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**DEPARTMENT OF DEFENSE PURCHASING OF
COMMERCIALY AVAILABLE OFF-THE-SHELF
SPECIAL OPERATIONAL EQUIPMENT:
A COMPARATIVE ANALYSIS OF DEFENSE
CONTRACTING AND COMMERCIAL E-COMMERCE
PURCHASING**

September 2021

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COMPARATIVE ANALYSIS OF DEFENSE CONTRACTING AND
COMMERCIAL E-COMMERCE PURCHASING**

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ABSTRACT

The purpose of this research was to conduct a comparative analysis of an existing Department of Defense (DOD) contract for commercially available off-the-shelf (COTS) special operational equipment (SOE) items with commercial e-commerce portals to determine if there were certain categories of commercial items that should be purchased through the online marketplace. Specifically, the research analysis compared a specific set of COTS SOE items purchased by the Defense Logistics Agency (DLA) Troop Support through its tailored logistics support program (TLSP) contracts with the same set of items available for purchase through commercial e-commerce portals. The comparative analysis between DOD contracts and commercial e-commerce portals pinpointed benefits, disadvantages, and limitations of the implementation of commercial e-commerce portals for the procurement of COTS SOE.

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LIST OF ACRONYMS AND ABBREVIATIONS

COTS	commercially available off-the-shelf
CPARS	contractor performance assessment reporting system
C&E	construction and equipment
C&T	clothing and textiles
DLA	Defense Logistics Agency
DOD	Department of Defense
EDD	estimated delivery date
FAR	Federal Acquisition Regulation
FOB	freight on board
FOPOC	financial office point of contact
GPC	governmentwide commercial purchase card
GSA	General Services Administration
NDAA	National Defense Authorization Act
NSN	National Stock Number
OMB	Office of Management and Budget
SES	senior executive service
SIN	special item number
SOE	special operational equipment
TCE	Transaction Cost Economics
TLSP	tailored logistics support program

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I. INTRODUCTION

Chapter I provides an overview of the research topic including the background, purpose of the research, research questions, methodology, research importance, and research limitations. This chapter closes with the organization of the report followed by a brief chapter summary.

A. BACKGROUND

The speed of procurement has been a concern at the highest levels of government in the United States for several years. The U.S. government has relied heavily on the procurement of commercial items to increase the speed of acquisition rather than purchasing developmental items or non-commercial items with long lead-times. For that reason, 10 U.S.C. § 2377 implemented the requirement for the head of an agency to maintain a preference for the procurement of commercial items and services and/or make adjustments to requirements to allow commercial items to meet agency needs (Preference for Acquisition of Commercial Items, 2014). The streamlined procedures contained in Federal Acquisition Regulation (FAR) Part 12 (2019), Acquisition of Commercial Items, and FAR Part 13 (2019), Simplified Acquisition Procedures, make commercial item procurement much faster than the procurement of non-commercial and developmental items.

Although commercial item procurement is accelerated in comparison to non-commercial item procurement, there are two areas that restrict the speed of the procurement process for commercial items. The micro-purchase threshold and procurement lead-time required to execute contracting procedures are two potential areas for delays in commercial item procurement. The fastest way to procure commercial goods and services from the commercial item e-commerce portals is with the governmentwide commercial purchase card (GPC). The GPC is the preferred method for purchasing items at or below the micro-purchase threshold, which was increased to \$10,000 in 2019 under 41 U.S.C. § 1902 (FAR 13.201(b), 2019; Procedures Applicable to Purchases Below Micro-Purchase Threshold, 2019). The \$10,000 purchase limit for commercial items through commercial item e-

commerce portals restricts the number of items that can be acquired on a purchase order. Section A.1.2.1 of the *Department of Defense [DOD] Government Charge Card Guidebook for Establishing and Managing Purchase, Travel, and Fuel Card Programs* strictly forbids GPC holders from splitting larger purchases to fit within the constraints of the micro-purchase threshold, so they are subject to the contracting procedures prescribed in FAR Part 12 (2019) and FAR Part 13 (2019) for orders above this threshold (Office of the Under Secretary of Defense for Acquisition and Sustainment [OUSD(A&S)], 2020). Although the procedures outlined in the FAR and agency supplements provide contracting procedures to streamline the procurement of commercial items, the processes are slow compared to the commercial buying practices of commercial e-commerce portals, causing an increase in procurement lead-time. The limitations placed on transactions executed in the commercial e-commerce portals are based more on product availability than dollar thresholds and delays from contracting processes. In other words, many of the commercial item e-commerce sources may not have the specific product available at all or may not have the appropriate size, quantity, style, color, or other characteristic to fulfill the requirement.

Section 846 of the 2018 National Defense Authorization Act (NDAA; 2017) directed the creation of a DOD commercial item procurement program through commercial item e-commerce portals for the purpose of increasing competition, reducing procurement lead-time, and obtaining equitable pricing of commercial items. The creation of a commercial item e-commerce procurement program was intended to promote a faster and easier means of purchasing commercially available off-the-shelf (COTS) items. In the *Summary of the 2018 National Defense Strategy of the United States*, then-Secretary of Defense Jim Mattis (2018) stated:

We will continue to leverage the scale of our operations to drive greater efficiency in procurement of materiel and services while pursuing opportunities to consolidate and streamline contracts in areas such as logistics, information technology, and support services. (p. 10)

The commercial e-commerce portal utilization initiative set forth in the 2018 NDAA coincided with the streamlined procurement strategy outlined by Secretary Mattis

(2018) in the 2018 National Defense Strategy and opened the door to expedited commercial item procurement by the DOD.

B. PURPOSE OF RESEARCH

The purpose of this research is to conduct a comparative analysis of COTS special operational equipment (SOE) items purchased through an existing multiple award schedule DOD contract with the same items available through commercial item e-commerce portals to determine if there are certain categories of commercial items that should be purchased through commercial item e-commerce portals. The comparative analysis of the multiple award schedule DOD contract and commercial item e-commerce portals pinpoints the benefits, disadvantages, and limitations of the implementation of commercial item e-commerce portals for the procurement of COTS SOE.

C. RESEARCH QUESTIONS

Research objectives are addressed by answering the following questions:

- 1. What categories of COTS SOE items are more suitable for procurement through commercial item e-commerce portals?**
- 2. What evidence of cost, schedule, or performance efficiencies exists with the procurement of COTS SOE items through commercial item e-commerce portals?**
- 3. What are the potential benefits, disadvantages, and limitations of implementing the procurement of COTS SOE items through commercial item e-commerce portals?**

D. METHODOLOGY

Defense Logistics Agency (DLA) Troop Support provided the DOD contract data for this research. The research compared a set of items purchased by DLA Troop Support through an existing contract between March 2019 and March 2020 with the same items currently available through Amazon, General Services Administration (GSA) Advantage, and other commercial item e-commerce portals. The data analysis and comparison were

conducted to determine if there was evidence of cost, schedule, or performance efficiencies that may benefit the DOD if commercial item e-commerce portals are utilized to purchase COTS SOE. A COTS SOE commercial item e-commerce database was compiled using one year of contract data from the DLA Troop Support tailored logistics support program (TLSP) contract coupled with commercial item e-commerce data from Amazon, GSA Advantage, and other commercial item e-commerce portals. The database analysis was of the available COTS SOE item delivered unit prices, proxy delivery lead-times, and vendor performance records.

E. RESEARCH IMPORTANCE

The comparative analysis of this research may highlight benefits, limitations, and efficiencies in cost, schedule, or performance of the various approaches DLA Troop Support and/or commercial item e-commerce portals utilized to procure COTS SOE items. The research findings could be generalized across the other DLA Troop Support supply chains as well as used to determine how the DOD procures commercial items. The methods for analyzing data could be beneficial in the evaluation of other commodities within the construction and equipment (C&E) directorate, other contracts within DLA, and throughout the DOD. Overall, the research findings can be used to address any potential efficiencies, benefits, and limitations surrounding COTS SOE procurement practices and could be potentially applied to streamline the DOD commercial item procurement process.

F. RESEARCH LIMITATIONS

The research is limited based on data time range constraints, item type, and scope. The contract data received for this research is limited to COTS SOE item transactions gathered from one multiple award schedule contract from the C&E supply chain at DLA Troop Support. The time data range constraint is one year of contract data gathered from March 2019 to March 2020. The commercial item e-commerce data is restricted to GSA Advantage, Amazon, and other item e-commerce portals based on the COTS SOE item sample provided by DLA Troop Support.

G. ORGANIZATION OF REPORT

This professional research report is composed of six chapters. Chapter I introduces the research topic, provides background information, describes the purpose of the research, presents the research questions, and addresses the methodology, importance, and limitations of the research. Chapter II presents a literature review of the Transaction Cost Economics (TCE) theory, non-governmental and governmental commercial item procurement, DLA Troop Support policies related to COTS SOE procurement, current commercial item e-commerce initiatives, and previous research. Chapter III provides an organizational overview of DLA Troop Support. Chapter IV describes the research methodology for the creation of the COTS SOE commercial item e-commerce database as well as the comparative analysis process. Chapter V presents the findings, analysis, implications, and recommendations from conducting the comparative analysis portion of the research. Chapter VI provides the summary and conclusions and suggests areas for future research.

H. SUMMARY

Chapter I introduced the commercial e-commerce procurement initiative set forth in the 2018 NDAA (2017). The purpose of conducting a comparative analysis of the procurement of COTS SOE items from a multiple award DOD contract with commercial item e-commerce portals is to identify any benefits, disadvantages, or limitations associated with these purchasing methodologies. The research questions presented in this chapter are examined using a comparative analysis methodology. The result of this research is important for expediting the procurement process. Chapter II begins with a literature review of the TCE theory.

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II. LITERATURE REVIEW

Chapter II provides a literature review containing the theory, methods, policies, initiatives, and relevant research related to purchasing commercial items through commercial item e-commerce portals.

A. INTRODUCTION

The literature review in this chapter begins with a review of the Transaction Cost Economics (TCE) theory and is followed by an overview of non-governmental and governmental commercial item procurement. Next, DLA Troop Support guidelines for the procurement of commercially available off-the-shelf (COTS) special operational equipment (SOE) are introduced. Finally, this chapter concludes with current commercial item e-commerce initiatives and previous research associated with commercial item e-commerce procurement.

B. TRANSACTION COST ECONOMICS

The TCE theory states that an organization should execute “make or buy” decisions based on an analysis of transaction costs and production costs; whichever is lower will determine if the product is produced in-house or purchased from an outside source (Tadelis & Williamson, 2012). If a product has higher transaction costs and lower production costs, then the unit will be produced in-house. If a product has higher production costs and lower transaction costs, the unit will be purchased from an outside source. TCE theory provides a lens to analyze the purchasing of COTS SOE items by comparing the various procurement channels offered by the DOD and commercial item e-commerce portals to determine which source offers the most economically efficient means of executing the procurement. This section provides a TCE efficiency discussion focused on *transaction costs*, *alternative modes of governance*, and *governance efficiency*.

1. Transaction Costs

Transaction costs, with a focus on asset specificity, contract uncertainty, and purchase frequency, are considered the principal unit of analysis of the TCE theory

(Williamson, 2007). The more specific a product is, the higher the cost of the transaction. Williamson (1991) noted that asset specificity causes elevated transaction costs in all governance structures. Contractual hazards that require stricter governance structures include contract uncertainty and incompleteness (Tadelis & Williamson, 2012). Contract uncertainty is considered low when the frequency of transactions is high and repetitive; however, the more infrequent the transactions, the greater the contract uncertainty (Vosselman & van der Meer-Kooistra, 2006). There is an inverse relationship between contract uncertainty and transaction frequency. TCE focuses on the comparative analysis of transaction costs versus production costs as well as alternative modes of governance for either producing or outsourcing requirements. Alternative modes of governance are discussed in the next section.

2. Alternative Modes of Governance

Alternative modes of governance can be described as the accrual of consistently positive or negative effects from independent or coordinated efforts (Williamson, 2007). The main attributes of the market and hierarchy governance structures are incentive intensity, administrative autonomy, and contract law restrictions (Tadelis & Williamson, 2012). The units that have lower production cost that are produced in-house follow a hierarchy governance structure, whereas units with lower transaction costs that are purchased from an outside source follow a market governance structure (Williamson, 2007). The TCE theory can then be extended beyond the “make or buy” decision based on transaction and production costs to making sourcing decisions based on minimizing economic transaction costs while maximizing economic value (Shook et al., 2009). The efficiency of these governance structures is dependent on the level of requirement for each of the governance attributes. Governance efficiency within TCE is discussed in the next section.

3. Governance Efficiency

TCE estimates that if there are greater-than-or-equal-to two different supply chain cost governance structures, the governance structure with the greater efficiency by comparison will be selected (Ketokivi & Mahoney, 2020). The best way to achieve an

efficient governance structure is to assign transactions to a governance structure economically based on transaction costs (Tadelis & Williamson, 2012). Figure 1 depicts the governance efficiency model that compares the effects of rising transaction costs of an item to increasing specificity in a dual governance structure.

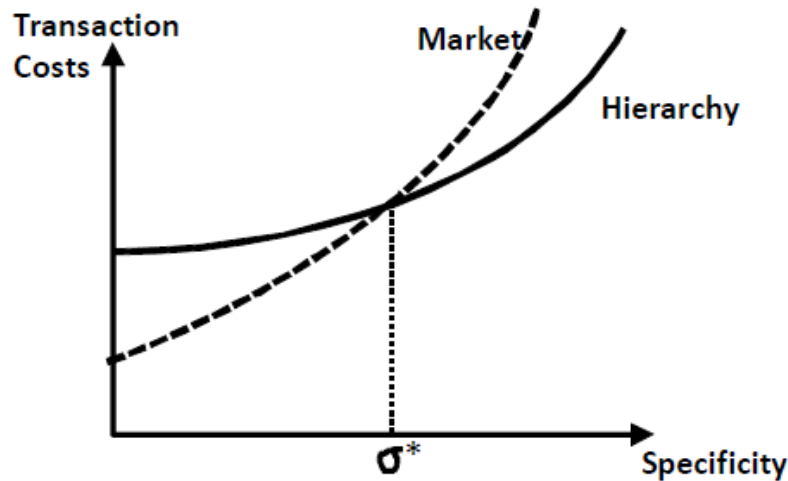


Figure 1. Governance Efficiency Model. Source: Tadelis and Williamson (2012).

