different parts of the Government as different customers, nor different NAICS Codes as different markets. On the other hand, some respondents noted they had definitely used FedBiz DaaS to explore the possibility of looking at providing services to other customers or markets. In fact, one of the organizations had switched its Primary NAICS Code to reflect a change from providing services under NAICS Code 541611, Administrative Management and General Management Consulting Services, to NAICS Code 561612, Security Guards and Patrol Services. This permitted the organization to have a higher revenue ceiling (from \$15M to \$20.5M) and still remain classified as a small business in the NAICS Code where the preponderance of their work existed.

Figure 6. Organizational Score By Use



FedBiz DaaS and Competiveness

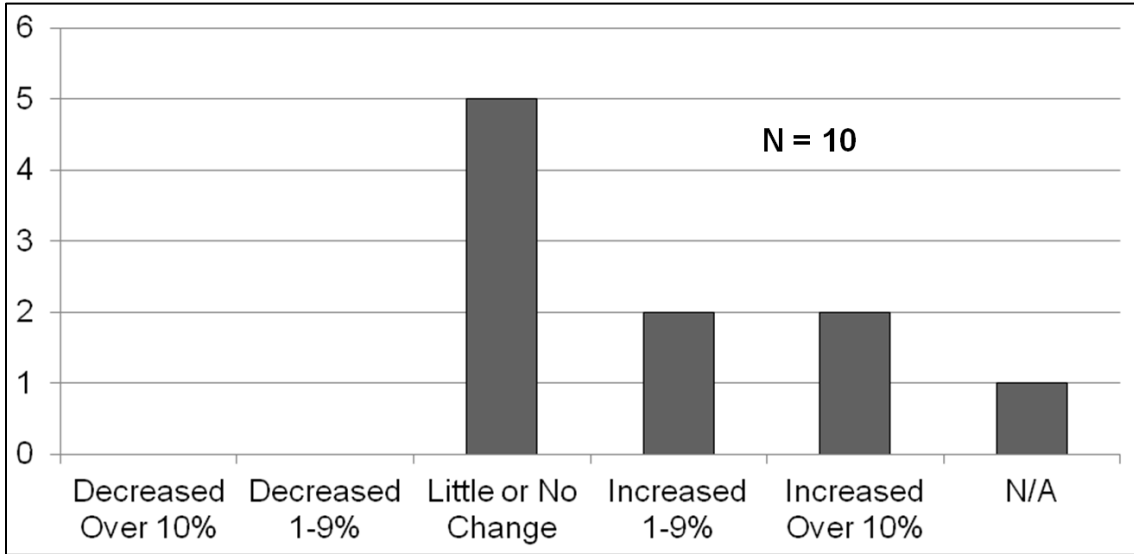
Competitive Position

Three approaches were used to identify a relationship between the use of FedBiz DaaS and improved Competitive Position.

Interview Question. First, as part of the interview, respondents were asked about their organization's win rate over time. Half of the respondents, five out of nine, said their win rate has not gone up since implementing FedBiz DaaS, two respondents indicated that their organization's win rate had increased, while two respondents indicated their organization's win rate had significantly increased. Interestingly, none of

the respondents noted that their organization’s win rate had decreased. One respondent offered that his organization’s use of FedBiz DaaS provides “only a data point and a ticket.”

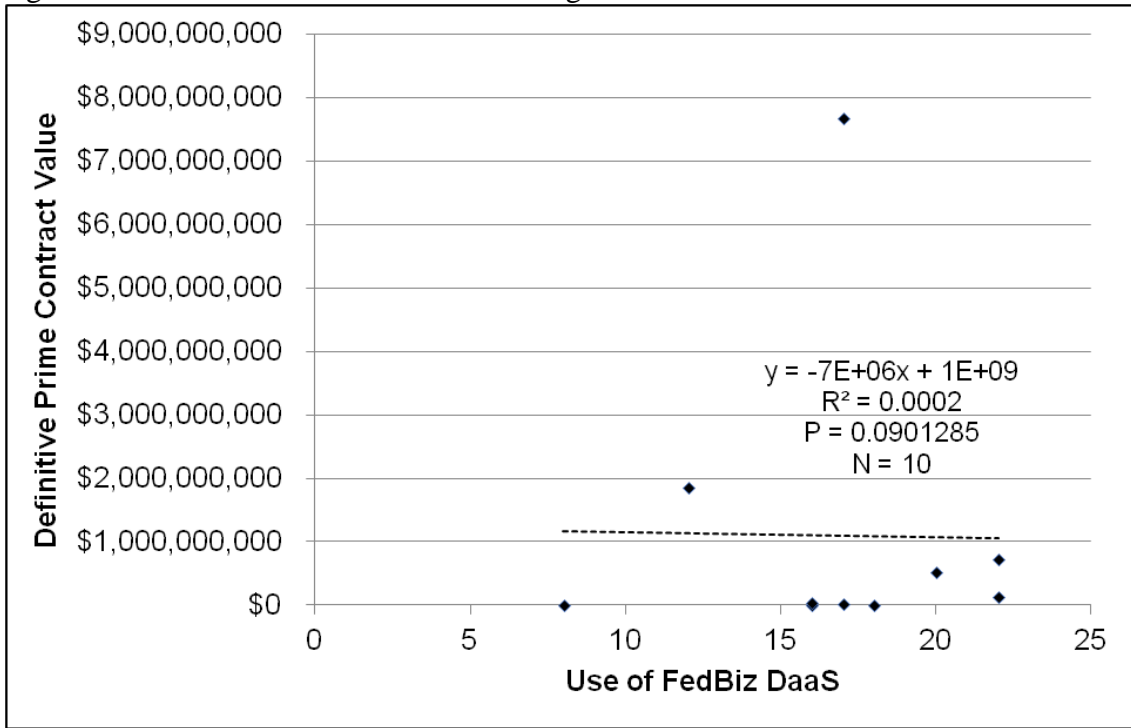
Figure 7. Perceived Change in Organization’s Win Rate With FedBiz DaaS



Relationship Between FedBiz DaaS Usage and Average Prime Contract Value.

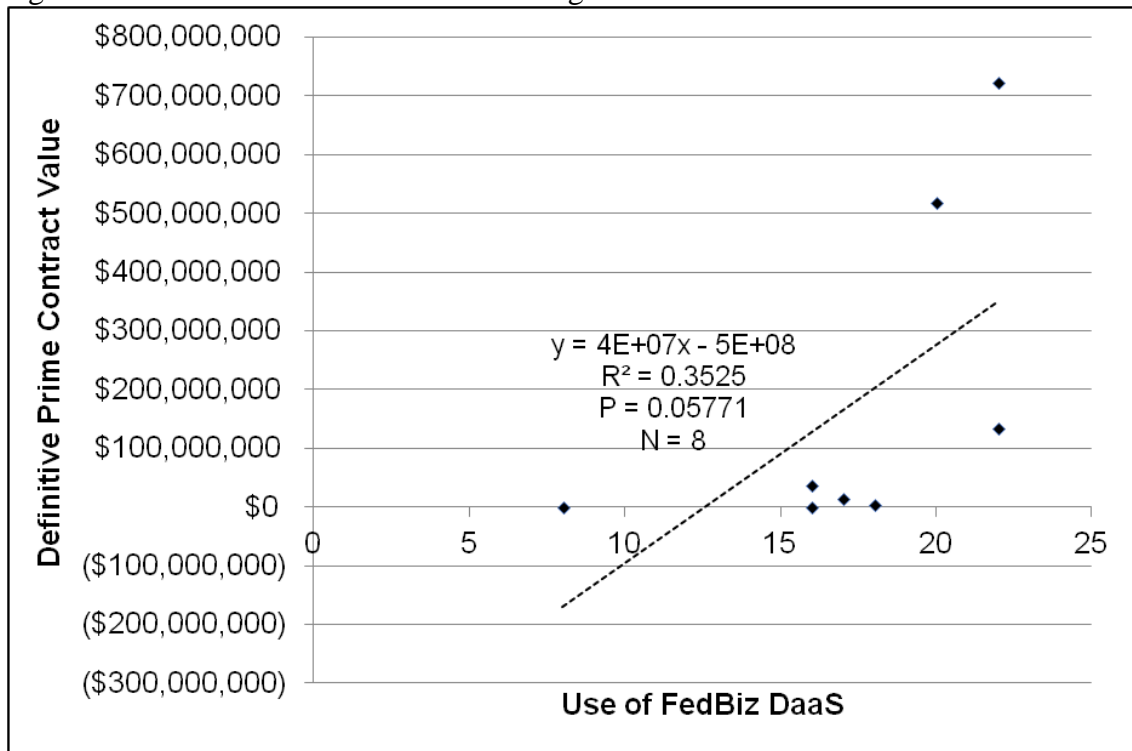
Second, we juxtaposed the organization’s average prime contract value with each organization’s FedBiz DaaS use score. An organization, such as Company B, that did not use a FedBiz DaaS (FedBiz DaaS use score = 8) had no revenue as a prime contractor. On the other hand, Company H makes extensive use of its FedBiz DaaS application (FedBiz DaaS use score = 22) and shows the highest prime contract value. A simple correlation was performed for FedBiz DaaS use versus the award value for all Prime Definitive Contract for each organization. Although no causal relationship is indicated by this association of usage and organizational revenue, this is an interesting relationship that deserves more investigation.

Figure 8. Correlation of FedBiz Use and Organizational Revenue



The reason this encourages further investigation is that when the two largest organizations were removed from the correlation, a significant difference was noted because both organizations generated billions of dollars of revenue while the other eight organizations did not. Examining the eight remaining organizations and correlates their use of FedBiz DaaS systems to the Total Prime Definitive Contract Value. In that correlation, the R value increases to 0.59, thus R^2 is now over 35 percent of the total variance. This clearly identifies that examination of a larger, more homogeneous sample size composed of small organizations may yield better insights.

Figure 9. Correlation of FedBiz Use and Organizational Revenue for SMEs



Comparing Organizational Win Rates Before and After FedBiz DaaS Implementation. Finally, we used three variables from the FPDS database to quantitatively compare each organization’s competitive metrics before and after implementation of FedBiz DaaS. Definitive Contracts won during the year of implementation were not included since we had no way to know if they were in fact awarded before or after implementation of the FedBiz DaaS system. The three metrics examined before and after implementation were:

- The average value of all Definitive Contracts won
- The number of Definitive Contracts won
- The Average Annual Prime Definitive Contract Value won

When collected, we see that only 4 out of 10 companies (highlighted in gray boxes) had measurable data both “before” and “after” implementation of FedBiz DaaS.

This is because some companies implemented FedBiz DaaS as soon as they started, did not use FedBiz DaaS at all, or did not know when they implemented FedBiz DaaS.

Table 7. Impact of FedBiz DaaS on Competitive Position

Company	Descriptor	Before FedBiz DaaS	FedBiz DaaS Implemented	After FedBiz DaaS
A	Total Prime Definitive Contract Value	\$0		\$0
	Total Number of Prime Definitive Contracts Won	N/A	2016	N/A
	Average Annual Prime Definitive Contract Value	\$0		\$0
B	Total Prime Definitive Contract Value	\$0		\$0
	Total Number of Prime Definitive Contracts Won	N/A	N/A	N/A
	Average Annual Prime Definitive Contract Value	\$0		\$0
C	Total Prime Definitive Contract Value	\$7,685,075,818		0
	Total Number of Prime Definitive Contracts Won	158	N/A	0
	Average Annual Prime Definitive Contract Value	\$48,639,720		\$0
D	Total Prime Definitive Contract Value	\$0		\$14,100,530
	Total Number of Prime Definitive Contracts Won	N/A	2008	3
	Average Annual Prime Definitive Contract Value	\$0		\$4,700,177
E	Total Prime Definitive Contract Value	\$5,500,000		\$513,773,606
	Total Number of Prime Definitive Contracts Won	2	2006	4
	Average Annual Prime Definitive Contract Value	\$1,833,333		\$46,706,691
F	Total Prime Definitive Contract Value	\$224,874,823		\$1,623,514,722
	Total Number of Prime Definitive Contracts Won	1	2009	9
	Average Annual Prime Definitive Contract Value	\$37,479,137		\$202,939,340
G	Total Prime Definitive Contract Value	\$0		\$37,067,010
	Total Number of Prime Definitive Contracts Won	N/A	2013	6
	Average Annual Prime Definitive Contract Value	\$0		\$6,177,835
H	Total Prime Definitive Contract Value	\$702,828,321		\$19,415,537
	Total Number of Prime Definitive Contracts Won	4	2010	2
	Average Annual Prime Definitive Contract Value	\$100,404,046		\$2,773,648
I	Total Prime Definitive Contract Value	\$4,553,528		\$0
	Total Number of Prime Definitive Contracts Won	3	2017	N/A
	Average Annual Prime Definitive Contract Value	\$1,517,843		\$0
J	Total Prime Definitive Contract Value	\$51,448,125		\$82,075,276
	Total Number of Prime Definitive Contracts Won	5	2010	7
	Average Annual Prime Definitive Contract Value	\$7,349,732		\$11,725,039

Comparing the organization’s status before and after implementation of a FedBiz DaaS capability, three of the four (75%) had a higher Total Prime Definitive Contract Value increase after implementation of FedBiz DaaS than before. Three of the four (75%) had an increase in Total Number of Prime Definitive Contracts Won. Three of four (75%) also had an increase in the Average Annual Prime Definitive Contract Value received after implementation of FedBiz DaaS when estimating Average Annual Prime Definitive Contract Value by dividing the Total Prime Definitive Contract Value by the Total Number of Prime Definitive Contracts Won.

A Paired Two Sample for Means t-Test was performed to look at before/after data for the four organizations. Looking at the Total Prime Definitive Contract Value, Total Number of Prime Definitive Contracts Won, and Average Annual Prime Definitive Contract Value, none of these measures were significant. However, while this does not definitively prove nor disprove the hypothesis, it does offer up an opportunity for further investigation.

Table 8. Paired Two Sample for Means t-Test

Measure	P Value	Significance
Total Prime Definitive Contract Value	0.262357	No
Total Number of Prime Definitive Contracts Won	0.156018	No
Average Annual Prime Definitive Contract Value	0.313956	No

Comparing these three sets of results, we see the following:

- Interview Question. No respondent indicated their organization’s win rate had significantly decreased since implementing a FedBiz DaaS system, but four out of nine indicated their organization’s win rate had increased to some degree.

- Relationship Between FedBiz DaaS Usage and Average Annual Prime Definitive Contract Value. The organization with the most extensive use of its FedBiz DaaS application shows the highest Average Annual Prime Definitive Contract Value; although in the aggregate, no relationship is observed. It is also important to note that the one organization that showed diametrically opposite results had been purchased by a larger organization during this time period and then been re-purchased by the original owners; this resulted in higher revenue being reported before implementation of a FedBiz DaaS resource.
- Comparing Organizational Win Rates Before and After FedBiz DaaS Implementation. Data for analysis was limited to four companies; 75% had a Total Prime Definitive Contract Value increase after implementation than before, three of the four (75%) had an increase in Total Number of Prime Definitive Contracts Won, and three of four (75%) had an overall increase in Average Annual Prime Definitive Contract Value. In spite of this, none of Paired Two Sample for Means t-Test showed a significant relationship.

Because no significance was shown in the Paired Two Sample for Means t-Test, it is difficult to make any definitive statement regarding FedBiz DaaS implementation. However, even with the small sample size available for this pilot study, it leads to an inference that FPDS data mirrors the responses to the related question in the structured interview. While an organization's implementation of a FedBiz DaaS system may be consistent with the survey question responses about win rate, it also may suggest that the difference between organizations that do, or do not see, results from implementation of a

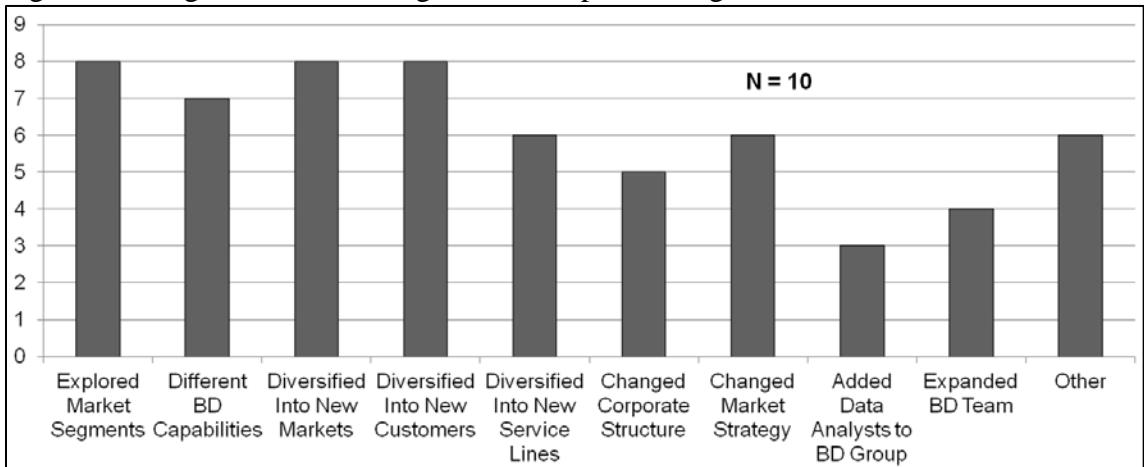
FedBiz DaaS system. This may be related to the adaption of different capabilities and configuration as identified by Eisenhardt and Martin's (2000) examination of how tools may be used to enhance or strengthen an organization to gain a long-term competitive advantage. Because of the pervasive presence of FedBiz DaaS in the marketplace, an organization may see the need to add and use a FedBiz DaaS system to maintain its Competitive Position versus its peer competitors.

Organizational Capabilities

As an interview question, respondents were asked how their organization had changed since the implementation of FedBiz DaaS. Eight of ten respondents indicated that their organization had explored different market segments, diversified into new market segments, or diversified into new customers as a result of implementing a FedBiz DaaS. Seven respondents noted they were using different business development capabilities. Sixty percent (6 of 10) respondents indicated that their organization had diversified into new service lines or changed their market strategy as a result of implementing a FedBiz DaaS. Upon deeper questioning, respondents from different organizations offered a wide variety of changes, some of which were completely opposite of each other, such as eliminating business development staff and hiring outside consultants versus, eliminating consultants and hiring more internal staff. One organization "incentivized their business development staff by sharing five percent of profits to the business development team as a bonus." Another organization took a similar tack by offering non-voting shares in the company as an incentive to operational managers to bring in new business because the organization did not have a designated business development staff; however, they discovered this was not successful because the

operational managers were too busy concentrating on customers to be productive in new business development. A third organization focused on hiring high quality “Indian Scout” personnel who looked two to five years into the future to identify opportunities, passing them off to tactical “Capture Managers” when the contracts were within two years of release; they worked as an integrated team to pursue the opportunity and claimed a Probability of Win (PWin) rate of dollars bid versus revenue of approximately 65 percent.

Figure 10. Organizational Changes Since Implementing a FedBiz DaaS



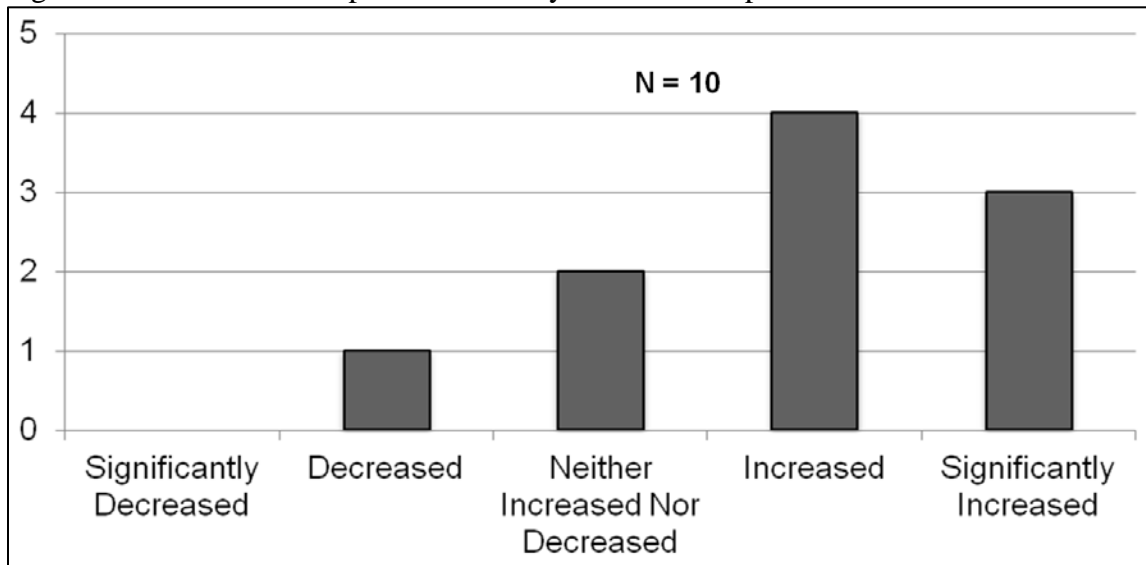
When respondents were asked for clarifying information, several interesting organizational changes were mentioned that might indicate new capabilities or applications such as incentive systems (company stock) for business development, hiring of low-priced analyst staff for basic research, aligning business development staff with operational manager, and full implementation of the Shipley Process. However, the question asked about any organizational changes rather than focusing on business development. The survey question missed the mark and needs to be refined to narrow its focus to business development, possibly by dividing the question into two, one focused

on the business development processes and one focused on staff and organizational changes.

