The B2B Internet Report

Collaborative Commerce

COMMERCE

COLLABORATION

- **The Internet has finally arrived for the business-to-business market. The infrastructure has been built, companies are interested, and the economic environment is robust. Technology is changing from a cost of doing business to a way of doing business**

- **Centralized markets for B2B commerce over the Internet will create unprecedented levels of market transparency and lower the cost of procurement (not necessarily the cost of the products)**

- **Companies will use these marketplaces as "e-hubs" to synchronize operations with their demand and supply chains**

- **Partnering and specialization — two trends e-hubs will facilitate — will become important drivers of the new economy**

- **We are optimistic about B2B business opportunities, but investors must be selective: Many B2B companies and business ideas may not succeed**
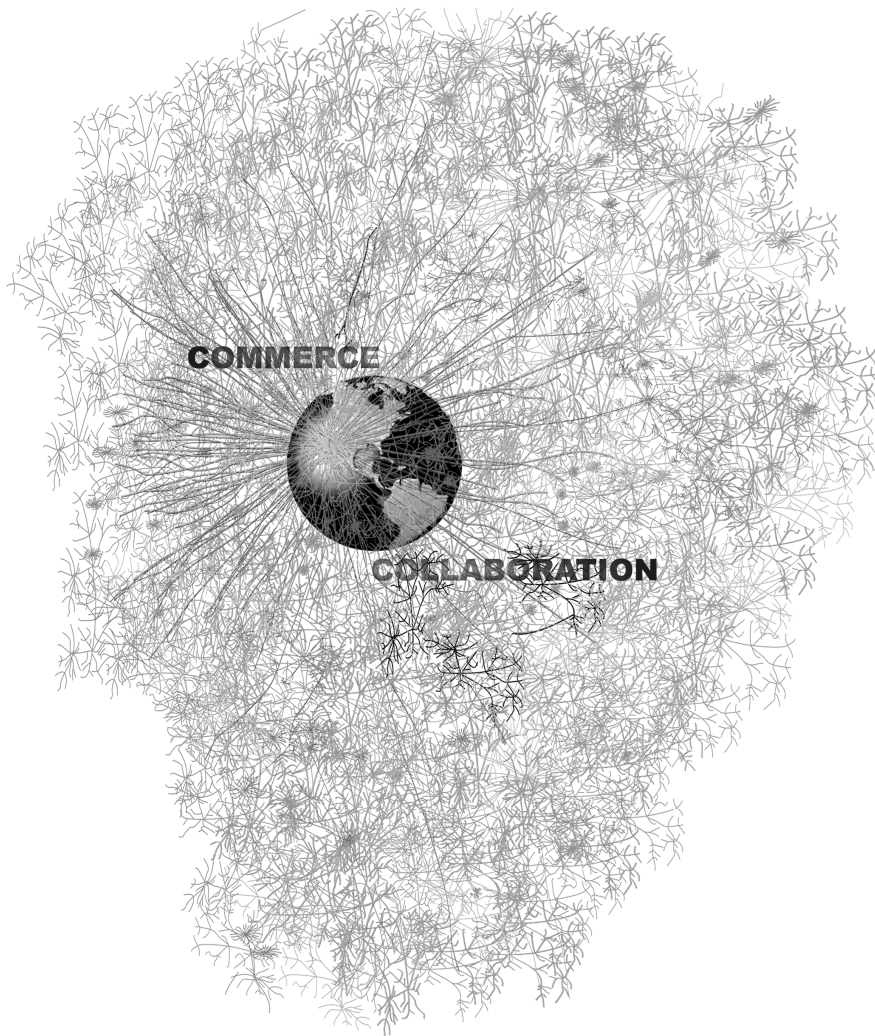
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The B2B Internet Report
Collaborative Commerce

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COMMERCE

COLLABORATION

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Collaborative Commerce
Hermes Would be Proud

Hermes, son of Zeus, was the god of commerce for the ancient Greeks. Fittingly, he was also the god of roads, responsible for wealth and luck, as well as the guardian of travelers and thieves — all peculiarly related to the exchange of goods and services in some sense. Perhaps Hermes would have foreseen a world with the ubiquitous exchange of goods, services, information, and ideas made possible by a networked, efficient market. But most mortals didn't, and we believe that time is now upon us. **In our view, the second industrial revolution at hand is really about much greater efficiency in markets and in the flow of commerce.**

Our Approach

We've tried to build a framework for business-to-business (B2B) e-commerce based on our experience, end-user surveys, and as many discussions as possible with key industry players, executives from brick-and-mortar companies, entrepreneurs with exciting ideas, Morgan Stanley Dean Witter analysts, and bankers across all industries, who all generously lent their vertical industry expertise to apply B2B concepts in their respective sectors.