The governance structures identified in Figure 1 are market and hierarchy. The market governance structure is identified by an administrative control retention by the parties involved and a high cost incentive; the hierarchy governance structure provides control to an intermediate entity with a low cost incentive (Tadelis & Williamson, 2012). As items become more specific, transaction costs begin to increase. Market and hierarchy are at an equilibrium at σ^* when transaction costs and specificity are at a level where they are equally efficient. A market governance structure relates to the procurement structure utilized for purchasing COTS SOE through DOD contracts and/or commercial item e-commerce portals, whereas a hierarchy governance structure relates to DOD in-house production. The non-governmental means for purchasing commercial items is discussed in the next section.

C. NON-GOVERNMENTAL COMMERCIAL ITEM PROCUREMENT

Non-governmental procurement of commercial items is based on the Uniform Commercial Code (UCC). The UCC is a set of laws adopted by most states that regulate all commercial purchases in the United States (Uniform Law Commission, n.d.). Regardless of the type of items, all federal government and executive agency procurement of commercial items is governed by the FAR. Although there are some clear differences between commercial procedures contained in FAR Part 12 (2019) and commercial business practices, UCC Article 2 provides beneficial commercial law practices that are more advantageous than DOD regulatory requirements (Olmsted, 2018). Although the laws contained in the UCC do not perfectly align with the procedures contained within FAR Part 12 (2019) and FAR Part 13 (2019), the UCC framework has been accepted at the state level and is currently being used for commercial item procurement on e-commerce portals. DOD procurement of commercial items is discussed in the next section.

D. DOD COMMERCIAL ITEM PROCUREMENT

As discussed in the previous section, DOD procurement of commercial items is governed by FAR Part 12 (2019) and FAR Part 13 (2019). The Federal Acquisition Streamlining Act of 1994 (FASA; 1994) established many of the DOD's commercial item procurement guidelines that are in place today, including the establishment of micro-purchase procedures. FAR 2.101 (2019) defines a commercial item as an item that is sold or offered for sale to the public for general and non-governmental use. FAR 2.101 (2019) defines a COTS item as an item that meets the definition of a commercial item, is sold in mass quantities to the public, and is sold to the government without modifications. Section 846 of the NDAA (2017) specifies that the establishment of e-commerce portals is for the procurement of items at or below the simplified acquisition threshold (SAT). Section 805 of the NDAA (2017) increased the SAT from \$150,000 to \$250,000 and the micro-purchase threshold from \$3,000 to \$10,000. The GPC is the preferred method for procuring items at or below the micro-purchase threshold, commercial items purchased through e-commerce portals (FAR 13.201(b), 2019). Procedures for procuring commercial items are contained in FAR Part 12 (2019); however, FAR 12.5 (2019) is not applicable to COTS items.

Although studies have identified some positive reasons for the government to implement commercial item procurement practices more in line with e-commerce portals, this idea has been met with some mixed criticism. Schooner (2011) argues that it is delusional to expect that purchasing commercial items will produce administrative or cost efficiencies; however, he agrees that COTS items should be procured by the government whenever feasible. One organization within the DOD that procures commercial items is DLA Troop Support, which is discussed in the next section and in greater detail in Chapter III.

E. DLA TROOP SUPPORT POLICIES AND PROCEDURES

DLA Troop Support has some specific policies and procedures in place for the procurement of COTS SOE. The *Special Operational Equipment Tailored Logistic Support Program Customer Guideline Document* governs the purchase of COTS SOE by the C&E directorate (DLA Troop Support Construction and Equipment Directorate Equipment Division, 2019). The purpose of the TLSP is to provide high caliber commercial items at a fair and reasonable price by competing orders among qualified vendors (DLA Troop Support Construction and Equipment Directorate Equipment Division, 2019). DLA Troop Support and associated policies are discussed in further detail in Chapter III.

F. CURRENT E-COMMERCE PLATFORM INITIATIVES

Section 846 of the 2018 NDAA (2017) required the Office of Management and Budget (OMB) and General Services Administration (GSA) to provide an implementation plan for the commercial e-commerce portal program. The GSA submitted its plan in March 2018 with the following three distinct portal provider models: E-Commerce model, E-Marketplace model, and E-Procurement model (GSA, 2018). The E-Commerce model would allow vendors to post their items for sale on a portal or website that acts like a storefront. The E-Marketplace model can be compared to a site such as Amazon because it sells products that the host provides as well as products from other vendors. The E-Procurement Model is run by the procuring entity and is based around order fulfillment and distribution networks. Figure 2 provides a visual representation of the three models described in the GSA's commercial e-commerce implementation plan.

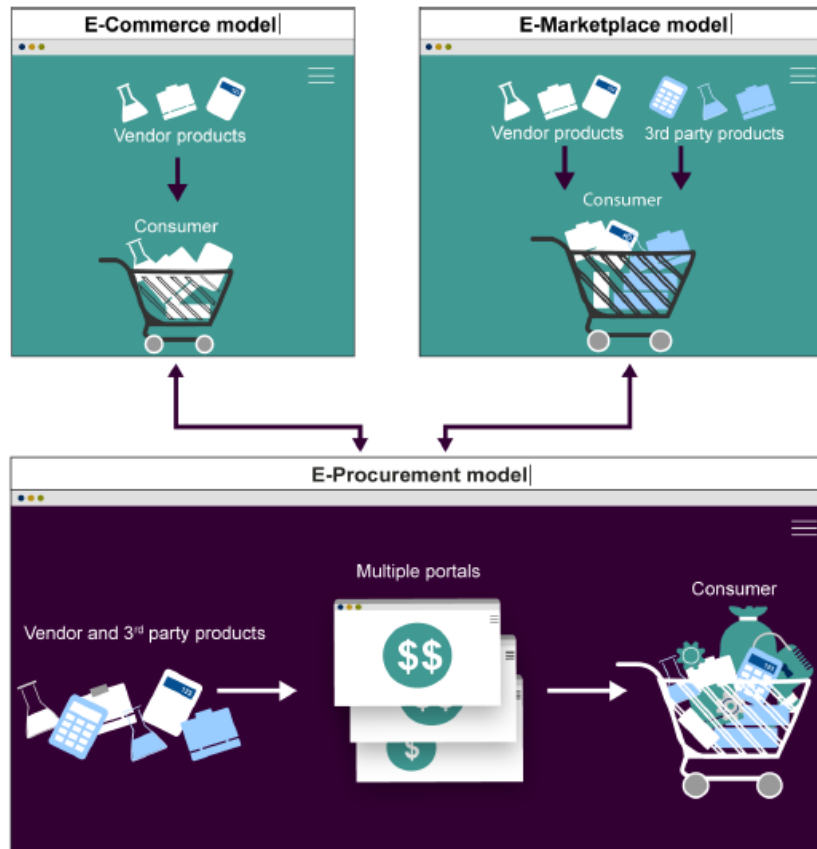


Figure 2. Portal Models Identified in the E-Commerce Implementation Plan.
Source: GSA (2018).

The GSA’s recommendations for streamlining the purchase of COTS items were to raise the micro-purchase threshold, amend regulatory requirements for purchasing commercial items, and change the definition of *commercial e-commerce portal* to allow the GSA to blend a mixture of its commercial e-commerce procurement models (GSA, 2018).

In addition to the requirement for an implementation plan from the GSA and the OMB, Section 846 of the 2018 NDAA (2017) sets forth the requirement for the comptroller general of the United States to conduct an assessment on the commercial e-commerce implementation plan within 90 days following the submission of the plan from the OMB and the GSA. The GAO (2018) completed its assessment of the GSA’s implementation plan and identified the following main questions regarding the GSA’s implementation plan:

- How will the portals program impact existing procurement programs?

- How will the portals program operate within the current procurement framework?
- How will data be obtained on purchases through the e-commerce portals?
- How will GSA and OMB measure the progress of the e-commerce portals program during its early implementation phases?
- What metrics will be used? (GAO, 2018, What GAO Found section)

The questions posed focus on trying to figure out how a commercial e-commerce program will fit within the existing DOD procurement framework. While the GSA stated that legislative changes were required and it would operate within the micro-purchase threshold, there are still regulatory conflicts, such as the Berry Amendment and the Buy American Act, as well as mandatory source program compliance issues with the Ability One Program and Federal Supply Schedule (FSS), that must be addressed in future implementation phases (GAO, 2018; GSA, 2018). Past research has focused on different approaches for procuring commercial items through commercial item e-commerce portals, which are discussed in the next section.

G. PREVIOUS RESEARCH AND ANALYSIS

Canter and Gomez (2017) conducted a study to compare and assess the benefits and limitations of conducting purchases with the GPC from commercial Amazon and federal GSA Advantage e-commerce websites. Canter and Gomez's study is like this research in that it compared commercial item e-commerce websites, while this research compares non-governmental and governmental commercial item procurement to determine if there are any efficiencies gained by purchasing commercial items through commercial item e-commerce portals. The study concluded that commercial e-commerce websites offered competitive pricing; however, the potential savings of using the GPC for Amazon purchases was unable to be captured accurately, and therefore, the benefit could not be realized.

This research differs from the research conducted by Canter and Gomez (2017) in key areas such as the data sources, commodity type, and theoretical framework. The data sources utilized for comparative analysis of this research include contract data from DLA Troop Support's TLSP contract and commercial item e-commerce data from Amazon,

GSA Advantage, and other individual commercial item e-commerce portals. The commodity type for this research is COTS SOE items compared to consumable items researched by Canter and Gomez (2017). This research adds to the TCE theory research stream by selecting the most efficient commercial item procurement supply chain network governance model based on transaction costs.

H. SUMMARY

Chapter II provided a literature review on the efficiency of procuring commercial items through e-commerce portals. First, the chapter included a review of the TCE theory, which was followed by an overview of non-governmental and governmental commercial item procurement. Next, DLA Troop Support policies relating to COTS SOE item purchases were introduced. This chapter concluded with a review of current commercial item e-commerce initiatives and previous research associated with commercial item e-commerce procurement. Chapter III provides an overview of the DLA Troop Support organization.

III. DLA TROOP SUPPORT ORGANIZATION OVERVIEW

Chapter III provides an overview of the organization that was the DOD contract data source for this research. DLA Troop Support, a DOD organization, provided a full year of contract data, from March 2019 to March 2020, to be used in the comparative analysis portion of this research.

A. INTRODUCTION

This chapter begins with a brief overview of DLA Troop Support's mission and organizational structure, followed by a review of the Construction and Equipment directorate. This chapter closes with a brief review of Special Operational Equipment (SOE) and the Tailored Logistics Support Program (TLSP) ordering process.

B. DLA TROOP SUPPORT ORGANIZATIONAL STRUCTURE AND OVERVIEW

DLA Troop Support, located in Philadelphia, PA, is one of six major subordinate commands that reports directly to DLA Headquarters, located in Fort Belvoir, VA. DLA is a joint logistics command comprised of service members from all branches of the military. The DLA Troop Support commander, who is currently a U.S. Army brigadier general, reports directly to the DLA Headquarters commander, who is currently a U.S. Navy vice admiral. Each military position within the DLA organization rotates across the military branches, giving each service a chance to hold senior positions within the agency. Figure 3 outlines the support provided from each of the nine major subordinate commands located throughout the United States, including three regional commands that act as the DLA liaison to the regions they are supporting.

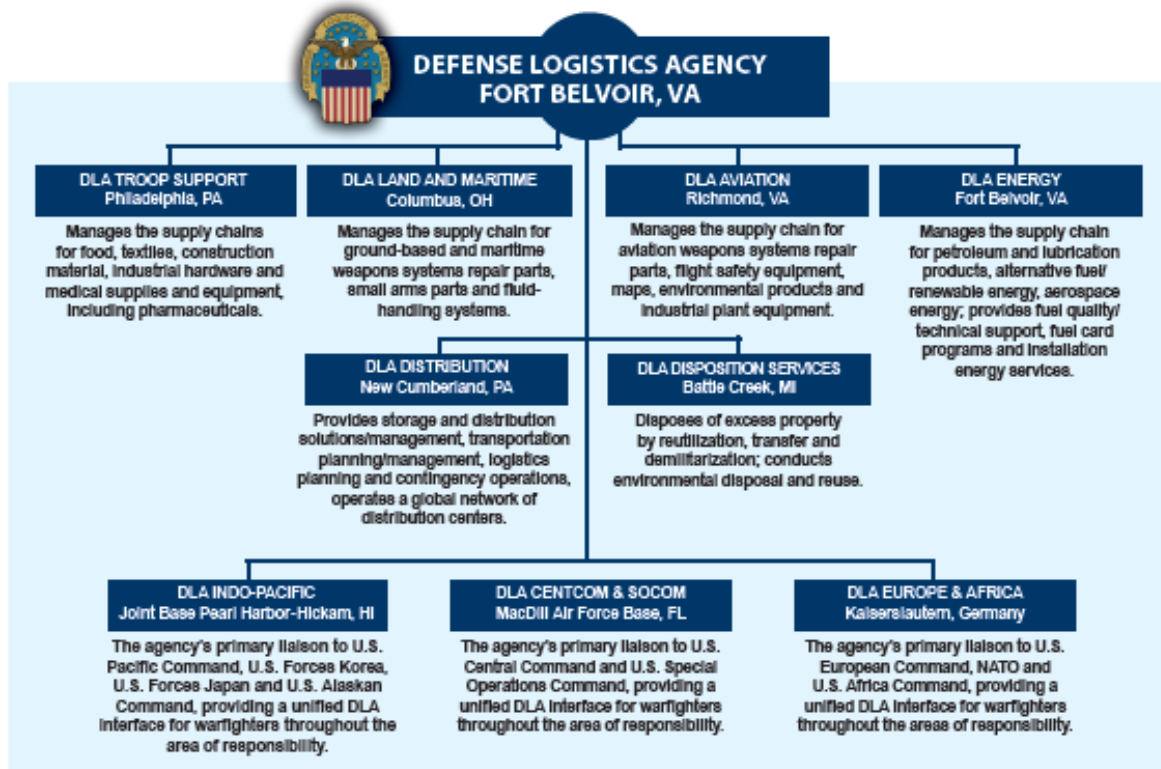


Figure 3. DLA Major Subordinate Command and Regional Commands.
Source: DLA Public Affairs Office (2020).

