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E-MARKETS 2000

Ultimately, all businesses will buy on a marketplace, sell on a marketplace, host a marketplace, or be marginalized by a marketplace.
— Ariba White Paper on B2B Marketplaces in the New Economy

They're testing the bounds of hyperbole on this one…most mega-exchanges are years away from their true promise…
— Red Herring[1]

E-markets are generating more questions than transactions right now.
— ComputerWorld[2]

INTRODUCTION

The Underlying Problems

Consumers and businesses had used markets for millennia to exchange goods and services. Over the centuries, new technologies had enabled these markets to increase their depth, efficiency, and geographic reach: paper enabled records to be kept and prices to be publicly displayed; the railroads enabled the widespread distribution of high-weight, low value goods; and, the telephone and telegraph allowed instantaneous verbal communication. Despite these and many other advances, during the final years of the 20th century, industries still faced three significant market-related problems:[3]

- Commerce was fragmented, often by geography, creating inefficient markets and uninformed buyers and sellers. Lack of information prevented buyers and suppliers from exploring new trading relationships.
- Value chains[4] had large amounts of excess inventory because of an inability to see and plan for the right mix and volume of sales, forcing producers to build inventory to cover all probable scenarios. Markets were not transparent enough

[1] "Revenge of the Bricks," Red Herring, August 2000.
[2] "Reality Check for E-Markets," ComputerWorld, June 5, 2000.
[3] "The B2B Internet Report: Collaborative Commerce," Morgan Stanley Dean Witter, April 2000.
[4] This research note will use the term "value chain" in the same context as the more commonly utilized "supply chain."

Research Associate Christopher Thomas prepared this case under the supervision of Professors Robert Burgelman and Garth Saloner as the basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation.

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with respect to current information on prices, product availability, product alternatives and trading partner alternatives.[5]

- Most complex, information-intensive interactions between businesses were performed manually. This was labor-intensive, inefficient, expensive and often prevented the right decision-maker from getting the right information at the right time. Most internal planning methodologies were also difficult to integrate with the actions of trading partners.[6]

Building the Information Systems to Enhance Transparency

At the end of the 20th century and the beginning of the 21st a new set of tools was introduced that could restructure markets to address these problems. During the 1990s, manufacturers and service companies had cultivated partnerships with key external suppliers. Faced with the pressures of globalization, shorter time-to-market, and demands for customized products, manufacturers had to optimize business processes across both internal units and trading partners. Supply chain management (SCM), the use of powerful computer analytical tools, and advanced business techniques to optimize the delivery of goods and services had become necessary to survive; "no one can dispute that supply change initiatives are key these days to business strategies…driving change in many industry markets."[7] However, extending internal data management efforts, often based on enterprise resource planning (ERP) systems, to external SCM collaboration proved difficult. A gap existed between sharing information internally and with trading partners. By 1999, only 50% of large businesses had exposed even one internal computer system to customers or suppliers.

Until the proliferation of Internet technologies, companies had relied on the telephone, fax, e-mail, or electronic data interchange (EDI) systems to share this value chain data. Although point-to-point EDI systems, introduced in the late 1960s and standardized in the 1980s, automated data exchange processes, they were expensive and took a long time to implement. Most EDI networks therefore excluded small and technically unsophisticated trading partners, even though value chains often comprised thousands of these companies, which conducted millions of conversations simultaneously (see Exhibit 1 for an overview of the aerospace value chain).[8] By 2000, however, companies were realizing that new Internet tools could allow them to connect more easily to external systems and develop inter-enterprise collaboration and integration tools. 90% of CEOs expected to expose more internal systems in the next two years, and 40% expected the number to increase fivefold.[9] (Exhibit 2)

E-Markets into the "Information Breach"

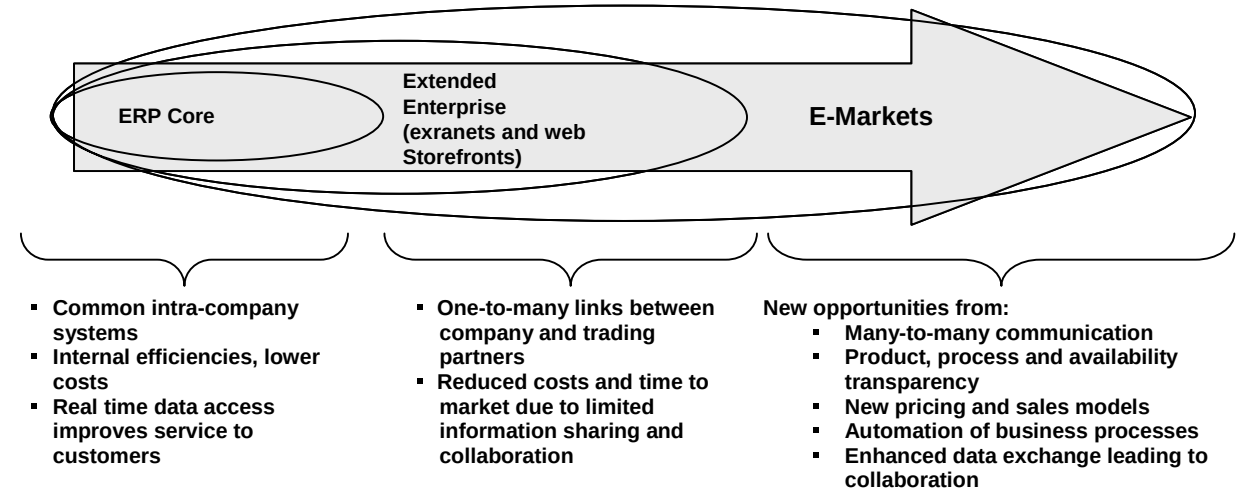
The Internet, combined with online procurement tools, market-making systems, an installed base of ERP systems, and business process optimization (BPO) packages, enabled the adoption of business-to-business electronic commerce ("B2B e-commerce") methods that promised to increase the transparency of marketplace operations and efficiency, and to allow greater inter-firm integration, leading to collaborative commerce.

B2B, first evident in web storefronts and extranets, was an extension of the cumulative information technology investments of the 1990s. During that decade, companies focused on managing and

[5] "Information Sharing in a Supply Chain," Stanford Research Paper No. 1549, Hau Lee and Seungjin Whang.
[6] In this research note, the word "product" includes goods and services; buyers and suppliers means not only manufacturers and end-customers, but all intermediaries along the value chain, such as subcontractors, distributors, resellers, etc. Most companies were both buyers and suppliers.
[7] "Future State: Emerging Scenarios in Vertical Markets," GartnerGroup, April 17, 2000.
[8] "B2B Supply Chains Solutions in Manufacturing: Poised for Proliferation," GartnerGroup, May 22, 2000.
[9] Forrester Research, December 1999.

conforming the vast array of internal computer systems that powered their operations. ERP penetration, an important building block for e-commerce, was well over 50% in the Fortune 500.[10] The collection, analysis, and dissemination of information internally had become central to managing firm operations. Many companies had formed the base for "digital nervous systems" that enabled real-time internal communication as each production/sales event warranted. Internet-based transactions utilized and extended this infrastructure. B2B e-commerce had reached $215 billion in 1999 and was projected to reach $5.7 trillion by 2004.[11] A major, emerging component of B2B e-commerce was electronic markets (Figure 1).

Figure 1:The Evolution from ERP to E-Markets[12]



E-markets provided an electronic, Internet-based commerce arena for a group of buyers and suppliers within an industry, geographic region, or affinity group. The key concepts were aggregation and intermediation; formerly point-to-point, one-on-one transactions would be brought into a multiple party environment. These new entities provided the technical infrastructure for communicating timely market data. E-markets also added simple order matching, more complicated online market making, content aggregation, value chain collaboration, collaborative product design, personalization, and value-added services, such as fulfillment and credit processing, and promised to let companies trade items that had never before benefited from a liquid market, such as intellectual property rights and unused telecommunications bandwidth -- "any technology that can be translated simplistically…to a shrink-wrapped licenses could potentially be …transacted electronically."[13]

Research analysts predicted that between 40-60% of B2B e-commerce would take place on e-markets by 2004, totaling between $1.5 to $3.0 trillion in total transaction value.[14]

[10] Casewriter research.
[11] "B2B Commerce Forecast: $5.7 Trillion by 2004," AMR Research, April 2000. There are numerous other projections of total B2B e-commerce transactions in the next 3-5 years.
[12] Adapted from research performed by Intel Corporation, May 2000. Please also Exhibit 2.
[13] "Through Integration, A Virtual Exchange for Intellectual Property is Born," *Wall Street and Technology*, August 2000.
[14] AMR Research, Forrester Research, GartnerGroup and Morgan Stanley Dean Witter. Total transaction value included multiple sales. The *Economist* predicted that the global gross value of all goods bought and sold in 2004 will be $105 trillion.

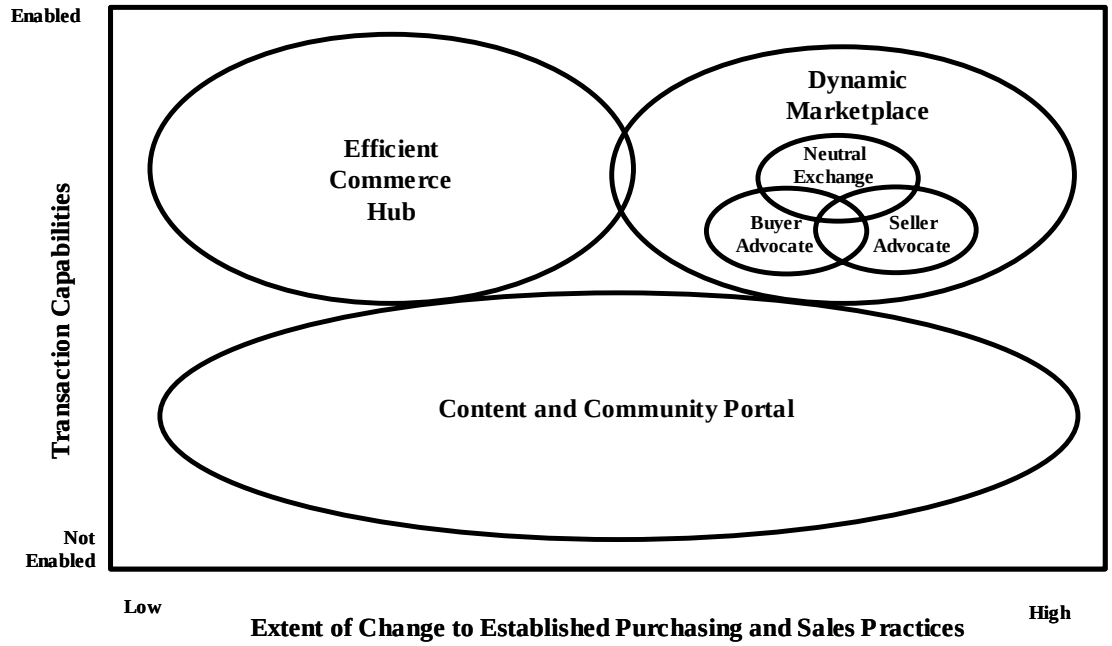
Product Design Collaboration

Corporations were also trying to move non-transactional product development efforts online. Many companies were making significant investments in online design collaboration and design for manufacturability applications.[15] In fact, many believed that the greatest benefits to B2B and tightly-integrated systems would be reduced design costs, reduced time-to-market, and reduced production costs through design-for-manufacturability. Many e-markets offered non-transaction based product design and technical collaboration features. This research note, which concentrates on the transaction and value chain integration aspects of e-markets, will only cover these efforts briefly.

