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**B2B Models for DoD Acquisition**

**30 July 2007**

**by**

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**Graduate School of Operational & Information Sciences**

**Naval Postgraduate School**

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# Abstract

A central vision of B2B e-commerce is that of an electronic marketplace that would bring suppliers together with major buyers of goods and services for the purpose of conducting “frictionless” commerce. The hope is that these suppliers would compete on price, transactions would be automated and low cost, and as a result, the price of goods and services would fall. Numerous Internet marketplaces came into being during the Internet boom; however, an almost equal number disappeared following the Internet bubble burst. Still, many survive today based on a variety of models that are quite successful. If a right model is selected, it could help large organizations, like the DoD, achieve great efficiencies for their acquisition and procurement processes.

The objective of the paper is to examine models for classifying and differentiating the business functionality provided by Internet marketplaces and to investigate the impact of the various models on government and DoD acquisition. The models will consider such variables as types of goods and services purchased, how these goods and services are purchased, pricing mechanisms, the characteristics of the markets, and ownership of marketplace.

**Keywords:** B2B E-Commerce, Internet Marketplaces, B2B Exchanges, Collaborative Commerce



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# Executive Summary

While B2B e-commerce today accounts for a small percentage of the total B2B, it is growing steadily and expected to reach 40% – 50% of the total B2B trade in a few years. B2B transactions promise to help organizations run more efficiently by achieving significant cost savings and reductions in cycle-time

This research examines various models for classifying and differentiating the business functionality provided by Internet marketplaces and investigates the impact of these models on government and DoD acquisition. The models investigated consider such variables as types of goods and services purchased, how these goods and services are purchased, pricing mechanisms, the characteristics of the markets, and ownership of marketplace. The research also examines how current models are evolving and what future models will likely look like.



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# Introduction

Business-to-business (B2B) e-commerce refers to transactions between businesses conducted electronically over the Internet, intranets, extranets, or private networks. Such transactions may be conducted between a business and its suppliers or between a business and any other business.

It is estimated that in 2003, B2B e-commerce in the United States was a \$1.5 trillion business. This represents about 11% of the total B2B trade estimated at \$13.5 trillion (Laudon & Traver, 2004). Gartner group predicts this percentage to grow steadily to reach over 40% in 2010. Forrester's research predicts a higher percentage of 53%.

There are many potential benefits of B2B e-commerce. These benefits depend on the model used, but are thought to include the following:

- Significant cuts in acquisition cost
- Expediting cycle-time
- Reducing errors and improving quality of service
- Seamless integration with suppliers
- Ability to have purchasing data instantly
- Reducing inventory levels and costs
- Immediate response to changes in customer purchasing patterns
- Facilitating mass customization
- Increasing opportunities of collaboration between buyers and sellers

In this paper, we examine models for classifying and differentiating the business functionality provided by B2B e-commerce and the impact of the various models on government and DoD acquisition. The models will consider such variables as types of goods and services purchased, how these goods and services are purchased, pricing mechanisms, the characteristics of the markets, and ownership of marketplace.



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## B2B Characteristics

There are many ways to characterize B2B transactions. In this paper, we differentiate between different types of B2B transactions based on the following characteristics: Parties to the transaction, types of transactions, types of products and services procured, the direction of trade, and number and form of participation.

### Parties to the Transaction

B2B commerce can be conducted *directly* between a buyer and seller or through a third-party intermediary.

### Types of Transactions

There are two types of transactions: Spot purchases and long-term sourcing. Spot purchases refer to the purchasing of goods and services as they are needed at the prevailing market prices. Long-term sourcing refers to purchases made through long-term contracting agreements that are negotiated between the buyers and the sellers.

### Types of Products and Services

There are two types of Products and Services: Direct and Indirect. Direct products and services are used directly in making the product, such as wood in furniture or paper in a book. Direct products and services are usually purchased in large quantities using long-term sourcing. Indirect products and services (such computer equipments, lights, or tools) support production, but are not directly involved in creating the end product. They are usually referred to as maintenance, repairs, and operations (MROs).

### Direction of Transactions

B2B transactions can be classified as either vertical or horizontal. A vertical market is one that provides products and services for a specific industry. Examples



include cars, steel, or electronics. Horizontal markets refer to markets that serve many different industries. Examples are office supplies, computers, and tools.

## Number and Form of Participation

There are four types of electronic marketplace participation: 1) Sell-side, 2) Buy-side, 3) Exchanges, and 4) Collaborative commerce.

In sell-side commerce, there is one seller that does all the selling to many buyers. In buy-side commerce, there is one buyer that does all the buying from many sellers. Both types are collectively referred to as company-centric electronic commerce, because they address a single company buying or selling needs.