1. Mission

DLA Troop Support's history in Philadelphia dates to 1800, with the creation of the Schuylkill Arsenal, which provided clothing, textiles, weapons, and munitions to the military in the War of 1812 (DLA, n.d.-c). Although the name has changed many times throughout the years, DLA Troop Support has continued its efforts to support warfighters by providing items within the subsistence, clothing and textiles (C&T), construction and equipment (C&E), medical, and industrial hardware supply chains. DLA Troop Support's mission is to deliver "optimal, global supply chain solutions to enable ready, lethal Warfighters and our other valued partners" (DLA, n.d.-a, para. 2). In 2020, DLA Troop Support provided \$19.1 billion in sales to 51,000 global customers across the five supply chains (DLA Troop Support, 2021). DLA Troop Support's customers include deployed and non-deployed military units from all branches of service, shore-based military

facilities, and other U.S. government agencies and partner forces (DLA Public Affairs Office, 2020).

According to a 2009 Congressional Research Service report,

DSCP¹ is responsible for procuring nearly all of the food, clothing, and medical supplies used by the military; about 90% of the construction materiel used by troops in the field, as well as repair parts for aircraft, combat vehicles, and other weapons system platforms. DSCP's Clothing and Textile (C&T) Directorate supplies more than 8,000 different items ranging from uniforms to footwear and equipment. (Grasso, 2009, Summary section)

2. Organizational Structure

The DLA Troop Support Command Staff is comprised of a one-star commander, a senior executive service (SES) deputy commander, an SES chief of staff, and an SES acquisition executive. The commander and their staff oversee operations within the Subsistence, C&T, C&E, Medical, and Industrial Hardware supply chain directorates. Each supply chain directorate is led by an O-6 director and deputy director and is divided into Customer Operations and Supplier Operations support, with each area led by its respective director. Customer Operations serves as the liaison between the customers and vendors to ensure orders are filled properly. The role of Supplier Operations is to execute pre-award, award, and post-award administrative functions and procurement contracting functions. Figure 4 depicts the DLA Troop Support command structure from the command staff to the supply chains and provides the coordination relationship with the outside the continental United States (OCONUS) Europe & Africa and Indo-Pacific regional commands.

¹ DLA Troop Support was known as Defense Supply Center Philadelphia (DSCP) from 1998–2010 (DLA, n.d.-c).

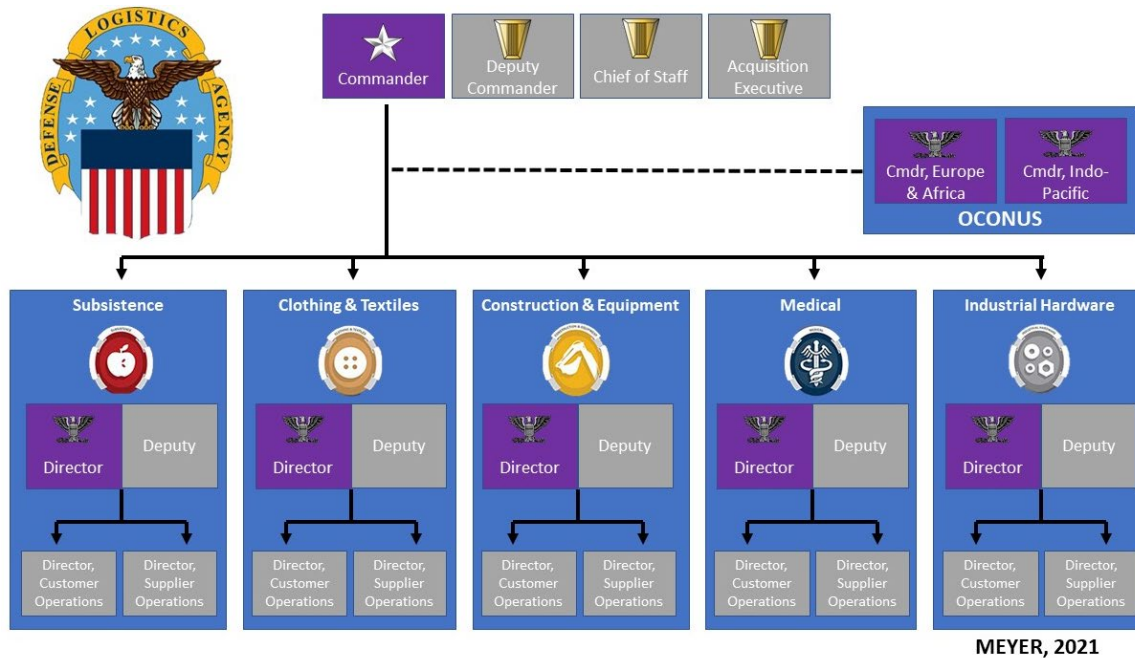


Figure 4. DLA Troop Support Supply Chain Organizational Chart

C. CONSTRUCTION AND EQUIPMENT

The C&E supply chain is led by a U.S. Navy Supply Corps captain and a general schedule (GS)-15 deputy director. With \$6.4 billion in sales in fiscal year (FY) 2020, the C&E directorate was the second highest grossing supply chain at DLA Troop Support (DLA Troop Support, 2021). C&E provides construction materials and equipment, fire and emergency services equipment, SOE, material handling equipment, and other various equipment to the DOD (DLA, n.d.-b). In DOD Directive 5101.12E, Change 3, the deputy secretary of defense assigned DLA to be the executive agent for construction and barrier material, making the C&E supply chain the Class IV material manager for the entire DOD (Work, 2019).

1. Special Operational Equipment

C&E provides many special operational equipment (SOE) items to the DOD. SOE includes items utilized in lifesaving, diving, tactical, survival, and explosive ordnance disposal (EOD) operations executed by special operations units within the DOD (DLA,

n.d.-d). Table 1 provides a list of the SOE item categories available through the Tailored Logistics Support Program (TLSP).

Table 1. SOE Item Categories Available through TLSP. Adapted from DLA Troop Support Construction and Equipment Directorate Equipment Division (2019).

SOE CATEGORIES	
i.	Survival Gear and Equipment Kits
ii.	Tactical Equipment
iii.	Protective Eyewear Vision Enhancing Equipment
iv.	Escalation of Force Equipment
v.	Visit Board Search and Seizure (VBSS)
	<i>Scuba and other Diving Equipment</i>
	<i>Thermal Protection Equipment</i>
	<i>Surface Supplied Diving Equipment</i>
	<i>Communication Devices</i>
	<i>Saturation Equipment</i>
	<i>Compressors and Air Purification Systems</i>
	<i>Hyperbaric Instrumentation and Equipment</i>
	<i>Lifesaving-Search and Rescue Equipment</i>
	<i>Gas Analysis Equipment</i>
	<i>Air Crew Support and Flight Deck Safety Items</i>
	<i>Underwater Tools</i>
	<i>Clothing & Textiles - Apparel</i>
	<i>Load Carrying Equipment, i.e., vests, backpack systems, trunk lockers</i>
	<i>Lethality Support Items, i.e., slings, holsters, mobility pad items, straps and fasteners, reflective belts</i>
	<i>Survival Kits</i>
	<i>Mountain Climbing Equipment</i>
	<i>Other Special Operations Equipment Items</i>

2. Tailored Logistics Support Program Overview

The TLSP program provides COTS SOE items to authorized customers. Authorized customers include but are not restricted to military units, military bases, and other federal agencies. Each ordering activity must register its program representative and designate a financial office point of contact (FOPOC) with proper funding authority DLA

Troop Support Construction and Equipment Directorate Equipment Division, 2019). Once the ordering activity is registered and the FOPOC is designated, the customer can begin ordering COTS SOE through the TLSP contract. Figure 5 depicts the typical ordering process for purchasing COTS SOE through the TLSP program, from registration through receipt of ordered material.

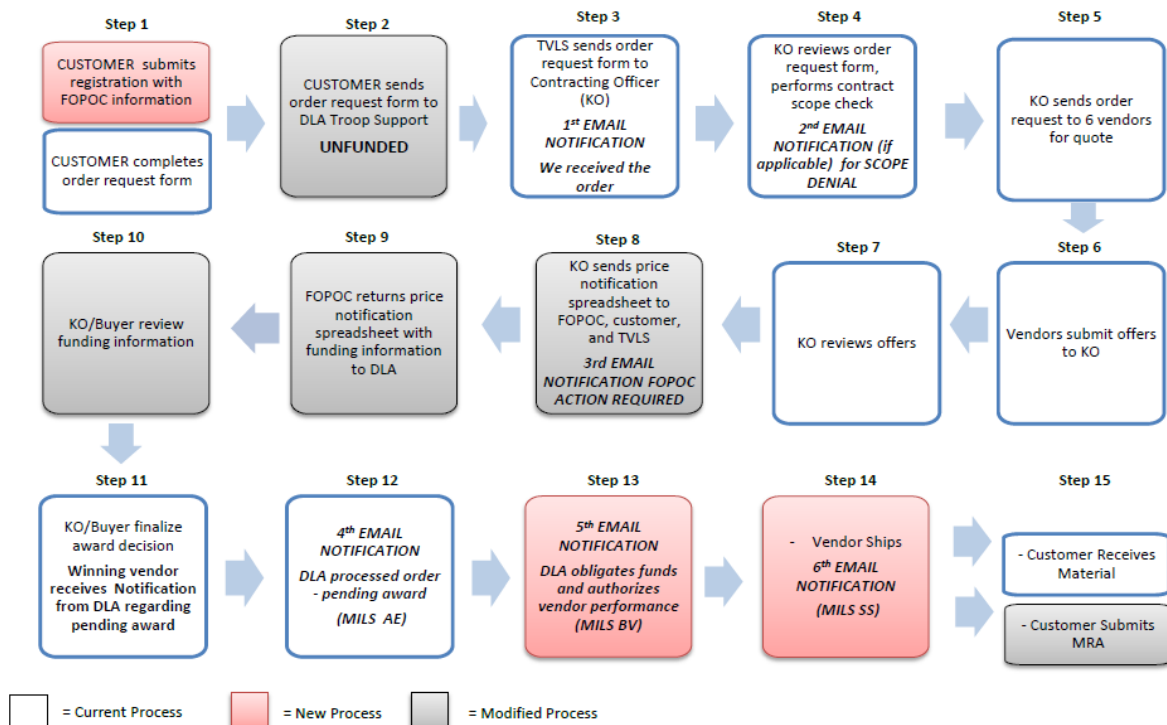


Figure 5. TLSP Order Processing Flow Chart. Source: Dougherty (n.d.); DLA Troop Support Construction and Equipment Directorate Equipment Division (2019).

The SOE TLSP contracting officer must perform an in-scope determination on all customer orders (DLA Troop Support, 2018; DLA Troop Support Construction and Equipment Directorate Equipment Division, 2019). Once the scope determination has been completed, the order is then competed among the six TLSP contract vendors. Each vendor provides a quote for the items on the order as well as an estimated delivery date (EDD). The vendor that quotes the lowest price is awarded the purchase order.

D. SUMMARY

Chapter III provided a brief introduction and organizational overview of the DLA Troop Support organization. The overview described the mission for DLA Troop Support and its organizational structure from the commander through the five supply chain directorates. Next, this chapter took a closer look at the C&E directorate and the supplies and services that support the warfighter. The chapter closed with a review of SOE and a description of the TLSP contract vehicle process. Chapter IV provides the methodology for this research.

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IV. METHODOLOGY

Chapter IV provides the methodology for collecting and analyzing data to adequately answer the research questions posed in Chapter I.

A. INTRODUCTION

This chapter begins with an introduction to the procedures that were used to form the COTS SOE commercial item e-commerce database from the contract data received from DLA Troop Support. Next, the procedures for gathering commercial item e-commerce data from commercial item e-commerce portals are addressed. The chapter closes with a description of how the comparative analysis is conducted between COTS SOE items from DLA Troop Support and commercial item e-commerce portals. The next section provides a COTS SOE commercial item e-commerce database formulation overview.

B. COMMERCIALLY AVAILABLE OFF-THE-SHELF SPECIAL OPERATIONAL EQUIPMENT COMMERCIAL ITEM E-COMMERCE DATABASE

This section provides information on the DOD contract data source, contract data categories, normalizing data and sample determination techniques as well as data fields required to form the COTS SOE commercial item e-commerce database. Microsoft Excel was used to analyze the database and perform data analysis functions. Information on the DOD contract data source is discussed next.

1. DOD Contract Data Source

As discussed in previous chapters, the DOD contract data source for this research was the DLA Troop Support construction and equipment (C&E) supply chain. The C&E contract used for this research was a multiple award schedule tailored logistics support program (TLSP) contract for the procurement of COTS SOE. The analysis included 1 year of data, from March 2019 through March 2020. The next section presents the categories of contract data required to meet research objectives.