Competitive Intensity

From the interviews, many organizations said that competition has increased in recent years, with many pointing to a significant increase. Seven out of ten respondents perceived there has been an increase in competition, two thought it had stayed the same, and one thought it had decreased. Interestingly, the respondent who indicated that competition had decreased thought it had done so because her organization had won Government certification as an economically and socially disadvantaged organization; she felt this reduced the competition they would face because they were now eligible for “sole source” contracts that could be awarded without competition.

Figure 11. Perceived Competitive Intensity in the Marketplace

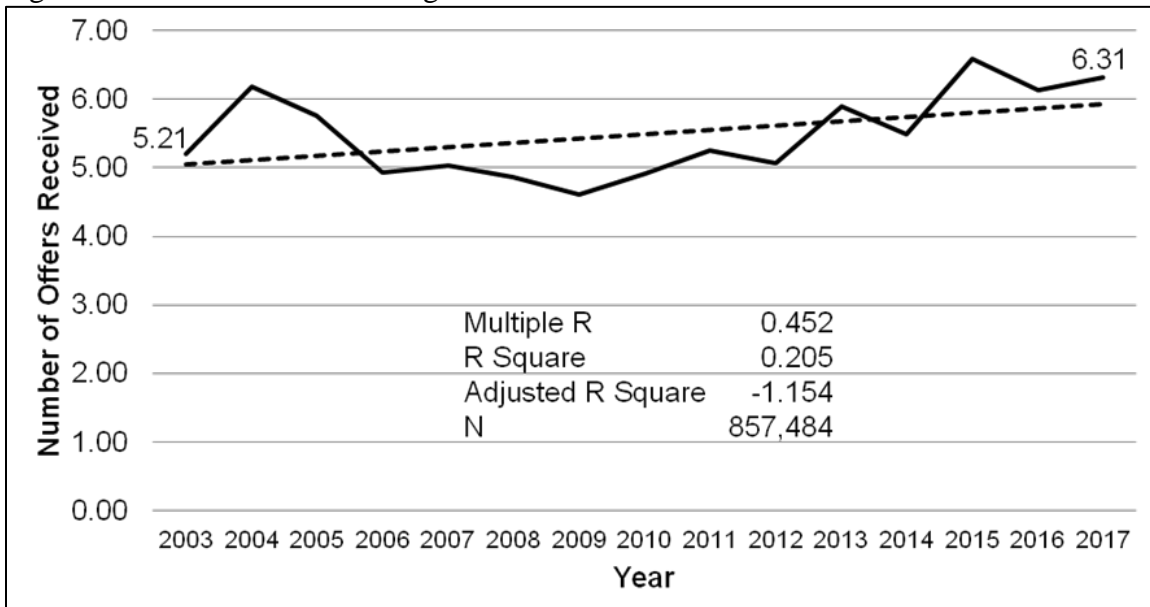


To examine overall Competitive Intensity in the marketplace, the Number of Offers Received for Definitive Contracts was extracted from FPDS for all contracts won in the three largest NAICS Codes associated with the services industry.

- 541611, Administrative Management and General Management Consulting Services
- 541618, Other Management Consulting Services
- 541690, Other Scientific and Technical Consulting Services

In 2003, the average number of offers received across all Definitive Contracts in these NAICS Codes was 5.21 for each competitive contract awarded, but 15 years later in 2017 the average number of offers received had climbed to 6.31 offers.

Figure 12. Increase in the Average Number of Offers Received



Discussion

In this pilot study we have identified the working definition of FedBiz DaaS and three hypotheses to explore in further understanding the resources and capabilities associated with FedBiz DaaS.

We began with a foundational review of both academic and practitioner literature focused on FedBiz DaaS applications and a thorough review of resources and capabilities. To frame the problem set and narrow our scope to the service industry, we

restricted our participants to organizations registered to do business with the U.S. Government. The three hypotheses for this pilot study were examined using three sources of data:

1. A structured interview administered to 10 organizational leaders.
2. FPDS contract award data specific to the 10 respondent organizations.
3. FPDS contract data for all awards within three service-related NAICS Codes (541611, Administrative Management and General Management Consulting Services; 541618, Other Management Consulting Services; and 541690, Other Scientific and Technical Consulting Services).

Hypothesis 1 – Use of FedBiz DaaS is positively related to competitive position.

The impact of FedBiz DaaS and its nearly universal implementation may be a factor in an increase in Competitive Position; however, more data collection is necessary to definitively prove a positive relationship exists. The structured interview questions substantiated that nearly half of the respondents believed their organization's win rate had increased to some degree. A comparison of the extent to which an organization used its FedBiz DaaS system is reflected in terms of Total Prime Definitive Contract Value, although it appears from the structured interviews that organizations are using it for different purposes and outcomes. More significantly, by comparing organizational win rates for Total Number of Prime Definitive Contracts Won before and after FedBiz DaaS implementation, it was interesting to see that three out of four organizations showed they earned more revenue after than before, but no statistical significance was shown.

The correlation between how much organizations use FedBiz DaaS systems for different purposes, to the Total Prime Definitive Contract Value, does not indicate a

strong correlation based upon available data; however, this may also be related to small sample size and the inclusion of large organizations that generated billions of dollars of revenue versus much smaller organizations. When the two largest organizations are removed from the correlation, the R value increases to 0.59, thus R^2 becomes approximately 35 percent of the total variance. This large shift encourages future research to focus on small organizations to see if the relationship exists with a much larger sample of similar-sized organizations.

The comparison of results between how actively an organization uses their FedBiz DaaS for multiple functions and its Competitive Position within the marketplace did not show a positive relationship; however, because of the small sample size available that included very large organizations, this area also offers opportunities for further research and analysis. If only small organizations are examined within the specified Primary NAICS Codes, the data analyzed will be on a more equal footing and could possibly show more definition. In addition, the survey questions used proved to be too broad, so any future questions need to be more focused on the business development function at each organization and the capabilities that are brought to bear.

Hypothesis 2 – Use of FedBiz DaaS is positively related to the generation of organizational capabilities.

The data collected shows that organizations are using FedBiz DaaS systems. The data shows that organizations have different objectives when using their FedBiz DaaS systems and that the more broadly an organization uses it the better they appear to do; and that for small organizations, this was clearly seen. The follow-up discussions to the question about FedBiz DaaS provided intriguing information about how organizations used FedBiz DaaS systems for both tactical and strategic advantage, although most

appeared to be using it for tactical advantage in contract acquisition rather than strategic positioning. At this point it appears that anyone who can afford FedBiz DaaS, has it; this puts organizations with less financial resources at a Competitive Disadvantage.

Through follow-up questions during the structured interview process, anecdotally it appears the organizations that use it for short-term goals do not gain as much as those who use it for both short and long-term goals, so this is an area for further investigation. Likewise, organizational changes as a result of FedBiz DaaS implementation is rich for future examination, potentially not by asking a single question but by asking more specific questions related to overall business development, the business development organizational structure, business development processes, and business development roles such as Capture, Proposal, and so on. A refined question and the gathering of additional data may clarify the most common uses of FedBiz DaaS applications. In addition, contextual comments suggested that new Organizational Capabilities may be emerging from the use of FedBiz DaaS as previously noted; however, more research is needed.

Hypothesis 3 – Use of FedBiz DaaS is positively related to competitive intensity in the Federal consulting marketplace.

The analysis of Competitive Intensity among Government services providers suggests that use of FedBiz DaaS systems are related to marketplace Competitive Intensity. The opinion expressed in the structured interviews stating that competition was increasing was substantiated by quantitative data from FPDS looking at the Average Number of Offers Received for contracts over a 15-year period. This shows a strong positive relationship between the level of competition increasing at the same time as the increased implementation of FedBiz DaaS throughout the industry and provides the

impetus for more extensive research to firmly establish the relationship and its impact on the Government contracting marketplace.

The third hypothesis is focused on the generation of new capabilities and how that influences the marketplace's Competitive Intensity; the research found a significant increase in the Average Number of Offers Received over all three NAICS Codes. Lahiri (2013) conducted extensive research within the IT-enabled services (ITES) industry and found that Competitive Intensity is positively associated with the relationship between organizational resources and firm performance. His research pointed out that when Competitive Intensity is high, the relationship between organizational resources and firm performance becomes stronger. This leads to the conclusion that the Government marketplace has become more competitive over the period of this study. Competitive Intensity demonstrably increased over the period that FedBiz DaaS use has exploded in the marketplace—this is an association, not a cause, and the data supports it.

Conclusions

There were three main observations resulting from this pilot study:

- While the examination of Competitive Position did not produce a strong correlation, the exclusion of large organizations in future research could lead to valuable insights into the Government marketplace when exploring how organizations use FedBiz DaaS systems for different purposes.
- Determining how Government contractor organizations differentiate themselves from competitors and sustain profitability to maintain their Organizational Capabilities is heavily predicated upon determining the purposes and desired outcomes that drive these organizations to use their

FedBiz DaaS systems; this can be further explored with a refined survey that focuses on business development processes, resources, and application using the Shipley Process.

- Respondents to the structured interview maintained that Competitive Intensity was very real from their standpoint, and the data from FPDS strongly supported the respondents in spite of the small sample size; the FPDS data showed the Average Number of Offers Received across all Definitive Contracts was 5.21 for each competitive contract awarded in 2003, but 15 years later in 2017 the average number of offers received had climbed to 6.31 offers. This finding provides an encouraging motivation to explore this relationship further between the incorporation of new capabilities and the marketplace.

Finally, in light of the results of this pilot study, future research should be limited to only small businesses based upon their Primary NAICS Code size standard. This may provide different results that may become evident with the removal of the large organizations with billion-dollar revenue streams versus more financially limited smaller organizations. There are thousands of small organizations registered in the Government's SAM and FPDS databases and their comparison may lead to more insights.

CHAPTER 4. NEW RESEARCH ON DATA AS A SERVICE

Introduction

To explore these relationships further between Competitive Position, Organizational Capabilities, and Competitive Intensity, research must be conducted on a much larger sample size. This includes an improved analytical survey administered within specific Primary NAICS Codes, further analysis of organizational performance within those Primary NAICS Codes, and correlation of the derived data with overall marketplace parameters.

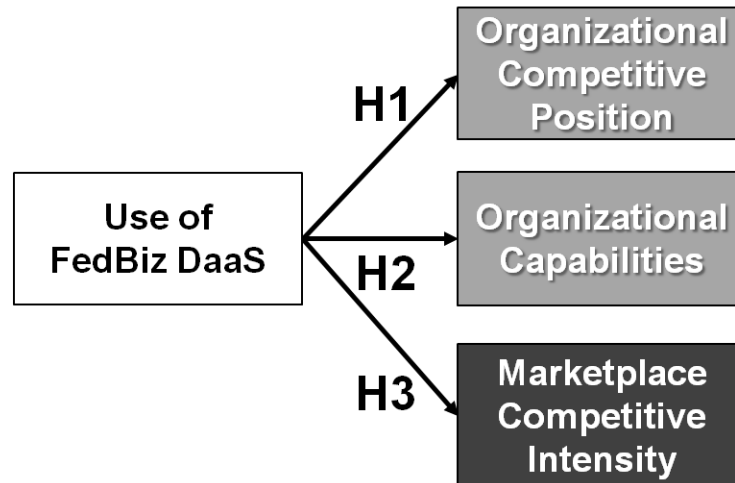
Conceptual Model and Hypotheses

The results of the pilot study led to one major change to the conceptual model, the revision of Hypothesis 2, Organizational Capabilities, to focus more specifically on changes related to an organization's business development Staffing, business development Roles, and business development Processes. The pilot study showed organizations are using FedBiz DaaS systems and as a result experiencing organizational changes, but additional data is needed to identify if new Organizational Capabilities are emerging in the organization's business development process and, if so, what they may be. The hypotheses for Competitive Position (H1) and Competitive Intensity (H3) remain unchanged.

Based upon the results of the pilot study, the revised conceptual model will be analyzed using a larger sample size to determine if a positive relationship exists between use of FedBiz DaaS and Competitive Position. Additional quantitative analysis of FPDS data will identify if the positive relationship between Competitive Intensity and the implementation of FedBiz DaaS is significant or not. While the conceptual model has

experienced modest change, modifications in the structure of the analysis and the production of quantifiable results will be applied in a broader context. For this research, the three hypotheses will permit further understanding of the resources and capabilities associated with FedBiz DaaS:

Figure 13. Conceptual Model



H1: Use of FedBiz DaaS is positively related to competitive position.

H2: Use of FedBiz DaaS is positively related to changes in an organization's business development capabilities as represented by changes in staffing, roles, and processes.

H3: Use of FedBiz DaaS is positively related to competitive intensity in the Federal consulting marketplace.

Extracting Federal Data

One change from the pilot study is that the sample will be limited to small organizations as defined in the SAM database. This provides a homogeneous population to study instead of studying organizations providing multiple goods and services, making comparisons difficult between an organization's Competitive Position, Organizational Capabilities, and the marketplace's Competitive Intensity. The rigid structure of the Government contracting environment provides the stratification necessary to examine

small organizations providing similar services, based upon their Primary NAICS Code. Future research is limited to three Primary NAICS Codes centered on the Government services marketplace, thus providing a consistent population that permits improved analysis. While this analysis is limited to these NAICS Codes, the results can be extrapolated to organizations operating in other service-related NAICS Codes as well as organizations operating in the broader commercial marketplace.

The first information extracted will be organizational information from the SAM database. It will provide information about each organization, including the organization's DUNS Number, Primary NAICS Code, number of additional NAICS Codes, date of establishment, and email information for points of contact. To obtain our research sample, the SAM database will be filtered as follows:

1. Variance will be limited by including only respondents from the three largest service-related Primary NAICS Codes: 541611, Administrative Management and General Management Consulting Services; 541618, Other Management Consulting Services; and 541690, Other Scientific and Technical Consulting Services
2. SAM data will be filtered to only select organizations that are small businesses within these three Primary NAICS Codes (size standard of \$15M in annual revenue).

Rationale: this will eliminate large, multi-billion dollar organizations that do multiple types of business with the Government from the sample thus providing organizations of comparable size for analysis.

3. The identified “Establishment Date” for organizations in the SAM database will be filtered to only include those in business before 2008.

Rationale: this will permit analysis over a sufficient time period for the study and permit thorough analysis to support determining any possible impact of FedBiz DaaS on an organization’s Competitive Position.

Once the information from the SAM database is filtered, the following demographic variables will be extracted: year the company was founded (Establishment Date), state of incorporation, and number of secondary NAICS Codes. The primary Business Point of Contact will also be extracted to provide the primary email address of all extracted organizations for the survey.

The FPDS database provides a number of details about every Federal contract. Based upon lessons from the pilot study, we will be filtering the data based upon these rules:

1. Contract award information will be extracted from FPDS for any contract won by a survey respondent using their DUNS Number. FPDS data in Column B, Award or IDV Type, will be filtered for only “Definitive Contract.”

Rationale: this will eliminate multiple award contracts and ensure that a vendor actually won an award rather than winning the right to bid on underlying task orders.

2. FPDS data in Column D, Offers Received, will be filtered to accept any integer between 1 and 30 (inclusive)

Rationale: “Blank” or “0” offers received makes no logical sense for a contract award to a vendor. Numbers like “99” and “999” appear to indicate multiple award contract vehicles),

3. FPDS data in Column G, Modification Number, will be filtered to only permit a value of “0.”

Rationale: this indicates an initial contract award; all subsequent contract modifications are indicated by sequential following numbers and can reflect either positive or negative values.

4. FPDS data in Column O, Base and All Options, will be filtered for any number below \$100,000 or \$150,000, depending upon the year.

Rationale: From 1995 to 2010, the maximum threshold for Simplified Acquisition Procedures (SAP) contracts was \$100,000; in 2010 it was increased to \$150,000. Maintaining a consistent minimum dollar value ensures awards are made using a competitive process, since SAP contracts typically have limited competition.

Specific variables for each contract will be extracted from the FPDS database once the filtering is complete: PIID (contract identification number), DUNS Number, Prime Definitive Contract Value, and Number of Offers Received. A separate extract of FPDS data for Hypothesis 3 will focus on all contracts issued during the years of this study in NAICS Codes 541611, Administrative Management and General Management Consulting Services; 541618, Other Management Consulting Services; and 541690, Other Scientific and Technical Consulting Services.

Identified Survey Deficiencies Needing Correction

The structured interview questions for the pilot study were developed in the hope that many of the questions would be carried over into a future, broadly distributed survey to multiple respondents. Because only ten (10) respondents were interviewed, significant findings were not expected; the pilot study was used to better understand the use and effects of FedBiz DaaS on organizations and the marketplace in pursuit of a more comprehensive survey to be administered to a larger sample size. The respondents' answers to the questions showed a strong need to review each question and restructure them to remove ambiguity and focus on the concepts of Competitive Position, Organizational Capabilities, and Competitive Intensity so they can support examination of the independent variables associated with the three stated hypotheses. Results from the questions used in the survey showed a need for refinement.

Table 9. Survey Revisions

Question	Action	Reason
Q1	Revise	Organization roles and titles vary significantly and it is very unclear what the pilot study responses meant. Instead we propose limiting organizational demographic information to just a determination of whether or not the organization has used any other DUNS Number since 2013
Q2	Edit	Drop Onvia because it was acquired by GovWin Drop Salesforce because it is a CRM software application, not a FedBiz DaaS system
Q3	Keep	Provides ability to differentiate “before” and “after” results of FedBiz DaaS implementation
Q4	Edit	Drop “monthly” and provide more granularity for use that occurs more than “Daily”
Q5	Drop	Use of additional modules for FedBiz DaaS is not relevant
Q6	Drop	Respondents' perception of the FPDS inaccuracy was that it lacked timeliness (i.e., it was often 3 months late). Since this study looks at data at least a year old, this criticism is not relevant
Q7	Drop	Data available from FPDS database
Q8	Drop	Data available from FPDS database

Table 9. Survey Revisions

Question	Action	Reason
Q9	Revise	Divide into multiple questions, focused on tactical and strategic use of FedBiz DaaS; revise terminology so it is more relevant to practitioners: <ul style="list-style-type: none"> • Using the Shipley Process as a guide, which of these steps does your organization use FedBiz DaaS to support?
Q10	Revise	Divide the question into multiple questions, focused on processes and organizational changes. <ul style="list-style-type: none"> • Using the Shipley Process as a guide, where has your organization changed staffing to support business development efforts since implementing a FedBiz DaaS too? • Has your organization significantly changed roles or added new roles anywhere in the Shipley Process since implementing as FedBiz DaaS tool? • Has your organization significantly changed its processes by which business development is accomplished within the Shipley Process since implementing a FedBiz DaaS tool?

Based upon the above discussion, a revised survey has been developed and is at Appendix 3. This revised survey will be administered to organizational points of contact representing approximately 2,000 small businesses registered in the SAM database as described above.

To enable analysis over time of organizational performance, all organizations selected for the survey will have been in business for at least 10 of the 15-year time period of the study (2003-2017). Respondents from the pilot study will be excluded from the revised survey. The selected organizational points of contact will have approximately 30 days to complete the survey. To encourage participation, respondents will be offered a two-page executive summary of the results of the research. In the event this offer does not entice enough respondents to the survey instrument, the survey will be administered to attendees at Government contractor conferences and “industry days” until a suitable number of responses (100 minimum) have been collected.

The survey will be developed and administered using Qualtrics, an online survey administration tool. The organizational points of contact will receive an introductory email inviting them to participate in a doctoral-level research project and will receive an explanation of what the researcher has identified as FedBiz DaaS. The email will explain that the survey will focus on the organization and not the individual; results will be analyzed in aggregate and all information will be kept strictly confidential with no personally identifying information collected or stored, therefore no survey answer will be linked to any individual respondent. The 2 January 2018 letter from the IRB will be referenced to notify the respondent that IRB approval is not required for the survey. Responses will be tracked using the respondent organization's DUNS Number to permit correlation of information to data extracted from the FPDS database. Once the surveys have been completed in Qualtrics, the results will be exported into a comma-separated values (CSV) file for ease of analysis; any survey questions that were not answered will be cleaned from the database.

