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Resources That Predict Microbusinesses Winning a U.S. Government Contract

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Abstract

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MBA, University of Illinois - Chicago, 2009

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Doctoral Study Submitted in Partial Fulfillment

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Abstract

The U.S. Government (USG) sets aside $133 billion annually to procure goods and services from small businesses. To increase efficiency and effectiveness, the USG employs e-commerce procedures that continually change, forcing small and microbusiness owners (MBO) to learn new technical skills. This continuum of change is adversely affecting MBO who lack technical skills. The purpose of this correlational study was to determine whether a relationship existed between the independent variables of formal training consisting of third party providers, consultants, and higher education (INTM); previous federal employment (PFE); and government-sponsored training (GST) and the dependent variable of MBO winning a USG contract. The theoretical lens used to frame the study was the resource-based view. Participants included 259 owners of microbusinesses with fewer than 5 employees located in the United States. A Web-based survey provided data for logistic regression analysis, which showed a statistically significant finding that MBO who did not have GST were 2.6 times more likely to win a USG contract than MBO who had GST. INTM and PFE were not significantly associated with winning a USG contract. Implications for social change include encouraging government officials to develop training programs whereby MBO may benefit from increased business opportunities, which may spark business growth, reduce unemployment within communities, and contribute to the economy.

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Dedication

I thank my wife and family who have helped make this lifelong goal a reality. My wife has endured countless hours of solitude during this process as well as my children and family. This doctoral journey has consumed much of my time; however, I am already seeing the fruits of this effort. Two children have since completed their degrees and others have been encouraged to continue with their studies. Completing this degree has inspired my wife to start her own doctoral journey. It is now time for me to support her and my family.

Acknowledgments

A special thank you to my chair, Dr. Lazo, and committee members, Dr. Rocky Dwyer and Dr. Judith Blando, for providing support and inspiration. Without your guidance, mentoring, and advice, I would not have been able to achieve this goal. Thank you, Dr. Taylor, for sharing your knowledge, advice, and guidance. Also, I would like to give sincere thanks to Dr. Turner for her endless support and encouragement throughout my doctoral journey.

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Section 1: Foundation of the Study

Since 1998, advancements in digital technologies enabled the U.S. Government (USG) to award paperless contracts using procedures that require unique skills in applying e-commerce technology (Lloyd, 2012). The U.S. Small Business Administration (SBA) confirmed that some microbusiness owners (MBO) experience difficulty in keeping pace with technological skills required for conducting e-commerce (e.g., registration, quoting, bidding, or submission of proposals) with the USG (SBA, 2016a). The purpose of this study was to examine the likelihood that intermediaries (INTM), previous federal employment (PFE), and government-sponsored training (GST) may provide the technical skills that might predict MBO's success in winning a USG contract.

Some MBO do not possess specialized training, technical knowledge, or technical skills needed to be competitive in e-commerce, thereby excluding them from participating in e-commerce with the USG (Taylor, Jaeger, McDermott, Kodama, & Bertot, 2012). The SBA and Small Business Development Centers are two sources of assistance for small businesses (Geho & McDowell, 2015). Although the USG provides free training for small businesses on the government's processes (SBA, 2016b), the information is often inconsistent and ineffective (Jaeger, Greene, Bertot, Perkins, & Wahl, 2012).

Xie (2012) posited that many small business owners lack resources, technical knowledge, and technical skills to compete effectively for these government contracts. In this study, I examined INTM, PFE, and GST to determine whether technical skills

obtained from these sources predicted the likelihood of MBO winning a USG contract. MBO may leverage this knowledge in adapting strategies for acquiring the training necessary to succeed in e-commerce with the USG. The results of this study may assist policymakers in understanding challenges that MBO might face when seeking business with the USG and implement programs that address technical knowledge issues.

Background of the Problem

The USG launched the first e-commerce program called Central Contractor Registration (CCR) in the Department of Defense (DOD) in 1998 to collect, validate, and store contract data, followed by a government-wide implementation in 2003 (Halchin, 2013). Lloyd (2012) stated that in August 2012, the USG combined CCR and eight different data tracking systems into one seamless system with the launch of the System for Award Management (SAM). Technological advancements such as the SAM are essential to the USG's management and efficient use of these data tracking systems (Lloyd, 2012). However, advancements in information and communication technologies (ICT) widen the skills divide and marginalize many businesses because of inadequate access to or knowledge of ICTs (Ayanso, Cho, & Lertwachara, 2014).

Dean (2015) identified marginalization as the last stage of the digital divide stating that groups of people are not digitally capable because they lack the skills necessary to access and use ICTs. The USG provides technology-based assistance that constantly changes and more frequently than government officials and businesses can adapt (McCue & Roman, 2012). Constant infusions of new software, acronyms, and e-processes create confusion that adds to technical skills barriers (Halchin, 2013).

Consequently, this overload of information regarding the government procurement processes and online systems intimidates some MBO (SBA, 2016c), leaving many owners confused as to where to seek assistance with technological issues (GAO, 2012).

Ritzhaupt, Liu, Dawson, and Barron (2013) posited that the digital divide is multidimensional. Ritzhaupt et al. further stated the traditional digital divide is closing; however, the digital or technical skills gap continues to widen. The digital skills gap illustrates one of the many technological challenges that MBO face when attempting e-commerce (Chao & Chandra, 2012). The objective of this study was to examine INTM, PFE, and GST to determine the likelihood that these variables may predict MBO winning a USG contract. The widening of the digital skills gap indicates that challenges exist; these barriers provided the foundation and focus for this study.

Problem Statement

Some MBO lack the technological skills required to engage successfully in e-commerce and have limited knowledge of resources that may provide these skills (Phillips, 2014). Thirty-nine percent of business owners experience difficulty in acquiring technological skills (Hall, 2014), with microbusinesses comprising 88% of all small businesses (Kamal, 2015). The general business problem was that many MBO are unaware of resources that offer training needed to obtain technological skills for conducting e-commerce with the USG. The specific business problem is that some MBO do not know if technological skills obtained from INTM, PFE, and GST training can predict the likelihood of MBO winning a USG contract.

Purpose Statement

The purpose of this quantitative correlational study was to examine whether INTM, PFE, and GST (independent variables) can predict the likelihood of MBO winning a USG contract (dependent variable). The population for this study was MBO in the United States pursuing business with the USG between August 2012 and July 2016 and registered in the USG's public database, SAM. The implications for positive social change include improved assistance from the USG to help MBO in developing strategies necessary to sustain their livelihood and business growth, which equates to job creation within the communities of the MBO as described by Williams (2015b).

Nature of the Study

The quantitative method was selected to conduct this study. The quantitative method is a recognized tool for researchers to employ experiments, conduct correlational studies, or collect numerical data to explain relationships or make predictions (Ingham-Broomfield, 2014; Pallant, 2013). The quantitative method met the needs of this study because quantitative attributes enable researchers to examine predictor variables for the likelihood of an outcome variable. Conversely, researchers use the qualitative method to identify or uncover an individual's experiences using personalized interviews and exploratory measures (Venkatesh, Brown, & Bala, 2013). Qualitative measures include unstructured and open-ended responses using interviews to understand phenomena rather than using numerical data (Yilmaz, 2013). The goal of this study was to examine numerical data rather than explore conceptual ideas. Therefore, the qualitative method did not meet the needs of this study. The mixed-methods approach combines quantitative

and qualitative methods when one method alone is insufficient to gain depth and breadth of complex topics and is undertaken sequentially or concurrently (Venkatesh et al., 2013). Because the objective of this study was to examine only numerical variables using quantitative procedures and did not require qualitative procedures to explore concepts, the mixed-methods approach did not meet the needs of this study.

I selected the correlational design for this study. The correlational design is a tool through which researchers use descriptive data to determine whether independent variables can predict the likelihood of the dependent variable (Field, 2013). Applying the correlational design, I used descriptive data to examine the relationships between the variables to meet the needs of the study. Experimental and quasi-experimental designs are appropriate for studies determining cause and effect (Abbott & McKinney, 2013). Researchers use experimental designs to observe the effects of an independent variable on the dependent variable (Abbott & McKinney, 2013; Tabachnick & Fidell, 2013). True experiments require two variables while quasi-experiments require only one variable and therefore are not true experiments (Field, 2013). Examining correlational relationships to determine the predictability of variables does not require the use of experiments or establishing cause and effect, which made these designs inappropriate for this study.

Research Question

The purpose of this quantitative correlational study was to examine whether INTM, PFE, and GST (independent variables) can predict the likelihood of MBO winning a USG contract (dependent variable). The central research question was the following: Can INTM, PFE, and GST predict the likelihood of MBO winning a USG

contract? To test each hypothesis independently, I divided the central research question into three subordinate questions:

1. Can intermediaries predict the likelihood of MBO winning a USG contract?
2. Can federal employment predict the likelihood of MBO winning a USG contract?
3. Can government-sponsored training predict the likelihood of MBO winning a USG contract?

Hypotheses

The null and alternate hypotheses for this study are as follows:

$H1_0$: Intermediaries do not predict the likelihood of MBO winning a USG contract.

$H1_a$: Intermediaries predict the likelihood of MBO winning a USG contract.

$H2_0$: Previous federal employment does not predict the likelihood of MBO winning a USG contract.

$H2_a$: Previous federal employment does predict the likelihood of MBO winning a USG contract.

$H3_0$: Government-sponsored training does not predict the likelihood of MBO winning a USG contract.

$H3_a$: Government-sponsored training does predict the likelihood of MBO winning a USG contract.

The diagram of the research model in Figure 1 illustrates three independent (or predictor) variables and one dependent (or outcome) variable. The study included three

hypotheses to support the central research question. The diagram shows each hypothesis and alternate question where hypothesis H1 relates to INTM (variable X_1), H2 relates to PFE (variable X_2), and H3 relates to GST (variable X_3). The results of the survey generated relationships between the independent variables and the dependent variable (Y_1). The dependent variable produced a binary outcome indicating whether the MBO did or did not win a contract with the USG.

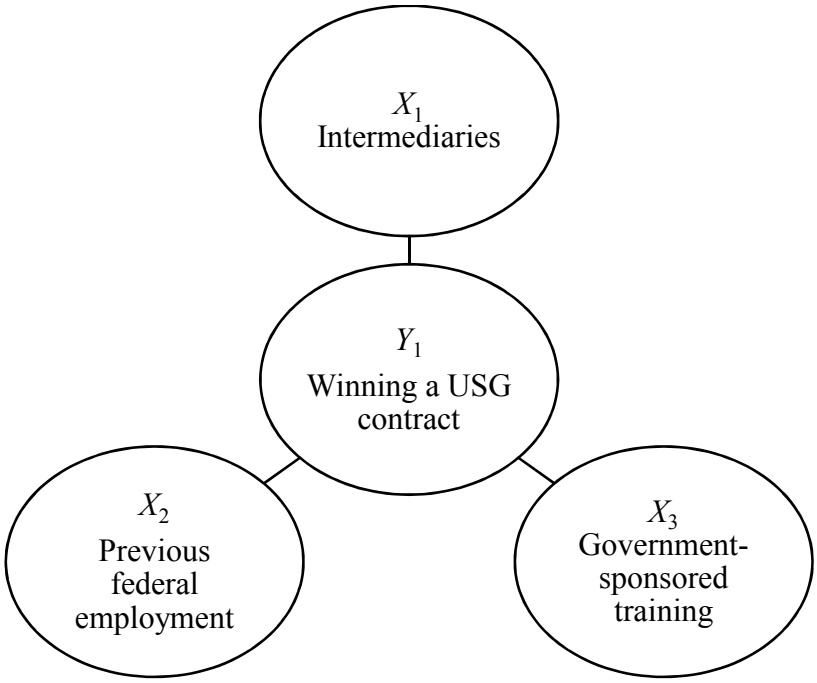

Figure 1. Schema of the research model identifying the variables.

Theoretical Framework

The theoretical framework for this study was the resource-based view (RBV). Barney (1991) developed RBV discussing internal resources such as assets, information, knowledge, and processes that firms possess to have a competitive advantage. Barney examined how a firm's owners exploit their available resources of information and knowledge to strengthen their strategic position. Moreover, Barney stated that a firm

accumulates resources that are tangible, intangible, and unique to each firm. Additionally, Barney posited that RBV includes four main constructs, (inimitable, rare, valuable, and nonsubstitutable), which give the firm a competitive advantage over its competition.

Barney (1991) posited that the internal and external resources a firm accumulates include all information, knowledge, and human capital. Barney, Ketchen, and Wright (2011) expanded RBV by adding that firms operating in their industry are diverse, and owners possess unique internal resources that may develop into a sustainable competitive advantage. As applied to this study, RBV held that a reasonable expectation would be that technical skills obtained by the independent variables may predict the likelihood of MBO winning a USG contract.

A central concept of RBV is that resources of a firm are nonsubstitutable, which gives the firm a competitive advantage (Barney et al., 2011). By examining the intangible internal resources of microbusinesses, I identified key relationships between resources of technical skills training and MBO winning a USG contract. RBV theory best aligned with and met the needs of this study because technical skills obtained by resources such as INTM, PFE, and GST are inimitable, valuable, and nonsubstitutable attributes of the RBV model as described by Rauch, Brinckman, and Frese (2012). Jones, Beynon, Pickernell, and Packham (2013) noted that small businesses rely on internal resources, knowledge, and skills to establish a competitive advantage.

Campbell and Park (2016) posited that a business owner requires internal and external resources to operate and sustain a business, regardless of size, and provided the

basis for this study. Chao and Chandra (2012) linked the internal resource of technical skills and the strategic viewpoints of small business owners' knowledge of information technology (IT) and found empirical evidence to support RBV theory relating to the relationship of small business owners' use of strategic knowledge and IT. Internal resources of technical knowledge and skilled personnel provide a foundation for technical skills necessary for success in e-commerce (Chao & Chandra, 2012; Kamal, 2015). Therefore, the theoretical framework for this study was RBV, which provided the lens to examine the source of technical skills of MBO.

Operational Definitions

Contracting officer: A contracting officer is a person with the authority to enter into, administer, and terminate contracts and make related determinations and findings on behalf of the government (Federal Acquisition Regulation [FAR], 2015).

E-commerce: Palvia (2013) defined e-commerce as electronic transactions that occur over the Internet between businesses and consumers for the purpose of buying and selling goods and services, which include reducing costs and information asymmetry.

Federal business opportunities (FBO): FBO is a Web-based portal that allows vendors to review Federal Business Opportunities (FedBizOpps, 2013).

Information resource: An information resource includes the use of websites, list serves, attendance at meetings or workshops, designers, and consultants (Buehlmann, Bumgardner, & Sperber, 2013).

Intermediary: The U.S. Government Accountability Office (GAO, 2012) defines an intermediary as third-party entities such as nonprofit organizations and higher

education institutions to provide assistance to small businesses. Ibrahim and Moertini (2015) categorized intermediaries into four groups: consultants, brokers, mediators, and resource providers.

Microbusiness: A microbusiness is a small business that has fewer than five employees (Cachon, Codina, Eccius-Wellmann, McGraw, & Myers, 2013; Cronin-Gilmore, 2012; U.S. Bureau of Labor Statistics, 2014), with the same meaning as a microenterprise (Kamal, 2015). A very small enterprise has fewer than 10 employees (Delécolle, 2011). A microcompany is a small business with fewer than 10 employees (Gandy, 2015; Nicholas & Fruhmann, 2014; Pickernell, Packham, Jones, Miller, & Thomas, 2011; Small Business Report, 2012).

Pett and Wolff (2012) defined a microfirm as a business with fewer than 25 employees. The U.S. Bureau of Labor Statistics [BLS] (2014) classifies firms with fewer than five employees as Size Class 1. This size class is the smallest classification and is equivalent to the microbusiness size used in this study.

Small business set-aside: A small business set-aside is a federal socioeconomic program whereby the government restricts competition exclusively to businesses that are determined to be small according to SBA size standards (FAR, 2015; SBA 2016j).

System for Award Management (SAM): SAM is the combination of nine federal procurement systems and the Catalog of Federal Domestic Assistance into one system (SAM, 2016a).

Assumptions, Limitations, and Delimitations

Assumptions

Researchers may not possess all facts necessary to conduct a study and therefore must make decisions regarding certain facts that they assume to be true but cannot prove (Abbott & McKinney, 2012). Additionally, researchers make assumptions about factors over which they have no control and would have a negligible effect on the outcome of the study (Foss & Hallberg, 2014). There were four assumptions in this study.

The first assumption was that MBO are accurate, ethical, accessible, and relevant in their responses, and surveys collected are from participants meeting the established criteria. The second assumption was that MBO maintained an active registration in SAM and possessed, or had access to, the requisite minimal skills and essential e-commerce components such as a computer, Internet access, and basic knowledge of how to use electronic systems. The third assumption was that registration in the SAM demonstrated the MBO's intention to conduct business with the USG. The fourth assumption was that MBO responding to the survey have sought business with the USG by submitting quotes, proposals, or bids in response to contracting opportunities.

Limitations

Kirkwood and Price (2013) defined limitations as factors or details outside of the researcher's control. Additionally, Brutus, Aguinis, and Wassmer (2013) stated that limitations might introduce a weakness thereby affecting the results of the study. Also, Brutus et al. posited that when researchers define study limitations, they identify potential weaknesses or shortcomings introduced into a study and means of mitigation. The target

population was MBO in the United States seeking business opportunities with the USG and may not be generalizable to other MBO.

The ideal participant was a microbusiness owner who was pursuing e-commerce with the USG and who had been in business for more than one year. Participants completing the survey may exaggerate the size of their business. Being untruthful about business size occurs, and as Ritzhaupt et al. (2013) posited, honesty of the participants is a limiting factor.

Abbott and McKinney (2012) indicated that researchers use surveys to collect data that may save time when studying large data sets that are time sensitive (e.g., U.S. Bureau of Labor and Statistics). In the context of this study, an examination of demographics that address financial ability, performance, and ethical or social responsibility issues was outside the scope and did not receive consideration. Attempting to generalize the results of this study is not practical because the target population was active MBO pursuing e-commerce with the USG, which met the criteria of a limitation as identified by Williams (2015b). E-commerce procedures with the USG are unique and may not be transferrable to other e-commerce systems (SBA, 2016a). Because all businesses registered in the SAM database attained access to technology to complete the registration within the previous year, basic technology was not a limiting factor for data collection.

Delimitations

Abbott and McKinney (2012) described delimitations as the boundaries or scope of a study. Similarly, Svensson and Doumas (2013) designated delimitations as a set of

guidelines researchers use when conducting a study. The boundary lines or delimitations included active MBO who met the specific criteria extracted from the SAM database, which consisted of 58,987 business entities. The USG launched the SAM online system in August 2012 (Lloyd, 2012). Therefore, the boundary of time for this study was August 2012 through July 2016.

The SAM database provides information for all available businesses engaged in e-commerce with the USG. By applying study-specific filters to the SAM data, only MBO who met the criteria were invited to participate. Other delimitations of this study were time constraints and geographic location. Although attributes of the MBO such as North American Industry Classification System (NAICS) codes and industrial sector are important, they were outside the boundaries of this study.

Significance of the Study

The purpose of this study was to examine whether INTM, PFE, and GST, predicted the likelihood of MBO winning a USG contract. MBO are vital to the economy because they represent 60-88% of all businesses in the United States (Cronin-Gilmore, 2012; Kamal, 2015). Furthermore, MBO create 30-40% of all new jobs, generate employment opportunities, and may grow into a large business in the future and generate more jobs (SBA, 2012a). Additionally, if MBO are successful, they will contribute more to the economy (Nicholas & Fruhmann, 2014).

Ayanso et al. (2014) stated that some people need targeted training to obtain the skills necessary to use technology. Moreover, Phillips (2014) indicated that 80% of MBO have no employees, which makes locating specific training a challenge. This study

may address gaps in the business practices of MBO and may provide insight into whether technical skills obtained from INTM, PFE, or GST could increase the likelihood of MBO winning a USG contract.