2. Contract Data Categories

The categories of contract data were essential to building the COTS SOE commercial item e-commerce database. The contract data was used to determine the overall cost and schedule efficiency of the COTS SOE TLSP contract when compared to commercial item e-commerce portals. The contract data, consisting of over 31,000 SOE manufacturer part numbers, included the manufacturer name, short item description, delivered unit price, quantity, award date, and estimated delivery date for each item in the data set. Accurate part numbers, manufacturers, and item descriptions were essential to the commercial item e-commerce portal data collection portion of this research. Accurate unit prices and quantities were equally as important when determining the delivered unit price of items available through commercial item e-commerce portals. The contract award date and estimated delivery dates were required to determine the estimated number of days the DLA Troop Support vendors proposed for the delivery of the COTS SOE items.

Data from the contractor performance assessment reporting system (CPARS) was received for each of the six vendors performing under the COTS SOE TLSP contract. The data received from the vendor CPARS reports was used to calculate vendor performance efficiency. The CPARS report ratings are broken down across the following performance categories: quality, schedule, management, regulatory compliance, and schedule variance. The ratings for each vendor in each category were averaged together to create an overall average vendor performance rating for each category. The next section addresses how to normalize the data to provide the required output for the comparative analysis portion of the research.

3. Data Normalization

The data normalization in this research transformed contract data into data usable for findings and analysis. The contract data received from DLA Troop support included duplicate part numbers with a variance between the unit price, quantity, and range between award date and estimated delivery date. The data normalization was a two-step process that establishes proxy delivery dates and populates some of the fields required in the comparative analysis. The first step in normalizing the contract data was to calculate the

range in terms of days between the award date and estimated delivery date by using the DATEDIF function in Microsoft Excel. This Microsoft Excel function subtracts the date of award from the estimated delivery date and provides a proxy delivery time in number of days. The second step required the creation of a pivot table using the manufacturer part number in the rows and values in the columns in the form of average delivered unit price, average item quantity, and average proxy delivery days. This step eliminated duplicate part numbers and populated some of the required data fields, which are discussed in the next section.

4. Required Data Fields

The required data fields are the specific categories utilized in the comparative analysis portion of this chapter. The required fields received from the contract data were the manufacturer part number, manufacturer, and item description. The categories derived from performing the data normalization are average order quantity, average delivered unit price, and average proxy delivery days. These categories were used to compare the selected COTS SOE items procured by DLA Troop Support with the same items available through commercial item e-commerce portals. The procedure for selecting the specific COTS SOE items for the sample is addressed in the next section.

5. Sample Selection

The sample for this research was selected using the Microsoft Excel function RAND. Once duplicate part numbers were removed in accordance with the procedure outlined in the data normalization section, each manufacturer part number was assigned a number at random. The random numbers associated with individual manufacturer part numbers were then sorted from least to greatest, creating a random order from which to choose the sample. The first 30 items in the random list of COTS SOE manufacturer part numbers were used as the basis for the commercial item e-commerce data collection from commercial item e-commerce portals, which is described in the next section.

C. COMMERCIAL ITEM E-COMMERCE PORTAL DATA COLLECTION

The data collected from commercial item e-commerce portals was added to the categories outlined in the required data fields section of this chapter. The fields required for commercial item e-commerce portal data collection are outlined in Figure 6.

Commercial Availability (YES/NO)	Commercial Platform Availability (YES/NO)	Lowest Cost per Unit (\$)	Shipping Time (DAYS)	Shipping Cost (\$)	Shipping Terms	Vendor Name	Vendor Performance Reviews
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MEYER, 2021

Figure 6. Commercial Item E-Commerce Portal Data Collection Fields

The commercial item e-commerce portal data collection sources for this research are Amazon, GSA Advantage, and other individual commercial item e-commerce portals. First, each item in the sample was checked in Amazon, GSA Advantage, and other commercial item e-commerce portals to determine whether the item was available through commercial e-commerce portals. Each data field listed in Figure 6 is populated for all sample items. Three separate commercial item e-commerce data collection fields were filled out for each sample item; one was filled out for Amazon, followed by GSA Advantage, followed by an additional commercial item e-commerce portal. The other commercial item e-commerce portal search was completed using the Google search engine using any combination of manufacturer part number, manufacturer name, and item description to find the item in commercial item e-commerce portals. Commercial special item number (SIN) category information is documented from items available through GSA Advantage. Once the sample data collection is complete and all fields are documented, it is time to move into the comparative analysis portion of the research, which is discussed in next section.

D. COMPARATIVE ANALYSIS

The comparative analysis conducted between the COTS SOE contract data received from DLA Troop Support and the commercial item e-commerce data gathered from the sample supports the findings and analysis portion of this research. The SIN categories documented from the items available through GSA provide information as to what categories of COTS SOE items are more suitable for procurement through commercial item e-commerce portals.

Cost efficiencies can be determined by performing a direct comparison between the delivered unit price of the DLA Troop Support item with the delivered cost of the same item available through the commercial item e-commerce portals. The delivered cost includes the unit price as well as any shipping charges. Schedule efficiencies can be determined by directly comparing the average proxy delivery days from the DLA Troop Support item with the shipping time for the same item available through commercial item e-commerce portals. Performance efficiencies can be defined by comparing the vendor CPARS performance reports with customer performance reviews available through the commercial item e-commerce platforms.

E. SUMMARY

This chapter presented procedures used to form the COTS SOE commercial item e-commerce database. Next, it addressed procedures for gathering data from commercial item e-commerce platforms. The chapter closed with the process for conducting the comparative analysis between COTS SOE items from DLA Troop Support and commercial item e-commerce platforms. Chapter V introduces the findings, analysis, implications, and recommendations of this research.

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V. FINDINGS, ANALYSIS, IMPLICATIONS, AND RECOMMENDATIONS

Chapter V provides the results of the comparative analysis of the DOD multiple award schedule commercial contract with commercial item e-commerce platforms.

A. INTRODUCTION

This chapter commences with an introduction of the findings from the comparative analysis of the commercially available off-the-shelf (COTS) special operational equipment (SOE) items from DLA Troop Support's tailored logistics support program (TLSP) with the same items found in commercial item e-commerce portals. Next, there is an analysis of the findings followed by a discussion on the implications of the findings. This chapter closes with some proposed recommendations related to DOD commercial procurement. The next section reports the research findings.

B. FINDINGS

This section provides overall, cost, schedule, performance, and commercial item category findings from the comparative analysis of data populated in the COTS SOE commercial item e-commerce database provided in appendices A through I, which was created specifically for this research. The overall findings are discussed in the next section.

1. Overall Findings

As discussed in Chapter IV, the contract data used to create the COTS SOE commercial item e-commerce database was obtained from DLA Troop Support's COTS SOE TLSP multiple award schedule contract. A sample was then derived from the data and used as a basis for conducting the commercial item e-commerce portal data collection portion of the COTS SOE commercial item e-commerce database. The data from the COTS SOE commercial item e-commerce database relating to Amazon is found in appendices A through C. Due to the low number of Amazon items available for comparison to DLA Troop Support items, the research findings related to Amazon can be used for observational purposes only and can be expanded through additional research. The data from the COTS

SOE commercial item e-commerce database relating to GSA Advantage is found in Appendices D through F. The data from the COTS SOE commercial item e-commerce database relating to other commercial item e-commerce portals is found in Appendices G through I. The items available through GSA Advantage and other commercial item e-commerce portals are closer to the minimum sample size of 20, making the research findings a more accurate depiction of the overall population.

Overall, there were 30 items contained in the sample. Three of the 30 items in the sample were not available through any commercial platform. The remaining 27 items are listed in Table 2, which depicts the overall item availability of items in the sample.

Table 2. Overall Commercial Item Availability

Item Type	Item Count	% of Sample	% of Non NSN/NON Service
Service	1	3%	N/A
NSN	3	10%	N/A
Commercial item e-commerce portals availability	17	56%	65%
Direct Commercial Vendor	6	20%	23%
TOTALS	27	76%	88%

It was found that one out of the 30 items, or 3% of the sample, was a service item. Three of the 30 items, or 10% of the sample, were National Stock Number (NSN) items. In terms of items that allow a direct comparison with DLA Troop Support items, 17 of the 30 items, or 56% of the sample, were available through commercial item e-commerce portals. It was calculated that 65% of the non-NSN and non-service items in the sample were both available through commercial item e-commerce portals and could be compared directly to the items on the DLA Troop Support COTS SOE TLSP contract. An additional six items from the sample were available commercially by direct vendor interaction

through the original equipment manufacturer website; however, pricing and shipping data was not readily available for comparison. Overall, including the items available directly from vendors, 23 of the 30 items were available through commercial item e-commerce portals, which was 76% of the sample, or 88% of the remaining non-NSN and non-service items. The next section reports the findings related to delivered unit cost.

2. Cost

This section breaks down the related delivered unit cost metrics for the sample and is broken down into commercial item e-commerce platform categories. The commercial item e-commerce platform categories are GSA Advantage and other commercial item e-commerce portals. Table 3 provides the cost comparison between DLA Troop Support's COTS SOE TLSP contract with GSA Advantage and other commercial item e-commerce portals. The values contained in Table 3 are discussed in greater detail in the following delivered cost sections for each of the commercial item e-commerce platforms.

Table 3. Commercial Item E-Commerce Portal Cost Comparison to DLA Troop Support

	DLA Troop Support	GSA Advantage	Other Commercial Item E-Commerce Portals
Total Delivered Cost	\$23,716.76	\$26,025.24	\$20,768.78
Total Delivered Cost Difference Compared to DLA Troop Support	N/A	\$2,308.48	-\$2,947.98
Total Delivered Cost % Difference compared to DLA Troop Support	N/A	9.73%	-12.43%
Average Delivered Cost % Difference per Item Compared to DLA Troop Support	N/A	13.83%	22.37%
Items available for direct comparison	12	12	12
Percentage of Sample for direct comparison	40.00%	40.00%	40.00%
Number of items offered at the lowest delivered cost	7	2	3
Percentage of Items available at lowest delivered cost	58.33%	16.67%	25.00%
MEYER, 2021			

The next section begins with the delivered unit costs obtained from DLA Troop Support.

a. DLA Troop Support's Delivered Item Cost

As described in Table 3, seven (58.33%) of the 12 items used as a direct comparison in the sample, were offered at the lowest delivered cost through DLA Troop Support's TLSP Contract. The overall cost for the 12 items available through DLA Troop Support was \$23,716.76, which was \$2,308.48 (9.73%) cheaper than the overall delivered cost of the same items available through GSA Advantage, and \$2,947.98 (12.43%) more expensive than the same items available through other commercial item e-commerce portals. The average delivered cost percentage difference for DLA Troop support was 13.83% cheaper than GSA Advantage and 22.37% cheaper than other commercial item e-commerce portals. The next section reports GSA Advantage's delivered item cost.

b. GSA Advantage Delivered Item Cost

The overall total delivered cost difference for the GSA Advantage items was \$2,308.48 more expensive than the same items available through DLA Troop Support. GSA Advantage's overall delivered cost for the 12 items available for direct comparison was 9.73% higher than DLA Troop Support's delivered cost for the same items. GSA Advantage's average delivered cost difference per item was 13.83% higher than DLA Troop Support's delivered cost per item. GSA Advantage offered the most cost-efficient pricing for two of the 12 items, or 16.67% of the items, directly compared to DLA Troop Support.

As described in Appendix D through Appendix F, 16 (53%) of the 30 items in the sample, or 61% of the remaining non-NSN and non-service items, were available through GSA Advantage. Six of the 16 items available through GSA Advantage offered freight on board (FOB) origin shipping terms, whereas the remaining 10 items were FOB destination. FOB destination pricing includes the cost of shipping, compared to FOB origin pricing, in which there is a shipping charge from the point of origin where the goods entered the shipping supply chain. Ten (62.5%) of the 16 items available through GSA Advantage provided a calculated total delivered cost for each unit. For that reason, the cost of GSA

items may be around 2% higher than reported. The next section reports other commercial item e-commerce portals' delivered item cost.

c. Other Commercial item E-Commerce Portals Delivered Item Cost

The overall total delivered cost difference for the items available through other commercial item e-commerce portals was \$2,947.98 less expensive than the same items available through DLA Troop Support. Other commercial item e-commerce overall delivered cost for the 12 items was 12.43% lower than DLA Troop Support's delivered cost for the same items; however, the average delivered cost difference per item was 22.37% higher than DLA Troop Support's delivered cost per item. Other commercial item e-commerce portals offered the most cost-efficient pricing for three of the 12 items, or 25% of the items, directly compared to DLA Troop Support.

As described in Appendix G through Appendix I, 13 (43%) of the 30 items in the sample, or 50% of the 26 remaining non-NSN and non-service items, were available through other commercial item e-commerce portals. Five of the 13 items available through other commercial item e-commerce portals offered free shipping, and vendors provided shipping information for the remaining items. The next section introduces the schedule section of the findings.

3. Schedule

This section reports the schedule for the DLA Troop Support items in terms of the difference in days between award date and EDD. The commercial item e-commerce schedule is reported in the same manner as DLA Troop Support or is the average delivery time when a date range is given. Table 4 provides the schedule comparison between DLA Troop Support's COTS SOE TLSP contract with GSA Advantage and other commercial item e-commerce portals. The values contained in Table 4 are discussed in greater detail in the following schedule sections for each of the commercial item e-commerce platforms.