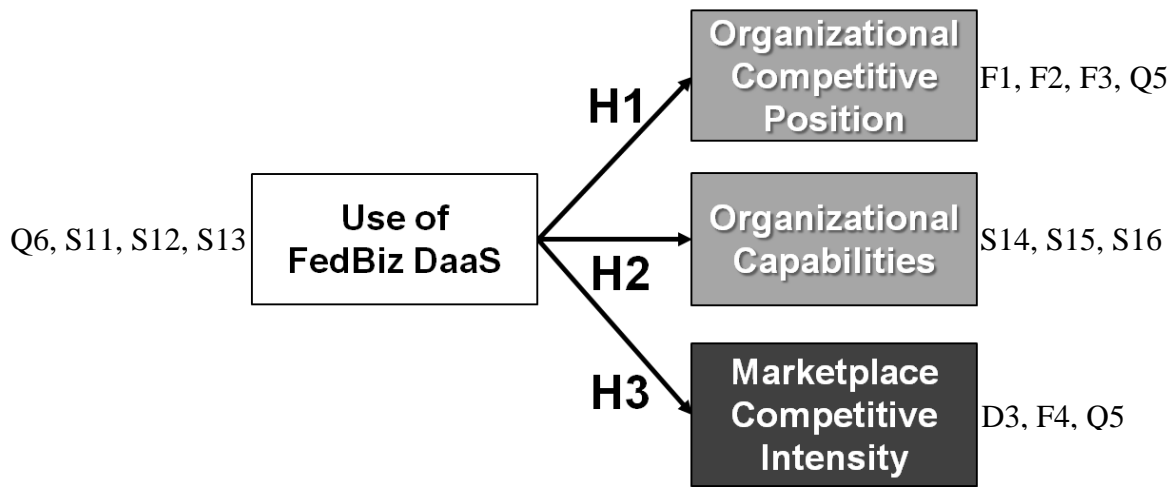
Data Analysis

The research will examine both survey results and data derived from the SAM and FPDS databases. Statistical analysis will rely upon descriptive statistics (sample means, standard deviation), correlation, regression analysis, t-Tests, and analysis of variance (ANOVA) to validate the relationships between the variables.

A refined survey administered to a larger sample size is necessary to ensure validity. The contextual responses provided to the pilot study structured interviews added credence to analytical data recovered from Government databases and indicated the value of the survey methodology in conjunction with analysis of SAM and FPDS

data. The analysis will rely upon a combination of survey questions linked to SAM and FPDS data for each survey respondent's organization. An annotated conceptual model follows that associates field codes with the Independent Variable and Dependent Variables, as well as identifying Control Variables. Following the figure, we identify measurable capabilities, operational definitions, supporting literature, data source, information, and field codes associated with research analysis:

Figure 14. Annotated Conceptual Model



Control Variables

- D1 Year the company was founded (Establishment Date)
- D2 State of incorporation
- D3 Number of secondary NAICS Codes
- Q2 Number of FTE working in Business Development
- Q3 Percentage allocation of revenue between prime Federal contracts, Federal subcontracts, and work for other customers
- Q4 FedBiz DaaS tool used

Table 10. Measurable Capability, Operational Definitions, Supporting Literature, Data Source, Information, and Survey Questions

Measurable Capability	Operational Definition	Supporting Literature	Data Source	Information	Field Code
Demographic Information for Organizations			SAM	Year the company was founded (Establishment Date)	D1
			SAM	State of incorporation	D2
			SAM	Number of secondary NAICS Codes	D3
			Survey	Any other DUNS Number	Q1
			Survey	Number of FTE working in Business Development	Q2
			Survey	Percentage allocation of 2017 revenue	Q3
			Survey	FedBiz DaaS tool used	Q4
Use of Fed Biz DaaS	The resource, usually a subscription service, that provides an organization nearly complete market data to inform business development decisions and functions.	Shipley 2011	Survey	Year in which FedBiz DaaS implemented	Q5
		Shipley 2011	Survey	Frequency of FedBiz DaaS use	Q6

Table 10. Measurable Capability, Operational Definitions, Supporting Literature, Data Source, Information, and Survey Questions

Measurable Capability	Operational Definition	Supporting Literature	Data Source	Information	Field Code
		Shiplely 2011	Scale	Overall Use	S11=SUM(Q7.0:7.6)/N
		Shiplely 2011	Scale	Use of FedBiz DaaS for Long-Term Positioning	S12=SUM(Q7.0, Q7.1)/N
		Shiplely 2011	Scale	Use of FedBiz DaaS for Tactical Positioning	S13=SUM(7.2:7.6)/N
Competitive Position	The number and amount of Prime Definitive Contracts won in direct competition in the Government marketplace.	Pavlou & El Sawy 2006 Pavlou & El Sawy 2010 Chi et al 2008 Farris et al 2010	FPDS	Total Prime Definitive Contract Value	F1
		Pavlou & El Sawy 2006 Pavlou & El Sawy 2010 Chi et al 2008 Farris et al 2010	FPDS	Total Number of Prime Definitive Contracts Won	F2
		Pavlou & El Sawy 2006 Pavlou & El Sawy 2010 Chi et al 2008 Farris et al 2010	FPDS	Pre/Post-FedBiz DaaS Average Annual Prime Definitive Contract Value	F3 (Calculated on Q5)
Organizational Capabilities	How organizations change staffing, roles, and processes to capture more value from new resources to improve the productivity of the organization and improve its effectiveness.	Shiplely 2011 Porter 1991 Stalk et al 1992 Ray 2004 Argote 1999	Scale	Changes to Staffing	S14=SUM(Q8.0:8.6)/N

Table 10. Measurable Capability, Operational Definitions, Supporting Literature, Data Source, Information, and Survey Questions

Measurable Capability	Operational Definition	Supporting Literature	Data Source	Information	Field Code
		Shiplely 2011 Porter 1991 Stalk et al 1992 Ray 2004 Argote 1999	Scale	Changes to Roles	S15=SUM(Q9.0:9.6)/N
		Shiplely 2011 Porter 1991 Stalk et al 1992 Ray 2004 Argote 1999	Scale	Changes to Processes	S16=SUM(Q10.0:10.6)/N
Competitive Intensity	The level of competition in the marketplace among peer competitors measured by competitive offers on Government contracts.	Eisenhardt & Martin 2000 Ferrier 1999	FPDS	Number of Offers Received for Definitive Contracts	F4

The survey will begin with a single demographic question about the specific organization, not about the individual responding to the survey, asking whether the surveyed organization has operated under any other DUNS Number since 2003. Because survey responses will be linked to the organization’s FPDS data based upon the organization’s DUNS Number, requesting if the organization has operated under any different DUNS Numbers between 2003 and 2017 allows for proper correlation of responses for organizations undergoing corporate purchase or reorganization.

Variables will be controlled for to determine their impact on the dependent variables in the model. These Control Variables include the year the company was founded (Establishment Date); state of incorporation; number of secondary NAICS Codes; number of full-time equivalent (FTE) personnel (staff or consultant) working in business development within the organization; the percentage allocation of the organization’s revenue between prime Federal contracts, subcontracts for Federal work,

and work for other customers such as state or local governments, commercial work, and so on; and the FedBiz DaaS tool used by the organization. These Control Variables were included to improve causal identification and support analysis to assess individual relationships between the Independent Variable, Dependent Variables, and Control Variables, supporting the evaluation of the absence or presence of individual relationships between variables to assist in data analysis.

To quantify the Independent Variable, Use of FedBiz DaaS, respondents to the survey will identify the specific FedBiz DaaS tool(s) their organization uses, the year it was implemented by the organization, and how often the organization uses the tool. Questions will also be asked about how each organization uses its FedBiz DaaS tool as part of its business development process as defined by Shipley (2011). Respondents will register their answers based upon a FedBiz DaaS Usage Scale that indicates whether they use a FedBiz DaaS tool “Multiple Times a Day,” “Once a Day,” “Two to Three Times a Week,” “Once a Week,” or “Do Not Use.” For analysis purposes, a score of 4 will be associated with “Multiple Times a Day,” a score of 3 will be associated with “Once a Day,” a score of 2 will be associated with “Two to Three Times a Week,” a score of 1 will be associated with “Once a Week,” and a score of 0 will be associated with “Do Not Use.”

Analysis of H1: Use of FedBiz DaaS is positively related to competitive position.

The Dependent Variable, Competitive Position, is defined using three factors:

- Total Prime Definitive Contract Value
- Total Number of Prime Definitive Contracts Won

- Average Annual Prime Definitive Contract Value (defined as the Total Prime Definitive Contract Value divided by years to establish an organization's revenue per year before and after implementation of a FedBiz DaaS system)

The Independent Variables for Competitive Position includes the Usage Scale of FedBiz and the Year of FedBiz DaaS Implementation from survey responses. The Control Variables for Competitive Position include the Percentage of Revenue from Prime Contracts, the state of incorporation from SAM, and the number of additional NAICS Codes claimed by the organization.

The first test to support H1 will estimate the effects of the independent variables (FedBiz DaaS Usage Scale and all control variables) on each of the three measurements of Competitive Position: Total Prime Definitive Contract Value, Total Number of Prime Definitive Contracts Won, and Pre/Post-FedBiz DaaS Average Annual Prime Definitive Contract Value.

The results will provide an indication of significance of the construct relationships and of how well the data supports the hypotheses depicted in the conceptual model. To establish the impact FedBiz DaaS has on an organization's Competitive Position (Total Prime Definitive Contract Value, Total Number of Prime Definitive Contracts Won, and Pre/Post-FedBiz DaaS Average Annual Prime Definitive Contract Value), an ANOVA model will be conducted to support that determination.

The second test of H1 will use survey question number 5 to divide each organization's 15-year competitive history into a pre-FedBiz DaaS period, the implementation year of a FedBiz DaaS tool, and a post-FedBiz DaaS period. We will then perform a Paired Two Sample t-Test for the Average Annual Prime Definitive

Contract Value to compare each organization's pre/post Competitive Position data to see if there is a significant difference between these two samples. No Control Variables will be incorporated for this test because it examines company specific FPDS data for the years before and after implementation of a FedBiz DaaS system.

Analysis of H2: Use of FedBiz DaaS is positively related to changes in an organization's business development capabilities as represented by changes in staffing, roles, and processes.

Examining the Dependent Variable, Organizational Capabilities, is focused on the organizational changes occurring to staffing, roles, and processes. It will reference the Shipley Process (2011). Respondents will be queried on any changes in business development staffing since acquiring a FedBiz DaaS tool and, if so, in which of the Shipley Phases. The follow-on question will again use the Shipley Process and ask whether the organization has changed its business development roles or added new business development roles since implementing a FedBiz DaaS tool. The third and final question in this series using the Shipley Process will inquire about changes in the organization's business development processes since implementing a FedBiz DaaS tool. For all three questions, the same answers of "None," "Minor," "Moderate," "Major," and "Significant" will be available for respondents and the previous 0-4scoring process will also be used for these answers. All responses will prompt a request for an explanation of the change.

The Dependent Variable for any changes in staffing and the Control Variables will be derived from Question 2 in the demographic section of the survey instrument related to the number of full-time equivalents (staff or consultant) working in business development for the organization and the overall total number of employees (staff or

consultant) and how those staffing levels are reflected in changes to staffing to support business development efforts since implementing a FedBiz DaaS tool (survey question 8). The Dependent Variable for any changes in organizational roles will again use the Control Variables from demographic information identified in Question 2 of the survey instrument to identify business development personnel and the overall number of employees in the organization in comparison to the Shipley Process. The Dependent Variable for any changes in organizational processes since implementing a FedBiz DaaS tool will rely upon answers to the survey question.

Using the Shipley Process (2011) to provide the framework for overall, strategic, and tactical changes occurring within the organization to staffing, roles, and processes will support creation of a general organizational usage scale, a strategic usage scale, and a tactical usage scale. The general organizational usage scale focuses on Shipley's Phases 0 through Phase 6. The strategic usage scale will focus on strategic Organizational Capabilities changes (Shipley's Phase 0 and Phase 1). The tactical usage scale will rely upon Shipley's Phases 2 through Phase 6. These scores will then support a multivariate analysis of H2 using an ANOVA to model the effects of the demographic variables and FedBiz DaaS use on changes to Organizational Capabilities.

Analysis of H3: Use of FedBiz DaaS is positively related to competitive intensity in the Federal consulting marketplace.

To examine the level of competition in the marketplace among peer competitors measured by competitive offers on Government contracts, FPDS data on how many offers received will be correlated with two variables. First, we will repeat the pilot study's analysis by correlating the Number of Offers Received per contract with the contract year to show changes in Competitive Intensity over time. Next, we will correlate

the Number of Offers Received for each contract, per year, with the market penetration of FedBiz DaaS during those years. Estimating the market penetration of FedBiz DaaS will be achieved by taking the year of FedBiz DaaS implementation for each respondent organization and calculating the percentage of respondents that had a FedBiz DaaS capability that year. The strength of the correlation will show if the penetration of FedBiz DaaS in the marketplace and the Competitive Intensity of the marketplace are related.

CHAPTER 5. ANALYSIS OF THE IMPACT OF NEARLY COMPLETE MARKET DATA

Introduction

Businesses constantly focus on how to maximize their revenue, and when purchasing resources, routinely perform an analysis of the return on investment they will receive. FedBiz DaaS applications are marketed to Government contractors as a tool that can provide a nearly complete picture of all FedBiz opportunities available for them to bid on because they supply historical data and basic analysis to provide early notification of pending contract solicitations.

FedBiz DaaS services are routinely provided as a web-based subscription service, and as Pavlou and El Sawy (2010) have noted, the use of information technology (IT) may either stimulate or facilitate competitive dynamics in organizations. While the FedBiz DaaS industry has grown in supporting business development efforts, it is unclear how extensively such systems are used or whether or not they bring value to the company. The FedBiz DaaS resource is readily available and may give companies a competitive advantage that could manifest itself in an increase in the number and value of contracts awarded. A detailed analysis of the implementation and application of FedBiz DaaS tools will determine the impact on the Organizational Capabilities and Competitive Position of companies while also looking at the overall Competitive Intensity within the Government contracting marketplace.

Conceptual Model & Hypotheses

The definitions for Competitive Position, Organizational Capabilities, and Competitive Intensity remain unchanged from the pilot study:

Competitive Position – The number of contracts won in a year, the total

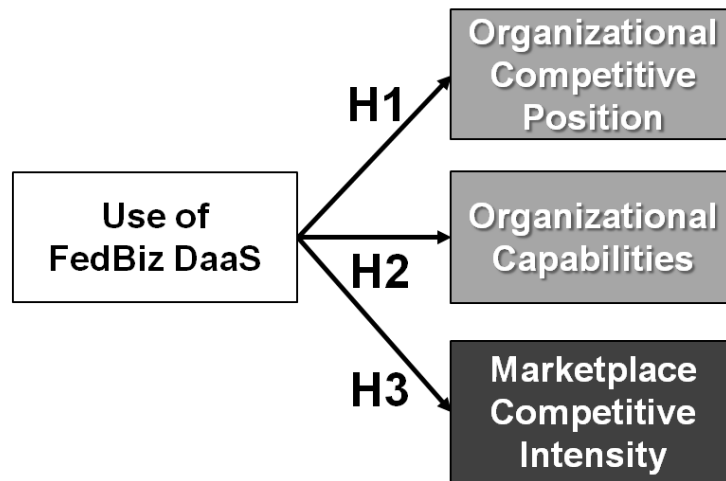
revenue awarded in those contracts, and an organization's annual average revenue.

Organizational Capabilities – How organizations change roles and processes to capture more value from new resources to improve the productivity of the organization and improve its effectiveness.

Competitive Intensity – The level of competition in the marketplace among peer competitors measured by competitive offers on Government contracts.

Hypotheses H1 (Competitive Position) and H2 (Competitive Position) remain unchanged. Hypothesis 2 (Organizational Capabilities) was revised to focus on a company's Staffing, Roles, and Processes associated with business development. Initially, The Total Number of Prime Definitive Contracts Won (F2) was proposed as a measure of assessing Hypothesis 1, Competitive Position; however, upon further investigation it was determined that revenue was the best measurement value, since the value of individual contracts varied considerably.

Figure 15. Conceptual Model



H1: Use of FedBiz DaaS is positively related to competitive position.

H2: Use of FedBiz DaaS is positively related to changes in an organization's business development capabilities as represented by changes in staffing, roles, and processes.

H3: Use of FedBiz DaaS is positively related to competitive intensity in the Federal consulting marketplace.

Data Collection

Based upon feedback from the interviews conducted in the pilot study, a survey was created in Qualtrics. The survey was released to various “survey panels” representing homogeneous groups over the course of several weeks; the groups were organized by Primary NAICS Code, size based upon Primary NAICS Code, and socio-economic status such as Woman-Owned Small Business (WOSB) or Service-Disabled, Veteran Owned Small Business (SDVOSB). Follow-up emails were sent one week as well as two weeks after the initial email to each group to encourage individual participation. To garner additional responses, attendees at an industry conference sponsored by the Hampton Roads Procurement Assistance Center at Old Dominion University were invited to complete paper copies of the survey. A breakdown of Qualtrics survey panels and solicitation dates is shown below.

Table 11. Survey Panels and Release Dates

Survey Panel	Initial Release Date
NAICS 541611 Distribution Panel (Count 1,212)	4 January 2019
NAICS 541618 Distribution Panel (Count 314)	4 January 2019
NAICS 541690 Distribution Panel (Count 578)	4 January 2019
Supplemental Distribution Panel (Count 171)	12 January 2019
NAICS 541330 Distribution Panel (Count 1,050)	12 January 2019
NAICS 541612 Distribution Panel (Count 160)	14 January 2019
GovWin Small Company Distribution Panel (Count 121)	16 January 2019
GovWin Large Company Distribution Panel (Count 1,392)	16 January 2019
GovWin WOSB Distribution Panel (Count 361)	20 January 2019
GovWin Certified 8a Distribution Panel (Count 383)	20 January 2019
GovWin SDVOSB Distribution Panel (Count 268)	20 January 2019
GovWin Top 100 Large Businesses (Count 2,896)	28 January 2019
Hampton Roads Procurement Assistance Center (Count 30)	30 January 2019
Women’s Professional Organization (Count 13)	4 February 2019
Total Count of Survey Invitations = 8,919	

Valid survey responses were received from 207 individual respondents; in cases where multiple responses were received from the same company, the most complete response was used to represent that company and the other responses were not counted, yielding respondents representing 186 different companies. Corporate DUNS Numbers were used to link survey responses to FPDS data; however, for the 15 responses received from the paper copies distributed at the industry conference on 30 January 2019, 10 responses did not provide a DUNS Number, leaving 176 responses with both survey and FPDS data. The responses not linked to a DUNS Number will not support analysis for H1 or H3, but can support analysis for H2.

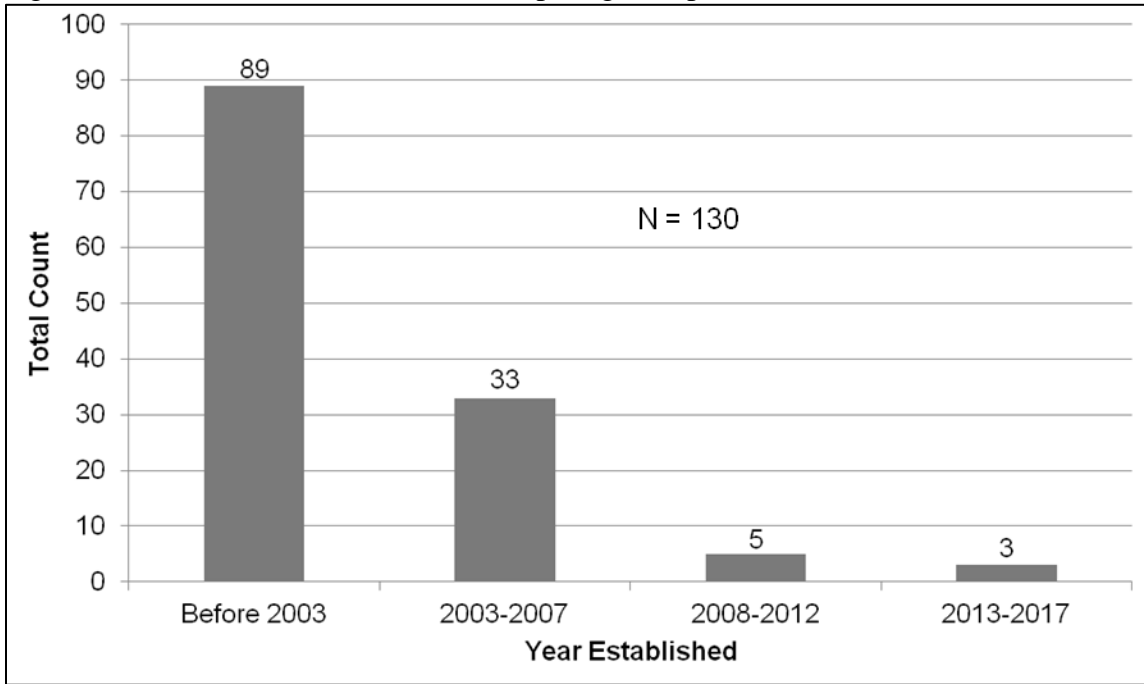
Table 12. Sample Size Adjustments

Sample Size	Description
8,919	Individuals receiving survey invitation
207	Valid survey responses
186	Individual companies
176	Companies associated with a DUNS Number
122	Companies with 10 or more years of SAM registration
82	Respondents who answered usage questions
60	Companies with known implementation years and size
45	Companies with known date of implementation and revenue
26	Companies with appropriate pre and post periods of revenue

Demographic Information and Analysis

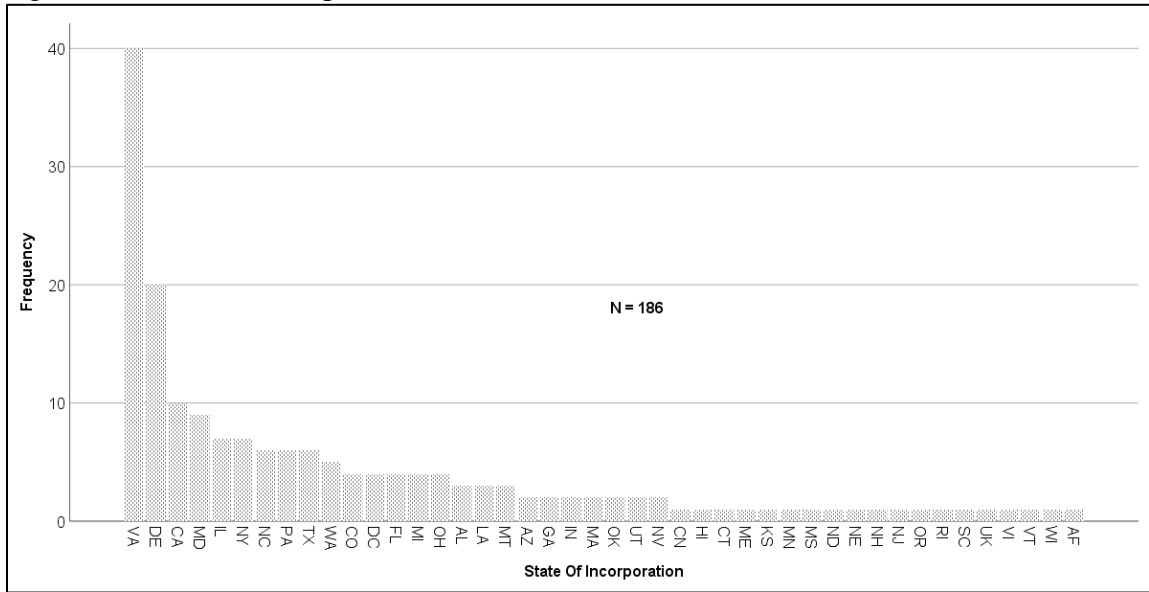
Of the 186 responses, it was determined that 89 were established before 2003, providing information on 48% of the corporations for analysis over the entire 15-year study period. An additional 33 companies were established between 2003 and 2007, thus prior to 2008; this means the total number of companies established for at least 10 years of the study period equaled 122, or 66 percent of the study population. Eight companies were established during the final ten years of the study period; five between 2008 and 2012 and three between 2013 and 2017.