A FRAMEWORK FOR E-MARKETS

On a functional basis, there were three main types of e-markets, segmented by their primary service offering and transaction capabilities (Figure 2).[16]

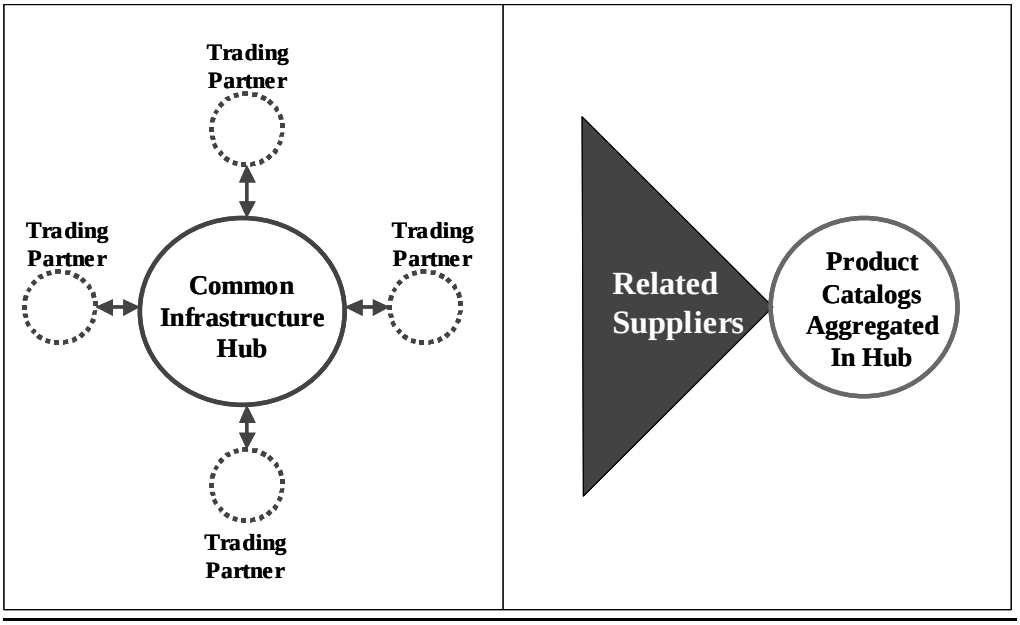
Figure 2: A Functional Categorization of E-Markets[17]



Efficient Commerce Hub (E-Hub). These trading networks automated existing transaction flow to make it more efficient. Analysts compared them to "an extranet with aggregation." E-hubs did not attempt to radically reshape existing value chain relationships and pricing models offer online market making.[18] The transaction relationship could be 1:1, many suppliers dealing independently with one buyer, or many buyers transacting independently with one supplier (Figure 3).

[15] "The e-Business Marketplace: The Future of Competition," Aberdeen Group White Paper, April 2000.
[16] "The E-Market Maker Revolution," GartnerGroup, September 27, 1999. There are numerous other taxonomies, such as Kaplan's and Sawhney's in "E-Hubs: The New B2B Marketplaces," Harvard Business Review, May/June 2000.
[17] Adapted from "The E-Market Maker Revolution," GartnerGroup, September 27, 1999.
[18] "Working Models of B2B: Business Information Exchanges," Alexis Gutzman, June 20, 2000.

Figure 3: Examples of E-Hubs[19]



E-hubs attempted to eliminate or minimize underlying transaction inefficiencies, such as error-prone manual processes, paper-based supplier catalogs, inefficient direct or phone-based sales staff, and general dearth of information in the supply chain. They could perform online, automated requisition routing and approval, order matching, fulfillment, settlement and content management. E-hubs addressed product and availability transparency and enabled value chain collaboration, but did not offer sourcing alternatives or pricing transparency.

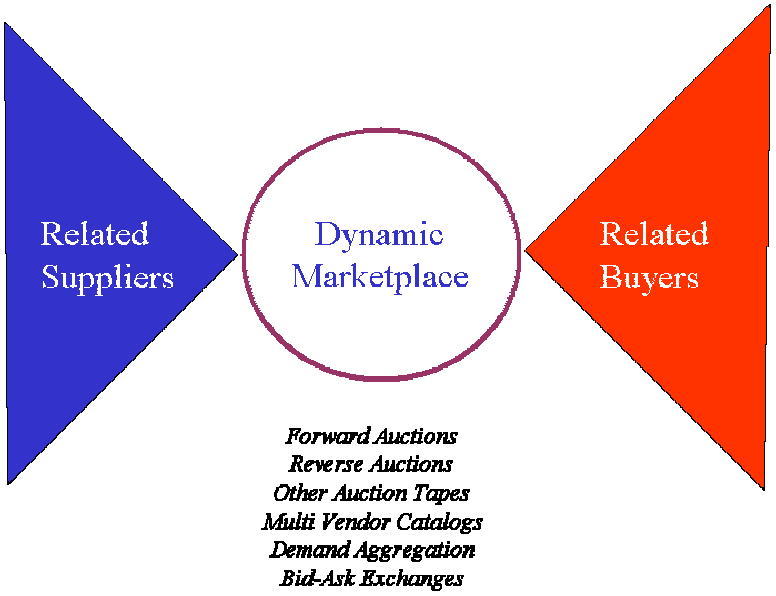
If necessary, e-hubs aggregated and digitized suppliers' catalogs and added links to value-added services, such as logistics and credit, and provided limited integration to a trading partner's back-end system.

Dynamic Marketplaces. These types of e-markets pursued many of the same efficiencies as the e-hubs, yet moved the terms of the transaction, such as product pricing, and negotiations into the marketplace. Dynamic exchanges were what most people envisioned when discussing online exchanges or e-markets (Figure 4).

They employed several market-making mechanisms such as auctions, reverse auctions, request for proposal/quote (RFP/RFQ), or bid-ask exchanges. Dynamic marketplaces attempted to use active intermediation to change the fundamental means by which firms bought and sold goods and services. Online market making might mean more than just price matching; "Price is not the only dimension a B2B trader cares about; size, quality or delivery considerations, for instance, may dominate. Buyers and sellers will demand value across multiple dimensions."[20] These e-markets were either tilted towards a supplier, a buyer or a neutral third-party. For example, a buyer-focused exchange could aggregate buyer product demands in a certain industry to increase customer bargaining power (Exhibits 3-5 depict the three types of exchanges)

[19] Adapted from Xuma.com web site, http://xuma.com/exchangex/index.html.
[20] Ganesh Mani, CEO of Powerloom.com, as quoted in "The Market Effect," Line56.com, October 10, 2000.

Figure 4: A Dynamic Marketplace[21]



The auction process had been receiving the most interest from analysts and industry participants. Firms had used auctions to sell spare, used, perishable, and end-of-life cycle products, but not on a wide basis. Independent companies, such as FreeMarkets and TradeOut, introduced auctions as a stand-alone solution to offloading excess and used inventory. However, auctions were becoming simply one part of larger e-market application offerings. Nearly all new consortia or independent e-markets included auctions as core functionality in their broader e-market offering. Online auctions were still in their infancy: "today's B2B auctions amount to little more than testing grounds…procurement managers are merely dabbling in them."[22] Only 10% of surveyed purchasing managers planned to pursue auctions as a core sourcing strategy.[23]

Many products did not merit real-time trading activity: "Visions of every product up for bid in a live trading auctions aren't realistic…we won't all be making markets in pencils or Snicker's bars soon. We actually have to get some work done at some point."[24]

Content and Community Portal. Many e-markets did not initially offer transaction capabilities; rather, they focused on the sharing of information for community-building and inter-enterprise collaboration. These were also effective for the product development collaboration discussed previously because the content could include CAD/CAM drawings, specification sheets, bulletin boards, discussion rooms, buyer/supplier lists, and more.

Public v. Private E-Markets. E-markets attempted to be all-inclusive, seeking the largest number of relevant buyers and sellers. This increased both the participants' choice among trading partners and market liquidity, a key component of building markets. Other markets were exclusive, excluding any trading partner that the e-market maker or the major customers/suppliers did not approve.[25]

[21] Adapted from Xuma.com web site, http://xuma.com/exchangex/index.html.
[22] "Auction Bridge," Jennifer deJong, Line56, September 2000.
[23] Purchasing Magazine, November 1999.
[24] "The B2B Internet Report: Collaborative Commerce," Morgan Stanley Dean Witter, April 2000.
[25] "Understanding e-Markets," Jeffrey Brooks and Susan Cantrell, Andersen Consulting, April 14, 2000.

Industry Characteristics and Their Impact on E-Markets

By the middle of 2000, e-market activity had touched nearly every industry in some way. E-markets in a particular industry evolved according to how transactions were currently conducted and the inefficiencies and opportunities in the current processes.

Concentration and Competition within the Industry

A key industry characteristic that would determine e-market characteristics was the concentration of power in the industry.

Industries were generally supplier-dominated, buyer-dominated, or fragmented.[26] Analysts determined that nearly half of the worlds' industries were fragmented (such as food services, life sciences), 1/3 were buyer-dominated (automobiles, aircraft manufacturing), and less than 20% were supplier-dominated (plastics, transportation).[27] Successful companies in a concentrated industry probably did not want to radically change market dynamics; those very market characteristics had allowed them to develop their current edge.

The existing industry participants in a concentrated market (either buyers or suppliers) had significant market power. They brought the most important asset to any market: trading liquidity, something "no exchange can live without." The major players' trading liquidity was an important source of leverage, and an e-market could not develop in their industry without their input. This fact prompted leading companies in major industry verticals to join consortia to build e-markets for their industry (to be discussed below).

Market concentration would also greatly affect who retained the greatest amount of value from an e-market; some analysts predicted that the party (buyers or sellers) with the greatest leverage would get 60-70% of the benefits.[28]

Fragmented industries, often geographically dispersed, offered a different path for introducing e-markets.[29] In these markets, even the top trading partners lacked the market share to form a powerful coalition and create the "rules" for making transactions. Thus, suppliers and buyers faced high search costs for trading partners and below-optimal product selection. An e-market could become the means through which these far-flung trading partners communicated, reducing costs and inefficiencies.

The benefits of e-markets in fragmented industries could be elusive. Many suppliers and buyers had to join the e-market just to create enough trading liquidity for an efficient market and to justify the cost of market membership, creating an acute "chicken and egg" problem.[30]

The level of competition would also affect the evolution of e-markets. If the dominant players in an industry, as Ventro CEO David Perry put it, "stuck together,"[31] they could generate an e-market to their liking. However, even if a group of buyers had the combined clout to shape the e-market landscape in their vertical market, they might not be able to cooperate effectively to do it.. Certain industries had been characterized by strong and unfriendly competition, where long-term competitors had been fighting tooth-and-nail for years. They might find it difficult, if not impossible, to build an e-market.