Table 4. Commercial Item E-Commerce Portal Schedule Comparison to DLA Troop Support

	DLA Troop Support	GSA Advantage	Other Commercial Item E-Commerce Portals
Total Estimated Shipping Days	3085	699	331
Overall Est. Shipping Diff. % compared to DLA Troop Support	N/A	-77.34%	-89.27%
Average Estimated Days of Delivery per Item	257	58	28
Average Diff. in Est. Shipping Days per item Compared to DLA Troop Support	N/A	-199	-229
Average Est. Shipping Diff. % per Item Compared to DLA Troop Support	N/A	-73%	-84%
Items available for direct comparison	12	12	12
Percentage of Sample commercially for direct comparison	40.00%	40.00%	40.00%
Number of items offered with a Est. Delivery shorter than DLA Troop Support	0	5	7
Percentage of Items available with the shortest Est. Delivery	0.00%	41.67%	58.33%
MEYER, 2021			

Figure 7 displays the average number of estimated shipping days of available COTS SOE items from the sample. The average estimated shipping time in terms of days for each procurement platform is as follows: 256 days for the DLA Troop Support COTS SOE TLSP contract, 61 days for GSA Advantage, and 26 days for other commercial item e-commerce portals.

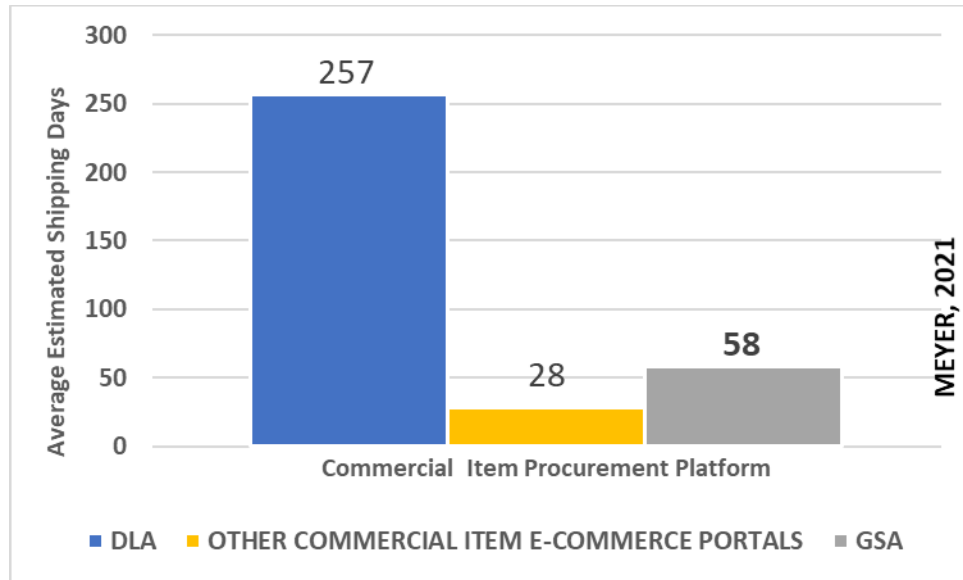


Figure 7. Average Number of Estimated Shipping Days for COTS SOE Items from Commercial Item Procurement Platforms

The commercial item e-commerce platform schedules of DLA Troop Support, GSA Advantage, and other commercial item e-commerce portals are discussed in greater detail individually. The next section begins with the schedule metrics obtained from DLA Troop Support.

a. DLA Troop Support

DLA Troop Support's total estimated shipping time for all 12 items available for direct comparison was 3,085 days. The overall total difference in estimated shipping time for the DLA Troop Support items was 77.34% longer than the same items available through GSA Advantage and 89.27% longer than the same items available through other commercial item e-commerce portals. The average difference in estimated shipping time for the items available through DLA Troop Support was 257 days, compared to 58 average estimated shipping days from GSA Advantage and 28 average estimated shipping days from other commercial item e-commerce portals. DLA Troop Support's average estimated shipping days for the 12 items was 73% slower than GSA Advantage and 84% slower than other commercial item e-commerce portals for the same items. DLA Troop Support did

not offer the shortest estimated delivery for any of the items in the sample used for direct comparison. The next section reports GSA Advantage's schedule metrics.

b. GSA Advantage Schedule

The overall total difference in estimated shipping time for the 12 items available through GSA Advantage items was 2,386 days shorter than the same items available through DLA Troop Support. GSA Advantage's overall total difference in estimated shipping time for the 12 items was 77.34% shorter than DLA Troop Support's estimated delivery dates for the same items. GSA Advantage's average estimated shipping days of 58 days was 73% shorter than DLA Troop Support's estimated shipping days per item. Overall, GSA advantage offered five items (41.67%) with the lowest estimated shipping days. The next section reports the other commercial item e-commerce portals' schedule metrics.

c. Other Commercial item E-Commerce Portal Schedule

The overall total difference in estimated shipping time for the 12 items available through other commercial item e-commerce portals was 2,754 days shorter than the same items available through DLA Troop Support. Other commercial item e-commerce portals' overall total difference in estimated shipping time for the 12 items was 89.27% shorter than DLA Troop Support's estimated delivery dates for the same items. Other commercial item e-commerce portals' average estimated shipping days of 28 days was 84% shorter than DLA Troop Support's estimated shipping days per item. Overall, other commercial item e-commerce portals offered seven items (58.33%) with the lowest estimated shipping days. The next section introduces the performance findings for the report.

4. Performance

This section reports the performance data for the DLA Troop Support COTS SOE TLSP vendors derived from CPARS. Due to the limited number of performance reviews available for commercial item e-commerce portal vendors, a true comparison between DLA Troop Support COTS SOE TLSP vendors and all commercial item e-commerce vendor sources could not be adequately conducted. Overall, the scale and method for rating

vendor performance was different, non-accessible, and/or non-existent for the commercial item-e-commerce platforms. Table 5 provides the performance comparison between DLA Troop Support's COTS SOE TLSP contract with Amazon, GSA Advantage, and other commercial item e-commerce portals. The values contained in Table 5 are discussed in greater detail in the following performance sections for each of the commercial item e-commerce platforms.

Table 5. Commercial Item E-Commerce Platform Performance Comparison

	Amazon	GSA Advantage	Other Commercial E-Commerce Portals	DLA Troop Support
Rating Method	Positive, Negative, Neutral	CPARS	Star Rating	CPARS
Performance Data Availability for items available through platform	100%	0%	23%	100%
Performane Rating	87.67% Positive	N/A	5 out of 5 Stars (27 Reviews)	See Table 6
Items Available in Sample	3	16	13	30
Items with a review available	3	0	3	30
Performance Data Availability for items available through platform	100%	0%	23%	100%
MEYER, 2021				

The item availability for Amazon, GSA Advantage, and other commercial item e-commerce portals are reported in the next section along with DLA Troop Support's performance information. The next section reports Amazon's relevant performance information.

a. Amazon Performance

Due to the low number of Amazon items available for comparison to DLA Troop Support items, the performance research findings related to Amazon can be used for observational purposes only and can be expanded through additional research. As described in Appendix A through C, only three (10%) of 30 sample items were available through Amazon. Two of the three COTS SOE item requirements available through Amazon's commercial item e-commerce portal were unable to be completely fulfilled due to a lack of stock in the appropriate model or quantity. The first item had the appropriate

size but did not have the required quantity in stock to fulfill the order. The second item was available through Amazon; however, the appropriate model was not in stock. Each of the three items available through Amazon provided customer quality reviews. The average positive vendor quality rating between the three Amazon vendors was 87.67%. The next section reports GSA Advantage's relevant performance information.

b. GSA Advantage Performance

As stated in previous sections, 16 (53%) of 30 sample items were available through GSA Advantage. None of the 16 items available through GSA Advantage provided customer quality reviews through the GSA Advantage commercial item e-commerce portal. The next section reports other commercial item e-commerce portals' relevant performance information.

c. Other Commercial item E-Commerce Portals Performance

As stated in previous sections, 13 (43%) of 30 sample items were available through other commercial item e-commerce portals. Three (23%) of 13 items available through other commercial item e-commerce portals provided customer quality reviews. All three items with customer reviews from other commercial item e-commerce portals had an average vendor quality rating of 5 out of 5 stars from a total of 27 total item reviews. The next section reports DLA Troop Support's relevant performance information.

d. DLA Troop Support COTS SOE TLSP Vendor Performance

As stated in a previous section, the performance data for the DLA Troop Support COTS SOE TLSP vendors comes from CPARS. Each of the six vendors who are part of the multiple award COTS SOE TLSP contract receive CPARS ratings in the following areas: quality, schedule, management, regulatory compliance, and schedule variance. The period of the CPARS report, from March 2019 to March 2020, coincides with the data range for the contract data received from DLA Troop Support. The ratings in CPARS reports range, in order from worst to best, from unsatisfactory, to marginal, to satisfactory, to very good, up to exceptional.

Table 6. Aggregate Vendor CPARS Data, March 2019–March 2020

Performance Category	Category Rating
Average Quality Rating	Very Good
Average Schedule Rating	Very Good
Average Management Rating	Very Good
Average Regulatory Compliance Rating	Satisfactory High
Overall Vendor Rating	Very Good
Average Schedule Variance	94.60%

Table 6 shows the aggregate vendor performance data received from DLA Troop Support COTS SOE TLSP vendors. DLA Troop Support’s COTS SOE TLSP contract vendors received an average Very Good rating for quality, schedule, and management. The COTS SOE TLSP vendors received an average Satisfactory High rating for regulatory compliance and a Very Good average overall vendor rating. The average schedule variance, or on-time delivery rate, for the COTS SOE TLSP vendors is 94.60%. The next section introduces commercial item category findings.

5. Commercial Item Categories

Nine separate commercial item categories of COTS SOE items were found in the GSA Advantage commercial item e-commerce portal during the data collection portion of this research. The categories include protective apparel, sporting goods equipment and supplies, footwear, clothing, law enforcement and personal equipment, marine craft, diagnostic, measuring and testing equipment, and repair/spare parts. Table 7 provides the list of commercial item categories as well as a brief description of each category.

Table 7. COTS SOE Commercial Item Categories Available through GSA Advantage. Adapted from GSA eBuy (n.d.).

SIN CODES	Category Name	Description
339113PA	Protective Apparel	Includes all protective apparel, including firefighting suits and accessories, body armor, head protection, etc. NOTE: Subject to Cooperative Purchasing
339920S	Sporting Goods Equipment and Supplies	Includes all sporting goods equipment and supplies, such as protective sports gear, sport-specific products, sports bags, air pumps, etc
316210	Footwear	Includes all types of footwear, including shoes, boots, etc. NOTE: Subject to Cooperative Purchasing
3152	Clothing	Includes all types of clothing, such as work suits, coats, hoods, gloves, reflective clothing, camouflage, hazardous material clothing and gloves, etc. NOTE: Subject to Cooperative Purchasing
332999	Law Enforcement Personal Equipment	Includes all personal equipment related to law enforcement, such as restraints, duty belts, flashlights, weapon scopes, gas masks, etc. NOTE: Subject to Cooperative Purchasing
336612	Marine Craft	336612 includes marine crafts and products such as boats (all types), floating marine barriers and booms, inboard and outboard engines, etc. NOTE: Subject to Cooperative Purchasing
334515	Diagnostic, Measuring and Testing Equipment	Includes diagnostic, measuring, and testing equipment used in laboratory settings, such as microscopes, borescopes, etc.
33411	Purchasing of new electronic equipment	Includes desktop, laptop, tablet computers (including rugged), servers, storage equipment, hyperconverged integrated systems, supercomputers, routers, switches and other communications equipment, IT security equipment (hardware based firewalls), audio and video (AV) equipment, public address systems, monitors/displays, sensors and other Internet of Things (IOT) devices, printers and Multi-Function Device (MFD) equipment, broadcast band radio, two-way radio (LMR), microwave radio equipment, satellite communications equipment, radio transmitters/receivers (airborne), radio navigation equipment/antennas, optical/imaging systems, and associated peripherals required for operations (such as controllers, connectors, cables, drivers, adapters, etc., ancillary installation of any equipment purchased. NOTE: Subject to Cooperative Purchasing
811212	Maintenance of Equipment, Repair Services and/or Repair/Spare Parts	Maintenance, Repair Service, and Repair Parts/Spare Parts for Government-Owned General Purpose Commercial Information Technology Equipment, Radio/Telephone Equipment NOTE: Subject to Cooperative Purchasing

Six out of the 16 sample items identified through GSA Advantage fell into more than one commercial item category. Category 3152 (clothing) and category 332999 (law enforcement personal equipment) were both identified six times, each making up 24% of the total commercial item categories identified from items available through GSA

Advantage. Category 33411 (new electronic equipment) was identified five times, making up 20% of the total commercial item categories identified from items available through GSA Advantage. Category 339113PA (protective apparel) was identified three times, making up 12% of the total commercial item categories identified from items available through GSA Advantage. The five remaining categories, 339920S (sporting goods equipment and supplies), 811212 (repair/spare parts), 316210 (footwear), 336612 (marine craft), and 335515 (diagnostic, measuring, and testing equipment) each made up 4% of the total commercial item categories identified from items available through GSA Advantage, with one instance each. The frequency of each category available through GSA Advantage in terms of total count and percentage of available GSA items is depicted in Figure 8.