Contribution to Business Practice

In the United States, small businesses account for 99.7% of the country's employers (Hayes, Chawla, & Kathawala, 2015; SBA, 2012a) and play an essential role in driving the economy (Nicholas & Fruhmann, 2014). Kamal (2015) indicated that microbusinesses accounted for 88% of all businesses. Furthermore, Kamal posited that MBO tend to struggle with technological issues. To assist with these issues, the USG provides free training and information on the government's processes (SBA, 2012a).

The policy of the USG promulgated through the FAR is to provide the maximum opportunity for all small businesses to compete for government contracts (FAR, 2015). If a predictable relationship exists between the resources of technical skills training obtained by INTM, PFE, GST, and MBO winning a USG contract and is empirically supported by the data, MBO, policymakers, and government officials may gain insight into resources that may provide the technical skills necessary for microbusinesses to be successful. Moreover, policymakers may consider proactive measures to target training opportunities, thereby increasing the number of small businesses that are knowledgeable in the e-commerce processes of the USG.

Implications for Social Change

The purpose of this study was to examine whether INTM, PFE, and GST (independent variables) predicted the likelihood of MBO winning a USG contract

(dependent variable), which may assist MBO in determining which source of technical skills training might improve their success of winning a contract with the USG. MBO attempting to conduct business with the USG was the target population for this study. The implications for positive social change include additional assistance from the government to help MBO in developing strategies necessary to maintain and sustain the livelihood of the business, thereby creating jobs within the MBO's communities and reducing unemployment, as illustrated by Williams (2015b). Also, microbusinesses owners may gain an understanding of the influence that possessing technical skills has on the success of microbusinesses.

Small businesses are vital to the U.S. economy (Hayes et al., 2015), and the USG provides assistance in business creation and growth (SBA, 2012a). From 2002 to 2012, MBO paid over one quarter of the payrolls in the U.S. private sector and created 30-40% of all new jobs (Broekemier, Chau, & Seshadri, 2015; SBA, 2012a). When MBO develop strategies to become more proficient in technical skills through education in electronic business processes, they have the potential to be more effective and successful in conducting e-commerce (Elmuti, Khoury, & Omran, 2012). By identifying resources of technical skills used by successful MBO, policymakers may be better equipped to assist MBO lacking digital skills.

If policymakers remove obstacles or mitigate technical skills barriers, marginalized businesses may increase their successes, be more competitive, and positively contribute to the economy (Nicholas & Fruhmann, 2014). Through the development of new or revision of existing programs to address and maximize training

opportunities, all stakeholders may benefit from the increased competition. Additionally, Nicholas and Fruhmann (2014) stated that by increasing participation and competition among small businesses, the number of businesses will increase, allowing more competitive pricing and value for the consumer.

A Review of the Professional and Academic Literature

This literature review includes an examination of peer-reviewed articles and synthesis of the information regarding resources whereby MBO obtained technical skills required for conducting e-commerce with the USG. The purpose of this quantitative correlational study was to examine whether INTM, PFE, and GST (independent variables) predicted the likelihood of MBO winning a USG contract (dependent variable). The central research question was the following: Can INTM, PFE, and GST predict the likelihood of MBO winning a USG contract? Scholarly articles relating to government procurement, microbusiness, small business, and technical skills formed the basis of this literature review.

The key terms used in the literature search included *barriers*, *challenges*, *digital divide*, *digital exclusion*, *digital skills*, *digital skills divide*, *digital literacy*, *e-business*, *e-commerce*, *e-commerce adoption*, *e-competence*, *e-government*, *e-marketplace*, *e-marketing*, *e-procurement*, and *e-skills*. The literature review is organized into five sections: RBV, digital skills divide, USG e-commerce practices, topics associated with ICTs, and USG efforts to minimize the digital skills divide. Figure 2 illustrates the flow diagram of each section in the literature review.

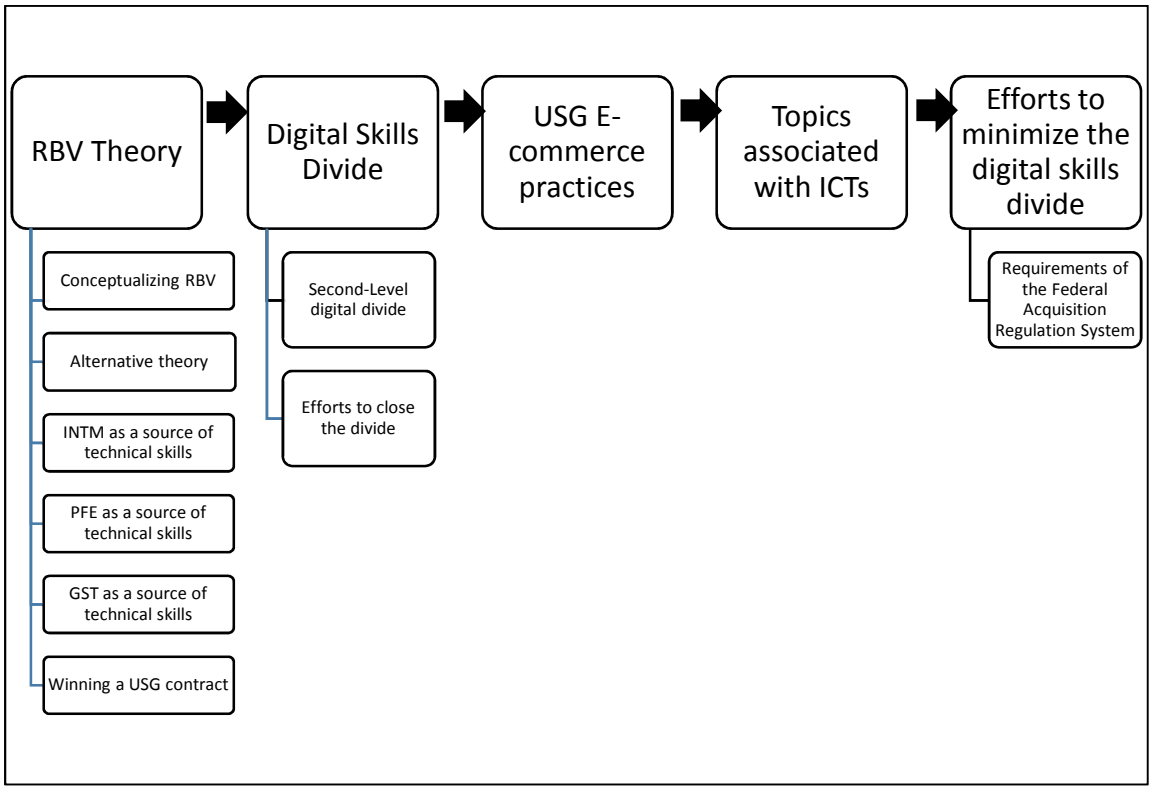

Figure 2. Flow diagram of the literature review.

Synonymous terms referring to technical skills emerged from the literature review; however, I concentrated on various aspects of ICT. Technical skills are components of the continuum called the digital divide (Dean, 2015). Furthermore, Cruz-Jesus, Oliveira, and Bacao (2012) established that the terms *digital skills* and *technical skills* are interchangeable, and in the context of this study the terms had the same meaning.

The digital divide is one of the most researched barriers in the literature. According to Ayanso et al. (2014) and Büchi, Just, and Latzer, (2015), most of the research addressing the digital divide centered on technological issues relating to the accessibility of the Internet. Williams (2015b) indicated that the requirements placed on

businesses to remain sustainable utilizing digital skills strategies have increased continuously since the 1990s.

I reviewed 157 peer-reviewed sources. Appendix A presents a detailed breakdown of each source type and percentage. Of the total sources cited, 95% were peer reviewed, and 90% met the requirement for publication within the last 5 years. Upon final submission, the study exceeded the 85% requirement of peer-reviewed articles within 5 years of publication.

Resource-Based View

The theoretical lens selected for this study was RBV theory. Barney (1991) established the resource-based view, which has become a prominent research model accepted in academia. Barney et al. (2011) expanded RBV by adding the assumption that firms operating within their industry are diverse and possess unique internal resources that may develop into a sustainable competitive advantage.

Barney (1991) defined a firm's resources as either tangible or intangible and examined how to exploit the firms' available resources to strengthen the firm's sustainability. Barney et al. (2011) indicated that (a) education, (b) human capital obtained from working in the commercial sector, (c) and technical training are intangible assets to the firm. These assets aligned with the independent variables in this study: (a) INTM such as third-party entities that provided education and training, (b) human capital obtained from PFE, and (c) technical training obtained from any GST.

Conceptualizing the resource-based view. Barney (1991) studied how each firm utilized its unique resources and examined how the utilization of resources

differentiated each firm from other firms in the industry. Barney postulated that there was a positive relationship between the attributes (resources) of each firm and its ability to sustain a competitive advantage. The firm's resources had to be heterogeneous, not easily duplicated, and able to provide a competitive advantage over other firms.

RBV is a proven theory (Rauch et al., 2012) that was relevant and suitable for studying internal resources such as technical skills. Sila (2013) indicated that RBV was one of the most used theories when studying IT and digital skills in e-commerce. Because technical skills include the intangible commodity of technical knowledge and an internal resource of the firm, the RBV model was the appropriate lens for this study.

Torugsa, O'Donanhue, and Hecker (2012) stated that RBV is a widely accepted approach when explaining one firm's superior performance over another. Torugsa et al. examined the relationship between a firm's proactive corporate social responsibility and financial performance using the resource-based view. Torugsa et al. found significant evidence to support a correlation between corporate social responsibility and the success of a business. Torugsa et al. indicated that internal resources of the firm were significant in providing a competitive advantage. Chao and Chandra (2012) also noted that internal resources that provide a competitive advantage are consistent with RBV.

Regardless the size of the business, IT is an essential internal resource that businesses should have to be sustainable (Chao & Chandra, 2012). Applying RBV, Chao and Chandra (2012) postulated that small firms should possess IT knowledge and implement a strategic alignment that creates synergy to boost efficiencies and business growth. RBV provided the foundation for this study involving the strategic use of

internal resources, which Chao and Chandra viewed as a problem for small businesses. The present study was consistent with the work of Chao and Chandra who examined how small businesses utilize internal resources to adapt and overcome the challenges that IT may cause, which may threaten their existence (Washah, 2013).

The U.S. DOD reengineered the procurement process and mandated that every vendor with the intent of conducting business with the government register with the Department's CCR database (Lloyd, 2012). Implementation of technologies such as CCR amplifies the effects of the digital divide. The USG reengineered the procurement process to reduce costs, improve customer service, reduce transaction costs, and lower staffing needs (Lloyd, 2012).

The reengineering process was the significant first step the government took in e-commerce on a department-wide basis (Lloyd, 2012). With the launch of technologies such as CCR, an era of marginalization and exclusion began (Dean, 2015). Gunasekaran, Rai, and Griffin (2011) noted that e-procurement use was low with only 40% of the businesses using this technology. Cruz-Jesus et al. (2012) and Van Dijk (2012) independently corroborated that the digital divide continues to widen.

Advancements in IT facilitated tremendous growth at the end of the 20th century, producing a wealth of knowledge and opportunities for businesses that readily adopted the technology (Ayanso et al., 2014). The purpose of this literature review was to identify articles related to impediments caused by a lack of technical skills that small businesses encounter when engaging in e-commerce opportunities with the USG. There was an abundance of research regarding digital divides, e-procurement, and ICT adoption

rates has been conducted (Chen & Holsapple, 2013). MBO must possess the internal resource of technical skills or have access to technical skills to navigate and succeed in e-commerce with the USG (SBA, 2016d). Obtaining technical skills was the guiding premise for the literature review that included authors and topics as illustrated in Table 1.

Table 1

Literature Review of Subjects Used to Gain Insight Into Digital Skills Issues

Subject	Author
Existence of the Digital Divide	Ayanso et al. (2014); Büchi et al. (2015); Brandtweiner et al. (2010); Chen (2013); Cruz-Jesus et al. (2012); Gonzales (2015); Min (2011); Reinhart et al. (2011); Van Dijk (2012); Warf (2012); and Wang, Myers, & Sundaram (2013)
Second-Level Digital Divide	Ayanso et al. (2014), Brandtweiner et al. (2010), Büchi et al. (2015), Delécolle (2011), Gonzales (2015), Min (2010), Reinhart et al. (2011), and Van Dijk (2012)
Skills Divide	Ayanso et al. (2014), Gonzales (2015), Salman (2012), Wang et al. (2013), and Van Dijk (2012)
Social Exclusion	Brandtweiner et al. (2010); Dwivedi, Weerakkody, & Janssen (2012); Reinhart et al. (2011); and Taylor et al. (2012)
Technology Acceptance Model	Al-Hudhaif (2011), Davis (1989), and McCue & Roman (2012)
Resource Based View (RBV)	Al-Hudhaif (2011); Arora & Nandkumar (2012); Barney (1991); Campbell & Park (2016); Chao & Chandra (2012); Chinomona (2013); Chowdhury, Schulz, Milner, & Van De Voort (2014); Dixon-Brugh (2011); Harris, Gibson, & McDowell (2014); Kozlenkova, Samaha, & Palmatier (2014); Levius, (2016); Perez-Arostegui, Benitez-Amado, & Huertas-Perez (2013); Pickernell et al. (2011); Rauch et al. (2012); Sila (2013); Thomason, Simendingera, & Kiernan (2013); Torugsa et al. (2012); Williamson & Bhadury (2012); and Xie (2012)

Perceptions of the digital divide vary depending on the geographic location. In the United States, the digital divide has evolved into a multilayered issue (Chen, 2013). Many scholars call this the second order divide, second-level divide, or the digital skills divide (Van Dijk, 2012). Regardless of the type of divide, the obstruction is no longer associated with the ability to access the Internet, at least in the United States (Gonzales, 2015).

Alternative theory. Two predominant theories emerged from the research that provided insight and direction for this literature review. The theoretical models were RBV by Barney (1991) and the technology acceptance model (TAM) by Davis (1989). The TAM and RBV models are used to measure different attributes.

Researchers using the TAM study how users accept technology, while RBV is used to measure internal resources such as human capital and knowledge of technical skills. To measure the attributes of a firm, Barney (1991) refined RBV of the firm using its heterogeneous resources to remain competitive. Strategic use of internal resources is critical to performance and competitive advantage (Rauch et al., 2012), and more specifically government procurement (Williams, 2015b).

Davis (1989) developed the TAM to study user acceptance of technology. Davis used TAM to look at the perceptions of technology users and their willingness to use new technology. Using the TAM model, Davis identified two constructs: perceived ease of use (PEOU) and perceived usefulness (PU). Davis described PU as the viewpoint that individuals take about how they think a new system will increase their job

accomplishment, and PEOU as their viewpoint on how the new system will decrease the amount of effort required to use the new technology.

Researchers use TAM constructs to test and evaluate a diverse set of user applications and to provide insight into how users accept change (Davis, 1989). Additionally, TAM and RBV are so prevalent in the field of IT and business that some researchers combine them. For example, Xie and Suh (2014) integrated TAM and RBV when exploring resource deficiencies of small and medium-size businesses to maximize their understanding and add strength to their research.

USG regulations mandate that when the USG procures commodities and services, e-commerce procedures must be used when practicable, cost effective, and advantageous to the government (FAR, 2105). When seeking USG contracts, businesses do not have a choice to accept or use new technology. Acceptance of technology relates to digital skills; however, the focus of this study aligned with RBV because RBV incorporates a business's internal resources of technology to remain competitive and sustainable. Therefore, the TAM model was a less viable lens for viewing this research. Moreover, businesses attempting e-commerce in any environment do not have the option to adopt digital technologies if they want to remain sustainable (Chao & Chandra, 2012).

Intermediaries as a source of technical skills. The results of the literature review revealed that many different entities perform as INTM. GAO (2012) identified many types of third party entities of INTM such as nonprofit organizations and higher education institutions that provide assistance to small businesses. When MBO seek assistance, many organizations purport that they can provide assistance. Ibrahim and

Moertini (2015) categorized INTM into four groups: (a) consultants, (b) brokers, (c) mediators, and (d) resource providers. Collectively, these third party entities comprised INTM and formed the background in which I conducted the literature review.

In the context of this study, knowledge workers are workers who think for a living (e.g., accountants, software engineers, and research scientists) and who occupy high-skilled positions. In an attempt to address the decline in knowledge workers, President Obama asked that every citizen obtain at least 1 year of higher education to meet the demands of the future (Small Business Report, 2012). Levinson (2012) echoed similar views stating that manufacturing firms in the United States spend approximately $8 billion dollars annually to train employees for the anticipated high-skill jobs that the firms are expecting.

Taylor et al. (2012) stated that people with the greatest need are limited because they lack the technical skills or technical knowledge necessary to be successful in an electronic environment. INTM are optional resources available to MBO; however, the demands of traditional education and consulting fees are costly and require considerable time investment (Wobbekind, 2012). One government consultant stated that there had been a continuous increase in the demand for e-procurement training, indicating a lack of skills on both sides (Lloyd, 2012). To stress this point, Lloyd (2012) stated that with automated computer systems becoming more complicated; public procurement personnel may need to become computer programmers to operate them!

Results from the literature also confirmed that a divide exists and is evolving from an access to technology issue to an information rich and information poor issue (Cruz-

Jesus et al., 2012). Xiong, Qureshi, and Lamsam (2014) acknowledged that the divide is real, and governments have to contend with Internet connectivity obstacles such as low levels of ICT education, training, and access to technology. Similarly, Gonzales (2015) and Ritzhaupt et al. (2013) posited that the digital divide continues to grow from an issue of ICT access to an ICT skills divide. Furthermore, Büchi et al. (2015) recognized this transition and stated that in advanced countries, the divide has evolved from the issue of access to the issue of how societies use technology.

Relatedly, Ayanso et al. (2014) discussed four barriers of the digital divide that include mental access, material access, skills access, and usage access. While each barrier involves different aspects of the digital divide, Ayanso et al. emphasized the third barrier of skills access, as a lack of education, social support, and non-user friendly IT systems. The SBA recognizes this barrier because of the complex and unique rules that dominate the government's e-commerce processes (SBA, 2016a). Moreover, according to Ritzhaupt et al. (2013), the digital skills divide continues to widen in many socioeconomic groups within educational systems.

Consistent with RBV, Xie (2012) indicated that many small businesses are resource constrained. Other factors prevalent in small businesses is their reliance on internal capabilities or other resources that include family, friends, or the local community (Pickernell et al., 2011). A close-knit structure such as family, friends, and community prevents access to outside information, cultural exposure, and creates a lock-in problem for small businesses. Moreover, research by Pickernell et al. (2011) confirmed that a business's reliance on their families as a resource is a preferred source

for advice and guidance. Reliance on family resources also extends into graduate entrepreneurs, who may have the education, but many times lack relevant business experience (Pickernell et al., 2011).

Sila and Dobni (2012) stated that, in the U.S., small businesses make up nearly 99.7% of all employers, while Cronin-Gilmore (2012) affirmed that 60% of those employers had fewer than five employees. Moreover, Phillips (2014) posited that upwards of 80% of these businesses have no employees. In a survey of 174 participants, Phillips found that as the number of employees increased so did the knowledge level of the entrepreneur and need for higher education.

Min's (2010) research was fundamental to this study because ICT skills related to the subordinate research question regarding INTM (variable X_1). Min further stated in a political context that the level of digital skill dictates an individual's use of the Internet, demonstrating that a person with more skills engages more in using the Internet. Min cited a possible correlation between Internet skills and educational attainment, whereby the higher the level of education an individual has, the higher level of Internet skills they possess (variable X_1).

Min (2010) cautioned that higher education does not automatically equate to someone with advanced Internet skills. This concept is comparable to Halchin (2013) who stated that access does not equate to understanding. In addition to digital skills, business owners must remain proficient and have knowledge of a wide range of business processes to be competitive and sustainable (Levius, 2016). Elmuti et al. (2012) provided empirical evidence indicating a positive correlation between small business owners

attaining higher levels of education and their success rate at conducting electronic business versus less-educated business owners.