Figure 16. Establishment Date for Participating Companies



The company “State of Incorporation” was pulled from the SAM database. For large businesses, 12 of 21 were incorporated in Delaware while 36 of 157 small businesses were incorporated in Virginia. There were 8 businesses that could not be identified with a state of incorporation. There were three businesses incorporated in foreign countries (Afghanistan, Canada, and the United Kingdom) but all three were registered to conduct business with the Government and the company incorporated in Afghanistan was actually a local legal entity of a very large corporation located in the United States.

Figure 17. State of Incorporation



Because the response rate to initial emailed survey invitations to small businesses was lagging, survey invitations were also sent to large businesses (as defined by the Small Business Administration and extracted from the SAM database). Ultimately, 165 responses were received from small businesses and 21 responses were received from large businesses.

Sample Data Distributions and Analysis

Since this study focuses on the use of FedBiz DaaS, we created two variables that measure use. Q6, Frequency of FedBiz DaaS Use looks at how often a firm uses its tool and S11, Overall Use, looks at how the tool is used throughout the business development process. To see if large and small companies differed in their use of the tool, we compared both measures of usage with organizational size. This analysis involved a crosstab of Q6, Frequency of FedBiz DaaS Use, with D4, Business Size, and an ANOVA of S11, Overall Use, and D4, Business Size.

Table 13. Crosstab of Overall Use and Business Size

		Frequency Of Use						Total
		Do Not Use	Weekly	2-3 Times a Week	Daily	Multiple Times a Day		
Business Size	Large	5	0	0	1	1	14	21
	Small	99	6	11	12	7	30	165
Total		104	6	11	13	8	44	186

Pearson Chi-Square of 25.219 with 5 degrees of freedom and a p-value of .000.

Table 14. Between-Subjects Effects for Overall Use and Business Size

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	3.551 ^a	1	3.551	3.832	.054	.049
Intercept	340.768	1	340.768	367.769	.000	.831
D4 Business Size	3.551	1	3.551	3.832	.054	.049
Error	69.494	75	.927			
Total	530.663	77				
Corrected Total	73.044	76				

a. R Squared = .049 (Adjusted R Squared = .036)

Table 15. Parameter Estimates for Dependent Variable Average Number of Offers

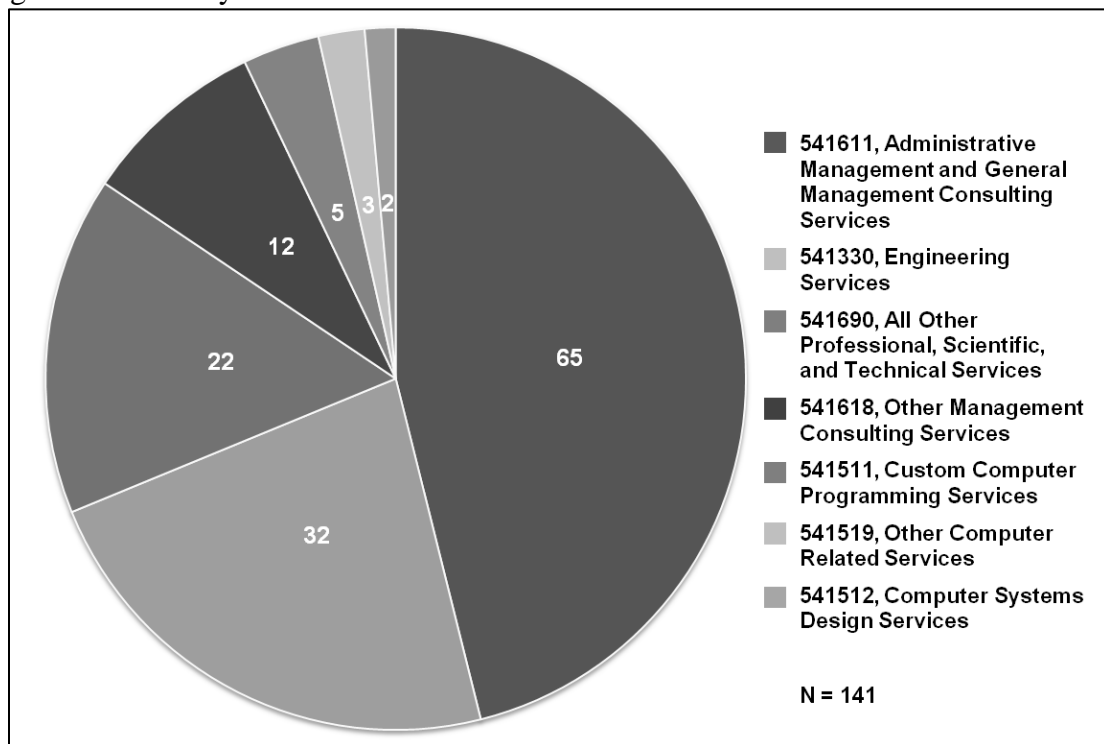
Parameter	B	Std. Error	t	Sig.	Partial Eta Squared
Intercept	2.328	.123	18.888	.000	.826
D4 Business Size = Large	.529	.270	1.958	.054	.049
D4 Business Size = Small	0 ^a				

a. This parameter is set to zero because it is redundant.

The p-value of the chi-square test on Q6, Frequency of FedBiz DaaS Use and D4, Business Size, was .000 showing that a significant relationship exists between the size of a company and the frequency of its use of FedBiz DaaS. The ANOVA of D4, Business Size, versus S11, Overall Use, produced a p-value of .054. This indicates that there is not a significant difference in how small and large firms use their FedBiz DaaS at the .05 level but it is very close to being significant. Interestingly, the ANOVA also shows a fairly strong coefficient of contribution of .529.

Most of the respondents were associated with providing services, with 131 of the 186 companies claiming 4 Primary NAICS Codes: 541611, Administrative Management and General Management Consulting Services; 541330, Engineering Services; 541690, All Other Professional, Scientific, and Technical Services; and 541618, Other Management Consulting Services. The remaining 55 companies claimed 16 different Primary NAICS Codes.

Figure 18. Primary NAICS Codes



The number of Full-Time Equivalent (FTE) personnel employed by each company ranged from a low of 1 to a high of 8,700. As shown below, the median FTE count was just 10 employees, meaning half of the respondents have 10 or fewer employees with companies having 1 employee being the most common (mode).

Table 16. Descriptive Statistics for Total Full-Time Equivalents (FTE)

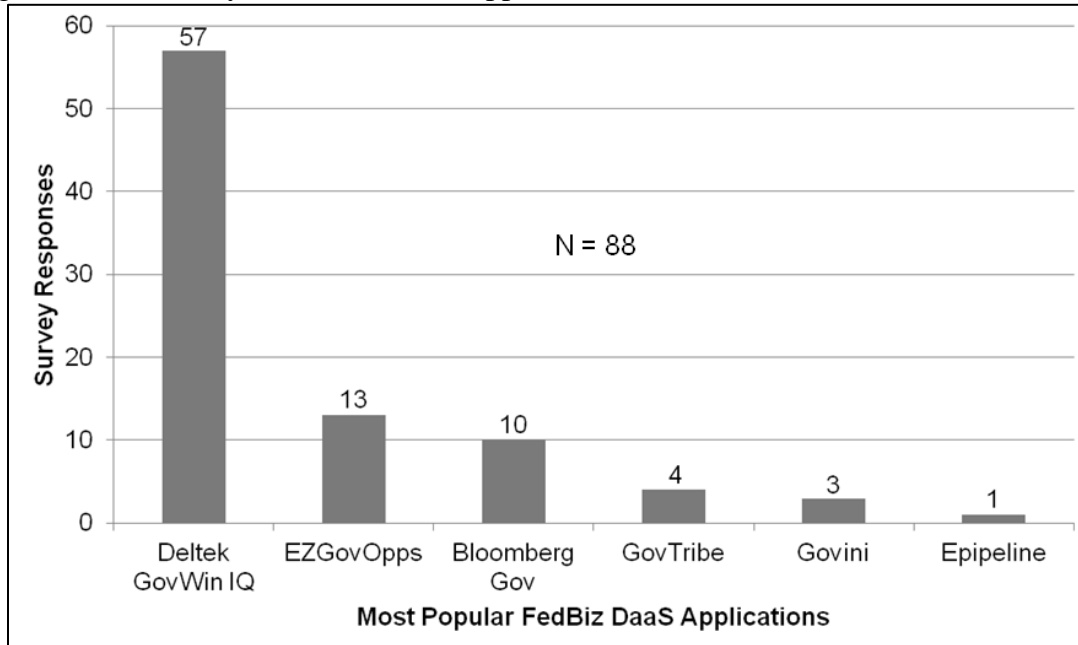
N	Valid	176
	Missing	10
Mean		2,109
Median		10.00
Mode		1

Looking at FPDS data, 120 of the 186 companies had not received a Prime Definitive Contract award during the 15 years of the study. The implication is that many of the respondents are small businesses that do not compete for Prime Definitive Contracts, making them less useful for this study. This does not mean these companies are unprofitable but rather that they find other types of work:

- Subcontract work
- Indefinite Delivery/Indefinite Quantity (IDIQ) contracts
- IDIQ task orders
- Task orders issued under a Government ordering schedule

When respondents answered questions about which FedBiz DaaS application they used, Deltek GovWin IQ was the market share leader. It should be noted that 28 of the respondents identified their company used at least 2 different FedBiz DaaS applications, while 9 companies reported using 3 or more different FedBiz DaaS applications.

Figure 19. Summary of FedBiz DaaS Applications

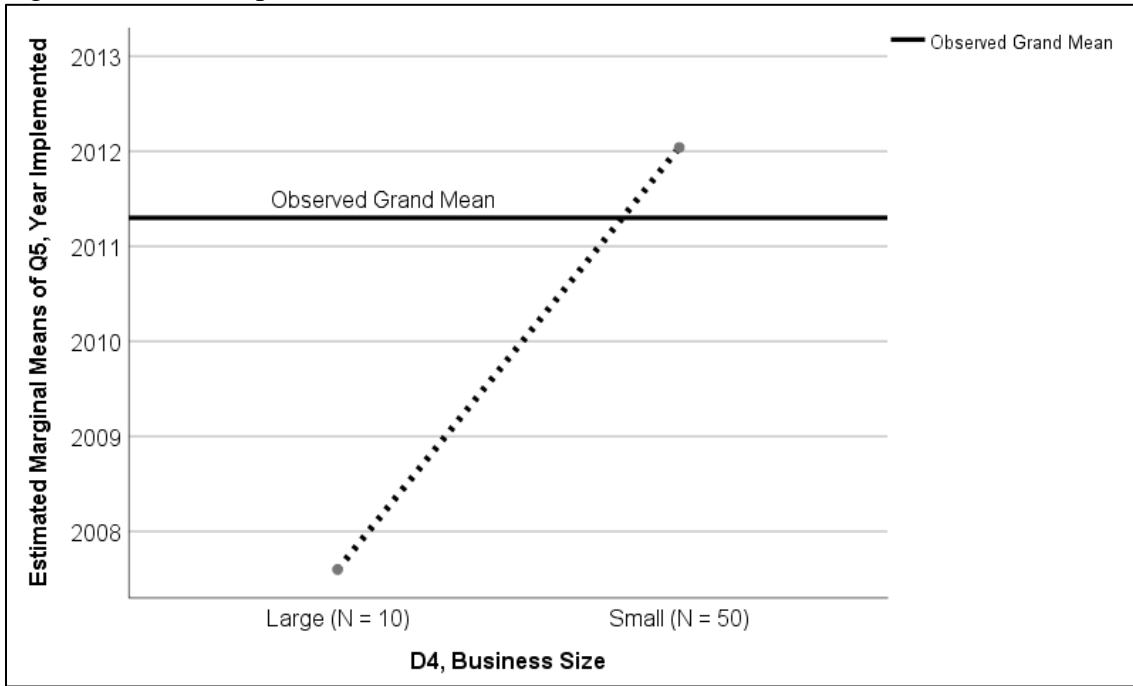


For the 60 respondents who knew when their company first implemented a FedBiz DaaS application, the average year for implantation was 2011. The 10 large businesses that could identify their implementation year reported they implemented as early as 2002 and as late as 2013, with an average implementation year of 2007. Implementation for the 50 small businesses ranged from 2002 to 2018, with the average year of implementation being 2012.

Table 17. Business Size and Year Implemented

	N	Earliest	Mean
D4, Business Size = Large	10	2002	2007
D4, Business Size = Small	50	2002	2012
Total			2011

Figure 20. Year Implemented and Business Size



An ANOVA shows that the difference in the FedBiz DaaS implementation timeframe (Q5, Year Implemented) between large and small businesses (D4, Business Size) is statistically significant with a p-value of .004 and there is a distinct difference between large and small businesses regarding when FedBiz DaaS was implemented. The coefficient of contribution of -4.440 is moderately strong indication of how much earlier large businesses implemented their FedBiz DaaS applications.

Table 18. Between-Subjects Effects for Business Size and Year Implemented

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	164 ^a	1	164	8.936	.004	.133
Intercept	134645882	1	134645881	7323750.002	.000	1.000
D4, Business Size	164	1	164	8.936	.004	.133
Error	1066	58	18			
Total	242720892	60				
Corrected Total	1231	59				

a. R Squared = .133 (Adjusted R Squared = .119)

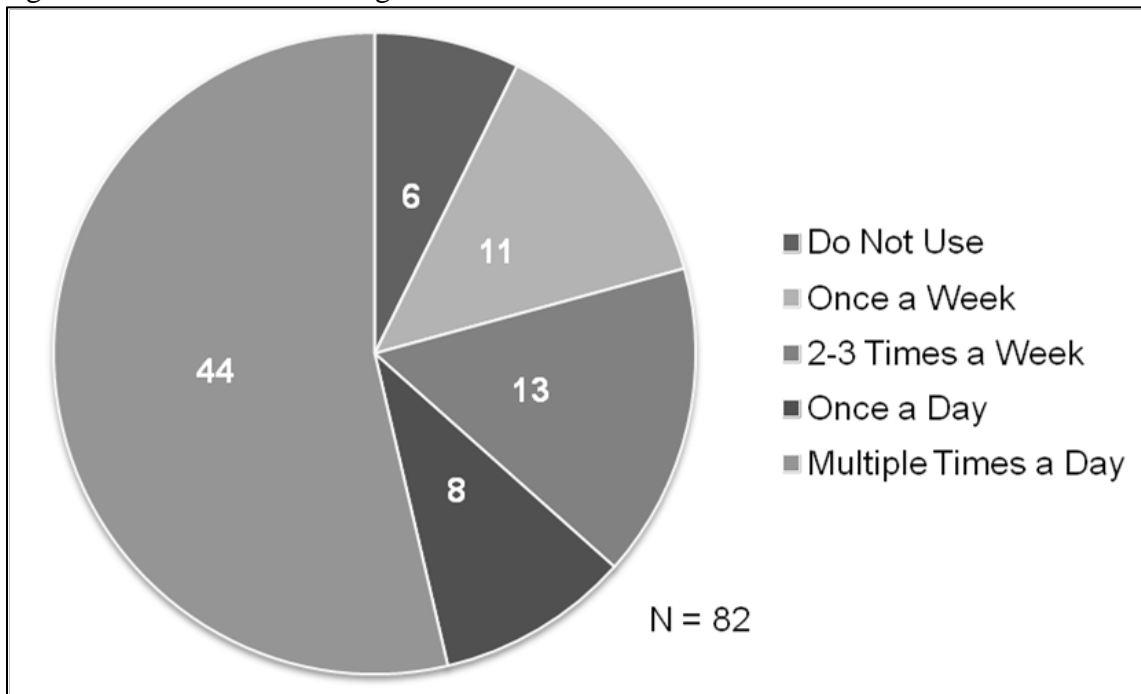
Table 19. Parameter Estimates for Business Size and Year Implemented

Parameter	B	Std. Error	t	Sig.
Intercept	2012.040	.606	3318.118	.000
D4, Business Size = Large	-4.440	1.485	-2.989	.004
D4, Business Size = Small	0 ^a	.	.	.

a. This parameter is set to zero because it is redundant.

In examining S11, Overall Use of FedBiz DaaS in Shipley Phases, the FedBiz DaaS applications appear to be heavily depended upon; over half (44 of 82) used their application “Multiple Times a Day” while only 6 of 82 replied “Do Not Use.” Combining “Multiple Times a Day” and “Once a Day” shows that 63 percent (52 of 82) of the companies use their application(s) at least daily.

Figure 21. FedBiz DaaS Usage



The Shipley Process is one of the most widely used methods within Government contracting, relying upon segmentation of a series of phases similar to Cooper’s Stage-Gate Theory (Cooper, 1986). Survey respondents were asked a series of questions about their use of FedBiz DaaS in the context of the Shipley Process. The first two phases can

be considered strategic positioning, Phase 0, Market Segmentation, and Phase 1, Long-Term Positioning, and will be examined through S12, Use of FedBiz DaaS for Long-Term Positioning. The next five phases, Phase 2 through Phase 6, are more tactical in nature and are focused on Opportunity Assessment, Capture Planning, Proposal Planning, Proposal Development, and Post-Submittal Activities; they will be examined through S13, Use of FedBiz DaaS for Tactical Positioning.