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[26] Suppliers and buyers could include channel intermediaries such as distributors and brokers.
[27] "Guide to Industry Consortia, Volume 1.0," Lehman Brothers, May 24, 2000.
[28] "The B2B Internet Report: Collaborative Commerce," Morgan Stanley Dean Witter, April 2000.
[29] "Industry Trading Communities (B2B Exchanges)," GartnerGroup, June 26, 2000.
[30] David Perry, CEO of Ventro in a speech at *Online Exchanges Conference 2000*, June 2000.
[31] "B2B E-Commerce: Where the New Economy Meets the Old Economy," Ventro White Paper, 2000.

However, other industries had more benign oligopolistic or monopsonistic competition, in which companies had avoided intense battles. An e-market's increased transparency could augment these oligopolistic industry structures by encouraging more collusion because the firms would more easily detect "cheating" on an explicit or implicit agreement.

Benefits to Value Chain Integration and Collaboration

Cyclical industries such as semiconductor and aerospace manufacturing faced, at varying times, supply constraints or excess capacity. Both were expensive because marginal profits were high and capital investments enormous (a new semiconductor wafer fabrication plant could cost $2 billion[32]). Capacity management was therefore extremely important. Business planners needed product availability, lead-time and inventory information from partners up and down the value chain. Because E-markets facilitated this information sharing, these industries may be among the first to adopt them. Integration was also important if the industry value chain was fragmented.

Many industries also had high inventory carrying costs. For example, the value of an Intel microprocessor dropped 90% in six months, making inventory expensive[33]; any information sharing that reduced inventory levels/holding period would generate tremendous value. In other industries, such as telecommunications and commercial air travel, the products (bandwidth and airline seats) were perishable, implying the need for dynamic pricing to sell unused capacity.[34]

Product characteristics also affected their suitability for e-markets in other ways. Creating e-markets for highly-customized or engineered products that had only a few buyers and suppliers would generate less value that one for a commodity product with many buyers and suppliers who might have transacted with each other in the past; "highly engineered or custom products simply don't have enough buyers and sellers to create a market, since they aren't standard."[35]

Entrenched Procurement Techniques

Companies had employed many processes to buy and sell products, depending on the importance of the product, and the volume and urgency of the purchase. Open sourcing purchases usually took place in the spot market and were often made *ad hoc* outside the purchasing department. Purchase orders and specialized relationships were generally for repeat buys, recurring purchases with multiple supplier relationships. Strategic partnerships were for program buys with long-term contracts and volume agreements; they were the largest dollar volume of transactions.

However, the greatest number of transaction relationships was based on standard purchase orders, with little open sourcing or collaborative partnering. Analysts expected e-markets to greatly reduce the number of traditional supplier relationships by i) making open sourcing more efficient with aggregation of content and supplier discovery techniques and ii) making specialized/strategic relationships more attractive and feasible through product, process, and availability transparency (Figure 5).

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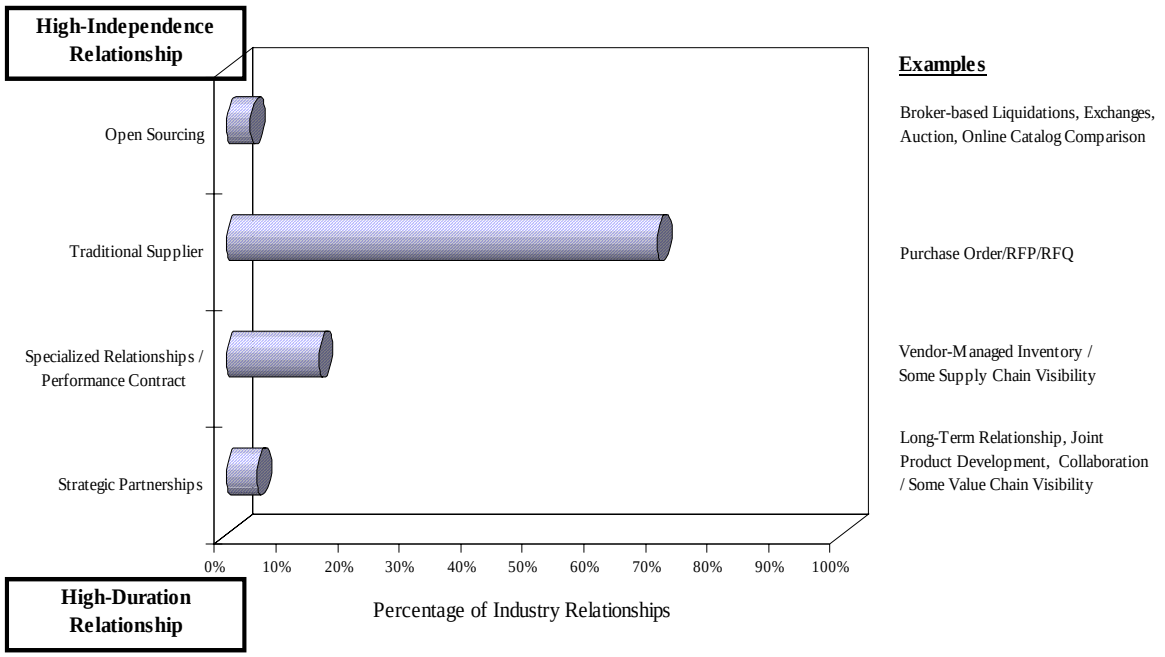
[32] Intel Sales and Marketing Conference, July 2000.
[33] Interview with Jim Erickson, Intel Corporation, July 2000.
[34] "The e-Business Marketplace: The Future of Competition," Aberdeen Group White Paper, April 2000.
[35] "The B2B Internet Report: Collaborative Commerce," Morgan Stanley Dean Witter, April 2000.

Figure 5: Use of Different Procurement Techniques[36]



Most e-markets only facilitated spot buys, using price and availability as the key purchasing decisions.[37] This was suitable only for a small percentage of total sourcing decisions; to penetrate procurement further, e-markets would have to become much more functional.

Product Characteristics and Their Impact on E-Markets

The total estimated procurement cost of all companies greater than $500 million in revenues globally was about $10 trillion. Firms spent roughly 65% of this on direct materials for products for resale, such as manufacturing raw material; the rest was indirect spending, including administrative supplies and operating inputs.[38]

Direct and indirect procurement were radically different processes in organizations. Corporations had automated direct procurement (generally through dedicated EDI links) more than indirect procurement, because direct materials orders were larger and buyers managed them more closely. Other direct materials tended to be commodities and were available from many suppliers, so buyers were less concerned with managing their procurement process.[39] Direct materials procurement was unique to each vertical industry value chain. Therefore, a vertical e-market that focused on a specific industry, such as electronic components, energy, or chemicals (or, increasingly, subsets of those industries like personal computer manufacturing or specialized chemicals), tended to service direct materials. Vertical e-markets claimed that their significant domain expertise made their operations optimal for their industry.

Indirect materials, which included both products and services, did not go into products for resale. These materials included administrative supplies; maintenance, repair, and operations (MRO)

[36] Adapted from "The E-Market Maker Revolution," GartnerGroup, September 27, 1999.
[37] "Key Components of a Marketplace," Ventro White Paper, 2000.
[38] "The Technology Primer," Morgan Stanley Dean Witter, May 2000.
[39] "Triggering the B2B Electronic Commerce Explosion," GartnerGroup, January 31, 2000.

products, project management; IT services; human resource services, etc. Indirect transactions tended to be smaller in dollar volume, and firms performed them far more often than direct purchases. An estimated 80% of all corporate sourcing transactions were indirect.[40] Purchasing indirect products was seldom a core competence of the buying organization, and administrative costs per dollar of materials purchased were high. Indirect purchasing processes tended to be similar across industries.[41] Horizontal marketplaces used this similarity to serve many vertical industries to try to build greater liquidity and scale.[42] Horizontal e-markets would also often provide commodity-based direct materials that many different industries used.

To deal successfully with physical goods, the technical structure of the e-market had to be linked to the enormous physical infrastructure of procuring, processing, holding, and distributing the goods. In addition, in many industries, goods manufacturers had already outsourced many marketing and order and inventory management functions to distributors. Therefore, many e-markets were competing with existing distributors to help companies make the value chain more efficient; many distributors were making e-commerce efforts and investments themselves.

In the services industries, middlemen, such as brokers and distributors, usually did not perform physical services and therefore provided less value to buyers and suppliers. Most services were also perishable. These differences mandated entirely different offerings and business models for goods e-markets v. service e-markets.

THE ECONOMIC IMPACT OF E-MARKETS

> *Although it is recognized that a supply chain that makes decisions based on global information would clearly dominate one with disjoint decisions by separate and independent entities in the supply chain, a well-coordinated supply chain has not been easy to achieve.*
>
> — Hau Lee and Seungjin Whang[43]

Adopting e-markets could have two major effects: it could increase the total profits available to the entire industry by reducing unnecessary costs or inefficiencies; and it could change the share of total industry profits that the different market participants acquired. The tools e-markets offered, how they managed transactions, and the nature of their business rules would both increase the size of the pie and change the each player's slice.

Increasing the Size of Industry Profits

More efficient and automated transactions reduced procurement costs and minimized ordering errors that resulted in sub-optimal decision-making. Better information would enable buyers and suppliers to use new decision support tools to build transparency into the supply chain, decrease administrative and logistics costs, increase capital asset intensity, increase inventory turns, and improve manufacturing and procurement processes (see Exhibit 6).

There had been numerous analyses by research analysts and investment houses on the potential cost-savings from e-markets. Morgan Stanley Dean Witter estimated the total potential cost savings on procurement administrative costs to be nearly half a trillion dollars. Gartner Group evaluated several industries and determined that using B2B e-commerce methods, not simply e-markets, could reduce total value chain management costs from 12-15% of revenues (industry average) to 3-5% of

[40] "SAP and the Online Procurement Market," May 2000.
[41] "Business-to-Business Infrastructure Practices," Jupiter Communications, June 26, 2000.
[42] "Understanding e-Markets," Jeffrey Brooks and Susan Cantrell, Andersen Consulting, April 14, 2000.
[43] "Information Sharing in a Supply Chain," Stanford Research Paper No. 1549, Hau Lee and Seungjin Whang.

revenues, a total savings of over a trillion dollars (see Exhibit 7). Bear Stearns projected the savings to be about 25% of current supply chain management costs,[44] while IDC projected a total of $480 billion.[45]

Changing the Relative Split of Profits in an Industry

E-markets also promised to change the balance of power within industries. Suppliers or customers that had benefited from asymmetric information might see that advantage reduced: "spreads are going to disappear in our very efficient market."[46] Existing intermediaries or distributors might have to compete with new, online entrants. E-markets such as FreeMarkets had already aggregated demand, where companies came together to make a consortium bid, in the computer equipment and services industry.[47] This practice altered established levels of negotiating power by increasing buyers' leverage.