Previous federal employment as a source of technical skills. Many MBO lack internal technical skills and are resource deficient when they attempt e-commerce with the USG. Chowdhury et al. (2014) used the RBV model as the lens to research human capital and skills obtained by an employee's experiences and support the argument that a business's knowledge and skills are limited resources and therefore inimitable, rare, valuable, and nonsubstitutable. Wu and Chen (2014) specified that knowledge is a unique asset of the firm and is a valuable resource consistent with RBV. The firm's resources draw upon the knowledge and education of not only the owners, but from also from all employees to gain a sustainable competitive advantage by using technology (Harris, Gibson, & McDowell, 2014).

Within the field of ICT, subcultures exist among various populations. Wang (2013) described older adults and individuals with lower social status as digital immigrants (not raised in or access to the digital world, just migrated to the digital world), whereas younger people are digital natives (born into a world of technology and instant communication). Digital immigrants experience more difficulty working with ICTs than their digital native counterparts (Wang, 2013). Crump, Singh, Wilbon, and Gibbs (2015) stated that older adults accumulate knowledge through experience and education and therefore more likely to become entrepreneurs; however, this outcome presents challenges as indicated by Wang.

Min (2010) added to the growing body of knowledge regarding the second-level digital divide and suggested that individuals with higher education or professional skills in using the Internet are increasing the digital skills gap. Min posited that individuals with previous exposure to computer skills and network usage had an advantage navigating in the information society. Digital skills are becoming a necessity for professionals and seeking employment opportunities (Murray & Pérez, 2014). As a result, employees often obtain technical skills while employed which relates to the subordinate research question regarding previous employment (variable X_2).

In addition to Internet skills, Chowdhury et al. (2014) stated that skills acquired through previous work, occupational experiences, and careers enhance the success of an entrepreneur (variable X_2). The experiences an individual gains before to embarking on an entrepreneurial venture significantly improve their start-up, growth, and sustainment. Regardless of how an entrepreneur obtains prior experience, the greater their potential is for success (Chowdhury et al., 2014).

Government-sponsored training as a source of technical skills. The results of literature review focused on a variety of small business issues but did not address technical skills barriers that MBO face when they pursue e-commerce with the USG. The USG acknowledged that when business owners chose to pursue business with the government, there are complex and unique rules that govern the process and provides free training covering basic requirements (SBA, 2016a). However, GST regarding technical skills is nonexistent, fragmented and confusing (GAO, 2012), resulting in a void in the literature.

The fundamental purpose of the U.S. SBA is to provide free counseling, technical assistance, and financial aid to prepare and educate small businesses (Cullen, 2012). In 2016, this mission extends into educating businesses on how to engage in business with the USG. The services offered by the SBA are a few of the resources available to small businesses that provide GST. While this approach is free and available, many MBO are not aware of the services offered by the SBA (GAO, 2012) or have the time and resources to take advantage of them. The largest providers of small business assistance are Small Business Development Centers with over 900 offices operated by counselors and other knowledgeable individuals (SBA, 2016e).

In addition to training, the SBA Office of Advocacy (SBA, 2012a) publishes frequently asked questions (FAQs) articles to assist small businesses. The SBA is the USG's advocate for providing vital training to the small and medium-sized enterprises (SMEs) that pay almost half of the payrolls of the U.S. private sector, employing 60-80% of new jobs from 2002 to 2012 (Broekemier, Chau, & Seshadri, 2015; SBA, 2012a). Furthermore, the USG is the largest buyer of goods and services in the world, spending $400-$500 billion each year (Gitterman, 2013; SBA, 2016j; Shoraka, 2014) and is an important customer for many SMEs.

Ayanso et al. (2014) applied three key components of access, use, and skills to guide their research, which added to the extant body of knowledge regarding ICTs. Ayanso et al. stated further that some people need targeted training to obtain the skills necessary to use ICTs. Moreover, Phillips (2014) indicated that locating the specific training needed is a challenge.

Winning a U.S. Government contract. As indicated by the literature review, there appears to be a gap in research studies conducted on the relationship between e-commerce and small businesses and microbusinesses (McCue & Roman, 2012). Therefore, this gap in the literature is worthy of further research and formed the basis for the dependent variable, Y_1 in this study. The results of this research may be beneficial to microbusinesses and policymakers by providing empirical evidence that a gap exists, which might assist decision makers in taking action to close or minimize its adverse effects. In addition to microbusinesses, all stakeholders in e-commerce may gain an understanding of resources that may provide the technical skills necessary to meet the requirements imposed on microbusinesses with limited financial and IT resources.

Digital Skills Divide

While numerous definitions of the digital divide exist, the common theme is that people on one side have computer hardware, Internet access, or money (to obtain access) and people on the other side do not (Wang et al., 2013). Articles addressing the digital divide are abundant, focus on computer ownership, and access or connectivity to the Internet, both of which are predominantly hardware issues (Gonzales, 2015; Van Dijk, 2012). Graham (2011) provided a similar definition of the digital divide and described the divide in an e-commerce frame. Graham posited two categories of access to the digital divide existed which include people with access to the global marketplace and information revolution and those who lack the capability.

Graham (2011) stated that regardless of the large sums of money and resources spent on this issue, the divide between the global marketplace and information revolution

continues to widen. Gonzales (2015) stated that 15% of Americans do not have access to the Internet or own a computer. In related research, Chen (2013) indicated that this number shrunk to 20% and called them information-have-nots. However, as Büchi et al. (2015) indicated, the divide evolved from the issue of access to the issue of how societies use technology.

Another variant form of the digital divide is digital exclusion, which includes marginalized groups such as microbusinesses. As academia debates the meaning of digital exclusion, Watling (2012) postulated that technology enables people to operate in a digital environment, and a lack of technical skills results in marginalization and digital exclusion and is common in a digital society. Similarly, Ayanso et al. (2014) cited concerns about individuals who lack computer skills and are at risk of exclusion, because they are unable to utilize ICTs to advance their socioeconomic status. Inability to use ICTs excludes 15-28% of Americans who do not own or use computers as identified by Chen (2013) and Gonzales (2015).

Concerning ICT technology, Nguyen et al. (2015) found that over 50% of businesses experienced difficulties in implementing information technologies. Some businesses lack capability while others lack strategies for implementation and execution. Furthermore, Nguyen et al. stated that when businesses commit to adopting information technologies, the implementation is attributable to internal and external pressures that may be out of their control. External pressures such as Nguyen et al. described illustrate one of the consequences brought about by the USG's e-commerce mandates.

Research by Kane, Palmer, Phillips, and Kiron (2015) regarding digital business maturity found that the maturity level of a company's technology strategy is a better indicator than possessing the digital technology. Kane et al. further stated that business owners must be observant to take advantage of opportunities, know how to evaluate and understand the data they collect, as well as how to respond quickly. Kane et al. showed that businesses that are the least mature reported that only 15% had a well-defined digital strategy, as compared to the mature businesses that reported 81% with a well-defined digital strategy.

Second-level digital divide. Min (2010) posited that the digital divide is dichotomous, split into different categories. Min further described the first divide as an *accessing* divide and the second as a *using* divide. Min added to the growing body of knowledge on the second-level digital divide, and those individuals with higher education or professional skills in using the Internet are increasing this gap. Xu (2011) described the dichotomy between knowledge gained, while using networks and knowledge gained by education and stated that they are not interchangeable.

Reinhart et al. (2011) described the second-level digital divide as how individuals use technology, rather than that of the first-level digital divide, which references issues between the *haves* and the *have-nots*. The second-level digital divide is a more complex matter, going beyond basic access to technological knowledge issues and delves into usage factors such as age, education level (Dean, 2015; Taylor et al., 2012), and digital skills gained by using technology (Brandtweiner et al., 2010). The second-level digital divide is a valid concern, having the propensity to exacerbate the social exclusion of

marginalized groups (Qureshi, 2014). Additionally, Brandtweiner et al. (2010) stated legitimate reasons exist as to why some people do not use computer technology. Further research by Reinhart et al. (2011) supported the second-level digital divide concept and confirmed that higher-order thinking creates information producers rather than information consumers.

Salman and Rahim (2012) posited that the digital divide is more than having access to the Internet; access also includes proficiency and gratification. Büchi et al. (2015) indicated that regarding accessing the Internet, the digital divide is narrowing; however, a significant digital skill divide continues to emerge, which is multifaceted (Chen, 2013). Brandtweiner et al. (2010) described the separation of the digital divide as the first-order and the second-order divide and described e-competence as having technical computer skills, as well as intellectual skills in various forms of media. Furthermore, Matzat and Sadowski (2012) cited that just because an individual frequents the Internet does not mean that they possess strong digital skills. In the case of the USG, just because a microbusiness has access to the government's systems, does not mean that the owners understand what they are doing once they obtain access (Halchin, 2013).

The focus of this study was to determine whether resources that provide technical skills training predicted the likelihood of MBO winning a contract with the USG. The increase of online e-commerce operations places many microbusinesses on the wrong side of the divide. Previous researchers have not examined the effects that increasing online systems have on microbusinesses. Addressing this void in the literature was the aim of this study.

The results from this research address this gap, thereby adding to the extant body of knowledge. Equipped with empirical data, government officials and policymakers may gain insight into the relationship between technical skills challenges that some MBO encounter and their attempts using e-commerce with the USG. Policymakers may then implement programs or policies designed to address this gap.

Min (2010) promoted the concept that ICTs are different from other forms of innovative technology in that they are far more complex, international in scope, and undergo continuous upgrades. The issues Min cited also apply to the USG. Furthermore, ICTs require on-going skills training to maintain proficiency and the need for highly skilled workers presents a challenge for some small businesses (Gordon, 2014).

Efforts to close the digital divide. Graham (2011) emphasized that many individuals, organizations, and governments have expressed concern and invested enormous sums of money attempting to eliminate a perceived digital divide that still exists. This divide affects different demographic segments (Taylor et al., 2012), and is unlikely to disappear (Min, 2010). However, academics posited that the divide is only temporary, and the private sector will close the gap (Taylor et al., 2012). Relatedly, Wang et al. (2013) asserted that the digital divide continues to close in most developed countries; however, the digital skill divide continues to widen.

Kiron, Shockley, Kruschwitz, Finch, and Haydock (2012) advanced the literature with their special report entitled Analytics: The Widening Divide. Kiron et al. identified three vital skill sets that contribute to the divide: information management, analytics skills and tools, and data-oriented culture. Attributes defined in this article support the

existence of a second-level divide. Hardware, access, or money to attain access describes the digital divide in the traditional sense. As Kiron et al. cited, the second-level digital divide explicitly identifies skills as the divide and does not relate to the traditional definition of the digital divide. Wang et al. (2013) stated that as the traditional divide closes, the digital skills divide is widening.

U.S. Government E-commerce Practices

Johnston and Girth (2012) established that since the early 1980s, federal procurement has undergone significant growth, and the lack of a competitive market is widespread. Since 1998, the requirements for conducting business with the USG grew from a paper-based process to a system where agencies administer the entire procurement process using paperless e-commerce procedures (Lloyd 2012). To educate businesses on e-commerce topics, the USG created extensive programs, policies, and assistance centers to counter many of the issues created by these technological advancements (Snider, Kidalov, & Rendon, 2013). Although assistance may be available, however, as Jaeger et al. (2012) cited, many times, the assistance is ineffective, with inconsistencies between locations.

Increasingly, the assistance provided by the U.S. Government is technology based, and as Halchin (2013) pointed out, IT is a fast moving target and software continues to advance at a prolific pace. Since the beginning of the Internet, technology intimidates some small businesses (Bakeman & Hanson, 2012). Many businesses are not familiar with electronic marketplaces, and technological issues remain. E-commerce technology created difficulties for small and microbusinesses (Chao & Chandra, 2012),

often including a lack of vision and planning by management, IT knowledge / experience, and inadequate implementation of IT strategies (Lechner & Gudmundsson, 2012).

In the knowledge-based economy, digital skill barriers emerge in e-commerce from the persistent infusion of software, acronyms, and e-processes, which adds to the confusion of too much information (Xu, 2011). Constant change requires small businesses to be proactive and proficient in digital skills to remain competitive in the electronic marketplace (Levius, 2016). Advancements in technology are in a constant state of flux and are endlessly changing (Delécolle, 2011).

Ayanso et al. (2014) indicated that the trend of technological advancement continues today. Since the adoption of e-commerce, the USG has continued to develop and improve its software programs as technology evolves (Halchin, 2013). In August 2012, the USG combined nine different information systems into one seamless system (Lloyd, 2012), launching the SAM (2014a). Instead of having multiple accounts and passwords, businesses have a single point of contact for interacting with the USG.

Phillips (2014) indicated that in 2012 when the USG consolidated multiple agencies into one, the goal was to simplify access for all businesses and appeared to be a step in the right direction; however, this continuum of change affects all stakeholders. Taylor et al. (2012) stressed that the growth of digital technologies is rapidly changing, and technology is virtually a facet of life (Büchi et al., 2015). Technology continues to advance faster than some microbusinesses can handle, and this advancement continues to widen the digital skills divide between businesses that have knowledge of technical skills and those who do not (Van Dijk, 2012).

Research provided by Russell (2013) indicated that the digital divide is existent in e-government and has a strong correlation between access to the Internet and the person's level of digital literacy. In similar research, Xiong et al. (2014) identified three challenges that state policymakers face when attempting to reduce or eliminate the digital divide: lack of ICT training, low financial education, and access to adequate financial resources. Although the research by Xiong et al. involved Native Americans at the state level, many of the same governmental challenges exist for numerous small businesses.

U.S. businesses are severely lacking when investing in technologies and utilizing the skills required by information systems using the Internet (Gordon, 2014). This result creates potential issues for the 28 million small businesses that employ 60 million Americans. Small businesses represent half of the private sector workforce in the United States (Small Business Report, 2012), generating almost half of the gross domestic product (GDP) (Sila & Dobni, 2012).

A review of the literature indicated a significant difference exists between e-government and e-procurement. Russell (2013) confirmed that a substantial amount of research conducted on adoption and implementation of e-government exists. However, this research did not include the impact of e-government or more specifically e-commerce has on businesses, especially small and microbusiness. Although both use the Internet, e-government acts as a service provider for citizens, whereas e-procurement utilizes e-commerce where the government becomes the buyer of goods and services. Advantages of e-procurement include reduced costs (Lloyd, 2012), better communications, and increased efficiencies (Chinomona, 2013), as well as social and

environmental issues (Snider et al., 2013). A significant debate exists among academics, policymakers, and experts regarding the implementation of e-procurement; however, research regarding small businesses and government procurement is new to academia (Williams, 2015b).

Regarding small and microbusiness, the processes required for e-procurement are where technological obstacles begin to develop. Dwivedi et al. (2012) discussed challenges whereby e-government unintentionally excludes certain segments of society similar to those that are digitally illiterate. Min (2010) discussed the notion that as e-citizens becomes more dependent on e-government barriers will dramatically increase. Dwividi et al. and Gonzales (2015) stated that scholars agreed that the digital divide intensifies the inequalities of many marginalized groups and prevents them from contributing to the economy. Factors such as these are worthy of research considering that small businesses make up 99.7% of the country's employers.

Xu (2011) surveyed 849 new ventures and concluded that entrepreneurs collect and absorb information and knowledge from people and organizations with whom they network. Conclusions similar to Xu's formed the basis of this research for variable X_2 (PFE) that may increase the successfulness of MBO winning a contract with the USG. The presumption was that skills acquired by an affiliation with government systems provided the digital skills and training upon which the small business can capitalize.

Topics Associated With Information and Communication Technologies

Throughout the literature, definitions used for describing different sizes of small business varied depending on the researcher and the country under study. Often used

interchangeably, many terms that include small business, small enterprise, microbusiness, microenterprise, and microfirm describe a microbusiness; however, significant differences exist (Pett & Wolf, 2012). There are many conflicting definitions of a microbusiness. A microenterprise is a business that can employ 10 people or less (GAO, 2012), microfirm with fewer than 10 employees (Gandy 2015), and microbusiness with fewer than five employees (Cachon, et al., 2013; Kamal, 2015).

The SBA determines the size of a small business by the average number of employees or dollars based on average annual receipts (SBA, 2016f). In the purview of the USG, a business can be both large and small at the same time depending on the industry in which they are competing (Snider et al., 2013). When determining business size in the services industry, SBA (2016d) policy states that a business may have small business status with as few as 1 employee or as many as 1,500 employees depending on the industry in which they operate.

Pickernell et al. (2011) identified gaps in the literature concerning research on small businesses and their adoption of e-commerce practices using a resource-based lens. Abebe (2014) stated similar concerns that the extant literature regarding e-commerce adoption was primarily exploratory in nature and did not discuss the relationship between e-commerce adoption and a businesses' performance. Furthermore, Pickernell et al. stated that a need exists to conduct research on small businesses that compete for public contracts to ascertain if there are differences between companies owned by graduates versus companies owned and operated by non-graduates.

One objective of this study was to extend the research by Pickernell et al. (2011) and add to the body of knowledge examining the differences between graduates (educational attainment) versus non-graduates in regards to adoption of e-commerce processes and the effects imposed on the microbusiness. A review of the literature indicates that SMEs attaining higher education are more likely to adopt e-commerce. This study may extend Xu's (2011) research by adding the dimension of examining the absorption of information and knowledge from people and organizations with which they network (i.e., previous federal employment to include military service).

Research by Van Dijk (2012) regarding the positive effects of higher educational attainment has yielded significant evidence on the influences of the digital skills divide. Van Dijk affirmed that the digital skills divide continues to exist and is evolving. However, the results of the literature indicated that in developed countries, the digital divide has transformed into a digital skills divide (Van Dijk, 2012). Common themes in the literature include digital or technical skills, such as the first-level and second-level digital divide (Reinhart et al., 2011), and social exclusion (Dwivedi et al., 2012). Researchers describe the digital divide in many different ways, yet the underlying theme is the division between those who have and those who have-not.

Withey (2011) stated that extensive scholarly research exists regarding procurement processes involving small business. Withey distributed 850 surveys to measure the intent of a small manufacturer to pursue public contracts and received 206 usable surveys and considered a response rate of 24.2% was adequate. Bressler, Bressler, and Bressler (2011) and Torugsa et al. (2012) received response rates of 12.3% and 20-

23%, respectively, which they deemed acceptable and coincided with Withey's assessment of an adequate response rate. Withey concluded that there is an absence of research on how small businesses view the procurement processes. Two of Withey's survey items were statistically significant: achieving success in the private sector and seeking consulting assistance. The results of this study corroborates the research by Withey by demonstrating that businesses who lack internal skills seek outside assistance.

U.S. Government's Efforts to Minimize the Digital Skills Divide

Since 1953, the USG has developed and implemented numerous policies and initiatives to assist small businesses (SBA, 2016g). To carry out these initiatives, the USG commissioned the SBA to assist small businesses with educational, financial, and marketing issues and to provide free training on how to conduct and participate in e-commerce (SBA, 2012a). The U.S. Congress enacted legislation requiring each agency of the Federal Government to establish an Office of Small and Disadvantaged Business Utilization under section (k) of the Small Business Act (SBA, 2012b).

To execute the provisions of the Small Business Act, the U.S. Government empowered the SBA to provide assistance to small businesses and to protect their concerns (SBA, 2012b). Since the creation of the SBA, its mission concentrated on four problematic functions (a) access to capital, (b) entrepreneurial development, (c) government contracting, and (d) advocacy (SBA, 2012b). Technological tools used to administer e-commerce systems, and the complex government regulations continue to increase the challenges facing the SBA (Gitterman, 2013).

The SBA continues to administer socioeconomic programs and policies designed to develop small businesses into viable entities (SBA, 2016j). One such tool is the Small Business Programs as mandated by the FAR, Part 19 (FAR, 2015). The USG policy is to maximize opportunities for all small businesses, with a special emphasis on businesses with socioeconomic status and to receive a fair portion of government contracts (SBA, 2016j). The Small Business Reauthorization Act of 1997 set the small business goal at 23% for all prime contracts (Blount & Hill, 2015; GAO, 2012; Snider et al., 2013; Williams, 2015b). Small businesses with socioeconomic status qualify for special small business set-asides and can receive contracts without competition (FAR, 2016). Socioeconomic status encompasses several factors that include race, ethnic origin, veteran status, or the physical location of the business.