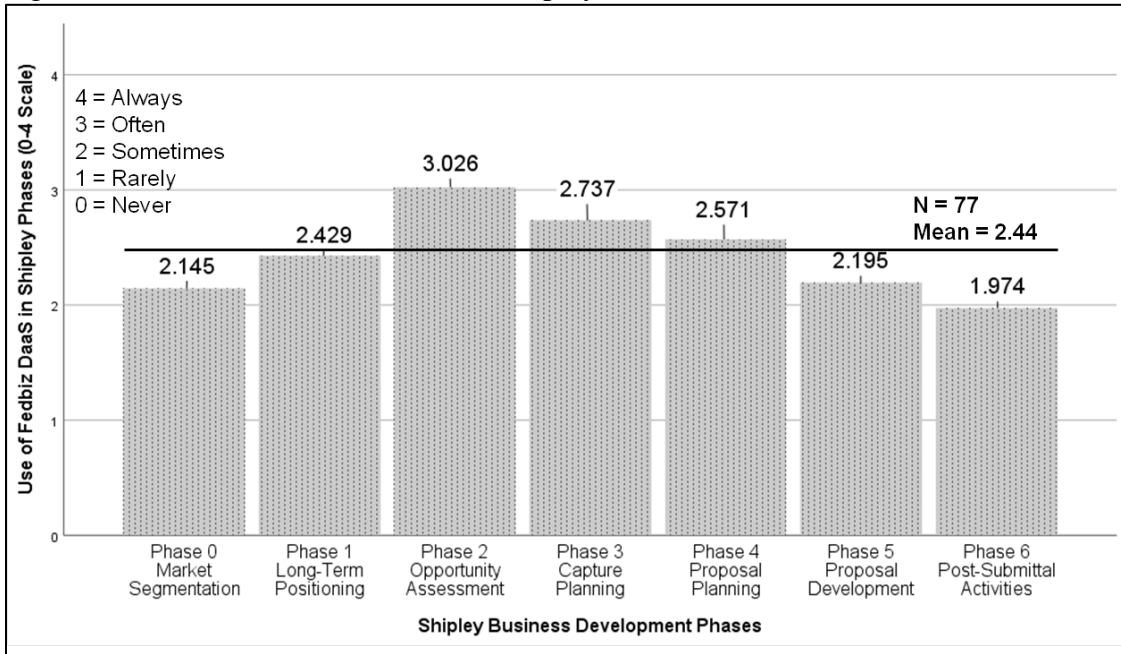
Survey respondents were asked about their overall use of the FedBiz DaaS application within the context of all seven phases of the Shipley Process. Their responses were entered into a Likert-scale with the options of: Never, Rarely, Sometimes, Often, or Always.

Table 20. Use of FedBiz DaaS in the Shipley Process

	N	Minimum	Maximum	Mean	Std. Deviation
Phase 0, Market Segmentation	76	0	4	2.14	1.303
Phase 1, Long-Term Positioning	77	0	4	2.43	1.282
Phase 2, Opportunity Assessment	77	0	4	3.03	1.203
Phase 3, Capture Planning	76	0	4	2.74	1.248
Phase 4, Proposal Planning	77	0	4	2.57	1.302
Phase 5, Proposal Development	77	0	4	2.19	1.367
Phase 6, Post-Submittal Activities	77	0	4	1.97	1.214
Valid N (listwise)	75				

Looking at the standard deviations, there appears to be no significant difference in responses. Respondent companies appear to use their FedBiz DaaS application the most in Phase 2 and Phase 3 and the least in Phase 6.

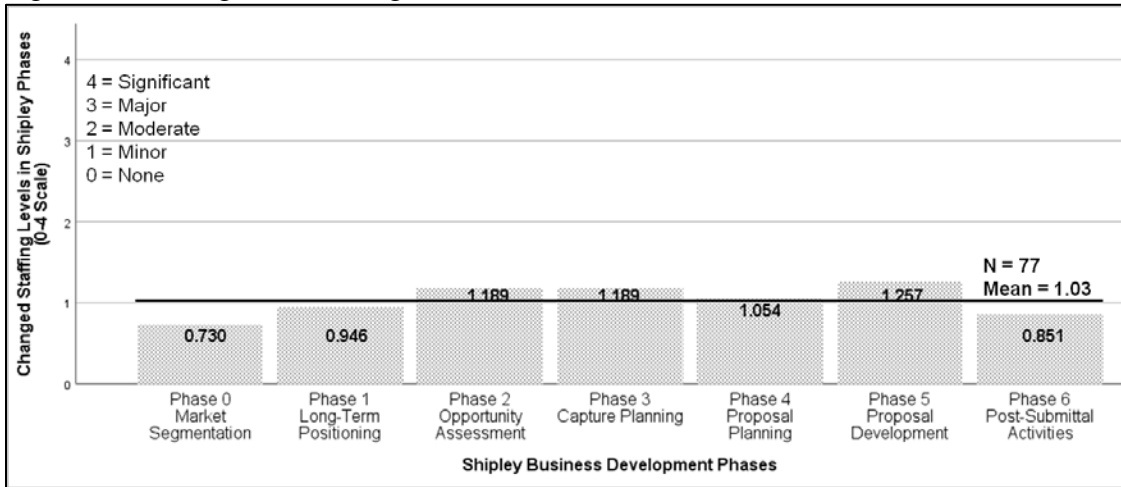
Figure 22. Use of FedBiz DaaS in the Shipley Process



The next survey question was related to S14, Overall Changed Staffing Since Implementing FedBiz DaaS, and asked respondents to identify changes to business development staffing levels that may have occurred within their company since implementing their FedBiz DaaS application. Responses were entered into a Likert-scale with the options of: None, Minor, Moderate, Major, or Significant. The standard deviations are too high to show any significant difference between phases, although there appeared to be an emphasis on staffing changes focused on providing short-term tactical advantage instead of supporting the long-term strategic focus that does not produce immediate results.

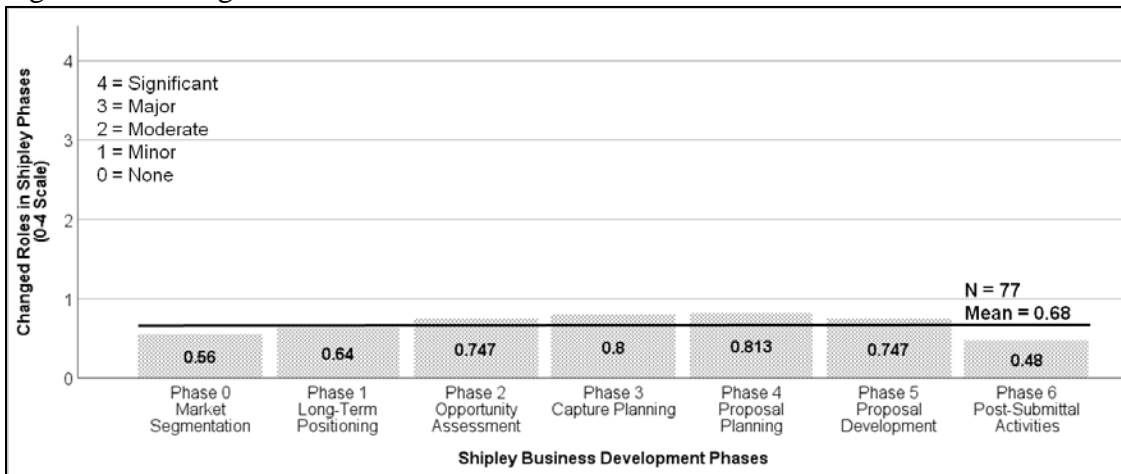
The standard deviation shows there was no significant difference in responses between phases. Staffing changes were evident in Phase 2 and Phase 3, with Phase 5 recording the highest score and least evident in Phase 0, Phase 1, and Phase 6.

Figure 23. Changes to Staffing



The next survey question asked respondents to identify whether or not their company had changed or added new roles anywhere in the Shipley Process to satisfy S15, Changes to Roles. Their responses were also entered into a Likert-scale with the options of: None, Minor, Moderate, Major, or Significant. Statistically, there was no significant difference in responses, with Phases 2 through Phase 5 showing the most impact and Phase 0, Phase 1, and Phase 6 showing the least impact.

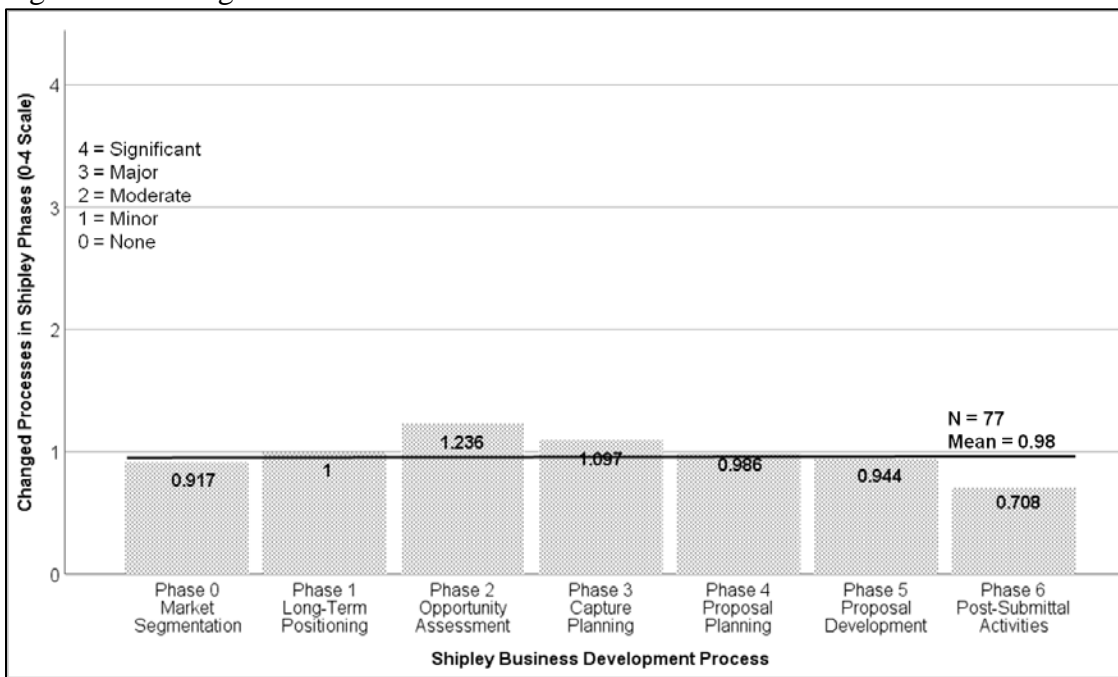
Figure 24. Changes to Roles



The final survey question based upon the Shipley Process asked respondents to address S16, Changes to Processes, regarding how their company accomplished business

development. Their responses were entered into a Likert-scale with the options of: None, Minor, Moderate, Major, or Significant. The standard deviation shows there was no significant difference between Shipley Phases although it does appear that Phase 2, Opportunity Assessment, had more process changes than any other phase. The standard deviation again shows no significant difference between phases. Phases 2 and 3 show the highest Changes to Processes and Phase 6 shows the lowest Changes to Processes.

Figure 25. Changes to Processes



To establish the results associated with the implementation of FedBiz DaaS applications, contract award data from the FPDS database was analyzed for each company that could be associated with a DUNS Number. For the 15-year study period, the data included the dollar value awarded annually for definitive contracts. When initially examining this information, there was concern that the inclusion of large businesses within the sample size might disproportionately exaggerate results, and there was the added complication that many of the small businesses reported no revenue from

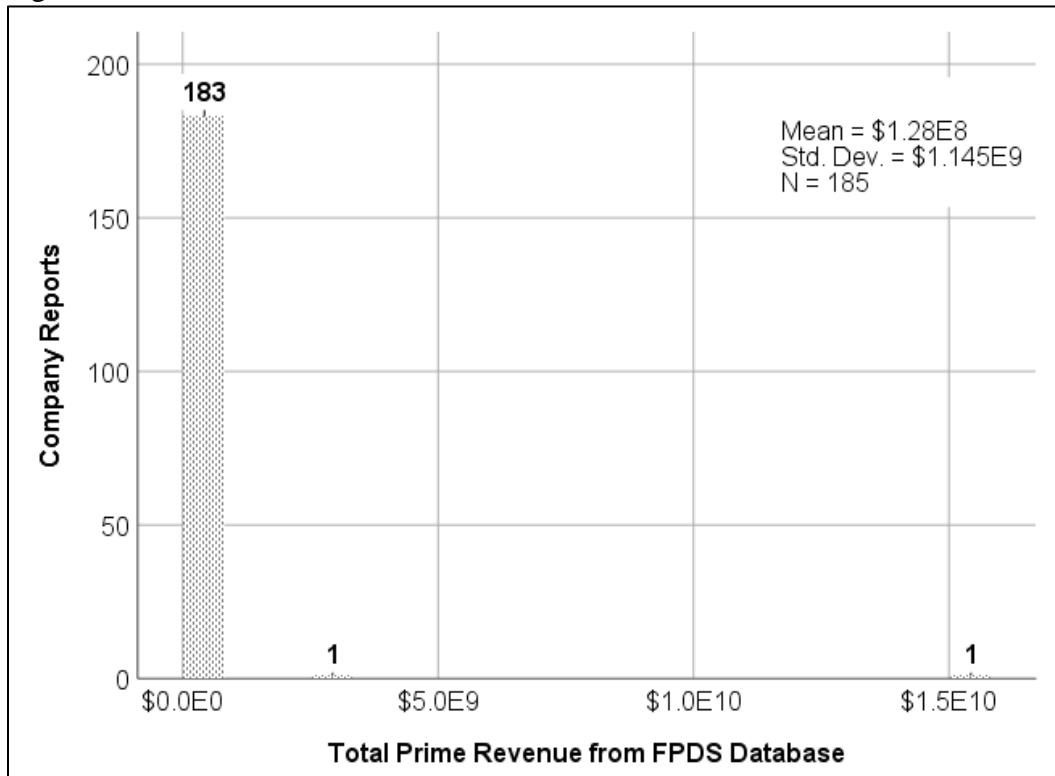
prime definitive contracts. This concern became manifest when the raw data was examined.

Table 21. Revenue for Prime Definitive Contracts

	Statistic	Std. Error
Total Prime \$ Mean	\$128,062,427	\$84,202,816
Std. Deviation	\$1,145,282,118	
Minimum	\$0	
Maximum	\$15,339,268,872	
Skewness	12.925	.179
Kurtosis	171.785	.355

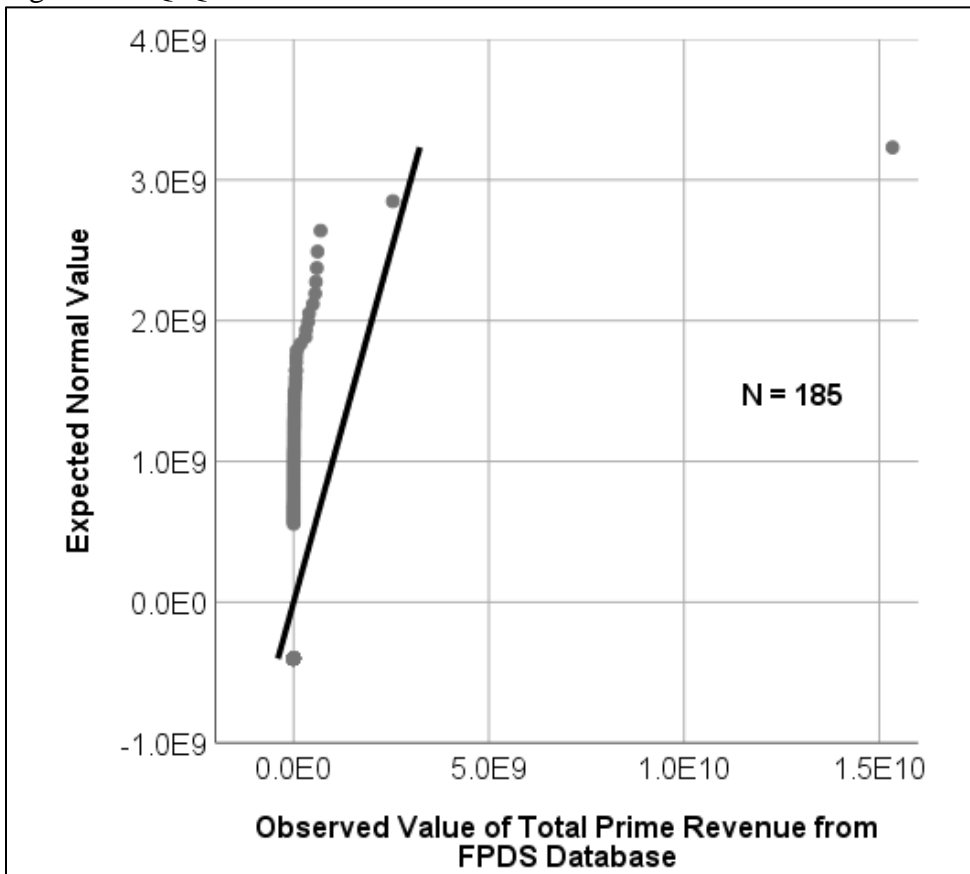
The values returned for skewness and kurtosis can only be classified as abnormal. A skewness value of 12.925 indicates that the distribution is not normal therefore making it unsuitable for standard statistical techniques. In a similar fashion, the kurtosis value of 171.785 shows infrequent extreme deviations (outliers) also making the distribution non-normal. Again, this is not suitable for standard parametric statistics.

Figure 26. Revenue from FPDS Database for Prime Definitive Contracts



To attempt to make sense of this information, a quantile-quantile (Q-Q) plot was processed in SPSS to produce a probability plot. Based upon the Q-Q plot, the abnormality is apparent and the distribution is not close to being normal.

Figure 27. Q-Q Plot of Total Prime Revenue from FPDS Database



To address this issue, the SPSS data set was reduced to only companies having Prime Definitive Contract revenue or having implemented a FedBiz DaaS. The rationale for excluding these companies is that this study is looking at the relationship between FedBiz DaaS use and Prime Definitive Contract awards. Companies with no Prime Definitive Contracts are usually sub-contractors or firms earning income in ways other than Prime Contracts and are normally not using a FedBiz DaaS application. Companies with no Prime Definitive Contracts that have implemented a FedBiz DaaS are

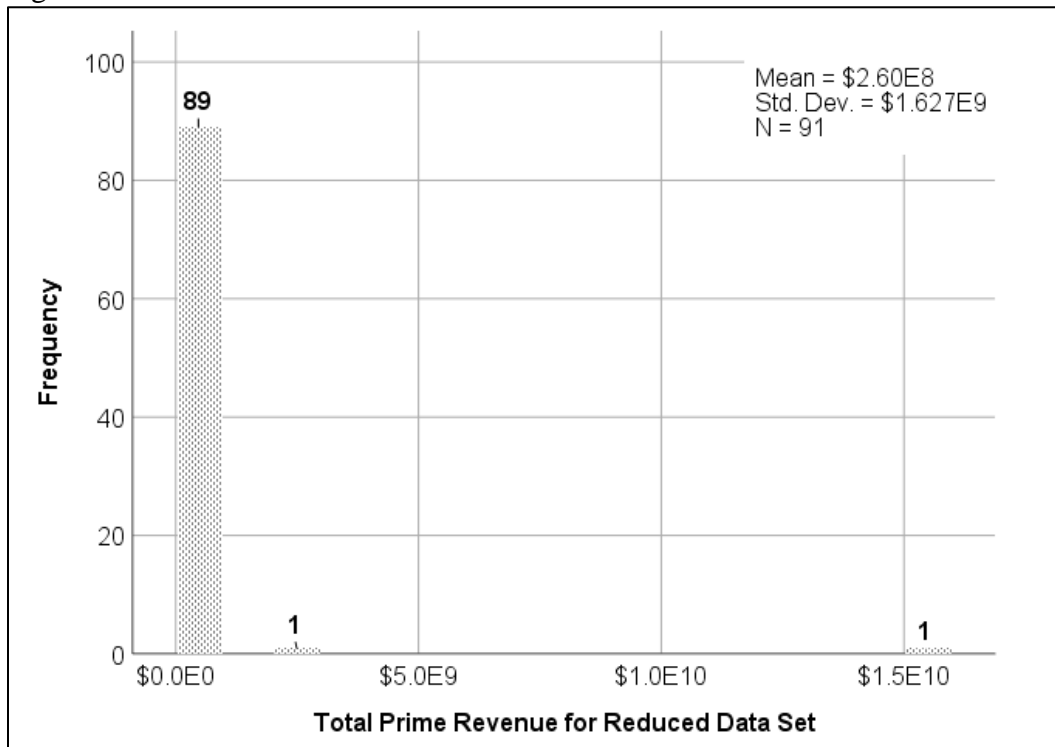
presumably looking to compete. Repeating the normality tests on this new distribution shows a similarly heavily skewed distribution.

Table 22. Reduced Data Set for Revenue from Prime Definitive Contracts

		Statistic	Std. Error
Total Prime \$	Mean	\$260,346,693	\$170,545,870
	Std. Deviation	\$1,626,903,906	
	Minimum	\$0	
	Maximum	\$15,339,268,87	
	Skewness	9.074	.253
	Kurtosis	84.593	.500

While skewness improved from 12.925 to 9.074 and kurtosis shifted from 171.785 to 84.593, the fact remains that the values must still be classified as abnormal and therefore not suitable for parametric statistical analysis.