Some believed that the e-market makers, those who set up and ran the e-markets, would garner a large share of these profits: "in return for delivering incredible value, market makers stand poised to reap substantial rewards by sharing the in the returns achieved by buyers and suppliers."[48] "Arms dealers," or those who provided the software and hardware infrastructure of e-markets, may also have been poised to take some of this value-add (see Exhibit 8).[49]

THE BUILDING BLOCKS FOR E-MARKETS

E-markets required a diverse set of participants: buyers, suppliers, e-market makers, and service companies that provided integration, infrastructure and associated services. These categories were not mutually exclusive; for example, many suppliers and buyers had set up e-markets, and early e-market makers had licensed their technical platforms to other e-markets.

The E-Market Makers

First Movers

An e-market maker, an organization that developed and managed an e-market, was a new entrant in the B2B landscape. The first players, such as FreeMarkets, VerticalNet, and Grainger.com began in 1995 and 1996 as independent companies, or as "bolt-ons" to existing distributors and middlemen.[50] This small trickle of companies had become a river in 1999, as many start-up companies and traditional middlemen attempted to gain first mover advantage by setting up shop in various vertical and horizontal markets. By January 2000, 20 e-markets had gone public, with a total market capitalization in excess of $100 billion.[51] From January 1999 to the middle of 2000, the number of e-markets jumped 12-fold to nearly 1,000.[52] About 600 of those exchanges were venture capital backed.[53] Most of them initially based their differentiation on technological prowess and first mover advantage, often considered a key for gaining trading liquidity.

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[44] "Revenge of the Bricks," Red Herring, August 2000.
[45] "B2B Marketplaces in the New Economy," Ariba White Paper, May 2000.
[46] Dr. Andrew S. Grove as quoted in [46] "A Special Report: Inflection Point: Andrew Grove Talks About How E-Commerce Will Change Just About Everything," Wall Street Journal, April 17, 2000.
[47] "FreeMarkets Customers Join Together to Save Millions Through Consortium Bid," Press Release, August 29, 2000.
[48] "B2B Marketplaces in the New Economy," Ariba White Paper, May 2000.
[49] "The B2B Internet Report: Collaborative Commerce," Morgan Stanley Dean Witter, April 2000.
[50] "B2B Marketplaces in the New Economy," Ariba White Paper, May 2000 and casewriter research.
[51] Broadview Associates, January 2000.
[52] "Developmental Phases of the B2B e-Market Space," Jeffrey Brooks and Susan Cantrell, Andersen Consulting, June 1, 2000. Estimates varied among analysts as to the total number of e-markets, often differing on definitional characteristics.
[53] Line56, September 2000.

Some of these e-markets were horizontally focused, such as MRO.com (for MRO transactions) and FreeMarkets (for the reverse auction of excess industrial parts); others attacked vertical markets; and some, like Internet Capital Group and VerticalNet, attempted to enter many vertical market segments.[54] Many e-market makers had tried to move market making that had previously been done offline onto the Internet, while others focused on products that had not been traded before (e.g., excess bandwidth, excess space in residential moving vans).

High market valuations for those first to go public, and a belief that "an early-mover advantage could be easily parlayed into a critical mass of buyers and sellers that would lock the early e-market into a dominant position via the network effect," led to a land rush mentality.[55] B2B e-commerce was the hottest investment sector for both private and public investors (in Q1 2000, venture capitalists backed more business-focused e-commerce companies than consumer-focused e-commerce companies for the first time[56]). However, these first movers generally had "meager transaction volume and equally meager revenues."[57] First mover advantage may not have been the edge it was thought to be; "unfortunately for most of the early movers, however, early entrance failed to produce the desired result."[58]

The Entry of the Consortia

The first quarter of 2000 radically changed the e-market maker landscape. Large, traditional companies began to join with each other in consortia to create focused vertical markets to compete with the startup e-markets. During the first four months of the year, an estimated average of 2 press releases per day trumpeted an e-market joint venture between competitors in a specific industry vertical.[59] Some of the major consortia were Covisint (automotive manufacturers), ehitex.com (electronic components), e2open.com (electronic components), Transora (processed food), Forest Express (paper products), Pantellos (energy), and Exostar (aerospace manufacturers). These efforts were well financed, with total equity contributions per e-market of $200 million or more.

Firms created these consortia for three main reasons: to generate the value chain efficiencies described above , to earn operating profits from managing the e-markets, and to generate financial gains for corporate shareholders through initial public offerings. There were rumors that the main push for these agreements came, not from the purchasing and sales departments, but from corporate finance groups with an ear on Wall Street.[60] "Some of the [consortia] frenzy is related to market-cap envy."[61]

As one aerospace executive involved in a consortia exchange put it, "there's basically two value propositions: one, cost savings and supply integration. And two, what we call icing on the cake. That's us putting in the money, getting this up and running, and charging our suppliers and ourselves fees for using the exchange. But the reason we call it icing on the cake is that we're not sure what this company is going to be worth; we only know what it *might* be worth."[62] These consortia were being setup as independent companies with separate facilities and management teams that could eventually be taken public separately from the member companies. However,

[54] Internet Capital Group is a holding companies that owned numerous e-market makers in several vertical markets.
[55] "Developmental Phases of the B2B e-Market Space," Jeffrey Brooks and Susan Cantrell, Andersen Consulting, June 1, 2000.
[56] PriceWaterhouseCoopers Money Tree Survey, July 2000.
[57] "Beyond the Exchange: The Future of B2B," Harvard Business Review, November-December 2000.
[58] "Developmental Phases of the B2B e-Market Space," Jeffrey Brooks and Susan Cantrell, Andersen Consulting, June 1, 2000.
[59] Comment at *Online Exchanges 2000* Conference, June 2000.
[60] "Revenge of the Bricks," Red Herring, August 2000.
[61] "The B2B Internet Report: Collaborative Commerce," Morgan Stanley Dean Witter, April 2000.
[62] "How the Top Guns Are Doing It," Red Herring, August 2000.

Wall Street was not impressed; the share prices of consortia members "haven't moved on these announcements."[63]

However, the entry of consortia in the second quarter of 2000 did radically change the valuation of independent e-markets (and many other B2B companies), which had been highly valued, based on high expectations for future, not current, earnings. The financial markets believed these new consortia would severely limit future profit opportunities. By May 2000, VerticalNet's market capitalization dropped approximately 75% and Ventro's an astounding 93%. E-market maker stocks continued to slump throughout 2000; by November the market value of ICG, an investor in many e-market makers in several verticals, was down 95%.

The entry of these consortia and stock price pressure imperiled existing independent e-markets. To succeed, they had to attract liquidity, the very thing that these large industry players possessed. Independent e-markets had been leveraging their high market valuations by offering equity stakes to large, established companies in return for transaction volume; these relationships were generally not exclusive.[64] This was becoming increasingly difficult. Independent e-markets also had a difficult public relations position; they had initially criticized the new industry-led e-markets, questioning whether they would get off the ground. This was risky; as one analyst said, "yeah, that's a good idea: criticize the companies you need to make your own marketplace liquid."[65]

Consortia e-markets had other inherent advantages: other trading partners could sign up more quickly because they has less uncertainty about which e-market would win, and the participants could avoid redundant infrastructure costs if they pooled their efforts and avoided investing in several independent, competing efforts.[66]

However, industry consortia also faced significant challenges. While the press releases had been filled with hyperbole of cost savings and total market sizes (see Exhibit 9), large companies had only gingerly been experimenting with this new transaction mechanism. Most industry-led consortia had little more than a press release and a memorandum of understanding, let alone definitive partnership agreements or completed transactions.[67] Late in 2000, in response to supplier pressure, many buyer-led consortia began to change the focus of their efforts from market-making (auctions, etc.) to reducing procurement costs.[68]

A key problem was governance; industry consortia were new companies that long-term industry competitors that had little history of cooperation and collaboration had set up. They often included 20 or more trading partners, making cooperation difficult. The CEO of Ventro said, "The single biggest problem is that joint ventures are hard, joint ventures are twice as hard, and joint ventures with many players who've been competitors for 80 years are nearly impossible."[69]

There were also issues of neutrality; how could potential participants be convinced that the e-market "rules" would not be tilted towards the consortia owners? But then again, was this potential conflict-of-interest any different from when e-market infrastructure player Commerce One offered 20% of its equity to General Motors in warrants, or when Ventro offered equity stakes to its market participants?[70] Finally, an industry often had more than one consortium, with no clear direction as

[63] "The B2B Internet Report: Collaborative Commerce," Morgan Stanley Dean Witter, April 2000.
[64] Ibid.
[65] Pierre Mitchell, AMR Research analyst, as quoted in Crain's, June 19, 2000.
[66] "The B2B Internet Report: Collaborative Commerce," Morgan Stanley Dean Witter, April 2000.
[67] "Revenge of the Bricks," Red Herring, August 2000.
[68] "Beyond the Exchange: The Future of B2B," Harvard Business Review, November-December 2000.
[69] "Revenge of the Bricks," Red Herring, August 2000.
[70] "Beyond the Neutrality Debate," Line56, August 14, 2000.

to how the two markets would interact. For example, two large industry-led consortia were announced in both the retail and the energy markets within a few weeks of each other.

When this case was written, "not a single one of the…B2B exchanges had reached even 1% of the overall trading volume" of its industry.[71] Less than 15% of e-markets had even completed a transaction.[72] Many analysts projected that the number of e-markets would increase upwards of 10,000, and then consolidate rapidly as some won and others lost. Some predicted that, by 2004, 4 to 5 "mega-exchanges" would control most e-market activity. Others thought that a slew of specialists (trade originators, speculators, sell-order swappers) similar to those in financial markets would support these large exchanges. Still others said that each vertical industry would have 2 to 3 markets, leaving a total of 50-100 survivors. Finally, a different group forecasted a flood of micro-markets with liquidity in small, specialized product lines linked to large, global technical infrastructures.[73]

E-Market Revenue Models

Most e-markets generated (or were attempting to generate) multiple revenue streams:

- Transaction fees: flat fees or a percentage of the value (a few basis points up to 15%) of sales that the e-market generated.
- Product markup fees: for products purchased at a volume discount from the seller and then resold to buyers.
- Subscription fees: access fees for monthly or annual usage, often scaling as the trading partner added functionality.
- Savings share: a performance-based fee that reflected savings the e-market participant accrued.
- "Value-added services," such as escrow, credit, logistics, quality assurance, etc.
- Miscellaneous other service revenues such as sales lead generation, data mining, advertising, software sales, professional services, or systems integration.[74]

Some analysts predicted early that between 10-25% of the added value an e-market generated could accrue to the e-market maker.[75] Others thought this overly optimistic and argued that large-scale order matching would offer limited profit or shareholder value; they pointed to the example of the most liquid, high-volume market in the world, "there is a reason that the NYSE, the mother of all trading exchanges…supports $7.3 trillion and 169 billion shares in trading volume but only generates $101 million in income annually. Order-matching is inherently a low-margin business."[76] Value-added services would be needed to generate significant profits and to make the market more "sticky," increasing/maintaining liquidity. E-market makers often pointed to their value-added services, such as logistics, credit, escrow, and other functions, as a key source of differentiation. Many of these were similar to those traditional distributors offered.