In 1994, the SBA developed the Very Small Business Pilot Program to assist businesses below the traditional size standards. The implementation of this program was an extension of the Small Business Set-Aside Programs under Section 304 of the Small Business Administration Reauthorization and Amendments Act of 1994, Public Law 103-403 (U.S. Government Publishing Office [GPO], 2016). The objective of this program was to make opportunities available to businesses that were significantly below the size standards of the SBA (Federal Register, 70 FR 56813, p. 1). Set-Asides for the Very Small Business Pilot Program were for acquisitions greater than $2,500 and less than $50,000; business size limited to 15 or fewer employees, and was available only to businesses located in 10 designated districts specified by the SBA. The Very Small

Business Pilot Program underwent two extensions until 2004 when Public Law 108-447, Division K abandoned the program.

Since the 1990s, many governments worldwide have invested more money implementing ICTs than on infrastructures like airports, highways, and water treatment facilities (McCue & Roman, 2012). The ICT systems used for USG e-procurement systems contain many design flaws and lack standardization (Lloyd, 2012). When addressing electronic procurement requirements, McCue and Roman (2012) suggested that government procurement professionals be more involved in the development of the ICT software and not an afterthought as indicated in the past. Surveys of procurement professionals in the United States and Canada confirmed that e-procurement requires skills that are different from the traditional procurement processes (McCue & Roman, 2012).

One expectation of e-procurement is that a more competitive market will emerge, thereby accessing more vendors; however, adoption barriers may become apparent. McCue and Roman (2012) conducted research on participants from the National Institute of Government Procurement (NIGP) to establish this point. When considering e-procurement systems, McCue and Roman purported that contracting personnel need to have a vocabulary that is common to the profession. Each state in the U.S. adopted the NIGP codes for use in their procurement systems whereas; the USG utilizes the NAICS. Both systems perform similar functions for tracking and reporting; however, these two systems have little else in common. In addition to a lack of a common vocabulary, the dissimilar procurement processes cause confusion for businesses and procurement

professionals at both the state and federal level (McCue & Roman, 2012; Williams, 2015b).

The NIGP code consists of five digits that identify the commodity or service. The NAICS codes contain six digits that drill-down to a specific commodity or service (SBA 2012d). Both coding systems fulfill a similar need in e-commerce but are unique and different. Differences between the two systems create additional technological obstacles for microbusinesses, which are crucial considering that in the public sector of procurement, there are approximately 90,000 agencies in existence (Withey, 2011).

The USG mandated that all agencies maximize the use of small business whenever practicable, and further directs the use of socioeconomic entities such as veteran-owned, service-disabled veteran-owned, small disadvantaged business, and woman-owned businesses (FAR, 2015). The SBA (2015i) administers a program referred to as the 8(a) Business Development Program, designed to assist small disadvantaged businesses. The rebuttable presumption is that Black Americans, Hispanic American, Native Americans, and Asians are members of socially disadvantaged groups and are afforded special economic status to receive contract awards on a sole source basis (FAR, 2015). Min (2010) stated the effects of the digital divide might exacerbate ICTs issues in this marginalized group of disadvantaged businesses.

Palvia (2013) stated that benefits of e-commerce transactions occurring over the Internet between businesses and consumers for buying and selling goods and services include cost reductions and information asymmetry. Palvia stated that e-commerce provides greater efficiency and effectiveness. Ironically, the USG did not state efficiency

or effectiveness as reasons for e-commerce but reported that programs are lacking efficiency and effectiveness in 61% of the programs reviewed (GAO, 2012).

Dwivedi et al. (2012) posited other underlying reasons exist why governments choose to adopt e-commerce. Dwivedi et al. affirmed that motivators like (a) political, (b) economic, (c) social, (d) technological, and (e) managerial are reasons for governments to adopt e-commerce. Dwivedi et al. supported the concept that both e-commerce and e-procurement reduce transaction costs and benefit the customer and supplier by reduced purchasing costs. When using e-commerce, all parties to the transaction become more efficient and share in the reduction of costs (McCue & Roman, 2012).

Increased emphasis on technology utilizing knowledge networks moved businesses from the industrial model of the past to an information-based model (Taylor et al., 2012). E-procurement is a subset of e-commerce that relies on ICT technology to operate through the Internet to automate processes (McCue & Roman, 2012), which requires personnel, equipment, Internet access, and knowledge of how to operate the systems. In the United States, small businesses lag when investing in technologies utilizing the skills required by the Internet (Gordon, 2014).

Kiron et al. (2012) generalized business into three groups of users of analytics: (a) aspirational, (b) experienced, and (c) transformational. According to Kiron et al. businesses identified as experienced and transformational are more than twice as successful as the aspirational group in using IT to gain a competitive advantage. Ramanathan, Ramanathan, and Hsiao (2012) conducted research using RBV when

evaluating the effects that e-commerce has on an organization's IT resources and concluded that IT is an essential element of a business's success, value creation, and competitive advantage. Kiron et al. further stated there was an increase of 57% in the usage of information analytics by companies to gain an advantage over their competition between 2010 and 2011.

Chao and Chandra (2012) stated that many SMEs do not use ICTs to gain an advantage because they lack insufficient skills and resources. MBO must focus on both skills and resources because they have smaller budgets, limited resources, and, therefore, cannot afford costly mistakes (Xie, 2012). Internal resources of in-house knowledge of technology or the employment of skilled personnel are necessary to provide technical skills required by successful MBO (Jones et al. 2013). Businesses need to integrate this technology to remain competitive in the market. Business owners that do not stay current with digital technology will experience digital exclusion (Van Deursen, Courtois, & Van Dijk, 2014). With the advent of the Internet, business models are experiencing a paradigm shift that is radically changing transactions for the business (Taylor et al., 2012).

Nguyen et al. (2015) asserted that most small businesses are flexible and can readily adapt to change. Additionally, Nguyen et al. posited that small businesses are innovative and have lower overhead cost, but still suffer from a lack of human and financial resources. Thomason et al. (2013) cited lack of skills and financial resources are two obstacles that small businesses face, and Washah (2013) indicated those businesses that are unable to overcome these challenges are at risk of closure.

The lack of resources, knowledge, and skill sets are significant difficulties that many SMEs experience (Pickernell, Jones, Packham, Thomas, White, & Willis, 2013). Many either do not possess the appropriate technological background or may not perceive the ways in which such an information infrastructure could enable them to operate their businesses more effectively or cost-efficiently. Lloyd (2012) and McCue and Roman (2012) stated that e-procurement has not reached the anticipated potential and that the current processes are not functioning.

The view of small business and its lack of resources, as stated, are in sharp contrast to Al-Hudhaif and Alkubeyyer (2011) who inferred that small businesses in developed countries possess the necessary resources for conducting e-commerce. Applying the resource-based view, Al-Hudhaif and Alkubeyyer stated that the requirements for small business in Saudi Arabia are significantly different from developed countries such as the United States. However, results of the literature indicate that regardless of location, whether the location of a small business is in a developing or a developed country, the resources required are similar when involving the adoption of e-commerce. Albeit small businesses in the United States are dealing with established business practices and stable culture and may ease certain issues, however, all businesses require similar resources to operate.

Gunasekaran et al. (2011) confirmed similar findings when they cited that the most common obstacles businesses encounter include (a) inadequate financial backing, (b) inconsistent communications, (c) insufficient knowledge of e-procurement requirements, (d) little managerial support, and (e) technical support. A review of many

studies indicated that similar obstacles are common throughout the literature. Barriers including insufficient knowledge of technology and e-procurement practices provided guidance and direction for this research.

McCue and Roman (2012) stated that technology for interacting with the government would force citizens to become more knowledgeable in IT because the government systems will require greater proficiencies. Nguyen et al. (2015) discovered that some SMEs do not have the capability to adopt or use IT resources. The decision not to keep up-to-date with technology may exclude these businesses from the benefits of technology (Warf, 2012), as well as the competition pool. The digital divide for businesses such as this are the most severe, and the result is social and technological exclusion from e-commerce.

Rauch et al. (2012) employed RBV to examine different internal resources and the effects they have on the firm that reinforces the theoretical framework selected for this study. The attributes of technological capabilities and human intellect are two attributes that directly influence digital literacy and contribute to the knowledge capital of the business. Rauch et al. specifically determined that merely possessing human and social capital resources were not sufficient for success.

Furthermore, Rauch et al. (2012) found that businesses had to make better use of its available resources to be successful. Rauch et al. asserted that financial capital and access to technology resources were not as important as human and social capital resources to gain a competitive advantage. While many scholars argue that financial

resources are easy to imitate, access to technology resources is a human capital issue that is hard to replicate.

The results of the literature review consistently show that barriers to e-commerce exist and many businesses do not know where to obtain the digital skills needed for success. The USG acknowledges the need for training to overcome the e-commerce learning curve and specifically addresses small business and has implemented policies and programs targeted to assist them (SBA, 2012a). McCue and Roman (2012) stated that in most developed countries, e-procurement processes are highly complex which may introduce barriers and adoption of ICT issues. In attempts to address barriers and technological issues, the SBA assists small businesses with educational, financial, and marketing issues and provides free training on how to conduct and participate in e-commerce (SBA, 2012a), in its efforts to remove barriers to participation. According to the SBA's FY 2014 Congressional Budget Justification and FY 2012 Annual Performance Report (SBA, 2016h), the agency requested an operational budget of $810 million dollars for the fiscal year 2014. The SBA designed the training to assist entrepreneurs and small businesses to reach out, educate, and provide funds for start-up and expansion projects for businesses.

The DOD was the first department to implement the requirements for contractors to register electronically in the CCR database (Halchin, 2013). Halchin stated further that in October of 2003, the USG expanded the policy mandating the use of the electronic database, CCR to include all departments of the U.S. Federal Government. This policy mandated that any organization wishing to do business with the USG under a FAR-based

contract register in CCR before contract award. In August 2012, the USG implemented its newest tool: SAM that consolidated nine different systems into one seamless process.

Although the SAM system combined nine systems with the goal of minimizing the burden on businesses, this improvement is yet another significant change in the ongoing evolution of government e-commerce. According to Halchin (2013), the first phase of the SAM implementation included the functionality from the following systems:

- Central Contractor Registry (CCR)
- Federal Agency Registration (Fedreg)
- Online Representations and Certifications Application
- Online Registration and Certification Application (ORCA) is sub-component of SAM and is an e-Government initiative that was designed by the Integrated Acquisition Environment (IAE) to replace the paper based Representations and Certifications (Reps and Certs) process.
- Excluded Parties List System (EPLS) is an electronic, Web-based sub-component of SAM used to provide a single comprehensive list of individuals and firms excluded by Federal Government agencies from receiving federal contracts or federally approved subcontracts and from certain types of federal financial and nonfinancial assistance and benefits.

SAM is the Official U.S. Government system that consolidated the capabilities of CCR-FedReg, ORCA, and EPLS (Lloyd, 2012; SAM, 2016a). SAM collects, validates, stores, and disseminates data in support of agency acquisition missions, including federal agency contract and assistance awards. SAM validates the registrant information and

electronically shares the securely encrypted data with the federal agencies' finance offices to facilitate paperless payments through electronic funds transfer (SAM, 2016b).

Pickernell et al. (2011) affirmed that SMEs are responsible for important contributions to the industrialization of countries by adding to the economy, innovativeness, employment, and creation of wealth. Technological advancements involving e-commerce force businesses to adopt e-commerce because the Internet is no longer a neutral environment (Watling, 2012). The Internet is the primary setting for all ICTs and an ideal venue for a business to remain competitive (Min, 2010). Digital technology is a continuum of possibilities where companies can strategically posture themselves to gain a sustainable competitive advantage.

Nguyen et al. (2015) indicated that external factors (i.e., buyers in larger companies drive the requirement for suppliers to use e-commerce practices) illustrate why SMEs adopt e-commerce. Implementing new digital applications led to increasing digitalized buyer-supplier relationships with new opportunities and threats, as a result. Other strategies to overcome e-commerce challenges include partnerships and alliances. Williamson and Bhadury (2012) recommended that small businesses should build alliances and or partnership strategies to allow the business to use other business's resources and free up their resources for more value-added activities using RBV theory.

Some MBO have the ability to overcome potential barriers. However, Nguyen et al. (2015) posited that businesses must adopt IT strategies because technology will continue to increase and exert forces within and outside the firm and become increasingly necessary to sustain a business so that they may prevail over their competition. Strategies

similar to these allow MBO to augment the lack of resources (i.e., technological skills) and overcome the impediments that may be preventing them from successful e-commerce with the USG. Osborne, Wisnieski, Soni, Bharadwaj, and Palmer (2013) asserted that business owners who utilize outside resources or expert consultants are much more successful than their competition, which aligned with Research Question 3 (variable X_3).

Innovations and advancements in technology continue to improve business operations, triggering changes in the evolution of e-commerce processes. The result is that businesses adopt ICTs out of necessity and not just choice (Sila & Dobni, 2012). Moreover, Sila (2015) posited that governments are self-serving and force businesses to adapt. As the pressures to meet government requirements grow, so do the processes and regulations that dictate the procedures used to meet those needs. Because of the occurrence of fraudulent claims and other malicious actions, the government must continuously enact laws and regulations to protect the public's interests (Cullen, 2012; Williams, 2015a).

Requirements of the Federal Acquisition Regulation System.

Attempting to combat abuse of the system and gain efficiencies, the USG implemented a myriad of regulations. To ensure proper expenditure of federal funds, the USG created the Federal Acquisition Regulation System, more commonly known as the FAR (FAR, 2015). The FAR is the primary federal regulation and contains 53 Parts, each containing Subparts, Sections, and Subsections. In addition, each department and agency of the Federal Government expands the regulations with supplements specific to each department (FAR, 2015). If the complex government regulations do not create

enough of an obstruction to e-commerce adoption (McCue & Roman, 2012), factor in the technological aptitude required to navigate the various online systems and the result is a multi-facetted challenge for many small businesses (GAO, 2012).

Figure 3 illustrates the number and complexity of the previous online system architecture from the Integrated Acquisition Environment (Acquisition Central, 2012).

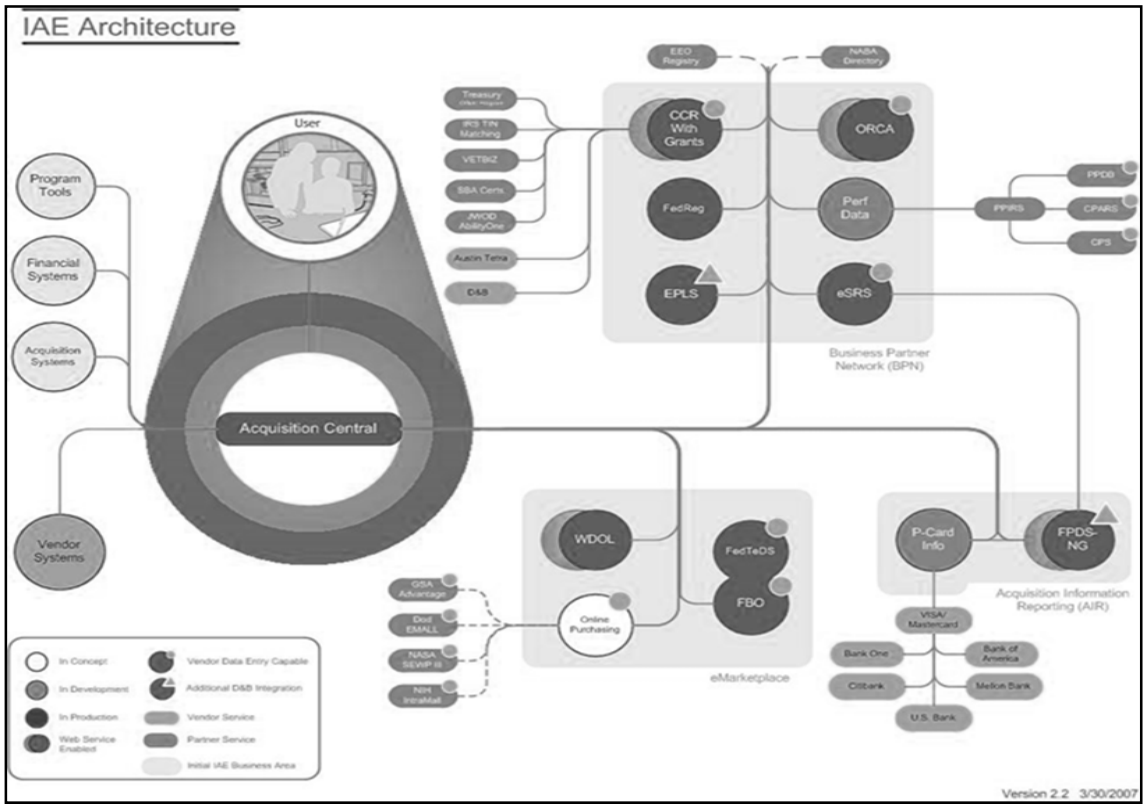

Figure 3. Integrated Acquisition Environment as of July 2012. Starting at the top and going clockwise in the diagram, the top right describes the back office systems, next are six Business Partner Network partners, and bottom left is the legend. From Acquisition Central, (2012), Retrieved from http://www.acquisition.gov/arch_drawings.asp

The previous IAE system environment consisted of nine separate and independent systems: (a) CCR, (b) Federal Register, (c) EPLS, (d) Electronic Subcontractor Reporting System, (e) FBO, (f) Federal Technical Data Solutions, (g) Federal Procurement Data System, (h) ORCA, and (i) Wage Determinations Online Program, each having its own

website and login. The USG consolidated nine systems into a single strategy with the launching of the Integrated Acquisition Environment, where users have access to all systems using the new tool called the SAM.

In the context of this study, the lack of technical skills is a subset of the larger digital skills divide and one of the many consequences of this evolutionary process and was the focus of this research. A goal of this study was to provide policymakers insight into the resources that may provide the digital skills necessary to eliminate potential barriers that small businesses may encounter while attempting to comply with the e-commerce processes of the USG. A small business may benefit from programs implemented to provide targeted assistance in adopting ICTs to ensure that they may become more successful in pursuing e-commerce with the USG (SBA, 2016b). E-procurement has advanced to the point where the USG can accomplish the entire procurement process in a paperless environment (Lloyd, 2012), and small businesses must adopt and embrace technology if the owners are to be successful in the USG e-commerce environment.

The policy of the USG is to use electronic commerce whenever practicable or cost effective. The use of terms associated with paper transactions (e.g., copy, document, page, printed, sealed envelope, and stamped) shall not be interpreted to restrict the use of electronic commerce (FAR, 2015). The potential impact on businesses regarding e-commerce and the barriers associated with technical skills is abundant in the literature. The addition of technologies such as the Internet, online marketing, e-processes, and e-marketplaces, adds a new dimension for MBO to learn and master.

The online environment is dynamic, and businesses need to become e-competent about the capabilities of the Internet (Brandtweiner et al., 2010). E-commerce processes are becoming more complex thus requiring more education; businesses will have to become equally educated to maintain an even balance to understand and compete. An important characteristic regarding ICTs is that having an online presence is quite different from conducting e-commerce (Halchin, 2013). When working with the e-commerce system of the USG, the differences between an online presence and e-commerce processes become apparent.

A business operating in an e-commerce environment must not only be knowledgeable but must also possess sufficient digital skills to gain access and have an understanding of how to benefit from all that e-commerce has to offer. Ultimately, however, there is an expectation by the USG that once small businesses have connectivity to the Internet, the owners are automatically ready to conduct e-commerce and whatever needs remain, the private sector will fill (Warf, 2012). The acquisition of digital skills is now a requirement to function not only in business but also in everyday life (Büchi et al., 2015). Basic knowledge and digital literacy are necessary to be online (Brandtweiner et al., 2010); however, individuals must also have an advanced understanding of the technical and procedural requirements of the systems in which they are working.

Results from the literature indicated that many variables factor into e-commerce. The lack of digital skills or digital literacy is among the primary impediments that small businesses face which places them at a disadvantage (Pett & Wolff, 2012). However, as Arora and Nandkumar (2012) suggested businesses that possess technology skills give

the business a competitive advantage and meet attributes of RBV that are rare, valuable, inimitable, and nonsubstitutable.