Exchanges are many-to-many electronic marketplaces, where many buyers and many sellers meet in electronic markets to conduct business transactions. Exchanges are usually owned and managed by a third party or by a consortium, and are open to all interested parties, and are, thus, considered public electronic marketplaces.

Collaborative commerce goes beyond selling and buying activities and includes activities that represent more than financial transactions—such as communication and sharing of information, planning, design, manufacturing, and management. Collaborative commerce is relationship-based rather than transactions-based and bears resemblance to internal workgroup collaborative environments.





## Buy-side Electronic Marketplaces Models

Under these models, a buyer opens an electronic marketplace on its own servers and invites potential suppliers to bid on the products and services that the buyer needs. This invitation could take the form of: 1) a request for Quote (RFQ), or 2) an invitation for a reverse auction. An example of the former is FedBizOpps (2007) and GSA e-buy (2007). An example of the latter is NAVSUP NavyAuctions (2007).

*FedBizOpps* is the single government point-of-entry (GPE) for Federal government procurement opportunities over \$25,000. Government buyers are able to publicize their business opportunities by posting information directly to FedBizOpps via the Internet. Using the same portal, commercial vendors seeking Federal markets for their products and services can search, monitor and retrieve opportunities solicited by the entire Federal contracting community.

*E-buy* is an electronic Request for Quote (RFQ)/Request for Proposal (RFP) system designed to allow Federal buyers to request information, find sources, and prepare RFQs/RFPs, online, for millions of services and products offered through GSA's Multiple Award Schedule (MAS) and Government-wide Acquisition Contracts (GWAC).

*Navy Auctions* is a secured Internet portal that allows online suppliers to compete in real-time for contracts by lowering their prices as they see other offers. In its first reverse auction, the Navy estimates that they achieved savings of 28.9% over the historical price for these items. The auction lasted 51 minutes, and the contract, valued at \$2.375 million, was awarded within an hour of the reverse auction closing.



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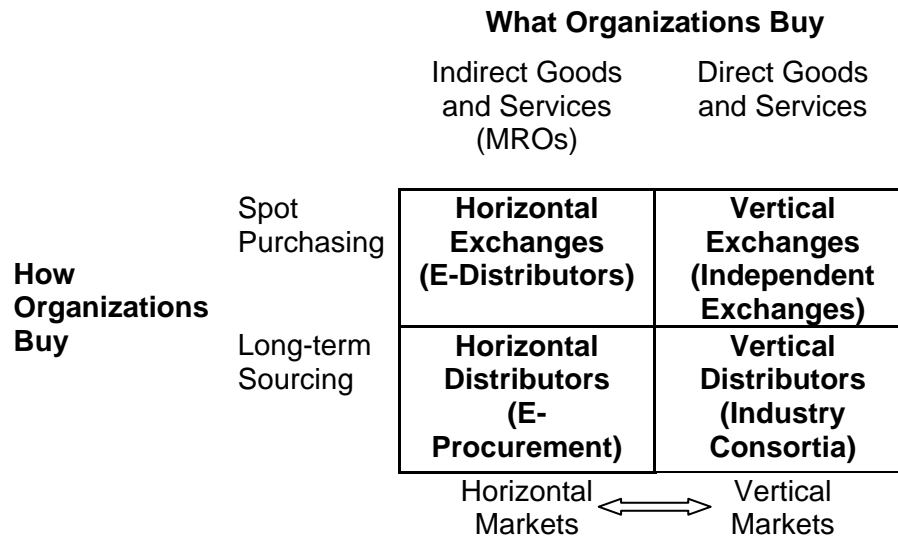
## B2B Exchanges

As discussed earlier, exchanges are electronic marketplaces where many buyers and sellers meet to buy and sell goods and services. Exchanges are known under different names: e-marketplaces, e-markets, Internet exchanges, Net marketplaces, and B2B portals.

### Classification of Exchanges

There are numerous ways of classifying exchanges. We use an approach similar to that suggested by Kaplan and Sawhney (2000) and Kerrigan, Roegner, Swinford and Zawada (2001). The classification model consists of a 2x2 matrix, as shown in Figure 1. The x-axis represents the types of goods and services purchased (indirect goods vs. direct goods), and the y-axis represents how these goods and services are purchased (spot purchases vs. long-term contractual agreement). The intersection of these dimensions produces four cells representing four types of exchanges: Horizontal exchanges (also known as e-distributors), horizontal distributors (also known as e-procurement), vertical exchanges (also known as independent exchanges), and vertical distributors (also known as industry consortia). Each of these exchanges seeks to provide value to customers in different ways. We discuss each type of exchange in more detail in the following sections.