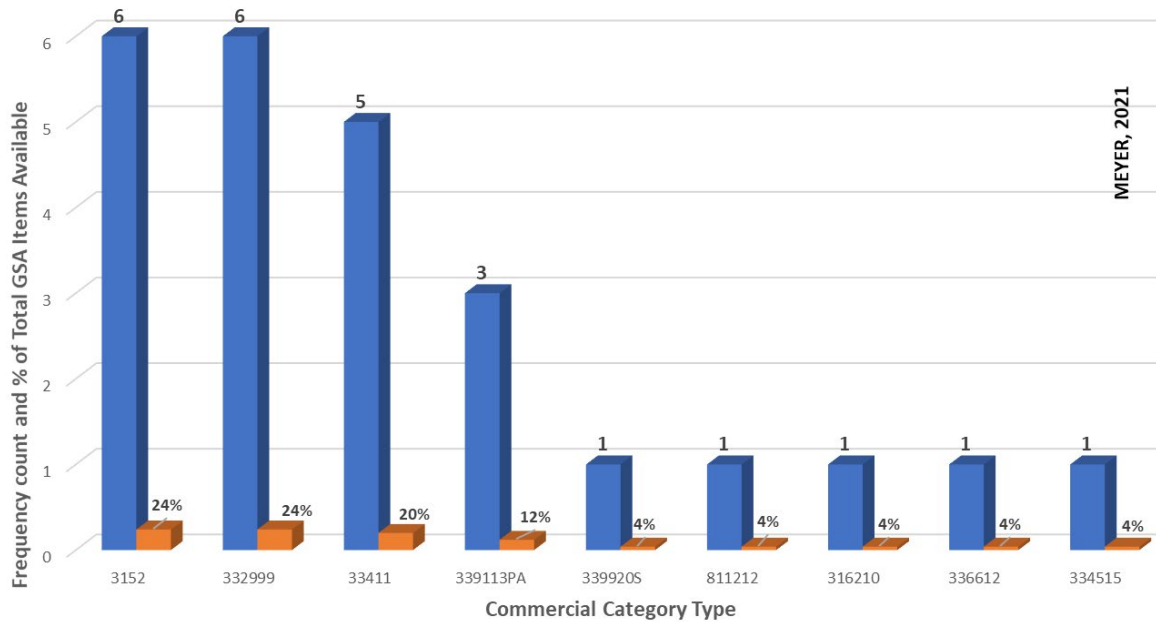


Figure 8. Commercial Item Category Frequency for COTS SOE Items Available through GSA Advantage

This concludes the findings section. An analysis of the information in the findings section is next.

C. ANALYSIS OF FINDINGS

This section provides an analysis of the findings of this research. The analysis begins with a cost efficiency analysis of the cost-related findings, then a schedule efficiency analysis of the schedule-related findings, followed by a performance efficiency analysis of the performance-related findings, and finally a commercial item category analysis. The analysis of findings begins in the next section with a cost efficiency analysis.

a. Cost Efficiency Analysis

The purpose of the analysis in this section is to determine what evidence of cost-efficiencies exists with the procurement of COTS SOE items through commercial item e-commerce portals. Based on the research findings found in Table 3, DLA Troop Support offers the lowest delivered cost to procure COTS SOE items. On average, DLA Troop Support's costs per item were 13.83% cheaper than GSA Advantage and 22.37% cheaper than other commercial item e-commerce portals. Although GSA Advantage and other commercial item e-commerce portals offered the cheapest pricing alternatives for 16.67% and 25% of the items directly compared to the COTS SOE TLSP contract, respectively, DLA Troop Support's contract was clearly the most cost-effective source for purchasing COTS SOE items with 58.33% of the items offered at the lowest delivered cost.

The findings of this research indicate that DLA Troop Support's COTS SOE TLSP contract offers the most cost-efficient means for procuring COTS SOE items. The analysis of findings continues in the next section with a schedule efficiency analysis.

b. Schedule Efficiency Analysis

The purpose of the analysis in this section is to determine what evidence of schedule efficiencies exists with the procurement of COTS SOE items through commercial item e-commerce portals. Based on the research findings found in Table 4 and Figure 7, commercial item e-commerce portals offer the shortest estimated delivery time for the procurement of COTS SOE items. DLA Troop Support's average number of estimated delivery days for the commercial items in the sample available through commercial item e-commerce portals is 257 days, compared to 58 days from GSA Advantage and 28 days

from other commercial item e-commerce portals. On average, DLA Troop Support's estimated shipping days difference per item was 73% longer than GSA Advantage, and 84% longer than other commercial item e-commerce portals. GSA Advantage and other commercial item e-commerce portals offered the shortest estimated delivery times for 100% of the items directly compared to the DLA Troop Support COTS SOE TLSP contract. DLA Troop Support's contract was clearly the least schedule-efficient source for purchasing COTS SOE items.

The findings of this research indicate that commercial item e-commerce portals offer the most schedule-efficient means for procuring COTS SOE items. The analysis of findings continues in the next section with a performance efficiency analysis.

c. Performance Efficiency Analysis

The purpose of the analysis in this section is to determine what evidence of performance efficiencies exists with the procurement of COTS SOE items through commercial item e-commerce portals. Based on the research findings found in Tables 5 and 6, DLA Troop Support, Amazon, and other commercial item e-commerce portals provide positive performance feedback for the procurement of COTS SOE items. DLA Troop Support's COTS SOE TLSP contract vendors have a very good rating, compared to an 87.7% positive rating from Amazon, and 27 (100%) of 27 5-star ratings from other commercial item e-commerce portals. In terms of COTS SOE item sample fulfillment, DLA Troop Support's TLSP contract can fulfill 100% of the sample compared to 10% from Amazon, 53% from GSA Advantage, and 43% from other commercial item e-commerce portals. Overall, commercial item e-commerce portals can fulfill 17 (56%) of the 30 items in the sample.

The findings of this research indicate that there is not enough evidence to claim that performance efficiencies exist when procuring COTS SOE items through commercial item e-commerce portals. The analysis of findings concludes in the next section with a commercial item category analysis.

d. Commercial Item Category Analysis

The purpose of the analysis in this section is to determine what categories of COTS SOE items are more suitable for procurement through commercial item e-commerce portals. Based on the research findings contained in Table 5, several commercial item categories were identified as suitable for procuring through the commercial item e-commerce portals. Four of the nine categories identified in the research findings made up 80% of the categories available through GSA Advantage. Category 3152 (clothing), category 332999 (law enforcement personal equipment), category 33411 (new electronic equipment), and category 339113PA (protective apparel) made up 80% of the categories from the COTS SOE sample items available through GSA Advantage. Category 339113PA (protective apparel) was identified three times, making up 12% of the total commercial item categories identified from items available through GSA Advantage.

Table 8. Commercial Item Categories Available Through GSA Advantage

Category	Sum of Use	% of Total GSA Items
3152	6	24%
332999	6	24%
33411	5	20%
339113PA	3	12%
339920S	1	4%
811212	1	4%
316210	1	4%
336612	1	4%
334515	1	4%
Grand Total	25	100%

The findings of this research indicate that category 3152 (clothing), category 332999 (law enforcement personal equipment), category 33411 (new electronic equipment), and category 339113PA (protective apparel) are categories of COTS SOE items suitable for procurement through commercial item e-commerce portals. The research implications discussion begins in the next section.

D. IMPLICATIONS

The purpose of this section is to discuss the overall implications of the research to address potential benefits, disadvantages, and limitations of implementing the procurement of COTS SOE items through commercial item e-commerce portals. The research implications discussion begins in the next section with potential benefits.

a. Potential Benefits

The research indicates that commercial item e-commerce portals could be utilized to procure commercial items at competitive pricing with a high schedule efficiency. GSA Advantage offered pricing that on average was only 13.83% higher than DLA Troop Support, with a delivery schedule that was 73% shorter than DLA Troop Support's COTS SOE TLSP contract. The potential benefit for utilizing GSA Advantage as the main source for procuring COTS SOE items is the obvious increase in schedule efficiency with a minimal loss of cost efficiency. Using other commercial item e-commerce portals for the procurement of COTS SOE items also increases the schedule efficiency. Although Amazon only had 10% of the sample available through its platform and could not be adequately compare for cost and schedule purposes, all available items had extensive quality reviews that would be beneficial for potential COTS SOE item buyers. Research implications continue in the next section with a discussion of the potential disadvantages of procuring COTS SOE through commercial item e-commerce portals.

b. Potential Disadvantages

The research indicates that there are some potential disadvantages for purchasing COTS SOE items through commercial item e-commerce portals. The most obvious disadvantage is the potential non-availability of items offered in commercial item e-commerce portals. GSA Advantage had 53%, Amazon had 10%, and other commercial item e-commerce portals had 43% of the items available from the sample. The lack of accessible quality ratings for all items and vendors is another area that potential COTS SOE buyers would face when procuring through commercial item e-commerce portals. The research implications conclude in the next section with potential limitations.

c. Potential Limitations

The research indicates that there are some potential limitations for purchasing COTS SOE items through commercial item e-commerce portals. The first limitation, which was also listed as a disadvantage, is the potential non-availability of COTS SOE items in commercial item e-commerce platforms. The highest percentage of items available through a commercial item e-commerce platform was 53%, which means almost half of the items would not be able to be sourced through commercial item e-commerce portals. The next area that potentially limits the number of COTS SOE items that a buyer can purchase through commercial item e-commerce portals is the GPC threshold. The current GPC threshold of \$10,000 restricts the purchase of COTS SOE items. Figure 9 outlines the percentage of total COTS SOE item transactions purchased through DLA Troop Support. Although about 63% of the transactions could be purchased with the GPC, 37% of COTS SOE items cannot be purchased with a GPC through commercial item e-commerce portals due to the current micro-purchase threshold.

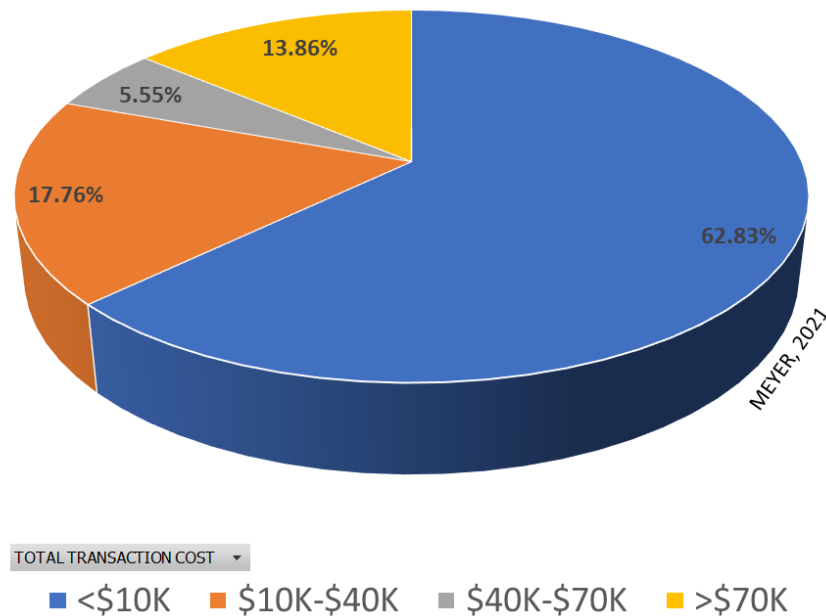


Figure 9. Percentage of Total COTS SOE Transactions Purchased from March 2019–March 2020 Through the COTS SOE TLSP Contract

E. RECOMMENDATIONS

The purpose of this section is to provide recommendations based on the research findings. The research objective was to determine what categories of COTS SOE are suitable for purchasing through commercial item e-commerce portals, provide evidence of cost, schedule, or performance efficiencies for purchasing COTS SOE through commercial item e-commerce portals, and describe potential benefits, disadvantages, and limitations of implementing the procurement of COTS SOE items through commercial item e-commerce portals. The following recommendations are made to meet the research objective.

My first recommendation, given the results of the comparative data analysis, is that DLA Troop Support's TLSP contract for purchasing COTS SOE items should be employed when cost efficiency is the highest priority in the procurement. DLA Troop Support displayed the highest cost efficiency among other commercial item e-commerce procurement platforms and should seek to maintain competition between its multiple award schedule vendors. During my research, I found a significant number of different commercial vendors that offered the same products through GSA Advantage. It is important to maintain the highest quality and most competitive sources for vendors, so DLA Troop Support should continue to evaluate new vendors when it is time to solicit the COTS SOE TLSP contract again. This would allow an increase in competition with the benefit of maintaining and potentially increasing cost efficiency.

My second recommendation is to maximize the use of commercial item e-commerce portals to obtain the highest schedule efficiency. Based on the comparison among the commercial item procurement platforms, commercial item e-commerce portals should be the method of purchasing COTS SOE when schedule efficiency is the highest priority in the procurement. DLA Troop Support's TLSP contract had between 41% and 80% longer estimated lead-times than the same items offered through commercial item e-commerce portals. If the items are going to be procured using a contract to maintain the highest cost efficiency, then I recommend conducting market research with commercial item e-commerce portals to determine if the estimated delivery dates provided by the vendor are fair and reasonable. Overall, commercial item e-commerce portals should be utilized to procure COTS SOE to achieve the highest schedule efficiency.

My third recommendation is based on the lack of vendor performance data found while conducting my research. Due to the lack of vendor performance data, there is not enough evidence to claim that performance efficiencies exist when procuring COTS SOE items through commercial item e-commerce portals. Although I am unable to make a recommendation based on performance efficiency, I can make a recommendation to make vendor performance more accessible through GSA Advantage. Although Amazon had only 10% of the sample items available through its online portal, it offered an extensive quality rating database for its vendors. I recommend making vendor performance information on GSA Advantage more accessible to government users in a format that is similar to Amazon's review section by utilizing performance data from CPARS as well as additional product reviews from GSA Advantage. If a government user reviews a particular product on GSA Advantage, it would be advantageous for another customer to be able to easily identify a vendor's schedule variance, quality rating, or regulatory compliance.

My fourth recommendation is to utilize GSA Advantage for the procurement of COTS SOE items to achieve the best overall efficiency. The research indicates that GSA Advantage provides the highest overall efficiency among the commercial item e-commerce platforms due to its competitive pricing and reasonable estimated delivery schedule. DLA Troop Support's pricing is the most cost efficient; however, all items purchased using the COTS SOE TLSP contract have long estimated lead-times. Amazon should be considered as a source for COTS SOE items only as a last resort or if the mission dictates. Amazon may be an excellent source for commodities other than COTS SOE items; however, Amazon does not appear to be a viable source for COTS SOE item procurement due to an inability to fulfill the specific items, sizes, and or quantities from the sample.