Nguyen et al. (2015) identified four attributes that small businesses must integrate into their processes: management, network relationships, IT consultants, and internal IT resources. The requirement to adopt technology can originate from inside or outside of the business. Moreover, Nguyen et al. stated, implementing IT is vital for a business's survivability.

Literature Review Summary

Figure 1 contains a diagram depicting the flow of the literature review for this study. RBV provided the lens for conducting this literature review based upon the seminal work by Barney (1991). Applying RBV, Barney posited that firms need resources that are inimitable, rare, valuable, and nonsubstitutable to gain a sustainable competitive advantage. Barney further defined resources as tangible or intangible and stated that firms must differentiate themselves from their competition to survive. Kamal (2015) posited that technical skills is an internal resource that can be used to sustain a business. As a result of the literature review, I defined the intangible resource of technical skills that a firm possesses as the independent variables for this study.

I organized the literature review to provide a chronological look at early stages of the digital divide and followed through to the present by highlighting articles about the digital divide, second-level digital skills divide, e-commerce practices of the USG, topics associated with ICTs. Kiron et al. (2012) specifically stated that the skills divide is a separate issue from the traditional digital divide. Ritzhaupt et al. (2013) determined that

the digital skills divide continues to widen in many socioeconomic groups. Min (2010) posited that individuals with advanced education or professional skills are exacerbating the skills gap. Moreover, Elmuti et al. (2012) provided empirical evidence indicating a positive correlation between small business owners with advanced education and their ability to conduct electronic business.

Matzat and Sadowski (2012) stated that because an individual frequents the Internet does not mean that they possess strong digital skills. Additionally, Halchin (2013) stated that if a business owner has access to the USG systems, access does not equate to understanding the USG's e-commerce processes. The results of the literature review revealed a lack of information about e-commerce and small and microbusinesses indicating a gap worthy of research (McCue & Roman, 2012). Furthermore, Chao and Chandra (2012), Rauch et al. (2012), and Sila (2013) applied RBV utilizing quantitative methodologies to examine a firm's use of internal resources such as technical skills and provided the lens through which to view this study.

Transition and Summary

In Section 1, discussions included the complex issue of technical skills and resources that MBO may use to obtain these skills and the evolutionary process of e-commerce. The requirements for technical skills and e-literacy continue to expand the definition of the digital skills divide. Businesses of all sizes are subject to this evolutionary process and should acquire and master the technical skills necessary if they wish to remain competitive in the new information age.

As with any new technology, businesses excluded from the mainstream will conform or fade away. Research for this study focused on potential sources of technical skills training that make some MBO more successful in the e-commerce environment of the USG. Examining the attributes of the businesses in this study uncovered competencies that reveal how these businesses adapt, overcome, survive, and succeed in competing for business with the world's largest purchaser of supplies and services. This study adds to the extant body of knowledge by providing empirical evidence that indicates potential sources of technical skills training that may increase an MBO's success while attempting to conduct e-commerce with the USG.

The literature review included an examination of articles involving e-commerce practices of the U.S. Federal Government, ICT barriers, and efforts implemented to overcome the divide using socioeconomic policies. There were two primary theoretical methodologies identified by the literature review that provided the theoretical framework for this study. TAM encompasses two primary concepts, perceived ease of use and perceived usefulness of technology. TAM lends itself to how society reacts to new technology and how society adopts that technology. Aligning with RBV, the intent of this study was to examine resources that provide technical skills from INTM, PFE, and GST, in predicting the likelihood of winning a USG contract among MBO. MBO possessing technical skills internal to the business may add to their sustainability and make them more competitive. As stated by Li and Xie (2012), internal resources such as technical skills are necessary to succeed in an e-commerce environment.

The discussion included the quantitative research methodology and use of the correlational design. Use of this design assisted in examining the likelihood of INTM, PFE, GST, and its ability to predict MBO winning a USG contract. As indicated in the literature review, evidence supports the lack of technical skills in some MBO. Education provides knowledge to overcome technical skills barriers; however, education by itself does not guarantee success (Min, 2010). Van Dijk (2012) established the existence of an evolving digital skills divide that continues to persist and widen in the United States and other parts of the world.

I discussed the research methodology in Section 2 that included the rationale used for selecting RBV methodology. This section included an explanation of the link between the research methodology and design, the population sample size, and the survey instrument used to collect data. After IRB approval, I began the data collection process, addressed the quality of the data regarding reliability and validity, and resolved all issues.

Section 3 includes an evaluation and presentation of the results from the data analysis, a determination of implications for social change, and based on findings a recommendation for future studies. The goal of this study was to examine the likelihood of INTM, PFE, and GST in providing the technical skills that may predict an MBO success in winning a USG contract. Education, targeted training, and an increase in awareness may drive social change necessary to avert a potential decline in the number of and livelihoods of the MBO that seek business with the USG.

Section 2: The Project

The purpose of this quantitative correlational study was to examine whether resources that provide technical skills predicted the likelihood of MBO winning a USG contract. Results from the survey of MBO provided the required data for analysis. I used statistical software to analyze the data to determine whether a statistical significant relationship existed between the resources that provide training in technical skills and MBO winning a contract with the USG. Section 2 outlines key information for the study, which includes the purpose statement, my role as researcher, the participants, as well as the methodology employed to conduct this research. In addition, I include justifications for selecting the research method, determining the sample size, obtaining and collecting data, and establishing reliability and validity.

Purpose Statement

The purpose of this quantitative correlational study was to examine whether INTM, PFE, and GST (independent variables) can predict the likelihood of MBO winning a USG contract (dependent variable). The population for this study was MBO in the United States pursuing business with the USG between August 2012 and July 2016, and registered in the USG's public database, SAM. The implications for positive social change include improved assistance from the USG to help MBO in developing strategies necessary to sustain their livelihood and business growth, which equates to job creation within the communities of the MBO as described by Williams (2015b).

Role of the Researcher

The role of a researcher in a quantitative study is to (a) develop a hypothesis; (b) design and conduct research; (c) collect data; and (d) analyze, interpret, and report the findings (Abbott & McKinney, 2012). For this study, I administered an online survey to collect the data needed for analysis. Abbott and McKinney (2012) posited that surveys are a fundamental research tool used in quantitative research. Surveys are the most common data collection tool for nonexperimental research (Tabachnick & Fidell, 2013). Furthermore, Chang and Vowles (2013) demonstrated that online surveys are equal to or superior to paper surveys for data collection. Therefore, I selected an online survey instrument as the tool to collect the necessary data.

My experience with microbusinesses in the field of federal procurement in the U.S. Air Force spans over 30 years. As a USG contracting officer, I assist small businesses in overcoming barriers created by the increased use of e-commerce procedures. Small businesses are vital to the U.S. economy (Hayes et al., 2015), are the least prepared for unexpected situations, have limited resources, and lack technical skills necessary to navigate e-commerce systems (Xie, 2012). My goal in this study was to provide strategies that MBO can use to become more proficient and successful in e-commerce. Moreover, my role in this study was to conduct research to examine which resource (INTM, PFE, and GST) provided the technical skills to predict a MBO's success in winning a contract with the USG.

The Belmont Report requires researchers to protect research subjects using basic principles to shield them from unethical treatment (U.S. Department of Health & Human

Services, [HHS], 2016). The Belmont Report protocol requires compliance before and during research that involves humans (HHS, 2016). I complied with the Belmont Report protocols by ensuring that each participant was fully aware of any risks associated with this study. As required by the National Institutes of Health (NIH) Office of Extramural Research, I completed the course entitled Protecting Human Research Participants (Appendix B).

Participants

Participants in this study were MBO pursuing contract opportunities with the USG. MBO who compete for USG contracts experience information overload when seeking assistance to understand the government's procurement processes and find online systems intimidating (SBA, 2016c). Taylor et al. (2012) posited that some MBO do not possess specialized training, technical knowledge, or technical skills needed to be competitive in e-commerce, thereby excluding them from participating in e-commerce with the USG.

Gandy (2015) and Williams (2015a) reached similar conclusions regarding technical skills of MBO. Gandy, Phillips (2014), Taylor et al. (2012), and Williams established that a gap exists in business practices regarding the lack of technical skills possessed by MBO. Furthermore, Pickernell et al. (2011) posited a need for more research on small businesses that compete for public contracts to determine whether there are differences between companies owned by graduates versus companies owned and operated by nongraduates. Therefore, I selected MBO pursuing opportunities with the USG as participants for this study.

The strategy I used to gain access to the email addresses of the participants for this study was the USG database, SAM. The SAM database contains emails of all registrants and provides free access to the data (SAM, 2016a). Bressler et al. (2011) and Dixon-Brugh (2011) used public databases to access their participants. I downloaded the data from SAM, saved a copy, and imported the data into Microsoft Excel to obtain the email address of each participant to transmit the surveys.

I used email correspondence to administer the survey and did not establish a working relationship with the participants. Surveys lack personal involvement and are impartial to participants (Yilmaz, 2013). Each participant received two emails: an introductory email and a second email indicating the start of the survey.

The introductory email explained the study and invitation to participate (Appendix C). The second email contained the required informed consent form to participate and instructed the MBO on how to complete the survey. The second email contained detailed instructions and a link to the online website SurveyMonkey (Appendix D). Bressler et al. (2011) and Dixon-Brugh (2011) employed a website service such as SurveyMonkey to administer an online survey.

Using an online survey to collect demographic data on INTM, PFE, and GST may indicate where the participant obtained the technical skills needed to win a contract with the USG. Min and Khoon (2015) posited that collecting demographic data related to the variables is necessary for analysis. Participants for this study were limited to microbusinesses registered in SAM. Four conditions for determining the participant pool for this study were as follows:

1. Business must have an active registration in the SAM database.

2. The designation in the database must indicate that the entity is a small business.

3. Small businesses with socioeconomic status such as All Native and Indian categories, Small Disadvantaged Business (all categories), 8a, or HubZone Business are not included in the participant pool because this status allows contract awards on a noncompetitive basis.

4. Participants must agree to complete the online survey.

Research Method and Design

Research Method

I used the quantitative method to conduct this study. The quantitative method is a recognized research tool available to researchers to expand the body of knowledge using experimental, correlational, numerical, causal, and predictive data to explain relationships among variables (Abbott & McKinney, 2013; Cronin-Gilmore, 2012; Johnson & Christensen, 2014; Querstret & Robinson, 2013; Rovai, Baker, & Ponton, 2013). Yilmaz (2013) posited that the quantitative method is impartial and generalizable to the entire population.

Pickernell et al. (2013) applied quantitative methodology when researching e-commerce trading activities in SMEs in the United Kingdom using a large data set. In similar research, Chao and Chandra (2012) reviewed the strategic viewpoints of small business owners' knowledge of IT and found empirical evidence to support their theory relating to the relationship of small business owners' use of strategic knowledge and

information technology. My study builds upon research by Chao and Chandra (2012) regarding the role that IT plays in the e-commerce environment.

Use of the quantitative method aligned with research by Chao and Chandra (2012) and Chowdhury et al. (2014) in the field of study involving technology, and by Dixon-Brugh (2011) addressing the digital divide. Chao and Chandra selected a quantitative research model to test their hypotheses involving the impact that IT had on the strategic alignment of the firm using data collected from surveys in the Midwest. Field (2013) posited that researchers use quantitative procedures to test a hypothesis when endeavoring to find relationships among variables. Therefore, I used the quantitative method to determine whether statistically significant relationships existed between the variables.

Qualitative methods are useful for gaining in-depth knowledge of participants using a personalized approach by conducting interviews and investigative measures to understand a phenomenon (Venkatesh et al., 2013). A qualitative study is ideal for investigating conceptual ideas and when variables are unknown using unstructured and open-ended responses to explore and understand phenomena (Yilmaz, 2013). My study did not involve interviews, investigative techniques, individuals, or small groups indicative of qualitative methods, which are exploratory in nature (Cronin-Gilmore, 2012). The qualitative methodology did not meet the needs for this study because the in-depth interviews, personal involvement, and coding procedures were not necessary to determine whether relationships existed between the variables using numerical data.

Researchers use a mixed-methods approach combining quantitative and qualitative methods when one method is inadequate for answering research questions (Querstret & Robinson, 2013). Mixed-methods researchers combine quantitative and qualitative approaches concurrently or sequentially for a deeper understanding of complex issues (Siddiqui & Fitzgerald, 2014; Venkatesh et al., 2013). When researchers utilize mixed-methods, they expend significant time and effort (Venkatesh et al., 2013). Researchers using a qualitative or mixed-methods approach may invite personal bias by being overconfident, personally involved, or overoptimistic, thereby creating potential issues with reliability and validity (Cahn & Glass, 2011). Chen and Holsapple (2013) noted that bias introduced during coding is almost unavoidable. The mixed-methods approach was not appropriate for this study because I did not combine quantitative and qualitative techniques to conduct interviews, distribute questionnaires, or use investigative procedures to answer my research question.

Research Design

I selected the correlational design to conduct this study. The correlational design allows researchers to use data sets to examine the likelihood that an independent variable can predict a dependent variable (Abbott & McKinney, 2013; Field, 2013; Johnson & Christensen, 2014; Tabachnick & Fidell, 2013). Pallant (2013) posited four fundamental data collection methods used to collect data when conducting quantitative research utilizing a correlational design. Four methods available to researchers include surveys, observations, field research, and use of secondary sources.

The correlational design is a means through which researchers use descriptive data to determine whether a relationship exists between two variables or if one variable predicts the outcome of another variable (Field, 2013). The correlational design met the needs of this study because I used descriptive data to examine the relationship between a set of predictor variables and a dependent variable. Conversely, experimental and quasi-experimental designs are applicable when determining cause and effect and using control groups to conduct research (Abbott & McKinney, 2013). Examining correlational relationships to predict the likelihood between variables does not require experiments, control groups, or the need to determine cause and effect.

Population and Sampling

The population for this study consisted of active MBO registered in the SAM database. As of July 2016, there were 602,485 active registrants in the SAM database (SAM, 2016a). The total number of registrants included all entities in the database: governmental agencies, nonprofits, educational institutions, and foreign entities. Applying the filtering function of Microsoft Excel, I removed all businesses that were not small businesses. The filtering process reduced the registrants to 58,987 to create the population for this study.

Further filtering of the data was necessary to remove entities with an economic status that may have distorted the results of this study. Two of these economic programs were the Small Disadvantaged Business and the 8(a) program. The economic criteria requirements of these programs are set by the U.S. Code of Federal Regulations 13 C.F.R. § 124.1002 (2016) and promulgated through the FAR (2015). For consideration

as a Small Disadvantaged Business, the business owner must demonstrate compliance as a small business in accordance with the NAICS size standards (SBA, 2016d). In addition, the business must be at least 51% owned by an individual socially or economically disadvantaged and having a personal financial net worth of less than $750,000 after exclusions (Cullen, 2012).

Another socioeconomic program is the 8(a) Program named after Section 8(a) of the Small Business Act (FAR, 2015) and is administered by the SBA. The 8(a) Program is a set-aside for small socially and economically disadvantaged businesses to obtain a foothold in obtaining contracts with the USG (SBA, 2016i). Other programs include (a) Historically Underutilized Business Zones (HUBZone), (b) Woman-Owned Small Businesses, (c) Veteran-Owned Small Businesses, and (d) Service-Disabled Veteran-Owned Small Businesses.

One key feature of these business development programs is that once the business is certified, the business may receive contracts on a sole-source basis without having to compete with other businesses (SBA, 2016i). However, when the government authorizes a sole-source procurement, it must be satisfied that the business has the capability to perform the work and that the price paid is fair and reasonable (FAR, 2015). Businesses with socioeconomic status in these programs are eligible for restricted competition and sole-source awards (FAR, 2015). Therefore, I excluded them from the study because they did not meet the criteria.

Application of the appropriate Microsoft Excel filters to the SAM data provided a list of microbusinesses that met the criteria. The SAM data set produced a large, reliable,

and validated participant pool. Surveys obtained from this pool provided the data to gain an understanding of the statistical relationships between the independent variables and its ability to predict the likelihood of the dependent variable. To express the MBO's intent to conduct e-commerce with the USG, MBO must register in the SAM database (SAM, 2016a), thereby determined their eligibility for this study.

When selecting a population, Tabachnick and Fidell (2013) suggested using random sampling to ensure that the sample is representative of the entire population. Samples are measured to make generalizations about populations. Therefore, a single stage, probabilistic random sampling of businesses meeting the criteria, described later in this section, created the sample population from 58,987 MBO.

Abbott and McKinney (2013) posited that by eliminating generalization issues related to samples limited to specific geographic location or industry sector, may provide more access to participants, flexibility, and incur minimal costs. Therefore, the participants selected for the online survey consisted of a random sample that was nationwide and included all industries. The SAM data set contained contact information for each microbusiness and was publicly accessible thereby simplifying access to the participants. As established by Abbott and McKinney (2013), online surveys allow an economical means of obtaining data from large populations thus making this approach feasible.

Statistical power is one of three elements required for determining the sample size necessary to understand the strength of correlations between the variables (Field, 2013). Recommended power levels should be as high as possible, but no lower than 80%

(Abbott and McKinney, 2012; Field, 2013; Johnson & Christensen, 2014; Tabachnick & Fidell, 2013). Abbott and McKinney (2012) and Field (2013) stated that a statistical power of 80% or more is necessary to ensure reliability and advocated oversampling.

When conducting quantitative research, Pallant (2013) recommended increasing the sample size to account for low response rates. Daniel (2012) posited that for research containing more than one variable type as in this study, the researcher should use the variable requiring the largest sample size. Suresh and Chandrashekara (2012) stated that studies using categorical variables require larger sample sizes. Furthermore, Scrutton and Beames (2015) identified low statistical power as a weakness in some quantitative research.

Many researchers use G*Power 3.1.9.2 to generate an acceptable sample size to ensure that an adequate statistical power is obtained (Peng, Long, & Abaci, 2012). Based on recommendations supported by Abbott and McKinney (2012) and Field (2013), I selected a statistical power of 95% to achieve the largest sample size. I used G*Power to calculate the sample size with a statistical power range of 85% to 95%.

Data are not normally distributed in logistic regression due to the dichotomous nature of the variables (Field, 2013; Tabachnick & Fidell, 2013). The distribution default setting in the G*Power software is designed for a normal data distribution and had to be adjusted to compensate for a nonnormal data distribution and was necessary to provide the correct sample size calculation. The statistical power range of 85% to 95% was used to calculate a sample size of 136 to 195 participants, respectively to ensure a sufficient sample size. The G*Power output is shown in Figure 4.

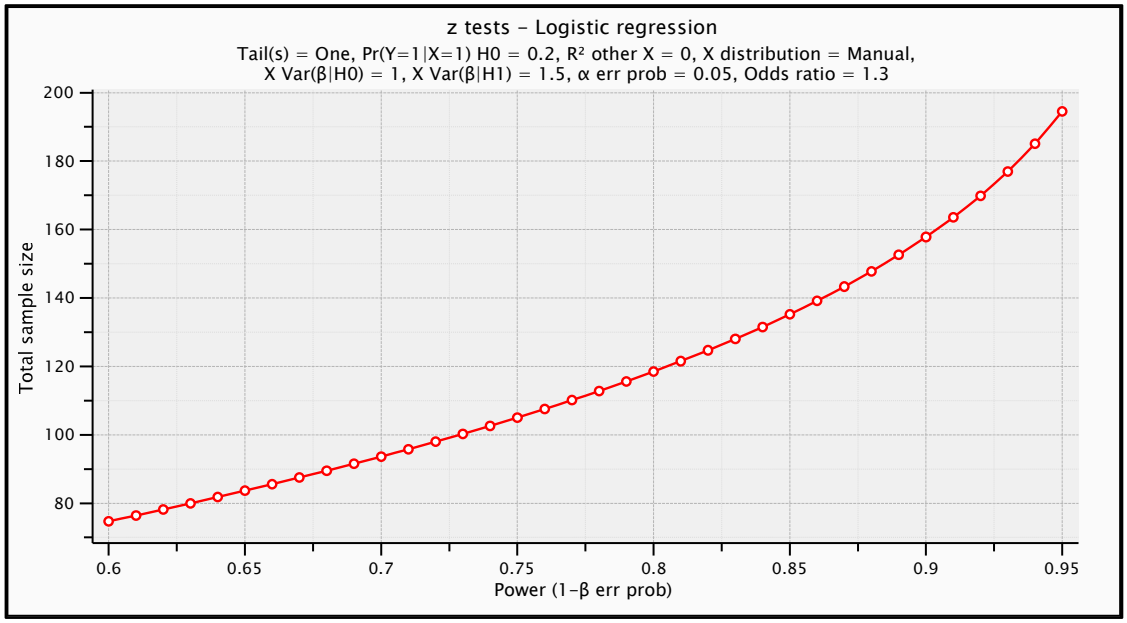

Figure 4. Power as a function of size. This chart indicates the required sample size at various power levels.