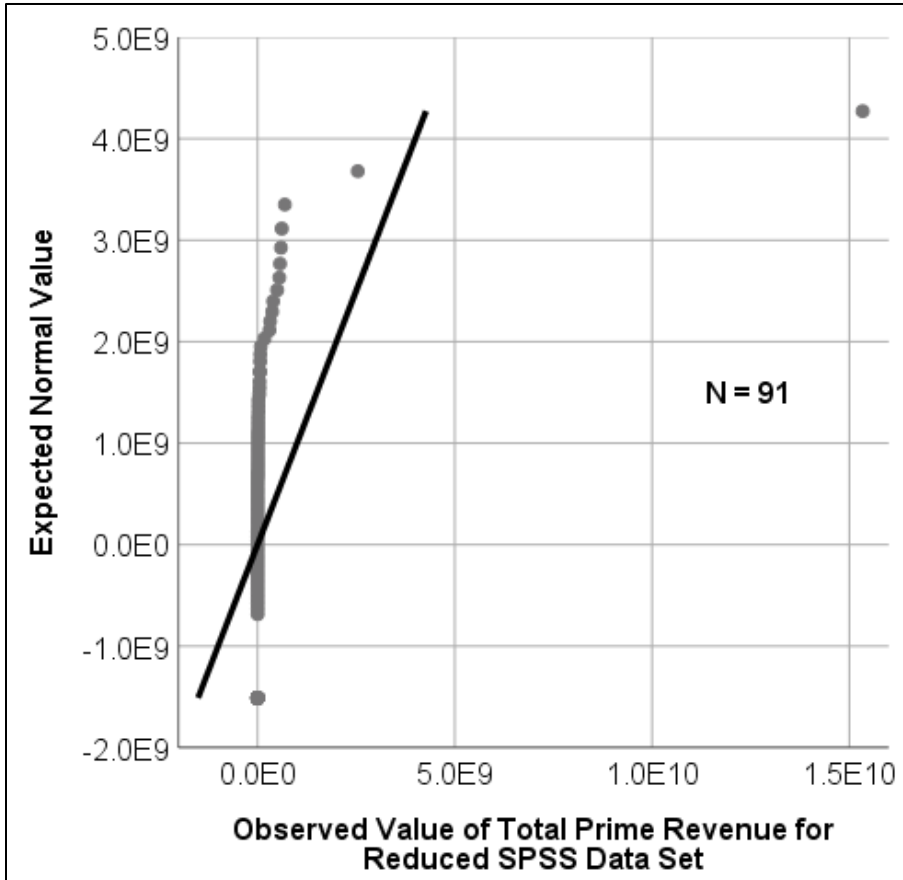
Figure 28. Revenue from FPDS Database for Prime Definitive Contracts



When the Q-Q Plot was run a second time in SPSS, it did not change much because the distribution is still not close to being normal. There is certainly improvement

from the initial Q-Q Plot, but the results still reflect the problems associated with abnormal skewness and kurtosis values and the distribution is far from normal.

Figure 29. Q-Q Plot of Total Prime Revenue Using Reduced Data Set



Statistical researchers have shown in studies such as this one that dollar values frequently skew distributions when analyzed for statistical purposes (Zumel and Mount, 2014) Zumel and Mount say that this is especially true in research with the presence of small businesses (small revenue) and large businesses (large revenue) in the same population sample (Zumel and Mount, 2014). To avoid such a skewed distribution, they recommend that a researcher transform the dollar denominated data using a log10 transform. Such a transform reduces the range from 0–tens of billions to 0-10, thus

concentrating the observations in a new distribution. This transformation was applied to F1, Definitive Prime Contracts and the normality examined again.

Table 23. Log10 Reduced Data Set for Revenue from Prime Definitive Contracts

		Statistic	Std. Error
Log10	Mean	6.924	.1639
	Std. Deviation	1.332	
	Minimum	3.86	
	Maximum	10.19	
	Skewness	-.100	.295
	Kurtosis	-.158	.582

As a result of using the Log10 transform, skewness is now -0.1, and kurtosis is 0.158. Both these measure are acceptable, closely approximating a normal distribution and hence acceptable for this analysis. Moreover, because the kurtosis is less than 3, it means there are not as many outliers, and those that exist are less extreme. The net result of the Log10 process is that acceptable data is now available for analysis. The resulting histogram and Q-Q plot demonstrate that the total prime revenue transformed by Log10 creates a normal distribution:

Figure 30. Log10 Total Prime Revenue Using Reduced Data Set

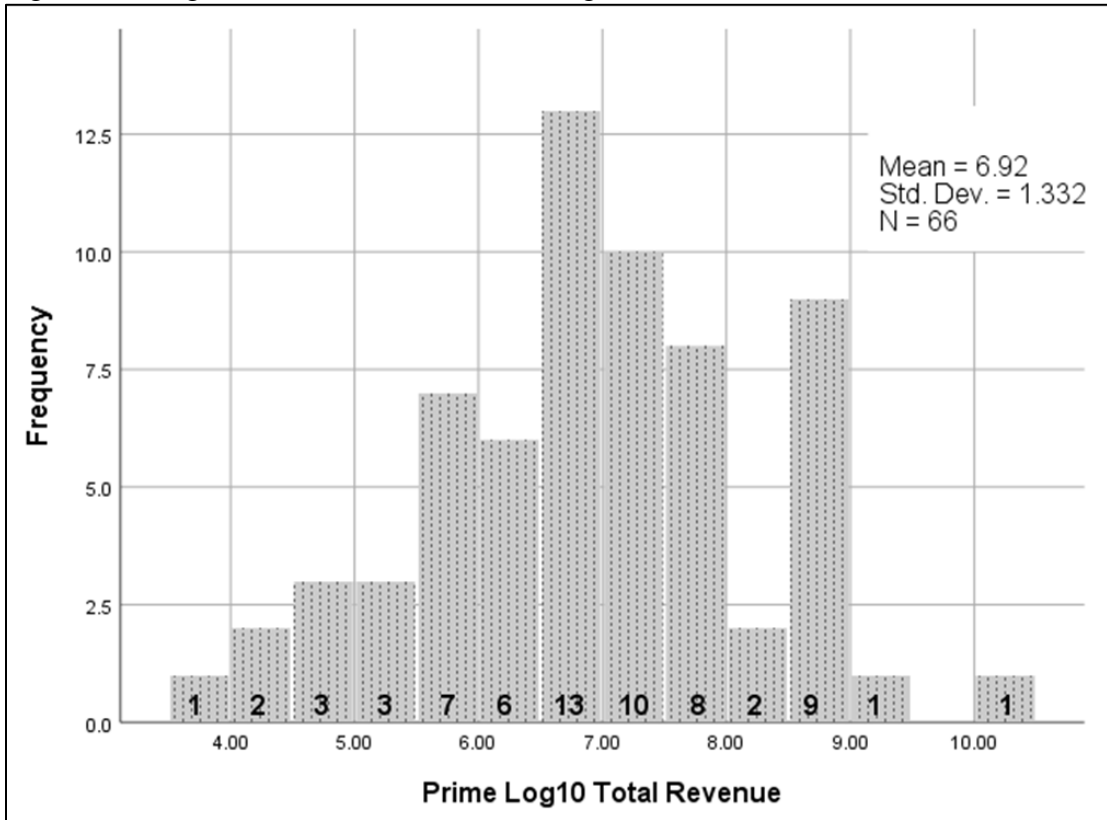
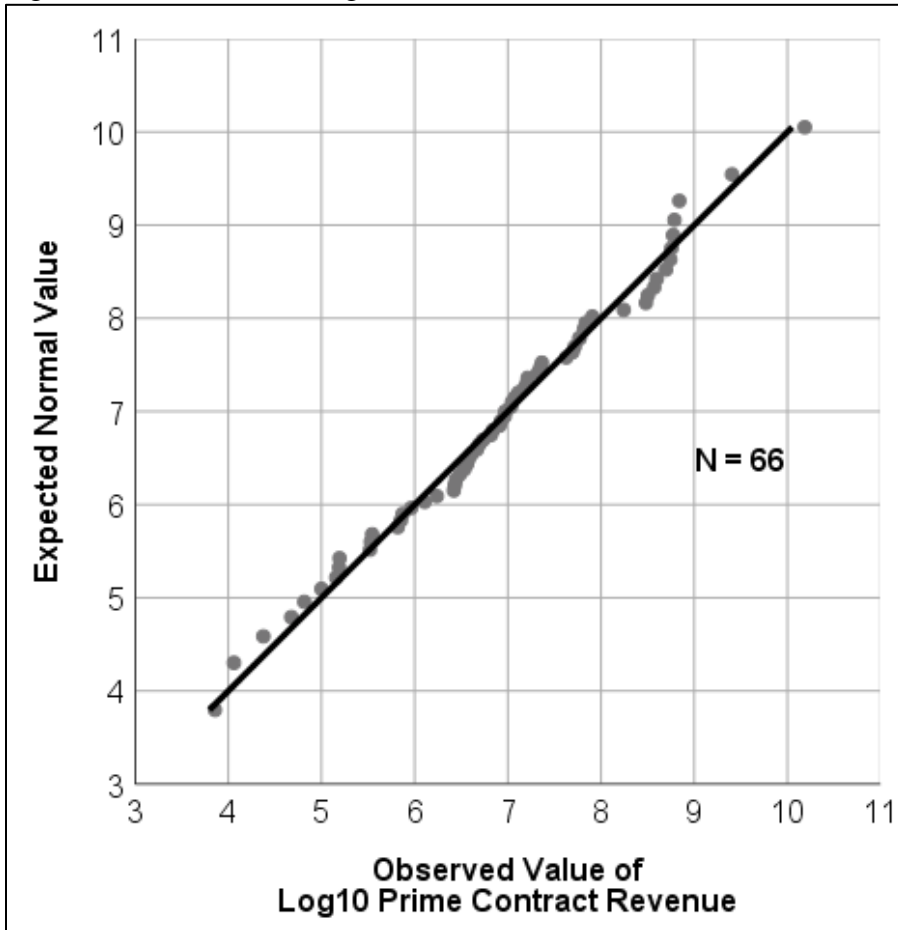


Figure 31. Q-Q Plot of Log10 Total Prime Revenue



Findings

Analysis of H1, Use of FedBiz DaaS is Positively Related to Competitive Position

Two tests of H1 were performed to assess the significance of the effect of the independent variable, use of FedBiz DaaS on the dependent variable, Competitive Position. The first test looked at the effects of two measures of use (Q6, Frequency of Use, and S11, Overall Use of FedBiz DaaS in Shipley Phases) on Log10 Prime (a Log10 transformation of F1, Total Prime Definitive Contract Value) using ANOVA.

Table 24. Descriptive Statistics for Prime Log10 and Overall Use

	Mean	Std. Deviation	N
Prime Log10	7.0877	1.20596	45
S11	2.4857	.96718	45

The first ANOVA used S11, Overall Use of FedBiz DaaS in Shipley Phases, as the independent variable and the Log10 transformation of F1, Prime Log10 as the dependent variable. The p-value was .035 showing that the effect is unlikely to have occurred by chance. Looking at the parameter estimates shows that S11, Overall Use, has a coefficient of contribution of .394 indicating a moderate effect.

Table 25. ANOVA^a for Prime Log10 and Overall Use

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.381	1	6.381	4.763	.035 ^b
	Residual	57.610	43	1.340		
	Total	63.991	44			

a. Dependent Variable: Prime Log10

Table 26. Tests of Between-Subjects Effects for Overall Use and Prime Log10

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	6.381 ^a	1	6.381	4.763	.035	.100
Intercept	216.546	1	216.546	161.629	.000	.790
S11	6.381	1	6.381	4.763	.035	.100
Error	57.610	43	1.340			
Total	2324.606	45				
Corrected Total	63.991	44				

a. R Squared = .100 (Adjusted R Squared = .079)

Table 27. Parameter Estimates for Overall Use and Prime Log10

Parameter	B	Std. Error	t	Sig.
Intercept	6.109	.481	12.713	.000
S11	.394	.180	2.182	.035

Given that our previous findings indicated a difference in how small and large firms use FedBiz DaaS, the ANOVA was redone with both D4, Business Size, and S11, Overall Use, to determine the significance of both relationships. The results show that D4, Business Size, has a significant relationship (.000) with Prime Log10 while S11 (.274) does not.

Table 28. Between-Subjects Effects for Overall Use and Business Size

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	31.425 ^a	2	15.712	20.263	.000	.491
Intercept	241.037	1	241.037	310.856	.000	.881
S11	.951	1	.951	1.226	.274	.028
D4 Business Size	25.044	1	25.044	32.298	.000	.435
Error	32.567	42	.775			
Total	2324.606	45				
Corrected Total	63.991	44				

a. R Squared = .491 (Adjusted R Squared = .467)

Table 29. Parameter Estimates for Overall Use and Business Size

Parameter	B	Std. Error	t	Sig.	Partial Eta Squared
Intercept	6.114	.366	16.726	.000	.869
S11	.159	.143	1.107	.274	.028
D4 Business Size=Large	1.628	.286	5.683	.000	.435
D4 Business Size=Small	0 ^a

a. This parameter is set to zero because it is redundant.

The second independent variable examined for H1 uses Q6, Frequency of FedBiz DaaS Use, as the independent variable and again uses Prime Log10 as the dependent variable. This ANOVA produced a p-value of .042, meaning that again there is a statistically significant relationship in Q6, Frequency of FedBiz DaaS Use, and the coefficient of contribution of .322 indicates a moderate impact.

Table 30. Between-Subjects Effects for Prime Log10 and Frequency of FedBiz DaaS Use

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	5.945 ^a	1	5.945	4.404	.042	.093
Intercept	172.055	1	172.055	127.457	.000	.748
Q6, Frequency Of Use	5.945	1	5.945	4.404	.042	.093
Error	58.046	43	1.350			
Total	2324.606	45				
Corrected Model	63.991	44				

a. R Squared = .093 (Adjusted R Squared = .072)

Table 31. Parameter Estimates for Prime Log10 and Frequency of FedBiz DaaS Use

Parameter	B	Std. Error	t	Sig.	Partial Eta Squared
Intercept	6.028	.534	11.290	.000	.748
Q6, Frequency Of Use	.322	.154	2.099	.042	.093

A second ANOVA was performed to test both D4, Business Size, and Q6, Frequency of FedBiz DaaS Use, and using Prime Log10 as the dependent variable. This ANOVA produced a p-value of .525 for Q6, Frequency of FedBiz DaaS Use, with a weak coefficient of contribution of .080. The p-value for D4, Business Size, was significant at .000 although with a relatively strong coefficient of contribution of 1.654.

Table 32. Between-Subjects Effects for Prime Log10 and Frequency of FedBiz DaaS Use and Business Size

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	30.798 ^a	2	15.399	19.485	.000	.481
Intercept	196.173	1	196.173	248.223	.000	.855
Q6, Frequency Of Use	.325	1	.325	.411	.525	.010
D4, Business Size	24.853	1	24.853	31.447	.000	.428
Error	33.193	42	.790			
Total	2324.606	45				
Corrected Total	63.991	44				

a. R Squared = .481 (Adjusted R Squared = .457)

Table 33. Parameter Estimates for Prime Log10 and Frequency of FedBiz DaaS Use and Business Size

Parameter	B	Std. Error	t	Sig.	Partial Eta Squared
Intercept	6.236	.410	15.202	.000	.846
Q6, Frequency Of Use	.080	.125	.641	.525	.010
D4, Business Size = Large	1.654	.295	5.608	.000	.428
D4, Business Size = Small	0 ^a				

a. This parameter is set to zero because it is redundant.

The second statistical test of H1 used a Paired-Samples t-Test to determine if the means of the same company's history before and after implementation were different for revenue and the number of contracts won. To provide comparative measures for unequal

periods of time, an annual average value was computed for all four measures. This resulted in F1A (Average Pre Total Prime Revenue), F1B (Average Post Total Prime Revenue), F3A (Average Pre Number of Contracts), and F3B (Average Post Number of Contracts).

Table 34. Paired Samples Test for Number of Contracts and Revenue

	Mean	Std. Deviation	Std. Error Mean	t	df	Sig. 2-tailed
Pair 1 F3A_Avg_Pre#Contracts	-.6123	1.445	.283	-2.162	25	.040
Pair 2 F3B_Avg_Post#Contracts						
Pair 1 F3A_AveragePreWins\$	-\$1,041,797	\$2,058,202	\$403,647	-2.581	25	.016
Pair 2 F3B_AveragePostWins\$						

The Paired Two Sample t-Test shows that both of these pairs were significant when assessing the results of the 2-tailed test (p-value < .05). It shows that a company's implementation of a FedBiz DaaS application has a significant effect on its Competitive Position as measured by contracts won and revenue.

Using the coefficient of contributions identified in the ANOVA for Overall Use and Frequency of FedBiz DaaS Use, we mathematically exponentiated the value back by a power of 10 and converted it to a percentage. For Overall Use, with a coefficient of contribution of .394, this means that for every unit of change (0-4), there is a corresponding increase in revenue of 148 percent. For Frequency of FedBiz DaaS Use, with a coefficient of contribution of .322, every unit of change equates to an increase in revenue of 110 percent. These percentage increases seem very high, but an examination of the raw data for the pair-wise t-Test for pre and post revenue showed they were not out of line.

Table 35. Percent Increase

	B	Exponentiated B	Percent Increase
S11, Overall Use	0.394	2.477	148%
Q6, Frequency of Use	0.322	2.099	110%

Analysis of H2, Use of FedBiz DaaS is Positively Related to Changes in an Organization’s Business Development Capabilities as Represented by Changes in Staffing, Roles, and Processes

The second hypothesis looks at how the use of a new resource (S11, Overall Use) impacts the capabilities of an organization as evidenced by changes to its business development staffing, roles, and processes. Respondents were first asked about the extent of any changes in business development staffing that occurred since acquiring a FedBiz DaaS tool and, if so, in which of the Shipley Phases it occurred. Follow-on questions asked for the same input about business development roles and processes. The resulting variables were S14, Changes to Staffing, S15, Changes to Roles, and S16, Changes to Processes.

The ANOVA testing the effect of Overall Use and Changes to Staffing yielded a p-value of .001, showing a significant relationship existed. The coefficient of contribution of .377 shows that while significant, this relationship is of only moderate impact.

Table 36. Between-Subjects Effects for Overall Use and Changes to Staffing

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	10.160 ^a	1	10.160	11.102	.001	.134
Intercept	.154	1	.154	.168	.683	.002
S11	10.160	1	10.160	11.102	.001	.134
Error	65.892	72	.915			
Total	154.694	74				
Corrected Total	76.052	73				

a. R Squared = .134 (Adjusted R Squared = .122)

Table 37. Parameter Estimates for Overall Use and Changes to Staffing

Parameter	B	Std. Error	t	Sig.	Partial Eta Squared
Intercept	.121	.295	.410	.683	.002

S11	.377	.113	3.332	.001	.134
-----	------	------	-------	------	------

The ANOVA comparing Overall Use, and Changes to Roles, did not produce the same significant results, producing a p-value of .067. However, the significance is not too far off the .05 threshold and indicates that use of FedBiz DaaS may have some impact on changes in roles but the low coefficient of contribution of .198 indicates that the impact is marginal.

Table 38. Between-Subjects Effects for the Overall Use and Changes to Roles

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	2.803 ^a	1	2.803	3.463	.067	.045
Intercept	.444	1	.444	.549	.461	.007
S11	2.803	1	2.803	3.463	.067	.045
Error	59.087	73	.809			
Total	96.959	75				
Corrected Total	61.890	74				

a. R Squared = .045 (Adjusted R Squared = .032)

Table 39. Parameter Estimates for the Overall Use and Changes to Roles

Parameter	B	Std. Error	t	Sig.	Partial Eta Squared
Intercept	.205	.277	.741	.461	.007
S11	.198	.106	1.861	.067	.045

Looking at the ANOVA between S11, Overall Use, and, Changes to Processes, the p-value returned was again significant at .000. The resulting coefficient of contribution of .442 shows the biggest impact among the three dependent variables. While moderate at just under 20 percent, it shows that as a new resource such as a FedBiz DaaS is implemented, changes to the business development process are likely to follow.

Table 40. Between-Subjects Effects for Overall Use and Changes to Processes

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	13.638 ^a	1	13.638	16.822	.000	.194
Intercept	.057	1	.057	.071	.791	.001
S11	13.638	1	13.638	16.822	.000	.194
Error	56.752	70	.811			
Total	140.122	72				
Corrected Total	70.390	71				

a. R Squared = .194 (Adjusted R Squared = .182)

Table 41. Parameter Estimates for Overall Use and Changes to Processes

Parameter	B	Std. Error	t	Sig.	Partial Eta Squared
Intercept	-.074	.279	-.266	.791	.001
S11	.442	.108	4.101	.000	.194

Overall, this analysis shows that changes to Staffing and Processes are likely to be associated when a FedBiz DaaS is implemented, but changes to Roles are less likely. The relationship is greatest for S16, Changes to Processes (p-value of .000 and coefficient of contribution of .442), then S14, Changes to Staffing (p-value of .001 and coefficient of contribution of .377), and finally for S15, Changes to Roles (p-value of .067 and coefficient of contribution of .198).