**Figure 1. Types of Internet Marketplaces**

## Horizontal Exchanges

Horizontal exchanges are independently owned intermediaries that offer individual customers a single source from which to make spot purchases of indirect or MRO goods. They operate in a horizontal market that serves many different industries with products from many different suppliers. Horizontal exchanges are usually “public” markets that any firm can participate in. They usually charge fixed prices, and their owners make money by charging a markup on products they distribute. The primary benefits to customers are lower search costs, lower transaction costs, wide selection, rapid delivery, and low prices. An example of a horizontal exchange is Grainger (2007) and the DoD Email (2007).

The DoD Email was launched by the Defense Logistics Agency (DLA) in 1998 as the DLA Email. It was created to leverage purchasing power across agencies to provide the Military Services and other Federal Government Agencies with volume discounts from Military and Commercial suppliers. Its mission is indicated in the FY99 *DoD Authorization Act* which states, “the Joint Electronic Commerce Program Office of the Department of Defense shall develop a single, defense-wide electronic mall system, which shall provide a single, defense-wide electronic point of entry and a single view,



access, and ordering capability for all Department of Defense electronic catalogs.” DLA was named the executive agent for the DoD Emall, which remains dedicated to its DoD-wide mission.

There are currently over 28,000 user accounts on the DoD Emall with 500 new users added each week. These users represent the DoD (All Services, National Guard, Reserves) as well as other Federal Agencies (DHS, FBI, etc.). More than 850 Commercial Contracts are currently hosted on DoD Emall, with additional catalogs added weekly. The DoD Emall has shown tremendous growth—with a sales increase from \$14M in FY02 to \$336M through April of FY05.

## Horizontal Distributors

Similar to horizontal exchanges, horizontal distributors are independently owned intermediaries connecting hundreds of online suppliers offering millions of MRO goods to thousands of business firms. They differ from horizontal exchanges in that they operate in a horizontal market in which long-term contractual purchasing agreements are used to buy indirect goods. Another important difference is that horizontal distributors usually provide value-chain management services, which could include the automation of a firm’s entire procurement process on the buyer side and the automation of the selling business processes on the seller side. For buyers, this includes the automation of purchase orders, requisitions, invoicing, and payments. For suppliers, it includes the automation of catalog creation, content management, order management, order fulfillment, invoicing and shipment. Horizontal distributors make money by charging a percentage of each transaction, licensing consulting services and software, and assessing network use fees.

The two largest horizontal distributor players are Ariba (2007) and Perfect Commerce, previously CommerceOne (2007). Although some Government and DoD initiatives include some characteristics of this model (e.g., e-buy), there is no Government or DoD effort that provides a full automation of the acquisition process on the buyer side and the automation of the selling process on the seller side.



## Vertical Exchanges

Vertical exchanges are independently owned online marketplaces that connect hundreds of suppliers to potentially thousands of buyers in a dynamic real-time environment. They are typically vertical markets in which spot purchases can be made for direct inputs (both goods and services). Similar to horizontal exchanges, the benefits for buyers include reduced search costs and lower prices, while the benefits for sellers include access to the global purchasing environment and opportunity to unload production overruns. Vertical exchanges make money by charging a commission on each transaction; pricing can be through an online negotiation, auction, RFQ, or fixed prices. Vertical exchanges are “public” markets and are biased in favor of the buyer. An important measure of success for vertical exchanges is their liquidity—which is measured by the numbers of buyers and sellers in the market, the volume of transactions, and the size of transactions. If there is a small number of participants, a low volume of small transactions, an exchange usually fails.

Examples of Vertical Exchanges include E-steel (2006), a spot market for steel products and Foodtrader (2003), a spot market for the food-products industry.

## Vertical Distributors

Vertical distributors, also known as industry consortia, are industry-owned vertical markets in which long-term contractual purchases of direct inputs can be made from a limited set of invited participants. They serve to reduce supply-chain inefficiencies by unifying the supply chain for an industry through a common network and computing platform. They make money through: 1) Industry members who pay for the creation of the site and contribute initial operating capital and 2) Buyer firms who pay transaction and subscription fees. The pricing mechanism of this model ranges from auctions to fixed prices to RFQs. The bias of industry consortia is toward large buyers who benefit from competitive pricing. Benefit to suppliers is from access to large-buyer-firm procurement systems, long-term stable relationships, and large-order sizes.



There are numerous vertical distributors in many industries, with many industries having more than one. The industries with the most common consortia are metals, chemicals, and retail. The long-term viability of Vertical Distributors is yet to be seen.

Examples of Vertical Distributors are Covisint (2007) for the automotive industry and Exostar (2007) for Defense and Aerospace.