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[71] "Container Case: B2B Exchanges," The Economist, October 21, 2000.
[72] "E-doption of E-Commerce," Line56, November 2000.
[73] "The B2B Internet Report: Collaborative Commerce," Morgan Stanley Dean Witter, April 2000, and "Beyond the Exchange: The Future of B2B," Harvard Business Review, November-December 2000.
[74] "Winning E-Marketplace Strategies," GartnerGroup analyst Leah Knight, May 8, 2000.
[75] Ibid.
[76] "The B2B Internet Report: Collaborative Commerce," Morgan Stanley Dean Witter, April 2000.

E-Market Infrastructure

> *The technology infrastructure required for a net market is evolving rapidly because the requirements are changing as buyers and sellers become more sophisticated…The Internet provides the highway, but software is a key engine.*
>
> — Charles Phillips, Morgan Stanley Dean Witter[77]

Building the Central Hub/Marketplace

One of the first e-market makers, Ventro, spent $10 million and 18 months building its first exchange site in the mid-1990s. Most of the first e-markets had to develop their own software infrastructure (often with the help of consulting firms). Since then, both the time and the finances required to build an e-market have dropped dramatically. By mid-2000, basic exchange websites could be up and running in less than a month, with a total setup cost of about $1 million.[78]

The key technical building blocks for the central infrastructure of an e-market were as follows:[79]

- Application platform: standard e-commerce platform for static and dynamic Web pages, caching engine, content creation and management, load balancing, etc.
- Buy-side commerce server (hosted at central market and trading partner): a workflow engine with electronic procurement rules for a single buying organization, reports on procurement history, and order management.
- Sell-side commerce server (hosted at central market and trading partner): provided transaction processing and order status information, created purchase orders, enabled payment processing, merchandising and other seller functions, and provided systems integration to business services such as shipping or credit.
- Market-making transaction engine: order matching across multiple buyers and sellers (in multiple formats such as exchanges, auctions, etc.), aggregation of electronic catalogs from multiple suppliers.
- Catalog/Content Management: Tools that created, updated and maintained electronic catalogs and other forms of searchable and pertinent content.
- Community management: provided discussion groups, bulletin boards, news feeds and other pertinent community features.

The hub also needed databases for product information warehousing and transaction logs; security and authentication features; and transport, presentation, and routing (TPR) capabilities to communicate reliably with e-market participants (Figure 6).

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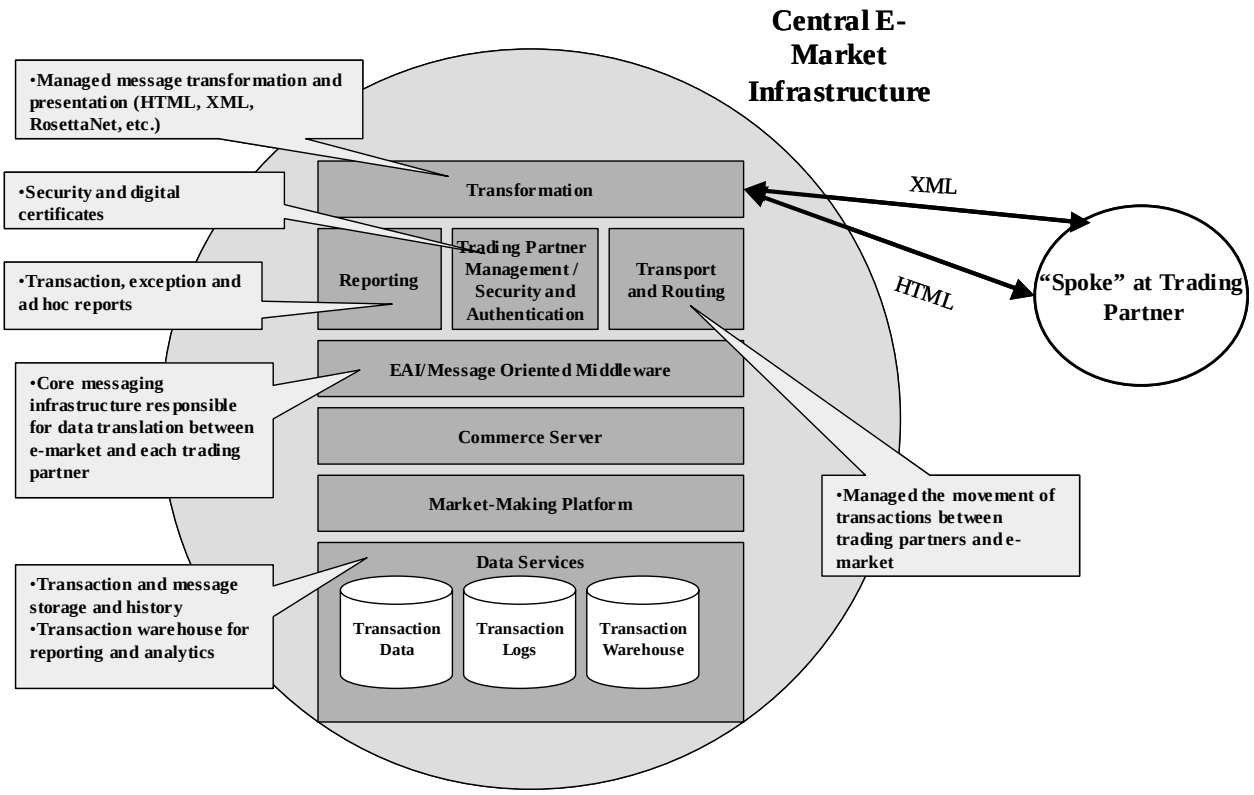
[77] Ibid.
[78] Conversations with Jamie Lerner, CTO of Xuma.com, June 2000.
[79] Numerous sources: Xuma.com homepage, "Commerce One Market Site Portal Solution 3.0" White Paper, 2000 and "The B2B Internet Report: Collaborative Commerce," Morgan Stanley Dean Witter, April 2000.

Figure 6: Representative Prototype of the Central E-Market Infrastructure[80]



Two of the strongest infrastructure providers were alliances. IBM, Ariba, and i2 Technologies, a leader in supply chain management software, had formed an alliance to offer B2B systems and software in March 2000; it became e-market focused in September 2000.[81] A strong competitor was the Commerce One/SAP alliance that wedded an e-market builder with the leading ERP provider. Oracle was also offering one-stop shopping for nearly all ERP, supply chain, and e-market needs. Major players offered central hub architecture and buy-side and sell-side applications hosted at the trading partners. While other firms had moved into this market more quickly, the ERP vendors' large installed bases made them competitive; an organization may want "to keep its systems as much as possible on a single platform."[82] The environment was extremely competitive: "there's no single dominant player yet, much to the dismay of any single vendor claiming that it is."[83]

An important complementary offering was BPO functionality (also called SCM solutions), software that allowed companies or trading partners to make better operating decisions based on the increased information the e-market offered. Leaders in this field were i2 Technologies, Manugistics, Numetrix, and Logility, with the major ERP vendors such as SAP working to improve the SCM functionality in their ERP modules. Many providers also offered a wide variety of niche technical services. These included website content management, catalog management, personalization, and channel relationship management modules. Many firms offered specialized,

[80] Adapted from analysis performed by PriceWaterhouseCoopers for Intel Corporation, June 2000.
[81] Advertisement in Wall Street Journal, September 7, 2000.
[82] "Business Seek to Cut Weak Link from Supply Chains…" InformationWeek, March 6, 2000.
[83] "Building an Exchange Machine," Line56.com, October 1, 2000.

point solutions, such as Moai Technologies with auction market-making and Clarus with buy-side procurement (see Exhibit 10 for a list of major providers).

Infrastructure providers were also designing the business structure of e-markets and running exchanges themselves. For example, Commerce One helped to create the Global Trading Web Council, a group of multinational corporations attempting to build a network of e-markets.[84] Oracle had created the Oracle Global Exchange Network to link together multiple e-markets.[85]

Application Integration Between the E-Market and the Trading Partners

> *Building the hub is easy, it's the spokes that are hard.*
> — Jamie Lerner, CTO of Xuma.com Corporation

> *Until the back-end integration issues are solved, corporate buyers and sellers are left wondering what the real value of B2B e-commerce is.*
> — Phillip Merrick, CEO of webMethods Corporation

Early e-markets were initially peripheral to core value chain transactions of trading partners and offered little or no technology integration with the participants' internal systems:; "only five to 10 of 600 independent exchanges have any significant support for supply chain integration."[86] If e-markets were to gain a significant proportion of strategic procurement spending, they would have to connect information contained in back-end ERP and manufacturing systems to other participants. One executive dubbed the fact, that, after e-markets brought a buyer and seller together, transactions were still finished by phone or fax, as "the dirty little secret of e-markets."[87]

E-markets needed both machine-to-person (browser-based) and machine-to-machine connections, which were the most difficult to create. Most large companies had ERP packages that contained the pricing, product and availability information that e-markets needed. Enterprise application integration (EAI), first used when two internal systems needed to exchange data without human interaction,[88] was rapidly being transformed into inter-enterprise application integration, "Today, undoubtedly, the lion's share is e-business integration."[89] New entrants, such as Extricity, Vitria, and WebMethods had taken a first-mover advantage. But large, traditional systems integrators like IBM and BEA, as well as other infrastructure providers such as Microsoft, had begun to provide application integration. The major ERP vendors were also pursuing this market.

More important than information systems integration was business process integration; i.e., for two trading partners to fully automate a transaction, they had to conform their respective business actions and then systematize those activities into software.

Process integration challenges were considerable: most business processes were not yet fully automated within companies, limiting any attempt at external integration. Many companies did not have an IT infrastructure or used simple accounting software. Moreover, trading partners had optimized business processes and data management for firm profitability, and had to deviate from that optimization to integrate their processes with others. Finally, application integration costs were also highly variable and differed on a company-by-company basis (some analysts gave a range of $1 to $6 million[90]).

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[84] "Battle to the Bitter End," Business 2.0, July 25, 2000
[85] "The e-Business Marketplace: The Future of Competition," Aberdeen Group White Paper, April 2000.
[86] "The Paradox of RosettaNet," Line56, September 2000.
[87] Phillip Merrick of webMethods, quoted in Line56.com July 31, 2000.
[88] NC.focus White Paper on EAI, 1999.
[89] GartnerGroup analyst Roy Schulte, as quoted by ebizQ.net.
[90] "Business-to-Business Infrastructure Practices," Jupiter Communications, June 26, 2000.

Hub-to-hub integration

> *Much like ATM networks, B2B markets are developing as islands.*
> — Charles Phillips, Morgan Stanley Dean Witter[91]

With the proliferation of both vertical and horizontal e-markets, many with varying levels of specialization, it was becoming clear that these markets had also to connect to one another. Trading partners could become frustrated at attempting to join and then integrate with 2-3 vertical e-markets as well as several horizontal markets for indirect procurement. This problem became more acute if there were many micro-markets.