Analysis of H3, Use of FedBiz DaaS is Positively Related to Competitive Intensity in the Federal Consulting Marketplace

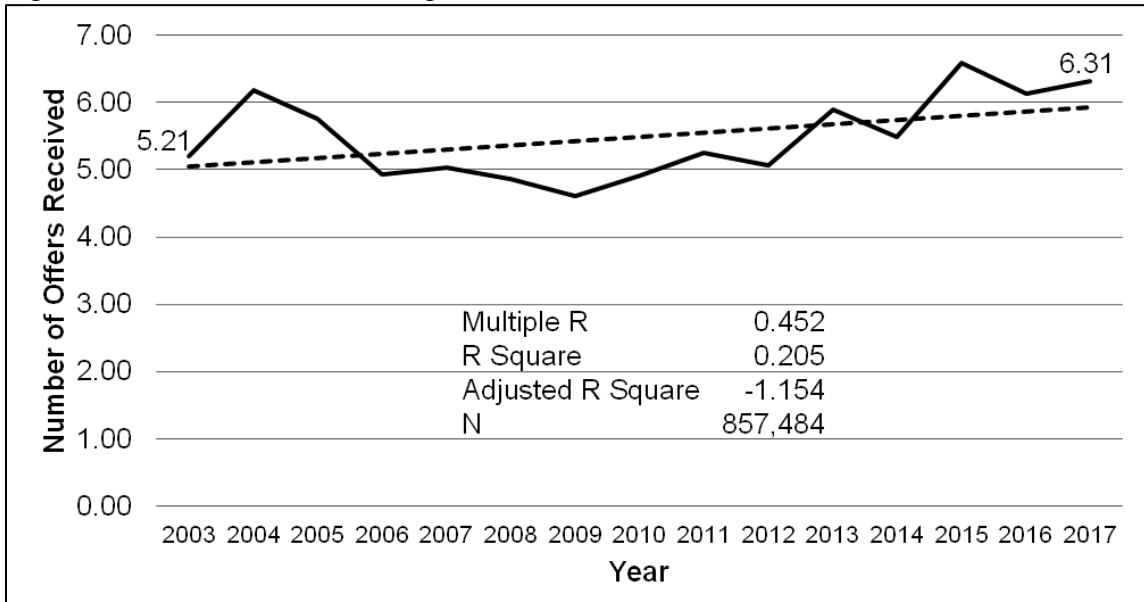
In the pilot study, an analysis of marketplace Competitive Intensity was performed over a 15-yr time period (2003-2017) for all Government-awarded Prime Definitive Contracts within the three largest NAICS Codes associated with the services industry:

- 541611, Administrative Management and General Management Consulting Services

- 541618, Other Management Consulting Services
- 541690, Other Scientific and Technical Consulting Services

This analysis revealed that the average number of offers received in 2003 was 5.21, but by 2017 the average number of offers received had increased to 6.31, an increase of over 20 percent. This strong positive relationship between the level of competition increasing at the same time as the increased implementation of FedBiz DaaS throughout the industry encouraged additional research into the market penetration of FedBiz DaaS applications to further explore H3.

Figure 32. Increase in the Average Number of Offers Received



To examine the market penetration of FedBiz DaaS applications and its impact on Competitive Intensity in the marketplace, the cumulative percentage of the 26 companies that provided a known year of FedBiz DaaS implementation was calculated for each year of the study. This was extrapolated to the 60 companies that reported using a FedBiz DaaS application. Yearly market penetration was then determined by dividing the

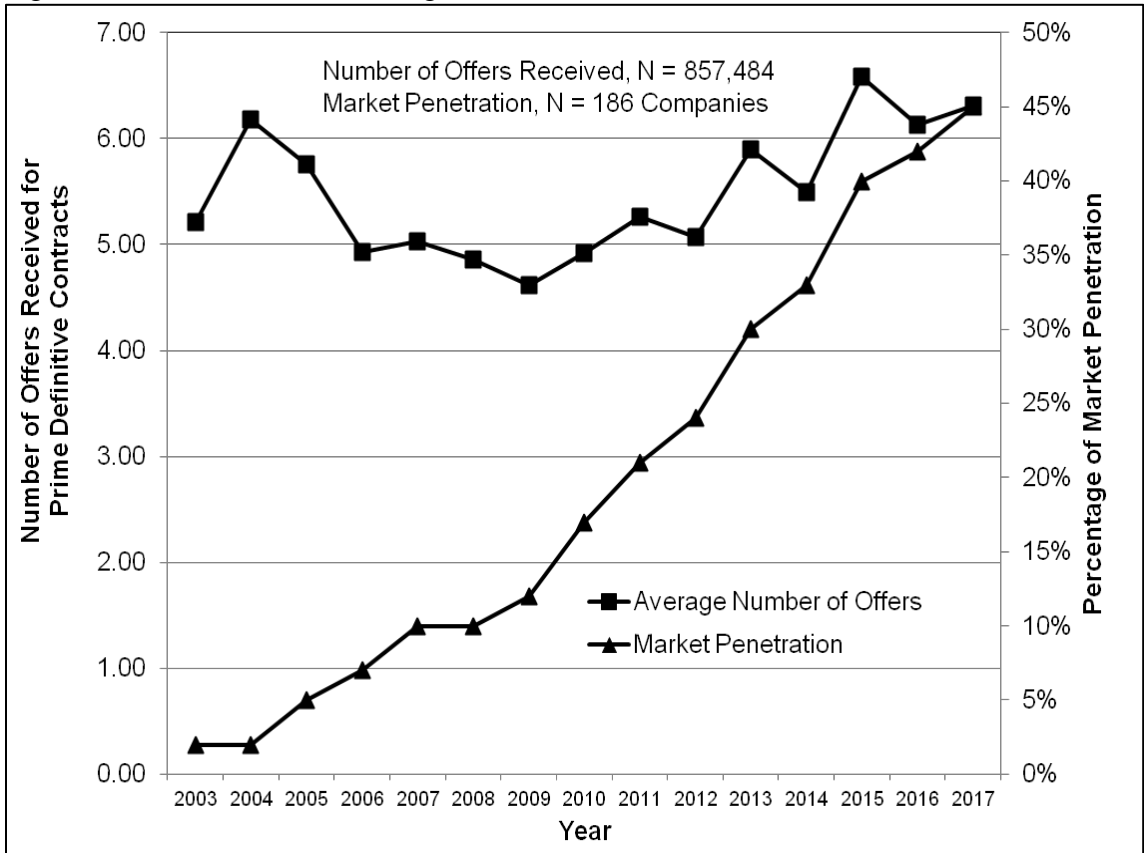
estimated number of firms with FedBiz DaaS applications for each year, by the total number of firms in the study.

Table 42. Market Penetration for FedBiz DaaS, 2003-2017

Year	Count	Cumulative	Penetration of 26	Extrapolated to 84	Overall Penetration
2002	1	1	4%	3	2%
2005	2	3	12%	10	5%
2006	1	4	15%	13	7%
2007	2	6	23%	19	10%
2009	1	7	27%	23	12%
2010	3	10	38%	32	17%
2011	2	12	46%	39	21%
2012	2	14	54%	45	24%
2013	3	17	65%	55	30%
2014	2	19	73%	61	33%
2015	4	23	89%	74	40%
2016	1	24	92%	78	42%
2017	2	26	100%	84	45%

When the overall market penetration values are correlated with the Average Number of Offers Received for each Prime Definitive Contract Awarded, it shows a strong correlation with a Pearson's R of .57

Figure 33. Increase in the Average Number of Offers Received and FedBiz DaaS Growth



Using an ANOVA to test the effects of both Year and Market Penetration on competitive intensity of the marketplace shows that both are significant ($p < .05$), but that Market Penetration has a weak coefficient of contribution of .159 and Year of Implementation has a moderate coefficient of contribution at -.458.

Table 43. Between-Subjects Effects for Dependent Variable Average Number of Offers

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	3.787 ^a	2	1.893	14.898	.001	.713
Intercept	2.042	1	2.042	16.068	.002	.572
Year	2.020	1	2.020	15.895	.002	.570
Percentage Market Penetration	2.699	1	2.699	21.241	.001	.639
Error	1.525	12	.127			
Total	456.507	15				
Corrected Total	5.312	14				

a. R Squared = .713 (Adjusted R Squared = .665)

Table 44. Parameter Estimates for Dependent Variable Average Number of Offers

Parameter	B	Std. Error	t	Sig.	Partial Eta Squared
Intercept	923.465	230.374	4.009	.002	.572
Year	-.458	.115	-3.987	.002	.570
Market Penetration	.159	.034	4.609	.001	.639

CHAPTER 6. CONCLUSIONS AND RESEARCH CONTRIBUTION

The nature of the Government services market provides an excellent opportunity to examine the impact of a nearly complete information resource on a company, ranging from changes to the company's competitive position, the changes company resources experience when this information relied upon, and the overall impact on the marketplace competitive environment. Understanding the impact of resources like FedBiz DaaS is a critical first step. In this research we looked at how FedBiz DaaS affected adopter's revenue; their staffing, roles, and processes; as well as how it affected the market overall. When the data was examined, the research supported all three hypotheses as well as providing a number of unexpected findings that are opportunities for further research.

It was surprising so many respondents were from small businesses. The median number of full-time equivalents for respondents was only 10 employees and the mode was a single employee. This means there are a very large number of Government contracting companies that are really micro-businesses. In the Government contracting arena, such businesses seem to operate as subcontractors and therefore the use of a FedBiz DaaS application may not have any value to them. The research also showed that these same small businesses do not usually compete for Prime Definitive Contracts, again providing little incentive for them to invest in a FedBiz DaaS resource. Many comments from small businesses focused on the expense associated with FedBiz DaaS resources, including "Too expensive for a small company" and "I don't see the cost value in these tools. Relationships and on the ground BD (business development) is my best tool."

Concerning FedBiz DaaS adoption, we saw that large companies implemented a FedBiz DaaS application on average 5 years before small companies, thus giving them a

first mover advantage. The later implementation of FedBiz DaaS by small businesses may reflect their need to carefully study and evaluate the return on investment for such an expense like FedBiz DaaS. They may adopt a “follower” strategy and mimic the actions of large businesses after they have seen their success.

There is considerable evidence that the use of a FedBiz DaaS can have a significant effect on a company’s future competitive position as represented by revenue and contracts won. We found that use (as measured by both Overall Use and Frequency of Use) is significantly related to revenue. The coefficients of contribution for both significant relationships indicate a firm can expect an increase between 110 percent and 148 percent in revenue for every step they move up on these measures. However, we also did see that the significant relationship with Overall Use disappears when Company Size is considered. This could be because large businesses started using these tools earlier; have more flexibility in their staffing, roles, and processes; or simply the fact that they were large when they implemented and continue to benefit from their size advantage.

Most significantly, we were able to look at the average annual revenue and contracts won before and after FedBiz DaaS implementation. The results were striking, with the 26 companies showing on average an increase in contracts won from 0.47 to 1.08 after implementation and an increase in average revenue from \$588,503 to \$1,630,300 after adopting a FedBiz DaaS. A pair-wise t-Test showed these differences to be significantly different. This is important evidence because 21 of the 26 companies in the t-Test were small businesses.

Although not significantly different, our results show that firms use the tool most in the Opportunity Assessment and Capture phases of the Shipley Process. This makes sense. FedBiz DaaS helps firms to identify opportunities, clarify the probability of win, provide historical data on previous iterations of the selected contract, show similar requirements on other contracts, and identify potential competitors and teaming partners. Information such as this plays a major role in how a company's Competitive Position can be improved when they decide to submit a proposal for a contract. The takeaway for a small business is, if it wants to compete and grow, it should emulate the way large businesses have embraced FedBiz DaaS applications if it wants to enjoy the same results.

Looking at internal capabilities, we see a significant relationship between the use of FedBiz DaaS applications and changes to the staffing and processes supporting a company's business development. These changes are predicted by the RBV of the firm (Barney, 1991). One respondent noted that, "once we got the software we dedicated an additional staff member and have been able to make much more traction—I feel like we have gained an entire team." In some ways, the cost associated with a FedBiz DaaS application may be compounded by the concurrent costs that may be incurred to support changes in staffing, roles, and processes. Combined with the implementation costs, these additional costs make FedBiz DaaS a difficult proposition for a small firm. The downside is that, if they do not accept the costs and implement a FedBiz DaaS application, they are at a significant disadvantage in the marketplace in relationship to their peer competitors.

It was curious that we did not see a similar significant relationship between FedBiz DaaS use and changes to a firm's business development roles. Anecdotal

evidence showed that such changes did occur. One firm “hired one additional BD person to assist in managing data,” another created “a professionally-led marketing and BD function,” and a third “added some part-time personnel with specific customer insight to position ourselves, qualify opportunities, and execute capture planning with specific customers.” While the relationship between use and roles was not significant, it was rather close with a p-value of .067.

We expected there would be a difference in the level of use of FedBiz DaaS among the various phases of the Shipley Process. We did see more emphasis on what could be viewed as the “tactical” phases (Phases 2-6) and less activity in the long-term or strategic phases (Phases 0-1); however, there were no significant differences in use of FedBiz DaaS between the seven phases. One potential explanation for the apparent lack of emphasis on the strategic phases may be related to the actual respondents themselves. Business development professionals were targeted for survey responses and their responses may have been different than what might have been collected from senior leadership. Senior leadership has a more vested interest in looking at business objectives over a longer time frame rather than a business development professional who is evaluated based upon the number of contracts won over a much shorter time span. This leads us to believe that an area for further study should be focused on the use of a resource for strategic positioning in the marketplace.

There is a significant relationship between market penetration of FedBiz DaaS applications and the Competitive Intensity in the marketplace. It appears that as larger companies implemented a FedBiz DaaS application and saw benefits, smaller companies followed by acquiring a FedBiz DaaS of their own—they wanted to emulate the way

large businesses embraced FedBiz DaaS applications in the interests of enjoying the same results. This cycle seemed to accelerate, and as more and more companies got better information about the opportunities they wanted to pursue, they became more competitive, thus forcing their competitors to adopt the same resources. This increased competition among peers drove up the number of offers received for each opportunity by 20 percent over the 15-year study, thus increasing the Competitive Intensity in the marketplace. In that light, the pervasive growth of FedBiz DaaS can be seen as essentially causing an “arms race” as more companies implement the same resources to compete in a marketplace that is more and more competitive.

Contributions to Theory

This research adds to the body of knowledge about a Government services marketplace that includes contracts worth over \$76 billion per year; this industry has been the subject of little academic research. In particular, little attention has been paid to small businesses and their business development practices in the marketplace, particularly since a major portion of existing literature focuses on large businesses. Because the research proved that using FedBiz DaaS increases revenue, and the more it is used, the greater the results, the impact on small businesses could be tremendous. However, business development activities for small businesses and micro-businesses remains a little recognized area of research.

Of the small businesses surveyed in this study, 74 had fewer than 10 employees while 36 companies had a single employee. This led these companies to develop a business model focused on performing subcontracting work for larger companies. These small businesses are normally not trying to win Prime Definitive Contracts from the

Government. Many rely upon their niche capabilities to win work. One respondent echoed the idea “I have been able to secure government contracts without tools. I do not bid for contracts, entities of the government come to me for my services. My work is super specific and unique.” Another respondent noted, “We are a small firm that subcontracts to larger firms. Prime contractors request our expertise for their projects.” Others appear to depend upon the larger companies’ need to meet Government socio-economic goals when hiring sub contractors. The implication is not that these very small firms are not competing for Prime Definitive Contracts from the Government but that there are a lot of these small businesses. The counter argument is that, if a small business implements a FedBiz DaaS application, it may be able to compete for Prime Definitive Contracts because it will have better market data, and thus could grow its revenue.

The relationship between the existence of an information-based resource, FedBiz DaaS, and the Competitive Intensity of the marketplace is a compelling finding for the expansion of theory. Traditional business theory has established that when more complete market information is available for any given market, the expectation is that the market will become increasingly competitive. Given the recent increases of customer data in many markets with the growth of “Big Data,” it is logical that increased competition follows. The fact that Competitive Position and Organizational Capabilities were both linked to increases in revenue when a FedBiz DaaS is implemented adds even more credence to this argument.

Looking from an RBV view of the firm perspective, this research supports the theory that adding a resource like FedBiz DaaS impacts the capabilities of the firm. We saw significant effects between the use of FedBiz DaaS and a firm’s business

development staffing and processes and were surprised when business development roles did not appear to be impacted as much. Further study is necessary regarding the impact of information resources like FedBiz DaaS on a firm's business development staffing, roles, and processes. Since the research statistically showed that using FedBiz DaaS resources increased revenue, a business seeking to increase its revenue should look at the associated costs for staffing, roles, and processes as part of the overall cost of implementing a FedBiz DaaS resource.

Contributions to Practice

For Government contractors looking to improve their firm's competitiveness, this research shows that adding a FedBiz DaaS can have significant impact on the firm's revenue. That makes the use of FedBiz DaaS tools a compelling growth strategy for firms that wish to compete for Prime Definitive Contracts. For firms that already have a FedBiz DaaS, this research also shows that increasing the use of the tool can impact their revenues, whether they are small or large. Even though companies may have the same resource, they may not be using that resource in the same way, and will therefore have differing results.

Small businesses do have a decision to make when it comes to implementing a FedBiz DaaS application. For a company with a single employee, functioning in many ways as a consultant and with no desire to grow, content to be sought for their unique skills, and satisfied with their business model, it probably does not make sense to implement a FedBiz DaaS application. However, for a company with 10 employees, the choice becomes one of whether or not they want to grow and increase revenue. If they do want to grow, our research suggests the best option is to implement a FedBiz DaaS. We

have shown that on average, firms that do implement and use this tool will increase their contract wins and revenue. Companies that have 100 or more employees, while still classified as small, realistically have no option other than to implement a FedBiz DaaS, since market penetration indicates that their peer competitors are incorporating the resources into their normal business development functions.

Practitioners who implement a FedBiz DaaS tool in their business should expect to see a change in staffing and processes, and possibly a change in roles. The RBV of the firm would suggest that those who adapt most quickly will receive the most benefits from the new resource. While this research did not test this directly, it is interesting that the large companies that implemented earliest seem to have enjoyed more benefits than those that did not. At the same time, the frequency that a company uses a FedBiz DaaS tool is also a factor. It does no good to implement such an application and then continue to operate in the same manner as before. However, if a FedBiz DaaS resource is embraced and incorporated into all phases of business development activities, a firm should expect to see increases to revenue.

Of special note is the fact that as the FedBiz DaaS market becomes more saturated and the marketplace even more competitive, firms without a FedBiz DaaS will be at a significant disadvantage. If a company wishes to compete for contracts and maintain their viability in the marketplace, this research suggests that they will need to have a FedBiz DaaS resource and use it to its fullest extent, because other businesses are using their FedBiz DaaS resource to improve their Competitive Position. To be competitive, they need to have the same resources as their competitors, and implementing a FedBiz DaaS is no different from establishing relationships with suppliers and customers or

securing a line of credit. If a company does not have the same resources as their competitors, they will fall further and further behind. They may not see the same benefits as the early adopter, but without one, they will be at a significant competitive disadvantage to companies that have implemented a FedBiz DaaS resource.

REFERENCES

- Amit, R., & Schoemaker, P. (1993). Strategic Assets and Organizational Rent. *Strategic Management Journal*, 14(1), 33-46.
- Argote, L. (1999). *Organizational Learning: Creating, Retaining, and Transferring Knowledge*. Boston: Kluwer Academic.
- Armstrong, J. and Green, K. (2007). Competitor-oriented Objectives: The Myth of Market Share. *International Journal of Business*, 12(1), 115-134.
- Auh, S. and Menguc, B. (2005). Balancing Exploration and Exploitation: The Moderating Role of Competitive Intensity. *Journal of Business Research*, 58(12), 1652–1661.
- Bajtelsmit, V.L. and Bouzouita, R. (1998). Market Structure and Performance in Private Passenger Automobile Insurance. *The Journal of Risk and Insurance*, 65(3): 503.
- Barnett, W. (1997). The Dynamics of Competitive Intensity. *Administrative Science Quarterly*, 42(1), 128.
- Barney, J. (1991). Firm Resources And Sustained Competitive Advantage. *Journal of Management*, 17(1), 99-120.
- Bengtsson, M., Eriksson, J. and Wincent, J. (2010). Co-opetition Dynamics – An Outline for Further Inquiry. *Competitiveness Review: An International Business Journal incorporating Journal of Global Competitiveness*, 20(2), 194–214.
- Bharadwaj, A. (2000). A Resource-Based Perspective on Information Technology Capability and Firm Performance: An Empirical Investigation. *MIS Quarterly*, 169-196.
- Chi, L., Holsapple, C., & Srinivasan, C. (2008). Digital Systems, Partnership Networks, and Competition: The Co-Evolution of IOS Use and Network Position as Antecedents of Competitive Action. *Journal of Organizational Computing and Electronic Commerce*, 18(1), 61-94.
- Collis, D. (1994). Research Note: How Valuable Are Organizational Capabilities? *Strategic Management Journal*, 15(S1), 143-152.
- Conner, K., & Prahalad, C., (1996). A Resource-Based Theory of the Firm: Knowledge Versus Opportunism. *Organization Science*, 7(5), 477-501.
- Cooper, R. (1986). *Winning at New Products*. Reading, MA: Addison-Wesley Publishing Company.
- Cooper, R., Edgett, S., & Kleinschmidt, E. (2002). Optimizing the Stage-Gate Process: What Best-Practice Companies Do—I. *Research-Technology Management*, 45(5), 21-27.
- Cooper, R. G. (2008). The Stage-Gate Idea-to-Launch Process—Update, What’s New and NexGen Systems. *Journal of Product Innovation Management*, 25(3), 213-232.