My final recommendation was determined by asking how the DOD increases the procurement of COTS SOE through commercial item e-commerce portals? Figure 9 depicts the percentage of total COTS SOE transactions purchased by DLA Troop support. Due to the current limitations from the micro-purchase threshold currently set at \$10,000, only about 63% of the COTS SOE item transactions can be purchased through commercial item e-commerce portals. To increase the number of COTS SOE items purchased through commercial item e-commerce portals, I recommend an increase in the GPC threshold to a

range between \$40,000–\$70,000 to allow up to 86% of COTS SOE transactions to be purchased through commercial item e-commerce portals. If there is a concern about giving every GPC holder a higher threshold, I recommend allowing a certain number of certified buyers to have a higher purchase authority than the standard GPC holder.

F. SUMMARY

This chapter presented the findings from the comparative analysis of the COTS SOE items from DLA Troop Support's TLSP contract with the same items found in commercial item e-commerce portals. Next, the analysis of the findings was reviewed, followed by a discussion on the implications of the findings. This chapter concluded with proposed recommendations related to DOD commercial item procurement. The next chapter provides the summary, conclusions, and areas for further research.

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VI. SUMMARY, CONCLUSIONS, AND AREAS FOR FURTHER RESEARCH

Chapter VI is the final chapter of this research report. This chapter provides a summary of the research followed by conclusions to the research questions posed in Chapter I. This report concludes with areas for further research that can expand the commercial item e-commerce procurement research stream.

A. SUMMARY

The U.S. government has made a push over the last few years to streamline the procurement of commercial items to increase the speed of the acquisition process. For that reason, the 2018 NDAA (2017) called for the implementation of a program to streamline the purchase of commercial items through commercial e-commerce portals. The intention behind creating the commercial e-commerce procurement program was to promote a faster and easier means of purchasing COTS items. Two potential areas that may restrict the purchase of commercial items are the micro-purchase threshold and long procurement lead-times. A limitation to procurement of commercial items through commercial item e-commerce portals is the availability of the products in terms of size, style, and/or quantity.

The purpose of this research was to first conduct a comparative analysis of COTS SOE items purchased through an existing multiple award schedule DOD contract with the same items available through commercial item e-commerce portals to determine what evidence of cost, schedule, or performance efficiencies existed. The comparative analysis of the multiple award schedule DOD contract and commercial item e-commerce portals pinpointed the benefits, disadvantages, and limitations of the implementation of commercial item e-commerce portals for the procurement of COTS SOE. Finally, the research identified categories of commercial items that were suitable for procurement through commercial item e-commerce portals.

B. CONCLUSIONS

The objective of this research was to provide answers to three questions. Based on the research findings in this report, answers to the research questions are provided

beginning with categories of COTS SOE items suitable for procurement through e-commerce portals.

1. What categories of COTS SOE items are more suitable for procurement through commercial item e-commerce portals?

Based on the findings of the research, multiple categories have been identified as suitable for the procurement of COTS SOE items through commercial item e-commerce portals. The most suitable categories for procuring COTS SOE items are category 3152 (clothing), category 332999 (law enforcement personal equipment), category 33411 (new electronic equipment), and category 339113PA (protective apparel). These four categories made up 80% of all the COTS SOE items found through GSA Advantage. The research indicates that most of the COTS SOE items available through commercial item e-commerce portals in the sample fell into one or more of these four categories. The answer to the question regarding cost, schedule, and performance efficiencies is provided next.

2. What evidence of cost, schedule, or performance efficiencies exists with the procurement of COTS SOE items through commercial item e-commerce portals?

Based on the findings of this research, evidence of cost and schedule efficiencies in the procurement of COTS SOE items through commercial item e-commerce portals was present. The research indicates that commercial item e-commerce portals could be utilized to procure commercial items at competitive pricing with a high schedule efficiency. The findings of this research determined that DLA Troop Support's COTS SOE TLSP contract offers the most cost-efficient means for procuring COTS SOE items; however, GSA Advantage and other commercial item e-commerce portals provided competitive pricing, making the argument that commercial e-commerce portals may have a better total efficiency than DLA Troop Support's COTS SOE TLSP contract.

3. What are the potential benefits, disadvantages, and limitations of implementing the procurement of COTS SOE items through commercial item e-commerce portals?

The research found potential benefits, disadvantages, and limitations of implementing the procurement of COTS SOE items through commercial item e-commerce portals. The major benefit to the implementation of purchasing COTS SOE items through commercial item e-commerce portals is a major increase in schedule efficiency. A disadvantage and limitation identified is the potential non-availability of COTS SOE items through commercial item e-commerce portals. Another limitation identified is the current GPC threshold. Currently, 63% of all COTS SOE transactions are \$10,000 or below. To increase the number of COTS SOE item transactions in commercial item e-commerce portals, the micro-purchase threshold should be increased.

C. AREAS FOR FURTHER RESEARCH

The research was limited based on data time range constraints, item type, and scope. The DOD contract data received for this research is limited to COTS SOE item transactions gathered from one multiple award schedule contract from the C&E supply chain at DLA Troop Support.

The first recommended area to expand the commercial item e-commerce portal research is to analyze commercial contracts from other contracts within the C&E directorate as well as additional supply chains within DLA Troop Support to see if they are suitable for procurement through the commercial item e-commerce portals.

The second recommended area to expand the commercial item e-commerce portal research is to expand the time range of the DOD contract data extracted from the TLSP contract. The data time range constraint for this research was 1 year of contract data pulled from March 2019 to March 2020.

The third recommended area to expand the commercial item e-commerce portal research is to investigate more commercial item e-commerce procurement platforms to see if specific commercial commodities are suitable for DOD e-commerce procurement. The commercial item data was restricted to GSA Advantage, Amazon, and other commercial item e-commerce portals based on the COTS SOE item sample provided by DLA Troop Support. Expanding the scope of the contract data should assist in the determination of

whether procurement through commercial item e-commerce portals is an efficient means of purchasing commercial items.

The last recommended area to increase the commercial item e-commerce portal research is to investigate the pre-award lead time of commercial item e-commerce procurement portals. This investigative research could be used to determine if there are schedule efficiencies to be gained by purchasing commercial items through commercial item e-commerce portals by comparing the pre-award lead time of DOD commercial item procurement contracts such as DLA Troop Support's TLSP contract with the pre-award lead time of commercial item e-commerce portals.

APPENDIX A. SAMPLES 1-10, AMAZON

SAMPLE NUMBER	AVG QTY PER ORDER	AVG UNIT PRICE	AVG PROXY DELIVERY DAYS	COMMERCIALLY AVAILABLE (YES/NO)	AMAZON AVAILABILITY (YES/NO)	Lowest Amazon UNIT COST	TOTAL UNIT COST	Amazon Shipping Time (standard/Days)	Difference in Estimated Shipping Days from DLA	Difference in Estimated Shipping Days from DLA %	Amazon Shipping COST	AMAZON Total Delivered Cost EACH	Difference in Total Delivered Cost to DLA	Difference in Total Delivered Cost to DLA %	Amazon Shipping Terms	Customer Quality Reviews
1	1	\$243.79	251	YES	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	60	\$13.40	98	YES	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3	10	\$142.81	154	YES	YES UNABLE TO FULFILL FULL ORDER QTY	\$348.00	\$1,047.00	37	117	76%	\$8.00	\$351.00	-\$208.19	-146%	Unless noted otherwise in the ordering pipeline, No customer reviews for ships all items within two days of receiving an order. You will receive notification of any delay or cancellation of your order	Only 3 in stock (QTY NOT AVAILABLE) No customer reviews for product; Vendor review 67% Positive, 1% Neutral, 31% Negative (270 Total) LAST 12 MONTHS
4	2	\$15,683.87	760	YES	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5	80	\$5,583.77	337	YES*	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	42	\$139.61	279	YES	YES (Sho not in stock)	\$178.53		7	272	97%	\$0.00	\$178.53	-\$38.92	-23%	The item is Fulfilled by Amazon.com and ships based on Amazon.com Shipping Rates and Policies.	Size Not in Stock Item 4.5 Stars (52) 3% Negative (690 Total) LAST 12 MONTHS
7	391	\$46.74	278	YES	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
8	1	\$18,288.47	248	NO	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
9	5	\$47,103.41	229	YES*	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10	2	\$5,113.59	230	NO (NSN)	NO (NSN)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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APPENDIX B. SAMPLES 11–20, AMAZON

SAMPLE NUMBER	AVG QTY PER ORDER	AVG UNIT PRICE	AVG PROXY DELIVERY DAYS	COMMERCIALLY AVAILABLE (YES/NO)	AMAZON AVAILABILITY (YES/NO)	Lowest Amazon UNIT COST	TOTAL UNIT COST	Amazon Shipping Time (standard/Days)	Difference in Estimated Shipping Days from DLA	Difference in Estimated Shipping Days from DLA %	Amazon Shipping COST	AMAZON Total Delivered Cost EACH	Difference in Total Delivered Cost to DLA	Difference in Total Delivered Cost to DLA %	Amazon Shipping Terms	Customer Quality Reviews
11	12	\$44.99	127	NO (NSN)	NO (NSN)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
12	100	\$64.23	408	YES	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
13	17	\$2,754.99	317	NO												
14	3	\$37,180.33	304	YES*	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
15	7	\$981.09	146	YES	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
16	7	\$961.90	176	YES	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
17	19	\$251.35	272	YES	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
18	15	\$75.46	233	YES	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
19	1	\$2,521.00	214	YES	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
20	16	\$311.77	248	NO												

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APPENDIX C. SAMPLES 21–30, AMAZON

SAMPLE NUMBER	AVG QTY PER ORDER	AVG UNIT PRICE	AVG PROXY DELIVERY DAYS	COMMERCIALLY AVAILABLE (YES/NO)	AMAZON AVAILABILITY (YES/NO)	Lowest Amazon UNIT COST	TOTAL UNIT COST	Amazon Shipping Time (standard Days)	Difference in Estimated Shipping Days from DLA	Difference in Estimated Shipping Days from DLA %	Amazon Shipping COST	AMAZON Total Delivered Cost EACH	Difference in Total Delivered Cost to DLA	Difference in Total Delivered Cost to DLA %	Amazon Shipping Terms	Customer Quality Reviews
21	14	\$145.79	273	YES	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
22	43	\$33.00	130	YES	YES	\$55.00		11.5	119	91%	\$0.00	\$55.00	-\$22.00	-57%	Free Delivery June 1-4	12 Months, 96% positive, 1% neutral, 3% negative, 1141
23	273	\$198.02	159	YES	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
24	100	\$123.95	268	YES*	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
25	4	\$181,350.00	233	YES*	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
26	55	\$1.20	324	NO	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
27	2	\$3871.96	134	YES	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
28	1	\$1,507.20	166	YES*	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
29	2	\$1,761.65	373	NO (NSN)	NO (NSN)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
30	10	\$1,068.80	220	YES	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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APPENDIX D. SAMPLES 1–10, GSA ADVANTAGE

SAMPLE NUMBER	AVG QTY PER ORDER	AVG UNIT PRICE	AVG PROXY DELIVERY DMS	COMMERCIALLY AVAILABLE (YES/NO)	GSA Availability (YES/NO)	Lowest GSA UNIT COST	Difference in Total Delivered Cost to DLA	Difference in Total Delivered Cost to DLA %	GSA Shipping Time (Standard days)	Difference in Estimated Shipping Days from DLA	Difference in Estimated Shipping Days from DLA %	GSA Shipping Cost	GSA Total Delivered Cost	GSA Shipping Terms	SIN ITEM CATEGORY	Customer Quality Reviews
1	1	\$243.79	251	YES	YES	\$252.10	-\$8.31	-15%	45	206	82%	**0.00	\$252.10	45 Days ARO, Min order \$50, O - CONUS, AK, PR, HI. Item is FOB ORIGIN, -the price of transportation from the vendor to your shipping location. Additional charges for transportation will be added by the vendor.	3152, 3391129A, 332899	**VENDOR QUALITY AVAILABLE ON GSA ADVANTAGE
2	60	\$13.40	98	YES	YES	\$12.64	\$0.76	6%	20	78	80%	**0.00	\$12.64	20 Days ARO, Min order \$100, O - CONUS, AK, PR, HI. Item is FOB ORIGIN, -the price of transportation from the vendor to your shipping location. Additional charges for transportation will be added by the vendor.	3152, 332899	**VENDOR QUALITY AVAILABLE ON GSA ADVANTAGE
3	10	\$142.81	154	YES	YES	\$163.34	-\$20.53	-14%	60	94	61%	\$0.00	\$163.34	60 Days ARO, Min order \$150, FOB Destination CONUS, FOB Origin-AK, PR, HI	3152, 332899	**VENDOR QUALITY AVAILABLE ON GSA ADVANTAGE
4	2	\$15,663.67	760	YES	YES	\$17,531.25	-\$1,867.58	-12%	120	640	84%	\$0.00	\$17,531.25	120 Days Delivered ARO, FOB DESTINATION CONUS, AK, PR, HI. Direct Delivery 120 days delivered ARO, \$100 Minimum order	336812	**VENDOR QUALITY AVAILABLE ON GSA ADVANTAGE
5	80	\$5,563.77	337	YES*	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	42	\$139.61	279	YES	YES	\$202.60	-\$62.99	-45%	7	272	97%	**0.00	\$202.60	7 days delivered ARO, FOB Origin CONUS, AK, PR, HI. Item is FOB ORIGIN, -the price of the item does not include cost of transportation from the vendor to your shipping location. Additional charges for transportation will be added by the vendor.	3399205, 316210	**VENDOR QUALITY AVAILABLE ON GSA ADVANTAGE
7	391	\$46.74	278	YES	YES	\$46.43	\$0.31	1%	180	98	35%	\$0.00	\$46.43	Direct Delivery, 180 days delivered ARO, VOLUME DISCOUNTS \$25000 - \$9999999 2.0%, FOB Destination, CONUS, Origin-AK, PR, HI	332899, 3391139A	**VENDOR QUALITY AVAILABLE ON GSA ADVANTAGE
8	1	\$18,286.47	248	NO	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
9	5	\$47,103.41	229	YES*	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10	2	\$5,113.58	230	NO (NSN)	NO (NSN)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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APPENDIX E. SAMPLES 11–20, GSA ADVANTAGE