Technically, it was easiest to link e-markets that the same infrastructure provider designed (i.e., Oracle or Commerce One), allowing these companies to leverage their installed base. Disparate markets from several vendors could also be linked together. i2 Technologies had designed a specific product, TradeMatrix, to sit between e-markets and act as a gateway between them. Waybid was attempting to list merchandise across several e-markets to enhance liquidity.[92] The business rules of such linkages were not yet standard and were negotiated on a market-by-market basis.[93]

E-Business Standards

> *Companies recognize that unless standards implementation occurs, B2B becomes nothing more than a lot of hype.*
> — Jennifer Hamilton, CEO of RosettaNet[94]

Integration of applications and processes across multiple trading partners and/or e-markets required industry-wide standards.[95]

XML

E-markets needed a common, universal means to describe products, processes, trading partners, and other data types. A new tool, Extensible Markup Language (XML) used various "tags" to define the types of data in an electronic document, such as price, invoice number, trading partner, etc. It was rapidly becoming the communications standard for data interchange in B2B e-commerce. However, XML only provided a method for defining the data types, not the actual data types or application responses.[96] This was left to two players: standards bodies, who created *de jure* norms, and e-market software vendors, who created *de facto* standards through the proliferation of their applications. The vendors, specifically Ariba and Commerce One, moved first in this field with XML variants based on their own e-market applications. However, influential standards bodies and industry consortia soon moved in, with OASIS, OpenApplications Group, RosettaNet, and ebXML (an OASIS/UN joint venture) being representatives of the over 400 e-business standards bodies, most representing a specific interest or industry.[97] By mid-2000, there were over one hundred different dialects of XML, most so different they were "unusable by partners, suppliers and customers."[98] Each one had the backing of different constituencies with different motives. Since

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[91] "The B2B Internet Report: Collaborative Commerce," Morgan Stanley Dean Witter, April 2000.
[92] "Forget B2B. Think E2E," Red Herring, August 2000.
[93] Ibid.
[94] "The Paradox of RosettaNet," Line56, September 2000.
[95] "Understanding e-Markets," Jeffrey Brooks and Susan Cantrell, Andersen Consulting, April 14, 2000.
[96] Stanford Graduate School of Business case study, "SAP and the Online Procurement Market," May 2000.
[97] "The Paradox of RosettaNet," Line56, September 2000.
[98] "X Marks the Spot Where No One Can Agree," Tyler McDaniel for Line56, July 31, 2000.

companies expected to interface with several e-markets across different industries, they would have to adopt the XML data types each one used.[99]

Many industry analysts agreed "universal" XML standards would emerge eventually, but that these would vary by industry because each vertical had different information-sharing needs. Standards bodies understood the need for standards alignment and knew that the lack of clear rules was confusing the marketplace.

Process Conformance

To truly automate business interactions, more than standardized data had to be interchanged. The entire transaction process had to be broken down into discrete parts, optimized for the business purpose, and then conformed between trading partners. The first substantial organization to realize this was RosettaNet, a consortium of industry heavyweights in the information technology, electronic components, and semiconductor supply chains, formed in 1998. RosettaNet defined XML data types like other bodies, but it was also developing Partner Interface Processes (PIPs) that set the rules for the actual methods by which trading partners would conduct a transaction (or part of a transaction). It went beyond simple data sharing and was intended to standardize the "what" and "how" of trading partner actions in a transactions. It was slow going, both for the development of PIPs and for the firms adopting them. Most other industries had not yet begun to develop process conformance; in fact, they were approaching RosettaNet about adopting its standards methodology for their specific vertical.

ROADBLOCKS TO E-MARKETS ADOPTION

Despite the projections of enormous trading volume, many things could slow the movement of transaction volume to e-markets:

- Large purchases in many industries were already negotiated under long-term contracts (up to 90% of the monetary value of all transactions[100]), reducing the opportunity for new market-making mechanisms.
- Product and process complexity could make transactions difficult to standardize, systematize, and code into software.
- Buyers and sellers were delaying making e-market decisions to preserve their options.
- Supplier reluctance to join e-markets due to concerns about commoditization.
- System and process integration hindered by sunk cost in other data-sharing links.
- Ineffective efforts to set standards.
- Slow consolidation of competing e-markets.
- Regulatory concerns.

Some of these were particularly important. Many suppliers believed that price, availability, and process transparency tilted the competitive fulcrum towards buyers:

> *Let's see, you want me to put all my products and prices online so my customers can beat me about the head and shoulders. Then I can commoditize myself even more to*

[99] "The Paradox of RosettaNet," Line56, September 2000.
[100] "Container Case: B2B Exchanges," The Economist, October 21, 2000.

> *take my razor-thin margins down to microscopic levels. Finally, I get to pay transaction fees for this privilege…What am I missing?"*[101]

Research analysts agreed: "If we had to pick a single party as the largest net beneficiary on an aggregate basis across all industries, we'd have to go with buyers."[102] However, both supplier and buyer participation was necessary for an exchange to be liquid, so any e-market that was inherently too favorable to one side or the other "will likely hit a brick wall of resistance."

Moreover, many companies associated e-markets with auctions and feared that auctions would commoditize their products and reduce margins. Most companies preferred to "buy from an auction, but would never want to sell into one."

Nearly 300,000 companies had continued to use point-to-point EDI (about $580 billion in transactions in 1998[103]); many of them had invested heavily in the system and had optimized internal and external processes to use it. Most surveyed executives intended to keeping EDI as a significant component of their external communication strategy.[104]

Slow standards alignment could also hinder adoption of e-markets. It took 15 years from the first usage of EDI to widespread use due to disagreements on standards.[105] The financial services industry alone currently has five XML "standards", hindering B2B adoption in that vertical.[106]

Finally, several e-markets, often with overlapping membership and functionality serviced many industry verticals. Without consolidation, adoption could slow considerably, as uncertainty among trading partners and the costs of attaching to multiple e-markets caused confusion and indecision. In the high-tech electronic components industry in mid-2000, over 50% of key participants were members of more than one e-market, and over 25% had no e-market involvement at all.[107] Membership was also not exclusive; Lucent Technologies, an early member of a high-tech consortia e-market, still planned several separate e-commerce efforts, such as its own private, sell-side hub.[108]

Antitrust Intervention

> *An increasing number of regulators and firms in the industries being transformed are starting to worry that…rather than opening markets to greater competition, B2B exchanges could become powerful monopolistic tools.*
>
> — The Economist, June 17, 2000

American or European antitrust regulators could also slow or limit the adoption of e-markets. E-markets create opportunities for competitors to share information and processes, a situation that was ripe for illegal, anti-competitive practices, including explicit price collusion or supply aggregation. The powerful network effects of e-markets might also lead to a "winner-take-all" endgame, forcing trading partners to join an exchange to stay in business.

In response to these concerns, the Federal Trade Commission (FTC) investigated three major consortia e-markets in the automotive and aerospace markets.[109] It also convened a two-day

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[101] Anonymous source in "The B2B Internet Report: Collaborative Commerce," Morgan Stanley Dean Witter, April 2000.
[102] "The B2B Internet Report: Collaborative Commerce," Morgan Stanley Dean Witter, April 2000.
[103] "New BCG Study Re-Evaluates Size, Growth And Importance of Business-to-Business E-Commerce," January 4, 2000.
[104] "B2B Supply Chains Proliferate in Manufacturing, GartnerGroup, May 2000.
[105] *The Illustrated Book of Computer Technologies*, p. 198.
[106] Interview with GartnerGroup analyst Susan Cournoyer, August 2000.
[107] PriceWaterhouseCoopers analysis performed by Intel Corporation, June 2000.
[108] Press release, "Lucent Technologies Joins the e2open.com Global e-Marketplace," July 18, 2000.
[109] The FTC approved the Covisint e-market in September 2000.

workshop on e-markets in June 2000, in which it stated that e-markets would violate the law if they become cartels.[110] European antitrust regulators were also monitoring e-market development.

Analysts expected antitrust friction: "the exchanges are going to go as far as they can go until someone slaps their wrists."[111]

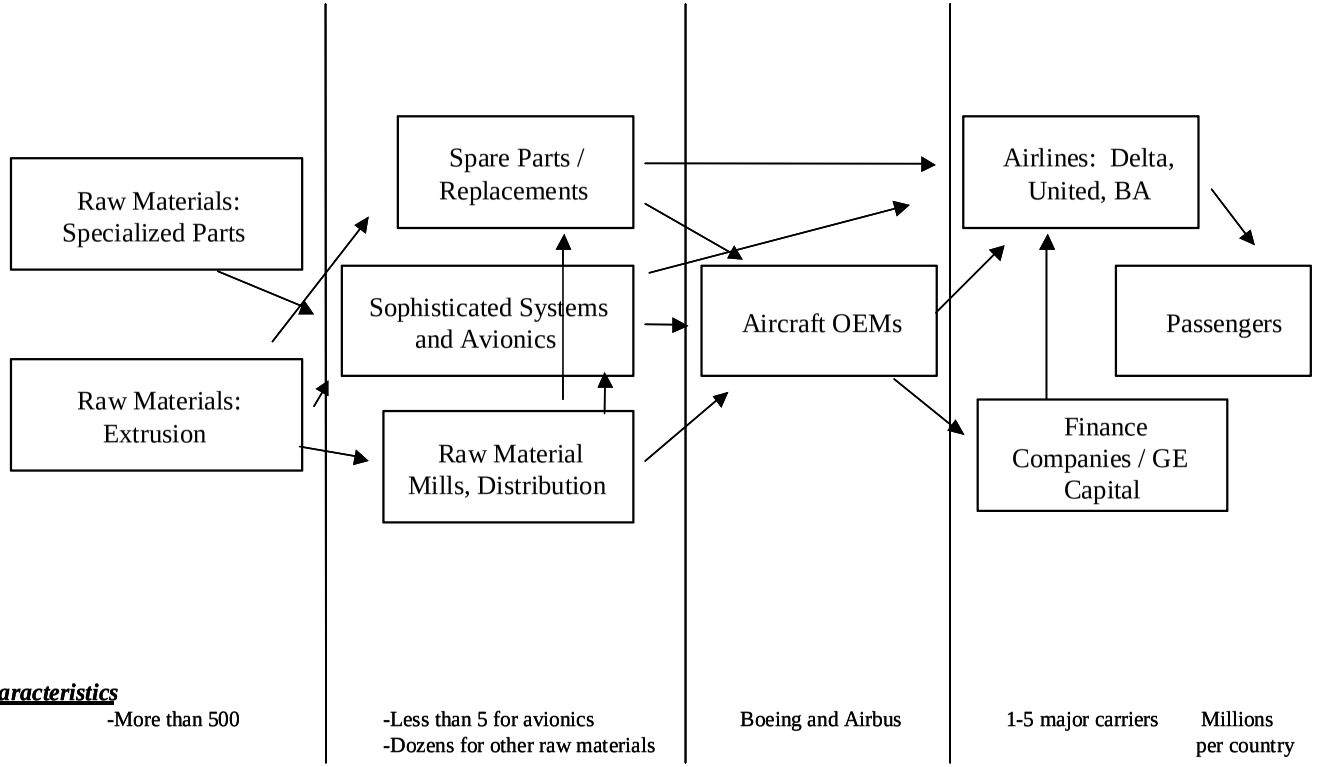
CONCLUSION

The promise of e-markets seemed enormous; yet the challenges to attaining those benefits were also large. The Internet communication mechanism and the creation of XML did not magically enable all businesses to effortlessly share error-free, timely, and appropriate data with each other. Early e-markets had many participants, each with its own agenda; managing these differences would be difficult. Enormous information systems integration and business process conformance would need to be completed by both the e-markets and trading partners. Despite this, large corporations, venture capitalists, entrepreneurs, and the financial markets had placed huge bets on an uncertain and dynamic future. Two opposing views sum up that future:

- "These newly-formed B2B exchanges never had sustainable business models from the start. The truth is there may be nothing fundamentally new about Newcos [e-market consortia] at all. Corporations have been trying to make their supply chains more efficient since Eli Whitney jiggered up the cotton gin. The newest trading exchanges, theoretically a quantum leap in the ways of doing business, may actually be nothing more that just a further evolution."[112]
- "B2B marketplaces are redefining how businesses interact with each other. Inevitably, all businesses will be affected by this revolution. The important question that all companies must answer is: 'How?'"[113]

[110] "FTC Keeps an Eye on B-to-B Online Markets," Computerworld, July 20, 2000.
[111] Lara Abrams of the Aberdeen Group as quoted in "Exchanges Under Scrutiny" InfoWorld, July 10, 2000.
[112] "Revenge of the Bricks," Red Herring, August 2000.
[113] "B2B Marketplaces in the New Economy," Ariba White Paper, May 2000.