To compensate for an anticipated low response rate, increasing the sample size to 195 helped ensure a sufficient number of responses to have meaningful results. However, receiving more than 136 responses would have provided sufficient data to allow a meaningful statistical analysis based on a statistical power of 85%, which exceeded the minimum power level of 80% as supported by Abbott and McKinney (2013), Field (2013), Johnson and Christensen 2014, and Tabachnick and Fidell (2013). Suresh and Chandrashekara (2012) recommended increasing the sample size by 10-20% to account for participants that fail to complete the entire survey or withdraw. When studying small businesses, Torugsa et al. (2012) received a response rate of 12.3%, which was less than expected and was typical for small businesses.

To select 195 participants, I used probabilistic random sampling to determine the population whereby all participants had an equal probability of selection. To overcome potential distribution errors, I used a random number generator to select the population as

recommended by Abbott and McKinney (2013) when researching large populations. A two-step approach is necessary to prevent distribution errors. The first step was to obtain a random number from a web application.

The website, Random.org provides tools such as the random number generator to produce random numbers. The random number generator will select a random starting number between 0 and 58,987 and displays the results. The random number generated was 57,645 and became the starting number. The second step was to use factoring to calculate a factor number to add to the random starting number.

Abbott and McKinney (2013) posited that when obtaining a sampling fraction, determine the total population and divide by the number in the sample (Total population)/Sample = n or 58,987/195 = 302. Upon selection of the random starting number, add the sampling fraction to the starting number, repeating this action until complete. The factoring started with 57,645 by adding 302 to each total and repeat the process, 57,947, 58,249, 58,551, and continuing until reaching 58,987. Next, the process was repeated in reverse by subtracting 302 from the starting number until reaching the first participant. The numbers selected comprised the random population.

After creating the sample population, the selected participants received two separate emails regarding the survey. The first email contained a cover letter that announced the study, a brief background, objectives of the study, and the required confidentiality statement (see Appendix C). The second email contained additional information and a link to the online survey website SurveyMonkey (see Appendix D). As necessary, a second email was sent reminding the participants of the survey.

Ethical Research

Research involving human subjects require ethical considerations such as informed consent meaning that participants must have knowledge of what they are about to partake before agreeing to participate (Rovai et al., 2013). Consistent with Rovai et al. and the instructions provided by HHS (2016), I used the invitation email containing the Technological Skill Resources Survey Participant Consent Form to obtain the participant's consent. Two emails explained the purpose of the study which contained the invitation to participate and a hyperlink to the online survey collection system, SurveyMonkey. Once at the website, SurveyMonkey, the participants acknowledged consent by clicking the link to the survey. This action documented the participant's consent. However, if the MBO chose not to participate they may have deleted the email, or navigated away from the website with no further action.

The invitation email included an explanation that there were no incentives for completing the survey. The intangible benefit to the MBO for completing the survey may be the knowledge that they assisted in providing empirical data that may identify potential resources of technical skills that might give them a strategic advantage in conducting e-commerce with the USG. Once the survey closed, I downloaded the raw data, burned the data onto a CD, and saved a copy for further analysis, which met the requirements of the university. Additionally, I placed the CD in a lockable fireproof safe, and will retain for 5 years after completion of the study. Upon arrival of the retention date, I will destroy the CD. Appendix C contains the agreement document sent in the introductory email.

Data Collection Instrument

The instrument used for this study was an online survey consisting of 13 questions divided into two parts (see Appendix E). Part 1 of the survey contained 10 questions to collect demographic information. When applying quantitative methods to research, Green and Salkind (2014) posited that demographic data is necessary to conduct a descriptive analysis of the population. Therefore, Part 1 contained questions regarding demographics such as age, racial or ethnic background, education, and socioeconomic status and as posited by Min and Khoon (2015), are key to understanding the population.

Part 2 of the survey included three subordinate research questions to obtain data for testing the hypothesis. The independent variables in this study were INTM (X_1), PFE (X_2), and GST (X_3). Each variable corresponded to questions in the survey instrument. The following survey questions (SQ) include the identification of INTM (X_1, SQ11), PFE (X_2, SQ12), GST sources (X3, SQ13), and the dependent variable of MBO winning a USG contract between August 2012 and July 2016(SQ10).

Chen and Holsapple (2013) posited that the survey instrument is the primary design tool used to collect data involving technology. In this research, I followed earlier studies (i.e., Bressler et al., 2011; Dixon-Brugh, 2011) where researchers used surveys to measure, understand, and analyze the demographics of the participants and, as such, a survey was the approach employed in this study.

Obtaining information about the population under study is essential for conducting descriptive statistics (Patten, 2014). Dean (2015) stated that the relationship between demographics and technical skills is well known. Moreover, Min and Khoon

(2015) recommended that researchers should consider collecting demographic data related to the variables when the data may influence the analysis. Additionally, Chen and Holsapple (2013) illustrated the need for demographic data as one component that requires consideration when establishing the effects of environmental factors. The survey contained two questions that address environmental factors: SQ7 covers the NAICS codes indicating the industry, and SQ8 includes the zip code, and was not analyzed.

The title of the data collection instrument was Technological Skill Resources Survey (see Appendix E). Bordonaba-Juste, Lucia-Palacios, and Polo-Redondo (2012) stated that there is a paucity of research about microbusinesses, thus creating difficulty in locating a survey instrument measuring the variables about microbusinesses and USG e-commerce. Accounts established online at the website SurveyMonkey.com host surveys and collect data for individuals and businesses (SurveyMonkey.com, 2016). Therefore, employing of a self-administered electronic survey to collect demographic data using an online website such as SurveyMonkey was fundamental and consistent with research by Bressler et al. (2011) and Dixon-Brugh (2011).

Abbott and McKinney (2013) stated that demographic data consisting of nominal (categorical) scales of measurement meet the requirements of the logistic regression model containing a binary outcome, and, as such used for the 13 nominal scales in this study. Employing analytical tools such as the logistic regression model presented by Pallant (2013) assisted in examining the likelihood of the independent variables in predicting the dichotomous dependent variable of MBO winning a USG contract.

Consequentially, encoding was required because the dependent variable is binary with MBO either winning or failing to win a USG contract.

In logistic regression, encoding the dependent variable with a value of 1 indicates the presence of the variable of interest (Pallant, 2013). Encoding the dependent variable as 0 and 1, where 1 is the variable of interest, which is MBO winning a USG contract. Therefore, encoding the failure to win a contract = 0 and winning a USG contract = 1.

Measuring the independent variables of where the MBO obtained their technical skills allowed the ability to infer conclusions on whether the independent variables can predict the likelihood of the dependent variable. The design of the survey instrument was to measure three independent variables (a) X_1 INTM, (b) X_2 PFE, and (c) X_3 GST and the dichotomous dependent variable (MBO winning a USG contract from August 2012 through July 2016). The goal of this study was to determine whether the independent variables could predict the dependent variable of MBO winning a USG contract.

Rovai et al. (2013) stated when studying descriptive statistics there are two designs, cross-sectional and longitudinal. Salkind (2010) posited that electronic survey instruments utilizing a cross-sectional approach are common practice for nonexperimental, correlational studies. Furthermore, Bressler et al. (2011) conducted a cross-sectional survey that measured technology adoption in small businesses from across the United States and provided direction for collecting data. Therefore, applying the research methods by Bressler et al. as a guide, I used a cross-sectional survey to collect the data in a single stage and at one point in time rather than longitudinally and is consistent with recommendations made by Salkind (2010) regarding Internet surveys.

Blair, Czaja, and Blair (2014) advocated that advantages to online surveys include low cost and rapid turnaround. Chang and Vowles (2014) and Salkind (2010) stated that in addition to low cost and rapid turnaround, Internet surveys have the ability to reach a large number of participants, allows for quick analysis, and minimizes human error. The typical online survey takes 10 to 20 days to complete (Blair et al., 2014).

There is a paucity of specific research on microbusinesses and USG e-commerce practices (Bordonaba-Juste et al., 2012). To address this gap, I used closed-ended questions to collect nominal, dichotomous data from the survey as outlined by Salkind (2010). The online survey instrument collected demographic data, which focused on the source of technical skills whether obtained through INTM, PFE, and GST. Upon collection of the survey data, an analysis determined the likelihood of the independent variables in predicting the dependent variable of MBO winning a contract with the USG.

As described by Abbott and McKinney (2013), the strategy used for this study established four types of validity. The four types of validity were: (a) face validity, (b) content validity, (c) concurrent validity, and (d) construct validity. Researchers must consider face validity when measuring variables and ensure that the instrument is measuring the correct variable (Abbott & McKinney, 2013).

Suresh and Chandrashekara (2012) described three categories of outcome variables. The first category is the simplest case and includes discrete answers such as yes/no or employed/unemployed. The second category encompasses multiple and exclusive possibilities such as ethnic groups or levels of education. The third category covers response variables that are continuous such as academic grades or age.

Each subordinate research question aligned to a corresponding survey question to measure the objective of that question. For example, SQ11 was: Have you or your business partner(s), obtained training beyond high school, by attending college, technical, university, or consulting assistance. This question generated a yes or no answer, thereby aligning itself with variable X_1: Can INTM (X_1) predict the likelihood of MBO winning a USG contract?

Content validity considers the adequacy of the measurement; does the measure include all elements intended in a study (Johnson & Christensen, 2014). Using the previous example regarding SQ11, there were only two possible outcomes from this question. The MBO indicated whether or not that they had training, higher education, or assistance provided by consultants. All survey questions aligned with the corresponding subordinate research questions and contained the same dichotomous yes / no answers.

Concurrent validity addresses the issue of whether a survey correlates with another survey measuring the same variables (Abbott & McKinney, 2013). For example, the survey question in SQ3 was: Please indicate the highest level of formal training obtained by owners. If the MBO selected any answer that shows any formal training beyond high school, there should be a strong correlation with SQ11: Have you or your business partner(s), obtained formal training beyond high school, by attending college, technical, or university? A strong correlation between questions SQ3 and SQ11 indicated concurrent validity.

The issue of construct validity addresses relationships between related concepts (Abbott & McKinney, 2013). For example, the question in SQ10 was: Did your business

win a contract award from the United States Government between August 2012 and July 2016? All affirmative answers in SQ10 correlated with SQ9: Between August 2012 and July 2016, did your company respond to an invitation for bid, request for proposal, or request for quote with the USG? Each affirmative response in SQ10 should have a direct correlation to each yes answer in SQ9 because MBO cannot win a contract without submitting a bid, proposal, or quote.

Reliability of a study dictates that if another researcher using the same survey instrument, same procedures, and conducting the research simultaneously, the researcher would achieve similar results within the sampling error (Blair et al., 2014). Another measurement used to ensure reliability is the test-retest. The test-retest approach involves conducting the survey at two different times measuring the correlation between the results of each survey (Green & Salkind, 2014; Pallant, 2013).

Internal consistency is another measurement of reliability that evaluates relationships between the survey questions. The intent of each subordinate research question was to determine the source of the technical skills training. If a correlation exists between the answers to the subordinate research questions and corresponding answers in the survey, the instrument will have internal consistency and be reliable (Abbott & McKinney, 2013).

Data Collection Procedures

The purpose of this quantitative, correlational study was to collect data from MBO using a self-administered Web-based survey. Upon obtaining IRB approval from Walden University, number 09-13-16-0264892, I collected data in three phases. The first

phase was to download the current vendor data set from the SAM database and save the file in Microsoft Excel. The resulting data set contained every business entity registered in SAM and all information necessary to select the population. I retained a copy of the unadulterated data to preserve the integrity of the source file.

The organization of the USG data set supports filtering of the data so that only businesses meeting the criteria remained. From this data set, filtering out all business entities that did not meet the small business size standards was necessary. Additional filtering excluded large businesses, other institutions, governmental agencies, municipal, and educational entities. Once the filtering process was complete, only small businesses remained.

From the remaining population, I further excluded businesses that have socioeconomic status. Exclusion of socioeconomic groups was necessary because members of these groups may receive contracts without competitive consideration and were outside the scope of this study. Upon completion of the filtering process, the number of businesses remaining was 58,987. After collecting the data, I used the Statistical Package for Social Sciences (SPSS) v. 23.0 to analyze and interpret the results as described by Field (2013) and Pallant (2013).

The total number of businesses that met the criteria was 58,987 and served as the population. The data set contained the company name, contact person, email address, phone numbers, and the socioeconomic status for each business. Gaining access to this information facilitated the invitation process and provided the email addresses needed to inform the participants of the online survey. The population of microbusinesses with

fewer than five employees seeking business with the USG using e-commerce procedures was the focus for this study. The final discriminator for participation is SQ6 that identified the number of employees meeting the microbusiness size desired for this study.

Conducting the study took place in six steps. Step 1, was to select the required number of participants, according to the calculated sample size. Step 2, was to send an introductory email explaining the purpose of the study and an invitation to participate (see Appendix C). The introductory email requested their participation and provided an opt-out statement that was included in the Consent to Participate Form with the option to explain their reasoning if they so desired. The introductory email informed the participant that, in 3 days, they would receive another email with instructions and a link to the survey.

Step 3, after the third day, I sent the email containing the instructions directing the participants to the website where they would find the survey instrument (see Appendix D). I monitored the progress of the survey to ensure timely responses. After the first week, the number of the surveys received was low, yielding a .019% response rate. I sent the business owners a follow-up email reminding them of the request and solicited their participation. Small business response rates are typically low with 12.3% determined to be acceptable (Torugsa et al., 2012) while Bressler et al. (2011) received 20% and 23.9%; therefore, I increased the number of participants to ensure that the response rate is sufficient to obtain valid and meaningful data. To obtain the number of surveys required, I selected 11,607 additional participants. Increasing the number of participants resulted in receiving 298 surveys overall with a 2.3% response rate.

Step 4, I downloaded the completed survey data from the SurveyMonkey website. Step 5, I validated and input the data into the SPSS software, which generated detailed descriptive statistics. Step 6, I analyzed, interpreted, and documented the results. Stratifying the data into descriptive groups allowed further analysis to identify characteristics of the participants (e.g., age, ethnicity, gender, education, number of employees, business classification).

Results from the survey provided the quantitative data necessary for analysis. Results from the analysis allowed an examination of the independent variables and its ability to predict the dependent variable. Upon completion of the analysis, I have an understanding of the relationships that can predict the likelihood of success between resources of technical skills and winning of a USG contract by MBO. These results add to the extant body of knowledge by detailing the results of the study including statistically significant relationships identified between the independent variables and its ability to predict the likelihood of the dependent variable.

Data Collection Technique

There are many advantages to using online surveys. The survey instrument is a common technique used to collect data in quantitative studies (Salkind, 2010). Abbott and McKinney (2013) indicated that the survey method is the primary tool used in social sciences and Patten (2014) included quantitative studies. Chen and Hosapple (2013) posited that 82.4% of research involving the adoption of technology used quantitative methods. More specific to this research, Ritzhaupt et al. (2013) stated that for digital divide research, surveys were the primary instrument used. Therefore, to answer the

research question: Can INTM, PFE, and GST predict the likelihood of MBO winning a USG contract?; I used a cross-sectional field study via an online survey to collect the data.

Abbott and McKinney (2013) indicated that when using surveys, a researcher might use a survey to collect data that may save time when studying large data sets that are time sensitive (e.g., U.S. Census). A strength of the survey method is that online surveys save valuable time as completion takes 10 to 20 days (Blair et al., 2014). Consistent with Blair et al., I allowed the survey to remain open for 22 days. Salkind (2010) stated that in addition to low cost and fast turnaround, surveys reach a large number of participants, allows for quick analysis, and minimizes human error. The survey represents a snapshot in time providing descriptive data to answer the subordinate research questions. The composition of the electronic survey was 12,607 MBO extracted from the USG database meeting the specified criteria.

Conversely, surveys may not capture in-depth knowledge that may be required when a more personalized approach is necessary such as interviews that need interpretation (Venkatesh et al., 2013). Surveys also lack personal involvement that may be necessary when investigative measures are necessary to explore underlying themes and patterns (Yilmaz, 2013). However, the benefits of reduced human error, bias, time, and cost in this cross-sectional survey outweigh the disadvantages.

Data Analysis

This study employed IBM's SPSS Statistical Package for the Social Sciences (SPSS), v. 23.0 to analyze and interpret the data. Using the SPSS software to conduct

statistical tests and analyze the data was comparable to research by Cachon et al. (2013) and Ritzhaupt et al. (2013). The SPSS software assisted in analyzing the data to answer the research question and determine the likelihood of INTM, PFE, GST, predicting winning a USG contract. The central research question was:

Can INTM, PFE, and GST predict the likelihood of MBO winning a USG contract?

To test each hypothesis independently, I divided the central research question into three subordinate questions, which were:

1. Can intermediaries predict the likelihood of MBO winning a USG contract?
2. Can federal employment predict the likelihood of MBO winning a USG contract?
3. Can government-sponsored training predict the likelihood of MBO winning a USG contract?

To support the hypotheses for this study, the null and alternate hypotheses are, $H1_0$, H1a, $H2_0$, H2a, $H3_0$, and H3a. The hypotheses are:

Hypotheses

The null and alternate hypotheses for this study were as follows:

$H1_0$: Intermediaries do not predict the likelihood of MBO winning a USG contract.

$H1_a$: Intermediaries predict the likelihood of MBO winning a USG contract.

$H2_0$: Previous federal employment does not predict the likelihood of MBO winning a USG contract.

$H2_a$: Previous federal employment does predict the likelihood of MBO winning a USG contract.

$H3_0$: Government-sponsored training does not predict the likelihood of MBO winning a USG contract.

$H3_a$: Government-sponsored training does predict the likelihood of MBO winning a USG contract.

Results from the online surveys furnished the data necessary for analysis to examine the predictability between the independent variables and the dependent variable. Logistic regression is an analytical process as described by Abbott and McKinney (2013) that allows an analysis of relationships, their strength, and may identify correlates with statistical significance with the outcome variable. The independent variables in this study were INTM (X_1), PFE (X_2), and GST (X_3).

Collecting descriptive data consisting of 13 nominal (categorical) scales of measurement generated three binary independent variables with a dichotomous outcome variable that made the logistic regression model the appropriate tool for analysis as established by Field (2013) and Pallant (2013). Green and Salkind (2014) stated that logistic regression is an analysis tool that researchers may use when there are two or more independent variables that are dichotomous and a dichotomous dependent variable. In this study, there were three interval-level independent variables of INTM, PFE, and GST that are dichotomous and one dichotomous dependent variable of MBO winning a USG contract.

Because there were more than two independent variables and a single dependent variable, parametric tests such as the Pearson's chi-square test were available. However, a high probability existed that MBO possessed skills obtained from more than one source. MBO may possess experience with any combination of INTM, PFE, and GST. Brooks, Dalal, and Nolan (2014) cited that the Pearson correlation coefficient (*r*) indicates the strength of a relationship between two variables. However, in cases where there are multiple variables, a Pearson's correlational coefficient analysis would produce a bivariate response and would not explain influences from the other variables (Abbott & McKinney, 2013).

Parametric tests such as the chi-square depend on a fixed number of parameters whereas nonparametric tests are flexible (Abbott & McKinney, 2013; Field, 2013; Pallant, 2013). Nonparametric tests are more simplistic than parametric tests and do not rely on data with a normal distribution as is the case with dichotomous variables (Field, 2013). Additionally, nonparametric tests do not follow a set of rigid assumptions as in parametric tests. Regression analysis is an extension of the chi-square test that uses more than two categorical variables.