- Cui, A.S., Griffith, D.A. and Cavusgil, S.T. (2005). The Influence of Competitive Intensity and Market Dynamism on Knowledge Management: Capabilities of Multinational Corporation Subsidiaries. *Journal of International Marketing*, 13(3), 32–53.
- D’Aveni, R. (1994). *Hypercompetition: Managing the Dynamics of Strategic Maneuvering*. New York: The Free Press.
- Day, G. S. (1994). The Capabilities of Market-Driven Organizations. *The Journal of Marketing*, 37-52.
- Defense Acquisition Guidebook. (2017). (dau.mil/tools/t/Defense-Acquisition-Guidebook)
- The Defense Acquisition Research Journal (ARJ). 2018. Publication Guidelines (dau.dodlive.mil/publication-guidelines).
- Deltek Systems, Inc. (deltek.com)
- Dun and Bradstreet, Inc. (dnb.com).
- Dutta, S., Narasimhan, O., & Rajiv, S. (1999). Success in High-Technology Markets: Is Marketing Capability Critical? *Marketing Science*, 18(4), 547-568.
- Eisenhardt, K., & Brown, S. (1998). Competing on the Edge: Strategy as Structured Chaos. *Long Range Planning*, 31(5), 786-789.
- Eisenhardt, K., & Martin, J. (2000). Dynamic Capabilities: What Are They? *Strategic Management Journal*, 21(10-11), 1105-1121.
- Eriksen, B., & Knudsen, T. (2003). Industry and Firm Level Interaction: Implications for Profitability. *Journal of Business Research*, 56(3), 191–199.
- Farris, P.; Bendle, N.; Pfeifer, P.; & Reibstein, D. (2010). *Marketing Metrics: The Definitive Guide to Measuring Marketing Performance*. Upper Saddle River, New Jersey: Pearson Education, Inc.
- Federal Acquisition Regulation. March 2005.
- Federal Business Opportunities. (fedbizops.gov).
- Federal-Contracting.com (federal-contracting.com).
- Federal Funding Accountability and Transparency Act of 2006. (fsrs.gov).
- Federal Procurement Database System (fpds.gov).
- Ferrier, W., Smith, K., & Grimm, C. (1999). The Role of Competitive Action in Market Share Erosion and Industry Dethronement: A Study of Industry Leaders and Challengers. *Academy of Management Journal*, 42(4), 372-388.
- Ford, Clay. (2017). Interpreting Log Transformations in a Linear Model. University of Virginia Library (data.library.virginia.edu/interpreting-log-transformations-in-a-linear-model).

- Galunic, D., & Rodan, S. (1998). Resource Recombinations in the Firm: Knowledge Structures and the Potential for Schumpeterian Innovation. *Strategic Management Journal*, 1193-1201.
- Gruber, M., Heinemann, F., Brettel, M., & Hungeling, S. (2010). Configurations of Resources and Capabilities and Their Performance Implications: An Exploratory Study on Technology Ventures. *Strategic Management Journal*, 31, 1337-1356.
- GSA Federal Procurement Data System-Next Generation (FPDS-NG) Data Element Dictionary, Version 1.4, November 10, 2017.
- Jermias, J. (2006). Competitive Intensity As a Quasi-Moderator of the Relationship Between Innovative Efforts and Performance. *Gadjah Mada International Journal of Business*, 8(3), 281–299.
- Kamboja, S., Goyalb, P., Rahmanc, Z. (2015). A Resource-Based View on Marketing Capability, Operations Capability, and Financial Performance: An Empirical Examination of Mediating Role. XVIII Annual International Conference of the Society of Operations Management (SOM-14), *Procedia – Social and Behavioral Sciences*, 189, 406-415.
- Karim, S., & Mitchell, W. (2000). Path-Dependent and Path-Breaking Change: Reconfiguring Business Resources Following Acquisitions in the U.S. Medical Sector, 1978–1995. *Strategic Management Journal*, 21(10/11), 1061-1081.
- Kogut, B., & Zander, U. (1996). What Firms Do? Coordination, Identity, and Learning. *Organization Science*, 7(5), 502-518.
- Lahiri, S. (2013). Relationship Between Competitive Intensity, Internal Resources, and Firm Performance: Evidence from Indian ITES Industry. *Thunderbird International Business Review*, 55(3), 299-312.
- Lengnick-Hall, C., & Wolff, J. (1999). Similarities and Contradictions in the Core Logic of Three Strategy Research Streams. *Strategic Management Journal*, 20(12), 1109-1132.
- Li, J.J., Poppo, L. and Zhou, K.Z. (2008). Do Managerial Ties in China Always Produce Value? Competition, Uncertainty, and Domestic vs. Foreign Firms. *Strategic Management Journal*, 29: 383–400.
- Makadok, R. (2001). Toward a Synthesis of the Resource-Based View and Dynamic-Capability Views of Rent Creation. *Strategic Management Journal*, 22(5), 387–401.
- Mata, F., Fuerst, W., & Barney, J. (1995). Information Technology and Sustained Competitive Advantage: A Resource-Based Analysis. *MIS Quarterly*, 19, 487-505.
- Merriam-Webster Dictionary. Competition. (n.d.). Retrieved August 19, 2018, from <https://www.merriam-webster.com/dictionary/competition>.
- Nelson, R. (1991). Why Do Firms Differ, and How Does It Matter? *Strategic Management Journal*, 12(S2), 61-74.

- Nelson, R., & Winter, S. (1982). *An Evolution Theory of Economic Change*. Cambridge, MA: Belknap.
- North American Industrial Classification System Association. (naics.com)
- Pavlou, P. & El Sawy, O. (2006). From IT Leveraging Competence To Competitive Advantage In Turbulent Environments: The Case of New Product Development. *Information Systems Research*, 17(3), 198-227.
- Pavlou, P. & El Sawy, O. (2010). The “Third Hand:” IT-Enabled Competitive Advantage in Turbulence Through Improvisational Capabilities. *Information Systems Research*, 21(3), 443-471.
- Pavlou, P. & El Sawy, O. (2011). Understanding the Elusive Black Box of Dynamic Capabilities. *Decision Sciences*, 42(1), 239-273.
- Peteraf, M. (1993). The Cornerstones of Competitive Advantage: A Resource-Based View. *Strategic Management Journal*, 14(3), 179-191.
- Porter, M. (1990). The Competitive Advantage of Nations. *Harvard Business Review*, 2 (March–April), 73–91.
- Porter, M. (1991). Towards A Dynamic Theory of Strategy. *Strategic Management Journal*, 12(S2), 95-117.
- Priem R. & Butler, J. (2001). Is the Resource-Based “View” a Useful Perspective for Strategic Management Research? *Academy Of Management Review*, 26(1), 22–40.
- Ray, G., Barney, J., & Muhanna, W. (2004). Capabilities, Business Processes, and Competitive Advantage: Choosing the Dependent Variable in Empirical Tests of the Resource-Based View. *Strategic Management Journal*, 25(1), 23-37.
- Shipley Capture Guide (2011). Shipley Associates, 132.
- Sinkula, J. (1994). Market Information Processing and Organizational Learning. *The Journal of Marketing*, 58(1), 35-45.
- Spanos, Y. E., & Lioukas, S. (2001). An Examination Into the Causal Logic of Rent Generation: Contrasting Porter’s Competitive Strategy Framework and the Resource-Based Perspective. *Strategic Management Journal*, 22, 907–934.
- Stalk, G., Evans, P., & Sgulman, L. (1992). *Competing on Capabilities: The New Rules of Corporate Strategy* (Vol. 63): Harvard Business Review.
- System for Award Management (sam.gov).
- Szymanski D., Bharadwaj, S., & Varadarajan P. (1993). An Analysis of the Market Share-Profitability Relationship. *Journal of Marketing*, 57(3), 1-18.
- Teece, D., & Pisano, G. (1994). The Dynamic Capabilities of Firms: An Introduction. *Industrial and Corporate Change*, 3(3), 537-556.
- Teece D., Pisano G., Shuen A. (1997). Dynamic Capabilities and Strategic Management. *Strategic Management Journal*, 18(7), 509–533.

- Teece, D. (2007). Explicating Dynamic Capabilities: The Nature and Microfoundations of (Sustainable) Enterprise Performance. *Strategic Management Journal*, 28(13), 1319-1350.
- Trott, P. (2012). *Innovation Management and New Product Development*. Fifth Edition, Harlow: Pearson Education Limited.
- USASpending.gov. (usaspending.gov).
- Vroom, G. & Gimeno, J. (2007). Ownership Form, Managerial Incentives and the Intensity of Rivalry. *Academy of Management Journal*, 50(4), 901–922.
- Washington Technology (washingtontechnology.com). (2010). “Deltek Makes \$60M Deal for Input.” September 30, 2010.
- Wernerfelt, B. (1984). A Resource-Based View of the Firm. *Strategic Management Journal*, 5(2), 171-180.
- Wernerfelt, B. (1995). The Resource-Based View of the Firm: Ten Years After. *Strategic Management Journal*, 16(3), 171-174.
- Winter, S. (2003). Understanding Dynamic Capabilities. *Strategic Management Journal*, 24(10), 991-995.
- WRAL TechWire (www.wraltechwire.com). Cary-based StrikeIron Sold to Data Integration Firm Informatica. June 17, 2014.
- Wu, J. & Pangarkar, N. (2009). The Bidirectional Relationship Between Competitive Intensity and Collaboration: Evidence from China. *Asia Pacific Journal of Management*, 27(3), 503–522.
- Zollo, M., & Winter, SG. (1999). From Organizational Routines to Dynamic Capabilities. Working Paper 99-07, University of Pennsylvania, Philadelphia, PA.
- Zumel, N. & Mount, J. (2014). *Practical Data Science with R*. First Edition, Shelter Island, NY: Manning Publications Company.

APPENDIX A

INSTITUTIONAL REVIEW BOARD DETERMINATION



Research Integrity & Compliance
Student Faculty Center
3340 N. Broad Street, Suite 304
Philadelphia PA 19140

Institutional Review Board
Phone: (215) 707-3390
Fax: (215) 707-9100
e-mail: irb@temple.edu

Not Human Subject Research Determination

Date: 02-Jan-2018

Protocol Number: 24916

PI: FLANAGAN, RICHARD

Sponsor: NO EXTERNAL SPONSOR

Project Title: Exploring the Impact of Nearly Complete Market Data on the Competitive Position of Businesses in the Government Professional Services Market

On 02-Jan-2018, the IRB reviewed the protocol 24916: Exploring the Impact of Nearly Complete Market Data on the Competitive Position of Businesses in the Government Professional Services Market.

The proposed activity is not research involving human subjects as defined by DHHS or FDA regulations. Consequently, Temple IRB review and approval is not applicable. You are welcome to pursue the activity, obtaining any applicable administrative or departmental (non-IRB) approvals.

This determination applies only to the activities described in this IRB submission and does not apply should any changes be made. Changes could affect this determination, therefore please contact the IRB for guidance.

DHHS Definitions

Research - a systematic investigation, including research development, testing and evaluation, designed to develop or contribute to generalizable knowledge.

Human subject - a living individual about whom an investigator (whether professional or student) conducting research obtains:

1. Data through intervention or interaction with the individual; or
2. Identifiable private information

FDA Definitions

Research - any experiment that involves a test article and one or more human subjects, and that either must meet the requirements for prior submission to the Food and Drug Administration

Human subject - an individual who is or becomes a participant in research, either as a recipient of the test article or as a control. A subject may be either a healthy individual or a patient.

Please contact the IRB at (215) 707-3390 if you have any questions

APPENDIX B

PILOT STUDY SURVEY INSTRUMENT

Government Contractor Interview Guide

Participant: _____

Company Name: _____

Company DUNS: _____

Company Primary NAICS: _____

Date: _____

Time: _____

Location: _____

Framing the Interview

- Ensure the Informant is comfortable
- Reassure the Informant of the privacy of the information they are sharing
- Make sure the Informant understands the time commitment
- Preview the topic with the Informant

Consent Forms

- Provide if requested

Conducting the Interview

Keeping information flowing (sample questions and prompts if discussion lags)

- Why did that happen?
- Tell me a little more about that.
- What happened next?
- How did that make you feel?
- How typical do you think that is?
- Was it expensive?

Federal Business Data as a Service Definition

Federal Business Data as a Service (FedBiz DaaS) – The resource, usually a subscription service, that provides an organization nearly complete market data to inform business development decisions and functions.

Interview Questions – Government Contractor

Demographics

1. In my organization, my business role most closely aligns with _____.
- Key Manager (CEO or President)
 - Senior Manager (COO or Vice President)
 - Operations
 - Business Development
 - Contract Management
 - Program Management
 - Other (please specify)

Independent Variable: Use of FedBiz DaaS

2. My organization uses the following FedBiz DaaS subscription service(s) (check all that apply):
- Bloomberg Gov
 - Deltek GovWin IQ
 - Epipeline
 - EZGovOpps
 - Fedmine
 - Govini
 - Onvia
 - Salesforce
 - Other (please specify) _____
 - None (If none, why doesn't your organization use one of these tools?)

- If None, how does your company get information for business development leads? _____
- If None, what are the challenges with this approach?

3. In what year did your firm implement a FedBiz DaaS tool? _____
4. My organization uses our FedBiz Database.
- Daily
 - Weekly
 - Monthly
 - Do Not Use

5. My organization subscribes to additional modules or services to enhance benefits of our FedBiz DaaS subscription services.

Yes (please specify) _____

No

Dependent Variable: Competitive Position

6. I will be using contract data from the Federal Procurement Data System to assess the competitive positions of firms involved in this study. Do you think that data accurately reflects the competitive position of your firm?

Yes (explain why) _____

No (explain why not) _____

Not Sure

Do Not Know

If previous question was answered "Yes" or "No," how do you support this position?

Percentage of contracts won

Percentage of dollar value of contracts won

Total dollar value of contracts won

Number of competitors the company beats for a contract award

Rank among peers

Revenue by year

Other _____

7. Has your organization's win rate changed since beginning to use a FedBiz DaaS?

Decreased over 10%

Decreased 1 – 9%

Increased or decreased between 0 – 1 %

Increased 1 – 9%

Increased over 10%

Dependent Variable: Competitive Intensity

8. Over the last five (5) years, competition for my firm has _____.

Significantly

Neither

Significantly

Decreased

Decreased

Decreased nor Increased

Increased

Increased

Moderator: Organizational Capabilities

9. In which of the following ways does your firm use a FedBiz DaaS:

- | | | | |
|---|-------|-----------|------------|
| A. We search for new opportunities | Never | Sometimes | Frequently |
| B. We search for contracts up for renewal | Never | Sometimes | Frequently |
| C. We search for new customers | Never | Sometimes | Frequently |
| D. We search for adjacent markets | Never | Sometimes | Frequently |
| E. We search for subcontractors | Never | Sometimes | Frequently |
| F. We analyze competitors | Never | Sometimes | Frequently |
| G. We analyze market data | Never | Sometimes | Frequently |
| H. We analyze customer needs | Never | Sometimes | Frequently |

10. Since implementing a FedBiz DaaS, my firm has changed in the following ways:

- Explored different market segments
- Adopted different business development capabilities
- Diversified into new markets
- Diversified into new customers (agencies)
- Diversified into new service lines
- Changed our corporate structure
- Changed our market strategy
- Added data analysts to our business development group
- Expanded our business development team
- Other (please specify)

APPENDIX C

QUALTRICS SURVEY INSTRUMENT

Federal Business Data as a Service (FedBiz DaaS) – The resource, usually a subscription service, that provides an organization nearly complete market data to inform business development decisions and functions.

Demographics

1. Since 2003, has your organization operated under any DUNS Number other than its current DUNS Number?

Yes (please provide) _____
 No

2. In your organization, how many Full-Time Equivalents (staff or consultant) work in Business Development and how many Full-Time Equivalents (staff or consultant) are employed overall?

Number of Business Development Personnel
 Overall Total Number of Employees

3. What percent of your organization’s 2017 revenue comes from:

_____ % Prime Federal Contracts?
_____ % Federal Subcontracts?
_____ % Other (State/Local, Commercial, etc.)?
(Note: Must = 100% to proceed to next question)

Independent Variable: Use of FedBiz DaaS

4. My organization uses the following FedBiz DaaS tool(s) (mark all that apply):

Bloomberg Gov
 Deltek GovWin IQ
 Epipeline
 EZGovOpps
 Fedmine
 Govini
 Other (please specify) _____
 None

CONDITIONAL: (If “None” is chosen, why doesn’t your organization use one of these tools?) _____

CONDITIONAL: If “None” is chosen, how does your organization get information for business development leads?

CONDITIONAL: If “None” is chosen, what are the challenges with this approach? _____

CONDITIONAL: If “None” is chosen, no further questions are asked.

5. In what calendar year did your organization implement a FedBiz DaaS tool?

6. In an average week, how many times does somebody in your organization use a FedBiz DaaS tool?

Do Not Use Once a Week 2-3 Times a Week Once a Day Multiple Times a Day

Shibley Business Development Lifecycle Process



Shibley Phases

Shibley Activities

0 - Market Segmentation	Explore and target potential markets, customers, and competitors; the overall aim is to identify the segments likely to be the most profitable or that have growth potential
1 - Long-Term Positioning	Establish the organization’s presence and capabilities to identify leads or opportunities
2 - Opportunity Assessment	Newly identified opportunities are assessed to determine the company’s interest and whether they are winnable
3 - Capture Planning	Individuals in government technical organizations are influenced to prefer the company’s solution and organization; detailed planning is performed to analyze the government technical customer, conduct a competitive analysis, develop a capture strategy for the specific opportunity, and produce action plans for individual execution
4 - Proposal Planning	The proposal effort is planned while sales efforts continue and the capture strategy morphs into the proposal strategy to produce a credible offer and increase the probability of contract award
5 - Proposal Development	The proposal is prepared, approved, and submitted
6 – Post Submittal Activities	The government may choose to conduct discussions with companies before making a final award decision; these may lead to proposal modifications (called Final Proposal Revisions (FPR) by the government).

7. Using the Shibley business development process as a guide, for which of the Shibley phases does your organization use a FedBiz DaaS tool (mark all that apply)?

Phase 0 - Market Segmentation Never Rarely Sometimes Often Always
 Phase 1 - Long-Term Positioning Never Rarely Sometimes Often Always

Phase 2 - Opportunity Assessment	Never	Rarely	Sometimes	Often	Always
Phase 3 - Capture Planning	Never	Rarely	Sometimes	Often	Always
Phase 4 - Proposal Planning	Never	Rarely	Sometimes	Often	Always
Phase 5 - Proposal Development	Never	Rarely	Sometimes	Often	Always
Phase 6 - Post-Submittal Activities	Never	Rarely	Sometimes	Often	Always

Dependent Variable: Organizational Capabilities

8. Using the Shipley business development process as a guide, where has your organization Changes to Staffing to support business development efforts since implementing a FedBizDaaS tool (mark all that apply)?

Phase 0 - Market Segmentation	None	Minor	Moderate	Major	Significant
Phase 1 - Long-Term Positioning	None	Minor	Moderate	Major	Significant
Phase 2 - Opportunity Assessment	None	Minor	Moderate	Major	Significant
Phase 3 - Capture Planning	None	Minor	Moderate	Major	Significant
Phase 4 - Proposal Planning	None	Minor	Moderate	Major	Significant
Phase 5 - Proposal Development	None	Minor	Moderate	Major	Significant
Phase 6 - Post-Submittal Activities	None	Minor	Moderate	Major	Significant

CONDITIONAL: If your organization has made a staffing change, please explain the nature of the change

9. Has your organization significantly changed roles or added new roles anywhere in the Shipley business development process since implementing a FedBiz DaaS tool?

Phase 0 - Market Segmentation	None	Minor	Moderate	Major	Significant
Phase 1 - Long-Term Positioning	None	Minor	Moderate	Major	Significant
Phase 2 - Opportunity Assessment	None	Minor	Moderate	Major	Significant
Phase 3 - Capture Planning	None	Minor	Moderate	Major	Significant
Phase 4 - Proposal Planning	None	Minor	Moderate	Major	Significant
Phase 5 - Proposal Development	None	Minor	Moderate	Major	Significant
Phase 6 - Post-Submittal Activities	None	Minor	Moderate	Major	Significant

CONDITIONAL: Please explain the change or addition.

10. Has your organization significantly changed its process by which business development is accomplished within the Shipley process since implementing a FedBiz DaaS tool (mark all that apply)?

Phase 0 - Market Segmentation	None	Minor	Moderate	Major	Significant
Phase 1 - Long-Term Positioning	None	Minor	Moderate	Major	Significant
Phase 2 - Opportunity Assessment	None	Minor	Moderate	Major	Significant
Phase 3 - Capture Planning	None	Minor	Moderate	Major	Significant
Phase 4 - Proposal Planning	None	Minor	Moderate	Major	Significant
Phase 5 - Proposal Development	None	Minor	Moderate	Major	Significant
Phase 6 - Post-Submittal Activities	None	Minor	Moderate	Major	Significant

CONDITIONAL: Please explain the change or addition.