Exhibit 1: Aerospace Manufacturing Value Chain[114]



[114] Adapted from "E-Commerce in the Aerospace Vertical," by Leeds, Leeds, Neist and Thomas, 2000.

Exhibit 2: The Transition of Data Sharing Techniques from EDI to E-Markets[115]

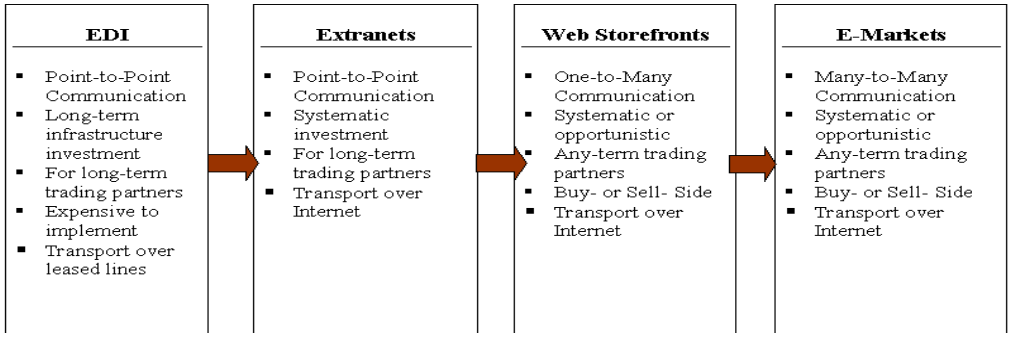
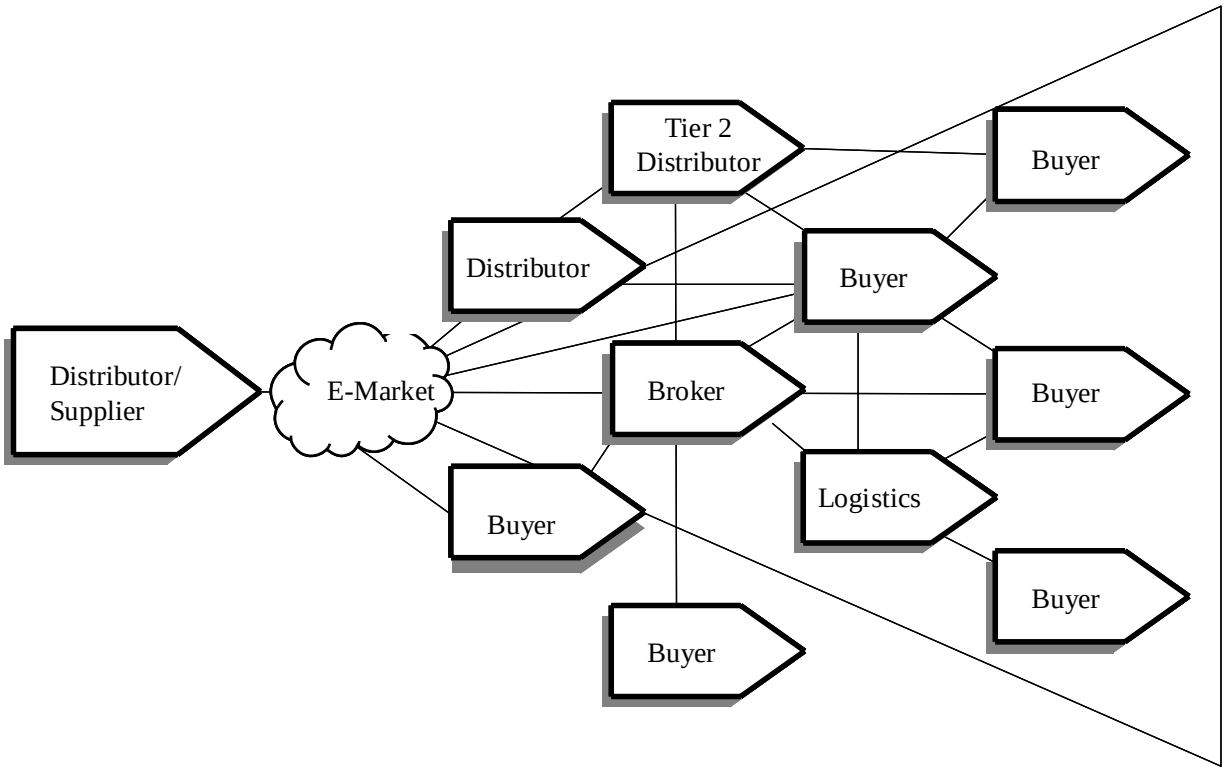


Exhibit 3: Buyer-Dominated Dynamic Marketplace[116]



[115] Adapted from "The E-Market Maker Revolution," GartnerGroup, September 27, 1999.
[116] Ibid.

Exhibit 4: Supplier-Dominated Dynamic Marketplace[117]

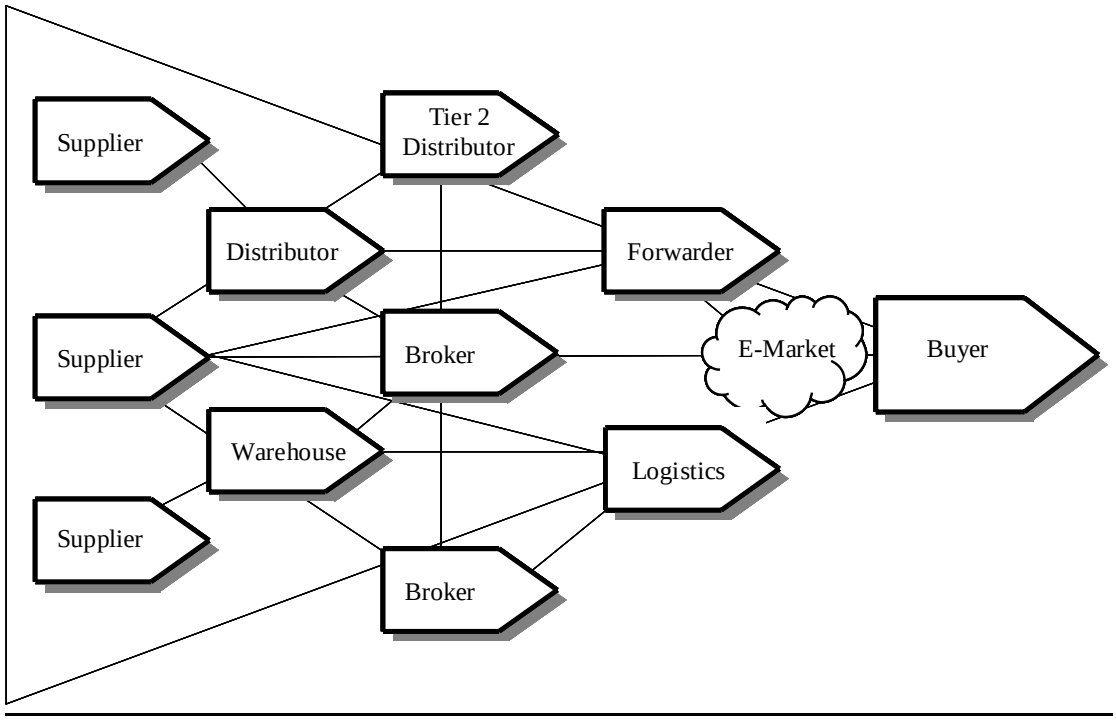
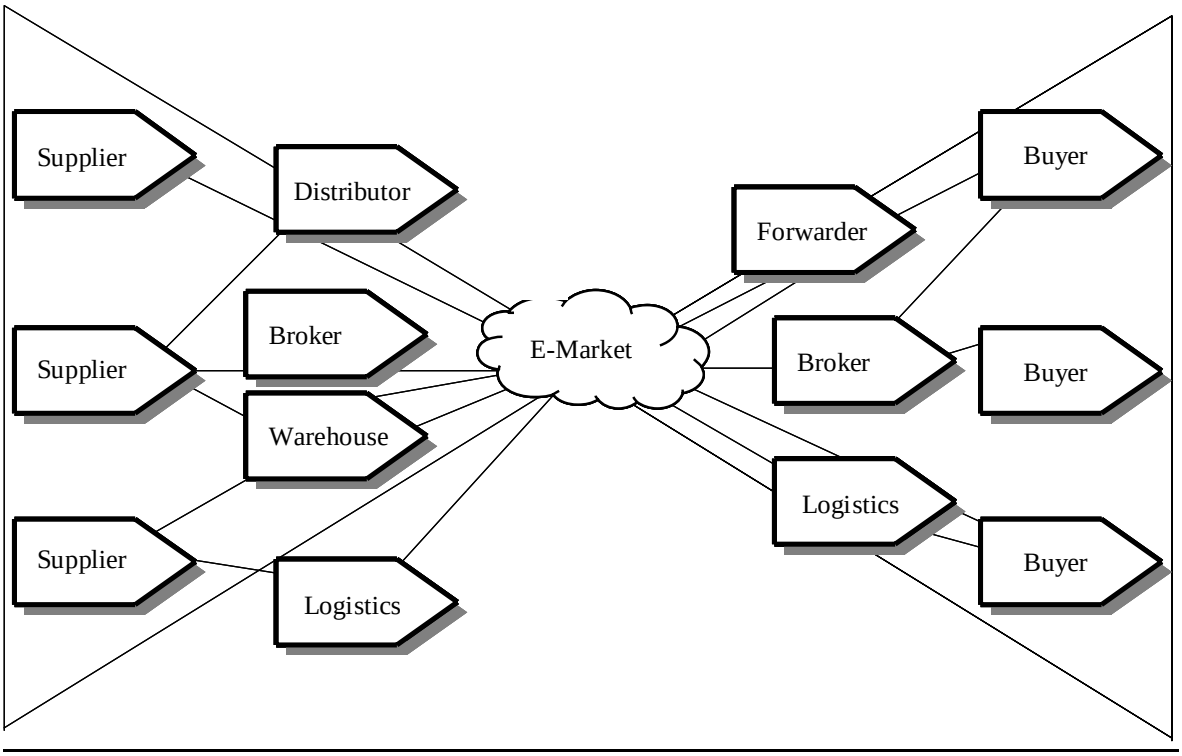