Field (2013) cited two assumptions for using logistic regression analysis. The first assumption is that each case is independent of each other and random. The second assumption is that the observed frequencies have a normal distribution of the expected frequencies over repeated samples. Field stated that when using logistic regression analysis, the data should be categorical but is not required. Additionally, the logistic

regression analysis does not differentiate between the independent and dependent variables and treats them synonymously.

The survey responses included nominal data that was nonparametric, which made parametric tests inappropriate. When the requirements for using parametric tests fail, Field (2013) suggested using an alternative nonparametric test such as Cramér's V for measuring the strength of a relationship between the variables. Cramér's V test for a relationship or association is a based on the chi-squared test. However, this test allows for more than two variables (Field, 2013). The output from Cramér's V measurement will vary from 0 (indicating no relationship) to 1 (indicating a significant relationship). Therefore, Cramér's V was the appropriate test to measure the strength of relationships between the variables. However, the Cramér's V test does not account for missing data.

Pallant (2013) stated that when working with human participants, there are occasions when data is incomplete or missing. To address this possibility, there are two techniques to account for missing data. The first technique is trimming the data. If there are sufficient responses from the participants and the number of missing responses is low, for example, less than 5%, removing the cases with missing data is sufficient and is the default function in SPSS.

If, however, trimming will cause the sample size to drop below an acceptable confidence level, the SPSS software has an option that will insert placeholders (impute) for the missing data (Green & Salkind, 2014). The technique that the software uses is multiple imputations and uses this process to look for patterns in the existing data, and makes a probability calculation to replace the missing data. As long as the participant

responded to some of the questions, the software will take the mean of the nonmissing data and multiply this factor times the total number of questions to determine a probable value (Green & Salkind, 2014).

The output from SPSS produced two types of data: descriptive and inferential. Descriptive data describes items of interest similar to the gender of the participant, race, or ethnic group that they belong (Green & Salkind, 2014). In the example of descriptive data regarding gender, SPSS will calculate the central tendency or mean of the data, for instance, 47% men and 53% women. The software interprets inferential data results, extrapolates the data, and makes pre-determined assumptions about the population.

To analyze the inferential statistics; I assumed a statistical power of 85% and a Type I error rate probability of 5%. Applying a statistical power of 85%, yielded a calculated sample size of 136; however using a statistical power of 95% confidence level, the sample size increases to 195 participants. A confidence interval of .95 indicates a 95% assurance that the results from the sample size are indicative of the entire population. Conversely, there is a 5% probability that a Type I error exists when rejection of the null hypothesis occurs when, in fact, the null hypothesis should be true.

Using the codes in Appendix F, the data were input into the SPSS software, which generated descriptive tables for each variable for interpretation and analysis. Based on the analysis, testing of the hypothesis was possible to examine whether resources of INTM, PFE, and GST, predicted the likelihood of MBO winning a USG contract. Also, analyzing the results from the independent variables indicated that there was no multicollinearity (relationships between the independent variables) among each of the

subordinate research questions. Pallant (2013) expressed that when using multiple regression analysis, researchers must test for multicollinearity as well as outliers, independence of residuals, homoscedasticity, and normality.

Study Validity

When conducting quantitative research, researchers must always address validity. There are two kinds of validity, external and internal. External validity includes events that can influence the outcome of research if the researcher fails to maintain control. Internal validity does not apply to quantitative research; however, there were other potential threats to the study. A more detailed description of each is in the following sections.

External Validity

When checking for external validity in research, Weathington, Cunningham, and Pittenger (2012) stated that there are four types of external validity. Weathington et al. cited that confounding variables caused by (a) uncontrolled conditions, (b) unintended sequence of events occurring when researchers survey participants that are out of order, (c) maturation as evidenced in longitudinal studies, and (d) intervening events, may affect the participant's behavior. Natural disasters, accidents, contact with other participants in response to the abovementioned conditions may act as threats to internal validity. The approach for this study was to administer the survey once, independent of other actions, and over a short period, which minimized effects from the four possibilities cited by Weathington et al.

Erchul and Sheridan (2014) stated four other factors that a researcher must consider when addressing external validity. The ability to achieve similar results with different participants is essential, in other situations, using other applications, and other research methods when addressing external validity. For this study, only active MBO registered in SAM pursuing electronic business with the USG comprised the population. There were no other participants, situations, or other known threats to validity in this study.

To further address external validity, the random sampling design strengthened the procedure of selecting the sample population. Achieving a high response rate also adds to external validity. Therefore, by increasing the sampling size of the population, the total responses received were proportionally increased. Moreover, the participants were from a nationwide pool, which captured all demographic characteristics of the population. Yilmaz (2013) stated when using the approaches as outlined, helps strengthen external validity and adds to the generalizability of a study (Yilmaz, 2013).

Internal Validity

The approach used in this study was a nonexperimental design using correlation analysis to determine whether a relationship existed between the independent variables that could predict the likelihood of the dependent variable. Vulnerabilities to internal validity do not apply to research using a nonexperimental design and therefore not applicable. However, there are three threats to address. The threats are: (a) reliability of the instrument, (b) data assumptions, and (c) sample size.

Reliability of the instrument involves measuring the variables to ensure consistency of the data as related to validity (Heo, Kim, & Faith, 2015). Accurately measuring the correct variables that are consistent is the objective of internal validity (Abbott & McKinney, 2013). In this study, measuring the microbusiness's responses using categorical demographic questions provided the data needed for analysis. Categorical questions are definitive with questions such as age of the owner, racial or ethnic group, level of education, socioeconomic status, gender of the owner, the number of employees, and NAICS code. The purpose of the survey questions was to align with each subordinate research question and to collect the data necessary to answer the central research question.

When using a measuring instrument to administer a survey, Abbott and McKinney (2013) described consistency as obtaining similar results when conducting the same survey with the same population at a different point in time. Maintaining consistency of the survey instrument and processes are essential. Moreover, processes internal to the SurveyMonkey software helped prevent errors and duplication of answers.

Supplementary statistical analysis of the data provided additional reliability. There are two measurements used to estimate internal reliability: test-retest and Cronbach's alpha. The test-retest approach involves conducting the survey at two different times and then measures the correlation between the results of each survey (Green & Salkind, 2014) and did not meet the timeframe allotted for this study. Cronbach's alpha is one of the most accepted tests for determining reliability by measuring internal consistency (Bonett & Wright, 2015).

Chang and Vowles (2014) stated that Cronbach's alpha values that are larger than 0.70 are typical in business literature. Bonett and Wright (2015) and Heo et al. (2015) recommend using Cronbach's alpha to determine internal consistency, and as such, I used Cronbach's alpha for each question and considered a score of >.7 to be acceptable. The SPSS software generated a Cronbach's alpha score that analyzed each survey question measuring similar concepts. Green and Salkind (2014) indicated that the closer this score is to one, the higher the reliability of the instrument. Cronbach's alpha is as accurate as the test-retest; however, both are acceptable methods of estimating internal reliability (Heo et al., 2015). Because the survey included a one-time distribution, Cronbach's alpha was the appropriate tool for estimating reliability.

The second threat to internal validity is making inaccurate assumptions about the data collected. To address this threat, the analytic tool selected for this study was the logistic regression model. When using logistic regression analysis, Field (2013) cited two assumptions that must be considered. The first assumption is that each case is independent of each other and random. The second assumption states that the observed frequencies have a normal distribution about expected frequencies over repeated samples.

The third threat to internal validity is sample size. Many researchers use the statistical software package G*Power 3.1.9.2 to ensure adequate statistical power to generate an acceptable sample size (Peng et al., 2012). Consequently, the calculations from the G*Power 3.1.9.2 software ensured an adequate sample size was obtained. Under controlled conditions, researchers use the statistical power function to minimize the chances of incorrectly accepting or rejecting the null hypothesis. Johnson and

Christensen (2014) provided an example that with a statistical power of 70%, the probability exists that 30% of the time, the conclusion is to reject the null hypothesis when accepting would be correct. Incorrectly rejecting the null hypothesis is a Type I error and a Type II error results from failing to reject the null hypothesis when the null hypothesis is not true (Abbott & McKinney, 2013; Johnson & Christensen, 2014; Suresh & Chandrashekara, 2012). Based on the research, a range of statistical power levels between 85% and 95% is sufficient to ensure a large sample size.

Transition and Summary

Since inception, the world of e-commerce promised cost savings, efficiencies, faster deliveries, and transparency. With advancements in technology, there are costs. Technological advancement creates many unintended barriers for some MBO attempting to use e-commerce. The cost to marginalized businesses is digital exclusion. Notwithstanding efforts by the USG to train and educate, some MBO continue to miss an opportunity to conduct business and profit with the USG.

The focus of this study was to determine whether a relationship existed between the sources of technical skills obtained from INTM, PFE, GST, and winning a USG contract by MBO when attempting to conduct e-commerce with the USG. Factors affecting the success and failure of small and microbusinesses warrant further research because they represent 99.7% of the United States economy. Using empirical data to validate findings, government officials, and policymakers may have insight into the challenges that exist for those MBO aspiring to compete for federal contracts. With an understanding of the technical skills issues, policymakers may make changes to existing

programs and policies to minimize the effect that a lack of technical skills has on all marginalized businesses, regardless of size.

Section 3 includes a presentation of the findings from the study and a determination of applicability in the field of business. The next segment includes a review of possible benefits of social change, recommend actions for stakeholders, and call for future research to gain a deeper understanding of any technical skills issues identified in this study. The section closes with any thoughtful insights gained, a discussion of prior expectations, and a comparison of the actual results while considering possible biases introduced into the study.

Section 3: Application to Professional Practice and Implications for Change

Introduction

The purpose of this quantitative correlational study was to determine whether INTM, PFE, and GST predicted the likelihood of MBO winning a USG contract. The population for this study was MBO registered in the USG's public database (SAM) and pursuing business with the USG between August 2012 and July 2016. The independent variables were INTM, PFE, and GST. The dependent variable was the likelihood of MBO winning a USG contract.

After analysis of the findings, the null hypothesis for the subordinate research question H1 was accepted and the alternative hypothesis was rejected. The null hypothesis for the subordinate research question H2 was accepted and the alternative hypothesis was rejected. The null hypothesis for the subordinate research question H3 was rejected and the alternative hypothesis was accepted. Analysis of the results indicated that GST significantly reduced the log odds of MBO winning a USG contract, while INTM and PFE were found not to be statistically significant.

Presentation of the Findings

This section outlines the results of the study starting with the description of the sample, independent and dependent variables, assumption testing, and primary analyses to answer the research question. For this study, the following central research question and hypotheses were addressed:

Can INTM, PFE, and GST predict the likelihood of MBO winning a USG contract?

$H1_0$: Intermediaries do not predict the likelihood of MBO winning a USG contract.

$H1_a$: Intermediaries predict the likelihood of MBO winning a USG contract.

$H2_0$: Previous federal employment does not predict the likelihood of MBO winning a USG contract.

$H2_a$: Previous federal employment does predict the likelihood of MBO winning a USG contract.

$H3_0$: Government-sponsored training does not predict the likelihood of MBO winning a USG contract.

$H3_a$: Government-sponsored training does predict the likelihood of MBO winning a USG contract.

Data from MBO survey responses were analyzed using descriptive statistics and logistic regression. Demographic data were used to define the population of MBO (N = 259).

Descriptive Statistics

In total, 296 surveys were received. Thirty-seven records were eliminated due to nonconformance with the study criteria (e.g., businesses with more than four employees), resulting in 259 cases for analysis. Table 2 presents the numbers and percentages for all demographic variables. Most of the participants were 55 to 64 years old (42.9%), Caucasian/non-Hispanic (88.0%), and male (66.7%). In addition, most of the participants responded that a graduate degree was the highest level of education obtained by owners and employees (54.8%), the business's socioeconomic status was a small business

(62.8%), and the business had responded to requests to bid, propose, or quote with the USG (58.4%).

Table 2

Numbers and Percentages for Demographic Variables

Demographic variable	*n*	%
Age of primary business owner		
25–34	10	3.9
35–44	28	10.8
45–54	55	21.2
55–64	111	42.9
65–74	44	17.0
75 or older	11	4.2
Race		
African-American	2	.8
Asian/Pacific Islander	3	1.2
Caucasian (non-Hispanic)	228	88.0
Latino or Hispanic	6	2.3
Native American or Aleut	1	.4
Other	7	2.7
Prefer not to answer	12	4.6
Highest level of formal training obtained by owners and employees		
No high school diploma	1	.4
High school diploma or GED equivalent	14	5.4
Some college	23	8.9
Two (2) year college degree	13	5.0
Four (4) year college degree	66	25.5
Graduate degree	142	54.8
Company's socioeconomic status		
Other (please specify)	30	11.6
Small Business (select when no socioeconomic status applies below, for example, white male, non-veteran, not located)	162	62.8

(*table continues*)

Demographic variable	*n*	%
Company's socioeconomic status		
VOSB (Veteran-Owned Small Business)	43	16.7
I have a status, but is not listed in the System for Award Management	3	1.2
Not sure (I do not know if my company has a socioeconomic status as listed above)	20	7.8
Gender of primary business owner		
Male	166	66.7
Female	83	33.3
Number of employees in company		
Less than four	256	100.0
Responded to request for bid, proposal, or quote with the USG		
Yes replied to opportunities	150	58.4
No reply to opportunities	107	41.6

Note. Numbers not summing to 259 reflect missing data.

Table 3 presents the numbers and percentages for the independent and dependent variables and were calculated to summarize the sample characteristics. Most of the participants reported that they did not win a USG contract (57.4%), had formal training (92.6%), did not have previous work experience (61.1%), and did not have federal training (71.7%).

Table 3

Numbers and Percentages for Independent and Dependent Variables

Variable	*n*	%
Won a contract award from USG		
Yes, won a contract	110	42.6
No, did not win a contract	148	57.4
INTM		
Yes, had formal training	238	92.6
No, did not have formal training	19	7.4
PFE		
Yes, had previous work experience	100	38.9
No, did not have previous work experience	157	61.1
GST		
Yes, had federal training	73	28.3
No, did not have federal training	185	71.7

Note. Numbers not summing to 259 reflect missing data.

Primary Analyses

Tests of assumption. Before testing whether INTM, PFE, and GST predicted the likelihood of MBO winning a USG contract, I examined the data to ensure that assumptions were satisfied prior to conducting logistic regression analysis. Five assumptions were addressed and met. The first assumption was that all continuous predictors have a linear relationship with the logit of the dependent variable (Tabachnick & Fidell, 2013). The logit of the dependent variable is the transformation of the regression equation into the natural log ($\log_e$) of the probability of being in one group (e.g., won a USG contract) divided by the probability of being in the other group (e.g., did not win a USG contract). Because the present study did not contain continuous

predictors, this assumption did not need to be confirmed.

A second assumption of logistic regression is independence of errors (Tabachnick & Fidell, 2013). Independence of errors assumes that each response comes from a different, unrelated case (Tabachnick & Fidell, 2013). Because the survey was sent to a randomly selected population of different MBO and the design of the study was between-subjects, the logistic regression met the independence of errors assumption.

To test whether the logistic regression model displayed an absence of multicollinearity (i.e., high correlations among independent variables), I conducted three Pearson's chi-square tests to examine the categorical association among INTM, PFE, and GST. In addition, I calculated phi coefficients (Φ) for each associative test. Phi is used to measure the strength of the association between two nominal variables that have only two categories, which is algebraically equivalent to Cramer's *V* (also called Cramer's phi), which is used to measure the association between nominal variables with two or more categories (Field, 2013).

In the present study, all categorical variables used in the analysis had only two categories. For Φ, values closer to +1 or -1 indicate a stronger association, whereas values closer to 0 indicate a weaker association. No association was found between INTM and PFE, $\chi^2(1) = 2.84$, $p = .092$, $\Phi = .106$. However, there was an association between INTM and GST, $\chi^2(1) = 5.31$, $p = .021$, $\Phi = .144$. According to Bonferroni-adjusted tests between column proportions, the percentage of MBO who had both formal and federal training (30.0%) was larger than the percentage of MBO who had federal training but not formal training (5.3%), $p < .05$. Table 4 displays the results of the

Pearson's chi-square analyses of INTM by PFE and GST.

Table 4

Numbers and Percentages for INTM by PFE and GST

	INTM						
	Yes, had formal training		No, did not have formal training				
Independent variable	*n*	%	*n*	%	χ^2	*p*	Φ
PFE					2.84	.092	.106
Yes, previous work experience	96 [a]	40.7	4 [a]	21.1			
No previous work experience	140 [a]	59.3	15 [a]	78.9			
GST					5.31	.021	.144
Yes, federal training	71 [a]	30.0	1 [b]	5.3			
No federal training	166 [a]	70.0	18 [b]	94.7			

Note. For each row category, pairs of column proportions with different superscripts differed significantly, $p < .05$.
[Φ] Phi coefficient reported.

I conducted a third Pearson's chi-square test of independence to assess the relationship between the independent variables PFE and GST. No association was found between PFE and GST, $\chi^2(1) = 0.06$, $p = .803$, $\Phi = .016$, as shown in Table 5. Based on the results from the Pearson's chi-square tests of independence among independent variables, the variables did not display extremely high correlations and, therefore, demonstrated absence of multicollinearity.

Table 5

Numbers and Percentages for PFE and GST

	GST						
	Yes, formal training		No formal training				
Independent variable	*n*	%	*n*	%	χ^2	*p*	Φ
PFE					.06	.803	.016
Yes, previous work experience	29 [a]	40.3	71 [a]	38.6			
No previous work experience	43 [a]	59.7	113 [a]	61.4			

Note. For each row category, pairs of column proportions with different superscripts differed significantly, $p < .05$.
[Φ] Phi coefficient reported.

Logistic regression. I conducted a multiple logistic regression to determine whether INTM, PFE, and GST predicted whether MBO won a USG contract. The model fit demonstrated an absence of outliers in the solution, as well as an adequate ratio of cases to variables. In addition, the Hosmer-Lemeshow statistic produced a nonsignificant, chi-square statistic, $\chi^2(3) = .14$, $p = .986$. A nonsignificant goodness-of-fit statistic indicated that participants with the higher estimated probabilities of winning a USG contract were categorized as winning a USG contract, whereas participants with lower estimated probabilities of winning a USG contract were not categorized as winning a USG contract.

The remaining three assumptions were necessary to ensure adequate model fit. Overall, the model was significant, $\chi^2(3) = 11.82$, $p = .008$, Nagelkerke $R^2 = .061$, Cox and Snell's $R^2 = .046$, suggesting that all three predictors, as a set, reliably distinguished

between MBO who won and did not win a USG contract. Only GST significantly predicted MBO winning a USG contract, (*Odds Ratio (OR)* = .383, p = .002).

Based on the odds ratio, MBO who had federal training had lower log odds of winning a USG contract than MBO who did not have GST. To determine the odds ratio of the group who did not have previous GST, I divided the odds ratio of having previous GST into 1 (i.e., 1 ÷ .383 = 2.61). Specifically, MBO who did not have GST were 2.6 times more likely than MBO who had GST to win a USG contract. INTM and PFE were not significant predictors of MBO winning a USG contract, ps > .05. Table 6 presents data for the multiple logistic regression.

Table 6

Summary of Multiple Logistic Regression Analysis for Predicting USG Contract Award

Predictor	*β*	*SE*	*Wald*	*OR*	*p*	95% CI *LL*	95% CI *UL*
Yes, formal training[a]	.40	.50	.64	1.497	.424	.557	4.022
Yes, previous work experience[b]	.33	.27	1.51	1.389	.219	.823	2.344
Yes, federal training[c]	-.96	.31	9.52	.383	.002	.208	.705

Note. $\chi^2(3) = 11.82$, p = .008, Nagelkerke R^2 = .061, Cox and Snell's R^2 = .046.
[a]Compared to No formal training. [b]Compared to No previous work experience.
[c]Compared to No federal training.