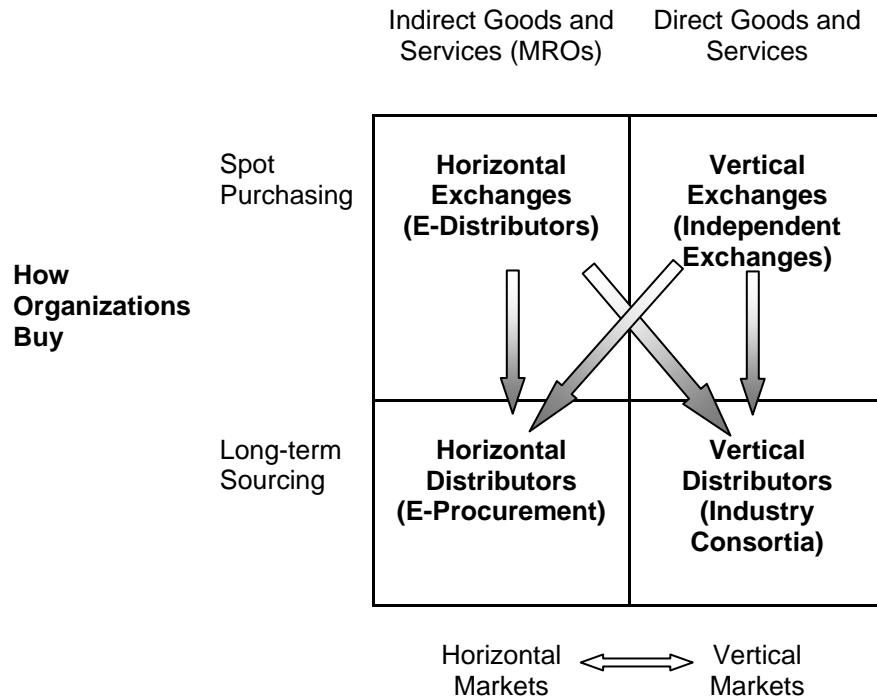
## How Are Exchanges Evolving?

Exchanges' capabilities are evolving rapidly and growing increasingly sophisticated. Figure 2 depicts some of these changes. Horizontal exchanges are moving away from being simple electronic marketplaces toward more active and sustained relationships with buyer companies by providing added-value services and participating in industry consortia as suppliers of indirect goods. These added-value services include the automation of part or the entire procurement process on the buyer side and the automation of the selling business processes on the seller side. For example, selling value-added services could include Web store fronts, the ability to configure and price products, and customer support, such as order-status monitoring, demand planning and collaboration.

Similarly, vertical exchanges are being absorbed into industry consortia as many were not attracting enough players to achieve liquidity. Another important trend in exchanges is the movement from simple transactions of spot purchases to longer-term sourcing agreements involving both direct and indirect goods (Wise & Morrison, 2000).



### What Organizations Buy



**Figure 2. Evolution of Exchanges**





# Collaborative Commerce

Collaborative commerce is used to describe Web-based communication environments that extend beyond procurement to include coordinating trans-organizational business processes. Collaborative Commerce permits buyer firms and principle suppliers to share product design and development, marketing, inventory, production scheduling, and unstructured communications. It generally starts as an enterprise resource planning (ERP) system in a single firm that is then expanded to include the firm's major suppliers. This fact differentiates private industrial networks from consortia, which are usually owned collectively by major firms through equity participation. Collaborative commerce is considered a buyer-side solution with buyer biases. It is the most prevalent form of Internet-based B2B.

A good example of the benefits of collaborative commerce is its collaborative resource planning, forecasting, and replenishment (CPFR)—which require the collaborating members to forecast demand, develop production scheduling plans, coordinate shipping, warehousing, and replenishment activities to ensure retail and warehouse shelf spaces are replenished “just in time.” This approach could potentially realize hundreds of millions of dollars in excess inventory and production savings and, therefore, produce large benefits to justify the cost of developing the collaboration network.

A second example of collaborative commerce is demand-chain visibility, in which excess capacity and supplies in the supply-and-distribution chain is visible to all members of the chain. Adjustments could then be made in real-time to production capacities to avoid excess inventories that usually create pressure to discount merchandise, reducing profits to all parties involved.

Collaborative commerce faces many implementation barriers. First, participating firms are required to share sensitive data with their business partners. This is a particularly major impediment for government and DoD organizations.



Second, integrating collaborative networks into existing ERP systems and EDI networks is expensive and time-consuming. Third, collaborative commerce requires a change in mind-set and behavior of employees, which constitutes a major paradigm shift.



## Conclusions

While B2B e-commerce today accounts for a small percentage of the total B2B, it is growing steadily and expected to reach 40% – 50% of the total B2B trade in a few years. B2B transactions promise to help organizations run more efficiently by achieving significant cost savings and reductions in cycle-time.

Many models of B2B e-commerce have emerged, each providing different functionality for the business it supports. Initially, B2B models' focus was commerce and transaction execution. However, newer models' focus is increasingly on value-added services and support for cross-enterprise collaboration. It is important for the DoD to examine these models, their characteristics, and trends in order to leverage the future of B2B and, therefore, to do business more efficiently.



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