SAMPLE NUMBER	AVG QTY PER ORDER	AVG UNIT PRICE	AVG PROXY DELIVERY DAYS	COMMERCIALLY AVAILABLE (YES/NO)	GSA Availability (YES/NO)	Lowest GSA UNIT COST	Difference in Total Delivered Cost to DLA	Difference in Total Delivered Cost to DLA %	GSA Shipping Time (Standard/days)	Difference in Estimated Shipping Days from DLA	Difference in Estimated Shipping Days from DLA %	GSA Shipping Cost	GSA Total Delivered Cost	GSA Shipping Terms	SIN ITEM CATEGORY	Customer Quality Reviews
11	12	\$44.99	127	NO (NSN)	NO (NSN)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
12	100	\$64.23	408	YES	YES	\$65.97	-\$1.74	-3%	60	348	85%	\$0.00	\$65.97	60 Days ARO, FOB Delivered CONUS.	3152	***VENDOR QUALITY REVIEWS NOT AVAILABLE ON GSA ADVANTAGE
13	17	\$2,764.99	317	NO	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
14	3	\$37,180.33	304	YES*	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
15	7	\$881.09	146	YES	YES	\$971.05	-\$89.96	-10%	30	116	79%	\$0.00	\$971.05	30 Days Delivered ARO, FOB D-CONUS, Minimum order \$100.	33411	***VENDOR QUALITY REVIEWS NOT AVAILABLE ON GSA ADVANTAGE
16	7	\$861.90	176	YES	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
17	19	\$251.35	272	YES	YES	\$294.70	-\$43.35	-17%	30	242	89%	\$0.00	\$294.70	30 Days Delivered ARO, FOB D-CONUS, Minimum order \$150.	3152	***VENDOR QUALITY REVIEWS NOT AVAILABLE ON GSA ADVANTAGE
18	15	\$75.46	233	YES	YES	\$105.60	-\$30.14	-40%	7	226	97%	\$0.00	\$105.60	7 Days Delivered ARO	33411	***VENDOR QUALITY REVIEWS NOT AVAILABLE ON GSA ADVANTAGE
19	1	\$2,521.00	214	YES	YES	\$2,824.83	-\$303.83	-12%	5	209	98%	\$0.00	\$2,824.83	5 Days delivered ARO	33411	***VENDOR QUALITY REVIEWS NOT AVAILABLE ON GSA ADVANTAGE
20	16	\$311.77	248	NO	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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APPENDIX F. SAMPLES 21–30, GSA ADVANTAGE

SAMPLE NUMBER	AVG QTY PER ORDER	AVG UNIT PRICE	AVG PROXY DELIVERY DAYS	COMMERCIALITY (YES/NO)	GSA Availability (YES/NO)	Lowest GSA UNIT COST	Difference in Total Delivered Cost to DLA	Difference in Total Delivered Cost to DLA %	GSA Shipping Time (Standard/days)	Difference in Estimated Shipping Days from DLA	Difference in Estimated Shipping Days from DLA %	GSA Shipping Cost	GSA Total Delivered Cost	GSA Shipping Terms	SIN ITEM CATEGORY	Customer Quality Reviews
21	14	\$145.79	273	YES	YES	\$149.87	-\$4.08	-3%	180	93	34%	**0.00	\$149.87	Direct Delivery 180 days delivered ARO	3152, 33299	***VENDOR QUALITY REVIEWS NOT AVAILABLE ON GSA ADVANTAGE
22	43	\$33.00	130	YES	YES	\$40.70	-\$7.70	-23%	45	85	65%	**0.00	\$40.70	45 days shipped ARO. Item is FOB ORIGIN -the price of the item does not include cost of transportation from the vendor to your shipping location. Additional charges for transportation will be added by the vendor. FOB Origin AK, PR, HI	33299, 3152, 339113PA	***VENDOR QUALITY REVIEWS NOT AVAILABLE ON GSA ADVANTAGE
23	273	\$198.02	159	YES	YES	\$193.44	\$4.58	2%	60	99	62%	\$0.00	\$193.44	60 Days delivered ARO. FOB Delivered CONUS	33411	***VENDOR QUALITY REVIEWS NOT AVAILABLE ON GSA ADVANTAGE
24	100	\$123.95	288	YES	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
25	4	\$181,350.00	233	YES	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
26	55	\$1.20	324	NO	YES	\$3,778.73	\$93.23	2%	120	14	10%	**0.00	\$3,778.73	Direct Delivery 120 days shipped ARO. Item is FOB ORIGIN -the price of the item does not include cost of transportation from the vendor to your shipping location. Additional charges for transportation will be added by the vendor. O-CONUS, AK, PR, HI - origin pricing to Alaska, Puerto Rico and Hawaii	334515, 33411	***VENDOR QUALITY REVIEWS NOT AVAILABLE ON GSA ADVANTAGE
27	2	\$3,871.96	134	YES	YES	\$3,778.73	\$93.23	2%	120	14	10%	**0.00	\$3,778.73	Direct Delivery 120 days shipped ARO. Item is FOB ORIGIN -the price of the item does not include cost of transportation from the vendor to your shipping location. Additional charges for transportation will be added by the vendor. O-CONUS, AK, PR, HI - origin pricing to Alaska, Puerto Rico and Hawaii	334515, 33411	***VENDOR QUALITY REVIEWS NOT AVAILABLE ON GSA ADVANTAGE
28	1	\$1,507.20	186	YES	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
29	2	\$1,761.65	373	NO (NSN)	NO (NSN)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
30	10	\$1,068.60	220	YES	YES	\$1,220.97	-\$152.37	-14%	5	215	98%	\$0.00	\$1,220.97	5 Days delivered ARO. FOB Delivered CONUS	81212	***VENDOR QUALITY REVIEWS NOT AVAILABLE ON GSA ADVANTAGE

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APPENDIX G. SAMPLES 1–10, OTHER E-COMMERCE PORTALS

SAMPLE NUMBER	AVG QTY PER ORDER	AVG UNIT PRICE	AVG PROXY DELIVERY DAYS	COMMERCIALLY AVAILABLE (YES/NO)	Available through additional E-Commerce platforms (YES/NO)	Lowest E-Commerce UNIT COST	Total Cost	E-Commerce Shipping Time (standard/Days)	Difference in Shipping Days from DLA	Difference in Estimated Shipping Days from DLA %	E-Commerce Shipping Cost	E-Commerce Total Delivered Cost	Difference in Total Delivered Cost to DLA	Difference in Total Delivered Cost to DLA %	E-Commerce Shipping Terms	Customer Quality Reviews
1	1	\$243.79	231	YES	YES	\$350.00		3.5	248	99%	\$0.00	\$350.00	-\$106.21	-45%	Eligible for FREE Shipping on Orders over \$75, Standard 3 to 4 business days	NO CUSTOMER REVIEWS AVAILABLE IN PORTAL
2	60	\$13.40	98	YES	YES	\$22.00	\$1,320.00	6	92	94%	\$0.00	\$22.00	-\$81.60	-64%	Free shipping, 5 to 7 days via UPS.	NO CUSTOMER REVIEWS AVAILABLE IN PORTAL
3	10	\$142.21	154	YES	YES	\$194.99	\$1,949.90	8.5	146	94%	\$4.99	\$195.49	-\$52.80	-37%	Standard Shipping 7-10 Business Days.	NO CUSTOMER REVIEWS AVAILABLE IN PORTAL
4	2	\$15,683.67	760	YES	YES	\$10,868.00	\$21,772.00	2.5	758	100%	\$168.79	\$10,970.39	\$4,713.28	30%	Price, if shown and unless otherwise noted, represents the Manufacturer's Suggested Retail Price (MSRP) or dealer unit price and does not include government fees, taxes, dealer vehicle freight/preparation, dealer document preparation charges, labor, installation, or any finance charges (if applicable). MSRP and/or final sales price will vary depending on options or accessories selected; contact dealer for more details. 2-3 Days using freightquote.com	NO CUSTOMER REVIEWS AVAILABLE IN PORTAL
5	80	\$5,563.77	337	YES	YES Available direct through vendor	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	42	\$159.61	279	YES	YES	\$169.95	\$7,137.90	7.5	272	97%	\$0.00	\$169.95	-\$30.34	-22%	ADO/PRO \$15 Flat Rate Shipping; Flat rate \$9.99 on orders less than \$99. Free shipping on orders \$99 and up	1 Review, 5 Stars
7	391	\$46.74	278	YES	YES	\$39.95	\$15,620.45	105	173	62%	\$158.79	\$40.36	\$6.38	14%	Standard lead-times are 65-120 business days from placement.	NO CUSTOMER REVIEWS AVAILABLE IN PORTAL
8	1	\$18,266.47	248	NO		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
9	5	\$47,103.41	229	YES	YES Available direct through vendor	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10	2	\$5,113.59	230	NO (NSN)	NO (NSN)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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APPENDIX H. SAMPLES 11–20, OTHER E-COMMERCE PORTALS

SAMPLE NUMBER	AVG QTY PER ORDER	AVG UNIT PRICE	AVG PROXY DELIVERY DAYS	COMMERCIALLY AVAILABLE (YES/NO)	Available through additional E-commerce Platforms (YES/NO)	Lowest E-commerce UNIT COST	Total Cost	E-commerce Shipping Time (standard Days)	Difference in Shipping Days from DLA	Difference in Estimated Shipping Days from DLA %	E-commerce Shipping Cost	E-commerce Total Delivered Cost	Difference in Total Delivered Cost to DLA	Difference in Total Delivered Cost to DLA %	E-commerce Shipping Terms	Customer Quality Reviews
11	12	\$44.99	127	NO (NSN)	YES (NSN)	N/A	N/A	N/A	N/A	N/A	\$0.00	N/A	N/A	N/A	N/A	N/A
12	100	\$64.23	408	YES	YES	\$85.00	\$935.00	5	403	99%	\$0.00	\$85.00	-\$20.77	-32%	5 Days standard shipping	1 Review, 5 stars
13	17	\$2,754.99	317	NO	YES Available direct through vendor.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
14	3	\$37,180.33	304	YES*	YES	\$1,050.00	\$7,350.00	4.5	142	97%	\$0.00	\$1,050.00	-\$168.91	-16%	FEDEX, 2-7 Business days.	NO CUSTOMER REVIEWS AVAILABLE IN PORTAL
15	7	\$861.09	146	YES	YES	\$1,050.00	\$7,350.00	4.5	142	97%	\$0.00	\$1,050.00	-\$168.91	-16%	FEDEX, 2-7 Business days.	NO CUSTOMER REVIEWS AVAILABLE IN PORTAL
16	7	\$861.90	176	YES	YES	\$945.00	\$5,915.00	9.5	167	95%	\$50.30	\$652.19	\$9.71	1%	Built in 5 business days. UPS Ground (3-5 days)	NO CUSTOMER REVIEWS AVAILABLE IN PORTAL
17	19	\$251.35	272	YES	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
18	15	\$75.46	233	YES	YES	\$80.00	\$1,200.00	21	212	91%	\$79.94	\$65.33	-\$9.87	-13%	Some items are built to order, with an average lead time of 2-4 weeks, but we strive to expedite products whenever possible.	26 reviews, 5 stars
19	1	\$2,521.00	214	YES	YES	\$2,182.33	\$2,182.33	24.5	190	89%	\$204.38	\$2,386.71	\$134.29	5%	UPS GROUND	NO CUSTOMER REVIEWS AVAILABLE IN PORTAL
20	16	\$311.77	248	NO												

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APPENDIX I. SAMPLES 21–30, OTHER E-COMMERCE PORTALS

SAMPLE NUMBER	AVG QTY PER ORDER	AVG UNIT PRICE	AVG PROXY DELIVERY DAYS	COMMERCIALLY AVAILABLE (YES/NO)	Available through additional E-commerce Platforms (YES/NO)	Lowest E-Commerce UNIT COST	Total Cost	E-commerce Shipping Time (standard Days)	Difference in Estimated Shipping Days from DLA	Difference in Estimated Shipping Days from DLA %	E-commerce Shipping Cost	E-commerce Total Delivered Cost	Difference in Total Delivered Cost to DLA	Difference in Total Delivered Cost to DLA %	E-commerce Shipping Terms	Customer Quality Reviews
21	14	\$145.79	273	YES	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
22	43	\$33.00	130	YES	YES	\$56.00	\$2,408.00	112	18	14%	\$27.53	\$56.64	-\$23.64	-72%	Orders may take up to 15 to 17 +/- weeks before they ship.	NO CUSTOMER REVIEWS AVAILABLE IN PORTAL
23	273	\$198.02	159	YES	YES Available by requesting quote through vendor site.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
24	100	\$123.95	268	YES*	YES Available by requesting quote through vendor site.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
25	4	\$181,350.00	233	YES*	YES Available through vendor site after requesting information.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
26	55	\$1.20	324	NO	YES	\$5,350.00	\$10,700.00	31	103	77%	\$13.84	\$5,356.92	-\$1,684.86	-38%	UPS GROUND NEXT DAY-END OF DAY	NO CUSTOMER REVIEWS AVAILABLE IN PORTAL
27	2	\$3,871.96	134	YES	YES											
28	1	\$1,507.20	186	YES*	YES Available through vendor site after requesting information.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
29	2	\$1,761.55	373	NO (NSN)	NO (NSN)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
30	10	\$1,068.80	220	YES	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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