To explore the bivariate relationships between the independent and dependent variables, I conducted three Pearson chi-square tests of independence between MBO winning a USG contract and INTM, PFE, and GST. As confirmed by the logistic

regression, only GST was significantly associated with MBO winning a USG contract, $\chi^2(1) = 9.22$, $p = .002$, $\Phi = -.189$. According to Bonferroni-adjusted tests between column proportions, the percentage of MBO who had GST and won a USG contract (18.2%) was smaller than the percentage of MBO who had GST but did not win a USG contract (35.4%), $p < .05$. The associations between INTM and PFE and winning a USG contract were not significant, ps > .05, as shown in Table 7.

Table 7

Numbers and Percentages for Independent Variables by USG Contract Award

	Won a contract award from USG						
	Yes, won a contract		No, did not win a contract				
Independent variable	*n*	%	*N*	%	χ^2	*p*	Φ
INTM					.28	.599	.033
Yes, formal training	102 [a]	93.6	135 [a]	91.8			
No formal training	7 [a]	6.4	12 [a]	8.2			
PFE					1.56	.212	.078
Yes, previous work experience	47 [a]	43.5	53 [a]	35.8			
No previous work experience	61 [a]	56.5	95 [a]	64.2			
GST					9.22	.002	-.189
Yes, federal training	20 [a]	18.2	52 [b]	35.4			
No federal training	90 [a]	81.8	95 [b]	64.6			

Note. For each row category, pairs of column proportions with different superscripts differed significantly, $p < .05$.
[Φ] Phi coefficient reported.

Summary of Findings

Overall, the results indicated that not having federal training predicted whether MBO won a contract award from the USG. These results were confirmed when

controlling for whether MBO had formal training and previous work experience. In addition, having federal training was significantly associated with INTM (i.e., having formal training). However, INTM as a single variable was not significantly associated with whether MBO won a contract from the USG.

Based on this study's research question and hypotheses, only the third (H_3) null hypothesis was rejected. That is, only the variable GST predicted whether MBO won a USG contract. Specifically, not having previous GST predicted winning a USG contract among MBO. I discuss the implications, limitations, and future research directions in the following sections.

Relating Findings to the RBV

Barney (1991) posited that RBV includes four main constructs, (inimitable, rare, valuable, and nonsubstitutable), which give the firm a competitive advantage. Barney et al. (2011) expanded RBV and stated that owners possess unique internal resources that may develop into a sustainable competitive advantage. Framed within the RBV theory, I collected demographic data and information related to the research questions regarding MBO obtaining technical skills and their likelihood of winning a USG contract.

By examining the intangible internal resources of microbusinesses, I identified key relationships between resources of technical skills training and MBO winning a USG contract. The findings in this study were consistent with constructs of the RBV because MBO accumulate technical skills from INTM, PFE, and GST that are inimitable, rare, valuable, and nonsubstitutable, which may provide a competitive advantage. An analysis of the data revealed that possessing internal resources of technical skills obtained from

other than GST predicted MBO winning a USG contract and was consistent with the RBV.

Relating Findings to the Literature

The findings in this study relate to the RBV theoretical framework and associated literature regarding resources that are required for businesses to be sustainable. As acknowledged as a gap in the literature, Chao and Chandra (2012) identified technical skills as one of many barriers that MBO encounter when attempting e-commerce. To overcome challenges of doing business with the USG, the SBA provides free training covering basic requirements because the government has complex and unique rules that govern the procurement processes (SBA, 2016a). However, the training that the government provides does not include technical skills, which adds to the confusion (GAO, 2012).

Ayanso et al. (2014) discussed three barriers of skills access, as a lack of education, social support, and non-user friendly IT systems. As shown from the survey results, education is not considered a barrier with 85.3% of the MBO possessing an advanced degree. Although learning styles were not discussed in this study, MBO that did not utilize GST were 2.6 times more likely to win a USG contract that MBO that had taken GST, which may be associated with alternative ways learning. Absent a significant finding regarding INTM and PFE; a reasonable assumption could be that because of limited resources these MBO learned by doing rather than pursuing external assistance. This assumption is based on Ekanem (2015) that stated that many small business owners use a hands-on approach and gain knowledge and skill through experiential learning.

Skills obtained through experiential learning align with the RBV because the experiences gained by learning are imitable, rare, valuable, and nonsubstitutable and unique to each business. Barney (1991) posited that businesses use their available resources of information and knowledge as a strategic advantage for sustainability and competitiveness. Internal resources of technical knowledge provide a foundation necessary for success in e-commerce (Chao & Chandra, 2012; Kamal, 2015). The results of this study support the assumption that MBO who acquire information and knowledge through experiential learning were 2.6 times more successful, further strengthening the alignment with RBV.

Applications to Professional Practice

The participants in this study were selected at random from the SAM database located in the continental United Stated. Although specifically targeted at MBO conducting business with the USG, the results of this study may be applicable to other MBO that operate in all facets of public procurement, such as state and local governments and other municipalities that employ e-commerce procedures.

The results of this research show a statistically significant correlation between GST and MBO winning a USG contract. However, the correlation is negative which may indicate that the training provided by the government is ineffective or that MBO are unaware of the resources available. Similarly, the results of this research is consistent with Jaeger et al. (2012) when they stated that the training provided by the USG to be inconsistent and ineffective. Moreover, the findings of this study may add to the body of

knowledge, provide value and guidance to MBO, assist other small business owners, and government stakeholders.

From the governments' viewpoint, understanding strategies for gaining technical skills that successful MBO use to compete for business with the USG may assist policy makers in applying those strategies in developing training that is more efficient. Efficiencies gained may include cost reductions in training delivery and cost savings obtained by increased competition.

Implications for Social Change

MBO that are successful at winning a USG contract sustain and grow their business by increasing the livelihoods of employees, creating jobs while reducing unemployment, and sparking economic growth in their communities. Further impacts to the MBO's community may include increased orders with suppliers, shipping and transportation support, and financial support. The empirical results from this study may extend positive social change to a national level by encouraging government officials to implement new or revise policies by adapting the unique strategies in which the MBO in this study used to learn and successfully navigate the e-commerce procedures of the USG.

Subsequently, MBO may gain an understanding of the relationship that possessing technical skills has on the success of other microbusinesses. Applying the RBV theory, unsuccessful MBO may develop strategies to acquire internal resources needed to maintain and sustain the livelihood of their business thereby increasing their

own wealth, creating jobs within their communities, and reducing unemployment, as presented by Williams (2015b).

Recommendations for Action

The results of this study identified one statistical significant finding, which was that MBO that did not receive GST were 2.6 times more likely to win a USG contract than those who had utilized GST. Jaeger et al. (2012) stated that many times assistance provided by the SBA is ineffective and lacks consistency among various training sites. The results of this study support the work of Jaeger et al, which leads me to make two recommendations.

The first is that government officials should understand the different ways in which MBO learn and develop strategies for success in the e-commerce environment. Many MBO are resource constrained (Kamal, 2015) which forces them to use innovative ways to save time and money to survive. Ekanem (2015) stated that many small business owners use a hands-on approach and gain knowledge and skill through experiential learning. As evidenced by the results of this study, MBO without GST were 2.6 times more successful than the MBO that had utilized the GST. The government would be in a better position to assist these MBO if its officials understood and explored different learning styles of MBO, provided alternative venues, and adapted training methods that are more effective.

Secondly, I recommend that MBO become aware of the resources provided by the government and seek training opportunities that are currently available. The rules of conducting business with the USG are unique and complex, and pose challenges for small

businesses (SBA, 2016j). Most programs offered by the SBA and its resource partners provide free information that is useful and valuable. As with any technology, the methods used by the SBA to deliver training will improve over time and well informed MBO can use this training to increase their odds of success.

I will share the findings of this study through scholarly publications, business journals, and promote this research at small business events. This includes participating in small business events such as Industry Days, Small Business workshops, and other venues in which I will collaborate with the participants and share my findings through networking and one-on-one interactions. Additionally, as a finance and business educator for many aspiring entrepreneurs, I will share my findings, offer assistance, and position myself as a point of contact for future reference.

Recommendations for Further Research

The purpose of this study was to examine the likelihood that INTM, PFE, and GST may provide the technical skills that might predict a MBO's success in winning a USG contract. Research by nature contains limitations that are factors or details outside of the researcher's control that might introduce a weakness thereby affecting the results of a study. The limitations of this study was the population of MBO within the United States seeking business opportunities with the USG, MBO misrepresenting the size of their business, and the survey instrument used to collect data.

Future research may address these limitations by examining different demographic groups of MBO, validating the business size of the MBO, and using different survey instruments. Because this study was conducted on a nationwide level,

future studies may focus on rural, regional, or cultural demographics that may validate this research or provide additional insight in understanding why some MBO more successful than others.

Research conducted using alternative survey instruments collecting different demographic information may yield new or supplementary information that might explain the unexpected results from this study. Microbusiness research is a growing area of interest and future researchers may use qualitative methods to enrich the body of knowledge to understand the results of this study. As this area of research continues to develop, government officials, small business owners, and specifically, MBO may gain additional guidance and awareness into issues that might assist their future success and growth.

Reflections

Throughout my career, I have been a strong supporter of small businesses and my goal in this doctoral journey was to conduct research that may assist MBO in being more successful. As an agent for the USG and former government procurement counselor, I have seen first-hand many issues that MBO encounter when attempting business with the USG. Upon learning that a gap existed in the literature regarding MBO, I became more determined to complete this research.

To avoid potential bias and to minimize any inadvertent influence brought about by my research, I used quantitative methods, a Web-based survey for data collection, and a randomly selected population. Furthermore, I maintained minimal contact with the participants throughout the survey process to reduce any personal bias or influence that

may have affected the results. Based on the literature regarding other small businesses, my a priori belief was that MBO with higher levels of education associated with INTM and prior knowledge obtained through PFE would be statistically significant. However, as the results of this study indicate neither variable of INTM or PFE was a good predictor of success when pursuing business with the USG. Moreover, the results of this study identified a statistically significant finding, which was that MBO that did not receive GST, were 2.6 times more likely to win a USG contract than those who had GST. This finding was contrary to my belief that training provided by the government would be a good predictor of MBO success in winning a USG contract.

Summary and Study Conclusions

I used a quantitative logistical regression study to understand the relationships between resources of INST, PFE, and GST that provided technical skills that could predict the success of MBO winning a USG contract. The logistical regression results obtained from this study aligns with the resource-based view. I used SPSS 23.0 to analyze the data from 259 participants who responded to the 13 question survey using binary responses to answer the subordinate research questions.

The results of this analysis supported the null hypotheses for H1 and H2 and did not predict MBO winning at USG contract. The variables INTM and PFE did not significantly predict the dependent variable of MBO winning a USG contract. However, the alternative hypothesis for H3 was shown to be a good predictor. The results indicated a statistically significant negative correlation between the independent variable, GST, and

MBO winning a USG contract where MBO that did not have GST were 2.6 times more likely to win a USG contract.

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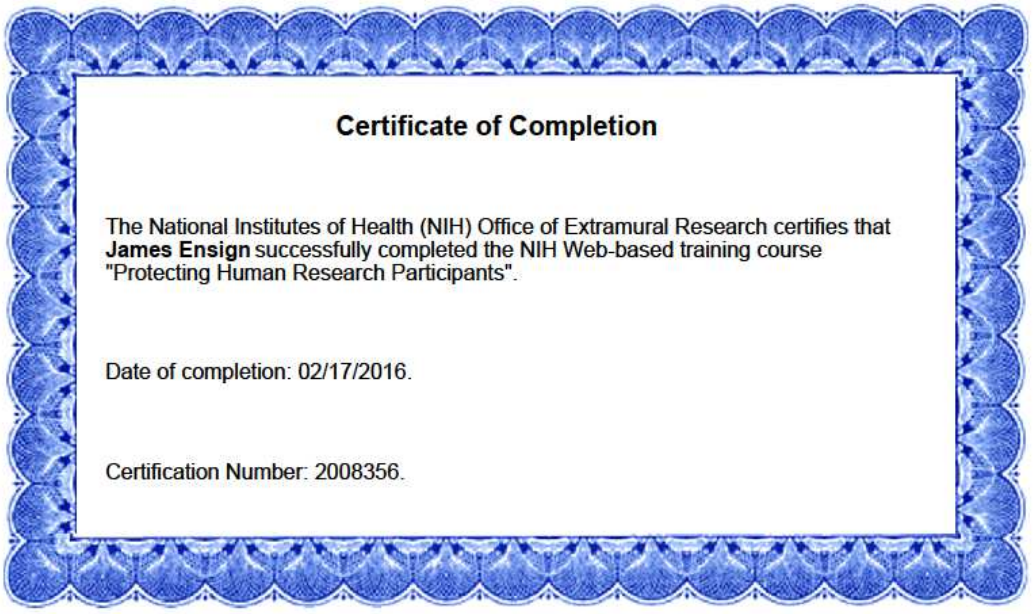
Appendix A: Sources Used in the Literature Review

Reference type	Total	2012 to 2016	2011 and older
Research-based peer-reviewed articles/Government sources	158	90%	10%
Dissertations	5	3%	0
Seminal work	2	0	1%

Appendix B: Protecting Human Research Participants Certificate



Certificate of Completion

The National Institutes of Health (NIH) Office of Extramural Research certifies that **James Ensign** successfully completed the NIH Web-based training course "Protecting Human Research Participants".

Date of completion: 02/17/2016.

Certification Number: 2008356.

Appendix C: Introductory Email to Participants

Dear Sir/Madam,

My name is James M. Ensign, and I am a doctoral candidate at Walden University. The doctoral study is required to complete the Doctor of Business Administration degree. My research is to examine the sources of technical skills training that microbusinesses acquire that may predict winning a United States Government (USG) contract. I invite you to take part in my research study of e-commerce barriers that some microbusinesses experience while attempting to conduct business with the USG.

I am inviting all microbusiness owner (those with less than five employees) who are actively seeking business with the USG to participate in this study.

I am conducting this study through the online survey website, Survey Monkey. The survey contains 13 questions and takes about 15 minutes to complete. In three days, I will send you another email summarizing the purpose of this research, the URL to the study, and further instructions.

The attached form is part of a process called *informed consent* to allow you to understand this study before deciding whether to take part. You will have to read and consent prior to accessing and completing the survey.

The survey will not collect personal identifying information and all other data will remain confidential and protected.

I look forward to working with you on this endeavor. My contact information is james.ensign@waldenu.edu. Please do not hesitate to contact me.

Best Regards,

James M. Ensign

Appendix D: Launch of Study Email to Participants

Dear Sir/Madam,

This is the follow-up email I referenced in my previous email regarding your participation in assisting me in conducting my study. As a quick refresher, I am James M. Ensign, a doctoral candidate at Walden University. My research is to examine the sources of technical skills training that microbusinesses acquire that may predict winning a United States Government (USG) contract.

Your participation would be appreciated in helping understand some of the challenges that your company may face while pursuing business with the USG. With this in mind, I invite you to take part in my research study of e-commerce barriers that some microbusinesses experience while attempting to conduct business with the USG. Please note that participation or non-participation in this study will not effect your company's relationship with the USG.

I am inviting all microbusiness owner (those with less than five employees) who are actively seeking business with the USG to participate in this study.

I am conducting this study through the online survey website, Survey Monkey. The survey contains 13 questions and takes about 15 minutes to complete. Please follow this link to the URL to complete the study. The website is https://www.surveymonkey.com/r/WTSVRXT. Thank you in advance for your participation.

The results of this study will be shared at Small Business Industry Days and through networking events with Small Business Development Centers and Procurement

Technical Assistance Centers. The results of the study may indicate which source of technical skills training is the best predictor of successful microbusinesses. Information in this study will be collected anonymously while all data is kept confidential and protected.

I look forward to working with you on this endeavor. My contact information is james.ensign@waldenu.edu. Please do not hesitate to contact me.

Best Regards,

James M. Ensign

Appendix E: Technological Skill Resources Survey

Section 1. Demographic Data

1. What is the age of the primary business owner?

   Answer Choices:

   a. ☐ 18-24 b. ☐ 25-34
   c. ☐ 35-44 d. ☐ 45-54
   e. ☐ 55-64 f. ☐ 65-74
   g. ☐ 75 or older

2. To which racial or ethnic group(s) do you *most* identify?

   a.☐ African-American (non-Hispanic) b. ☐ Asian/Pacific Islanders
   c. ☐ Caucasian (non-Hispanic) d. ☐ Latino or Hispanic
   e. ☐ Native American or Aleut f. ☐ Other
   g. ☐ prefer not to answer

3. Please indicate the highest level of formal training obtained by owner(s).

   a. ☐ No High School Diploma b. ☐ High School Diploma or GED equivalent
   c. ☐ Some College d. ☐ Two (2) Year College Degree
   e. ☐ Four (4) Year College Degree f. ☐ Graduate Degree

4. What is your company's socioeconomic status?

   a. ☐ Small Business (select when no socioeconomic status applies below, for example, white male, non-veteran, not located in an economically depressed area)
   b. ☐ HUBZone (Historically Underutilized Business Zone Program)
   c. ☐ WOSB (Woman-Owned Small Business or Economically Disadvantaged Woman-Owned Small Business)
   d. ☐ VOSB (Veteran-Owned Small Business)
   e. ☐ SDVOSB (Service-Disabled Veteran-Owned Small Business)
   f. ☐ 8(a) (SBA Business Development Program)
   g. ☐ SDB (Small Disadvantaged Business)
   h. ☐ I have a status, but is not listed in the System for Award Management
   i. ☐ Not sure (I do not know if my company has a socioeconomic status as listed above).

5. Does a man or woman own more than 51% of the business?

   a. ☐ Male

b. ☐ Female

6. What is the total number of employees in your company?

a. ☐ Less than four
b. ☐ More than four

7. What is the primary North American Industry Classification System Code (NAICS) for this business?

Enter NAICS code: _____

8. What is your Zip code?

Enter Zip code: _____

9. Between August 2012 and July 2016, did your company respond to an invitation for bid, request for proposal, or request for quote with the USG?

a. ☐ Yes.
b. ☐ No. My company did not respond to a government opportunity.

10. Did your business win a contract award from the United States Government between August 2012 and July 2016?

a. ☐ Yes.
b. ☐ No. My company has not received a government contract.

Section 2. Technological Skill Resources

11. Have you or your business partner(s), obtained formal training beyond high school, by attending college, technical, university, or consulting assistance?

a. ☐ Yes.
b. ☐ No. No one in the company has obtained higher formal training or received consulting assistance.

12. Do you or your business partner(s) have any previous federal employment (this includes military service)?

a. ☐ Yes.
b. ☐ No. No one in the company has previous federal employment.

13. Have you, your business partner(s), or any employees received federal government-sponsored training from one of the following organizations related to conducting business with the USG?

a. ☐ Yes.

b. ☐ No. No one in the company has sought assistance from government-sponsored training while seeking USG business.

Small Business Administration (SBA)
Small Business Development Center (SBDC)
Procurement Technical Assistance Center (PTAC)
Woman Business Center
Minority Business Center
SCORE
Local Economic Development
Government Conference or Workshop
Small Business Incubator
Other federal government assistance

Appendix F: Description of Coding Used for SPSS Analysis

Question Number	Code	Question
1	OwnAge	What is the age of the primary business owner?
2	Ethnic	To which racial or ethnic group(s) do you most identify?
3	Educ	Please indicate the highest level of formal training obtained by owners and employees.
4	Socio	What is your company's socioeconomic status?
5	MF	Does a man or woman own more than 51% of the business?
6	NumEmp	What is the total number of employees in your company?
7	NAICS	What is the primary North American Industry Classification System code (NAICS) for this business?
8	ZipCode	What is your zip code?
9	GovResp	Between August 2012 and July 2016, did your company respond to an invitation for bid, request for proposal, or request for quote with the USG?
10	USGAwd	Did your business win a contract award from the United States Government between August 2012 and July 2016?
11	IDV1	Have you or your business partner(s), obtained formal training beyond high school, by attending college, technical, university, or consulting assistance?
12	IDV2	Do you or your business partner(s) have any previous federal employment (this includes military service)?
13	IDV3	Have you, your business partner(s), or any employees received federal government-sponsored training from one of the following organizations related to conducting business with the USG?