Exhibit 5: Neutral Dynamic Marketplace[118]

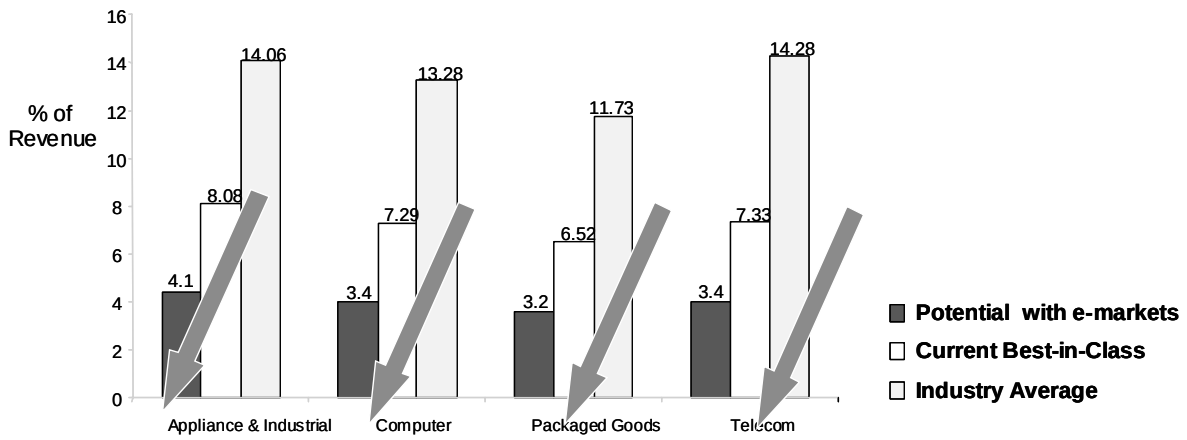


[117] Ibid.
[118] Ibid.

Exhibit 6: Ways in Which E-Markets Could Increase Total Industry Profits

Category	E-Market Offering	Impact on Buyer	Impact on Supplier
Transaction Processing, Automation and Management	• Systematization and coding of transaction rules so that more business processes can be performed by machines over the Internet, rather than humans using the phone, fax and paper	• Reduced procurement administrative costs (savings of up to 90%), due to lower level of "human touch" on orders, reducing chances for errors and labor expense • Elimination of redundant orders • Enforcement of corporate procurement policies and the control of "mavericks"	• Lower level of human touch on sales, reducing chances for errors and labor expense • Reduced order and customer management costs
Value Chain Visibility and Collaboration	• Product, process and availability transparency • Enhanced discovery and choices of buyers and seller • Removing layers of value chain intermediaries such as brokers and resellers that block data dissemination • Global, rather than local, optimization of business processes based on joint decision-making	• Reduced inventory levels due to more accurate matching of production to supplier inputs • Reduced production lead-time due to more efficient sourcing techniques • Reduced barriers to switching between suppliers • Business process optimization using decision support tools • Reduction in power / importance of non-value add intermediaries (and rents paid to them)	• Reduced inventory levels due to more accurate matching of production to customer orders • Greater asset intensity and better returns on capital investment due to more accurate forecasting • Reduced barriers to switching between customers • Business process optimization using decision support tools • Reduction in power / importance of non-value add intermediaries (and rents paid to them)
Content / Community Functions	• Sharing of industry best practices, knowledge management, benchmarking • Industry news and reports • Product information and reviews • Discussion forums	• Better information for better decision-making	• Better information for better decision-making

Exhibit 7: Potential Savings from Usage of E-Markets[119]



Total value chain management cost was the sum of the following costs: order management, material acquisition, and inventory carrying, as well as value chain finance, planning and information systems costs.

Exhibit 8: Ways in Which E-Markets Could Change the Relative Split of Industry Profits

Category	E-Market Offering	Impact on Buyer	Impact on Supplier
Pricing Transparency and Efficiency	• Alternative transaction mechanisms such as auctions, reverse auctions, bid-ask exchanges and electronic catalog aggregation • Increasing the number of diverse buyers and sellers • Removing or reducing the power of value chain intermediaries such as brokers and resellers • Real-time price discovery and collection of historical price data • Revenue management techniques such as yield management	• Access to broader number of suppliers, reducing barriers to switching • Potential lower prices due to greater supplier choice and easier comparison shopping	• Access to broader number of buyers, reducing barriers to switching • Better information for negotiations • Potential buyer focus on price due to lower barriers to supplier change
Demand Aggregation	• Buyers combine together to push for better pricing and terms from suppliers	• Lower purchase prices due to increased relative power	• Lower selling prices due to decreased relative power

[119] GartnerGroup research as shared with Intel Corporation, July 2000.

Exhibit 9: Press Release, Aerospace Consortia E-Market

BAE Systems, Boeing, Lockheed Martin, and Raytheon to Create B2B Exchange for the Aerospace and Defense Industry

Global Trading Exchange To Be Powered By Commerce One and Microsoft

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An aerospace and defense industry group including The BAE SYSTEMS, The Boeing Company (NYSE: BA), Lockheed Martin Corporation (NYSE: LMT), Raytheon (NYSE: RTNA, RTNB) and B2B e-commerce solutions leader Commerce One (NASDQ: CMRC) today announced the creation of an independent enterprise that will develop an Internet trading exchange for the global aerospace and defense industry. This open aerospace and defense exchange, based on the Commerce One MarketSite Portal Solution, powered by Microsoft, will be a secure, electronic marketplace where buyers and sellers around the world can conduct business.

The global aerospace and defense industry has commercial and military sales of more than $400 billion. Currently, the four lead participants in this new venture do business worldwide with more than 37,000 suppliers, hundreds of airline, and national governments globally, all of who will be invited to join the web-based marketplace. Boeing buys $38 billion annually in goods and services, while Lockheed Martin purchases $13 billion, BAE SYSTEMS spends $11 billion, and Raytheon spends $9 billion for a total combined procurement of $71 billion.

"This trading exchange can deliver enormous buy and sell side efficiencies to our industry, said Phil Condit, Boeing chairman and chief executive officer. By using a single e-marketplace, all of us manufacturers, suppliers, airline and government customers, and service providers can significantly lower transaction costs and deliver more value."

Vance Coffman, chairman and CEO of Lockheed Martin, said, "This global trading exchange will transform commerce for the aerospace and defense industry on a worldwide basis. It’s a catalyst that will set the industry standard for business-to-business e-commerce while driving its increased use of. It also should help us address a major priority of our government customers by reducing acquisition process costs and further aligning the industry with the Department of Defense Integrated Digital Environment initiative."

According to Sir Richard Evans, chairman of BAE SYSTEMS, "Our industry has always been identified with innovation and the exploitation of innovative ideas. I believe this Exchange to be a good example of that foresight. It embraces established concepts but develops them, capturing the essence of future global trading by bringing together the principals of our industry to serve the market in a truly integrated, global, context.

Raytheon Chairman and Chief Executive Officer Dan Burnham said, We are excited about the potential of this innovative, e-commerce trading exchange. By bringing the supply chain management expertise of the industry’s leaders to a single, online marketplace, we will put customers, suppliers and employees a mouse click away from achieving greater productivity, efficiency and cost savings.

Mark Hoffman, chairman and CEO of Commerce One, said, "These visionary companies have recognized the dramatic positive impact e-commerce can have on the aerospace and defense industry. This new enterprise will establish the 'mega exchange' for the industry. Our recognized leadership in e-commerce technology solutions built on Microsoft technology combined with the worldwide presence and domain knowledge of BAE SYSTEMS, Boeing, Lockheed Martin, and Raytheon will add a major new e-marketplace to the Commerce One Global Trading Web, the world's largest business-to-business trading community.

"A successful marketplace brings together a critical mass of buyers and sellers of all sizes," said Steve Ballmer, CEO of Microsoft. "We are delighted that Microsoft's Windows 2000 and our extensive Internet services will be the technology employed to create that critical mass in this new aerospace and defense marketplace. We have a proven track record of building marketplaces with Internet leaders like Commerce One, and are proud to be partnering with them again on this exciting project."

The five companies have signed a memorandum of understanding (MOU) to form the new venture. The parties expect to sign a binding agreement soon, and will form a new company that will own and operate the exchange. The web-based trading exchange is aiming for a launch by mid-year.

Under the terms of the MOU, the founding partners have agreed initially to take equal ownership stakes in the new entity. Adjustments to this allocation will be based on each founding partner's flow of its e-commerce through the exchange over the first three years. Twenty percent of the equity has been set aside for other industry participants and employees of the new venture. Commerce One will have a five percent equity position.

Condit said the new exchange is a logical extension of Boeing's leadership in aerospace e-commerce and evidence of its plan to pursue new-frontier opportunities in the networked economy. "Our PART Page, established in 1996, was the first web-based ordering system for after-market commercial airplane parts," he said. "In 1999, we generated more than $400 million in on-line sales and the site was used by more than 250 airlines and about 675 other companies. We'll migrate our industry-leading operation to this new trading exchange," Condit added.

Working with its government customers, Lockheed Martin has pioneered the early implementation of e-commerce solutions, according to Coffman. "Now, we and the other participants in this trading exchange will help provide a common and consistent platform to expand e-commerce across the aerospace and defense industry at large," Coffman said.

Exhibit 10: Major Providers of E-Market Technical Infrastructure[120]

B2B E-Procurement (Buy-Side)
- Ariba
- Commerce One
- Oracle
- Clarus
- Metiom
- RightWorks

Market-Making Software
- Ariba
- Open Site Technology
- Calico (Connect acquisition)
- Commerce One
- Moai Technologies
- FairMarket Inc.

Sell-Side Commerce Servers
- BroadVision
- IBM
- Microsoft
- InterWorld
- Sun/Netscape
- Oracle
- SAP
- Intershop

Channel Relationship Management
- Asera
- Channelwave
- Click Commerce
- Entigo
- Marketsoft
- Webridge
- Comergent

Catalog/Content Software and Services
- TPN Register
- Aspect Development (I2)
- SAQQARA
- Mercado
- Profile Systems
- Requisite Technology
- Reed Technology
- Commerce One (Mergent Systems)

Personalization
- Broadvision
- NetPerceptions
- Vignette
- Documentum

Product Configuration/Interactive Selling
- Calico
- FirePond
- On-Link (Siebel)
- Selectica
- Trilogy

Website Content Management
- Interwoven
- Vignette
- Documentum
- Broadvision (Interleaf acquisition)

Supply Chain / Business Process Optimization
- i2
- Manugistics
- JD Edwards

[120] "The B2B Internet Report: Collaborative Commerce," Morgan Stanley Dean Witter, April 2000. Reproduced with permission.