In this report we devote a lot of effort to describing what B2B is, and how the software is evolving to allow B2B commerce to occur. While we touch upon many of the B2B service providers in this report, we will devote more focus to these companies/sectors in later reports. In this document, we have profiled more than 170 emerging B2B companies (see the Company Profiles section) in more than 70 industries with eight business models. Note that we expect the number of B2B companies focused on vertical markets to spike in the next few years and then quickly decline, owing to consolidation and attrition.

> We subscribe to Einstein's thesis that things should be as simple as possible, but no simpler.

B2B Business Model Representative Companies

MULTI-SECTOR INTERNET COMPANIES
Internet Capital Group, CMGi, Ventro, FreeMarkets

MARKET COMMUNITIES FOR BUYING/SELLING
- **Multi-Vertical Exchange/Hubs**
  VerticalNet, mySAP.com, Oraclexchange.com, Commerce One, Ariba, Ventro, FreeMarkets
- **Vertical Exchanges**
  MetalSite, Instill, Altra, Commerx, XS Inc., ChipCenter
- **B2B Auctions**
  eBay, ZoneTrader, TradeOut

PROCUREMENT TOOLS FOR BUYERS
- **B2B Procurement Applications for Buyers**
  Ariba, Commerce One, Agile Software, FreeMarkets

PROCESSES MANAGEMENT BETWEEN PARTNERS
- **Vertical Business Process Portals**
  Healtheon/WebMD, buzzsaw.com, Impresse
- **Channel Relationship Management Apps**
  Click Commerce, Webridge, Asera
- **Product Life Cycle Management**
  i2, Agile Software
- **Supply Chain Management Software**
  i2, Manugistics

TOOLS FOR BUILDING MARKETPLACES
- **B2B Software Tools for Market Making**
  Ariba, Commerce One, Moai, Oracle
- **B2B Catalog Management**
  Requisite, Grainger, Commerce One
- **B2B Management Infrastructure**
  Computer Associates, Marimba
- **B2B Third Party Services**
  Agile Software, eCredit
- **B2B Integration to Buyers/Sellers**
  webMethods
- **Networks for Routing Transactions**
  Ariba, Commerce One, Oracle

TOOLS FOR SELLING FROM A WEB SITE FOR E-COMMERCE
- **B2B Order Management**
  SpaceWorks, Comergent, Yantra
- **B2B Integration to Internal/External**
  webMethods, Vitria
- **Sell Side Commerce Servers**
  BroadVision, Art Technology, Oracle, IBM, Microsoft
- **Web Site Content Management**
  Vignette, Interwoven, Documentum
- **Personalization**
  BroadVision, Vignette, NetPerceptions
- **Product Configuration/Interactive Selling**
  On-Link, Calico, FirePond
- **Catalog /Content Software and Services**
  Requisite, Aspect Development
- **Customer Analysis/Campaign Management**
  E.piphany, Broadbase, Siebel

In writing this report, the decision we faced was whether to wish away the complexity and hide behind a series of bullet points, or to attempt to conquer the complexity with more detail and precision. We chose the latter course. At some point, execution and precision become paramount in technology-oriented markets. Eventually, one has to put down the PowerPoint slides and figure out how to make the donuts. We wanted to at least describe some of the details that are relevant for decision-making in B2B.

Some Perspective…

B2B enthusiasm — we expected it to happen, and happen big. And here we are… B2B entrepreneurs are aggressively using private equity, the capital markets, and partners in an attempt to build next-wave Internet companies. The reward and the risks look huge. And timing isn't everything… but it's a lot.

Internet companies and the wealth they have helped create are symbols of our time: First came the IPO of Netscape, in August 1995, and most recently, in B2B, the IPOs of Healtheon (now Healtheon/WebMD) in February 1999, Vignette in February 1999, Ariba in June 1999, Ask Jeeves in July 1999, Chemdex (now Ventro) in July 1999, Agile Software in August 1999, FreeMarkets in December 1999, and webMethods in February 2000. Oracle took the Internet to the enterprise and bridged the old and new worlds. These Internet pioneers defined new categories and helped define the new landscape.

Each of these companies was a first-of-a-kind Internet pure play in the public market, and investors have allowed these early movers to get currency. Unlike many of their early B2C brethren, the ambitious B2B sorts are very aggressive about using their currencies to build their businesses and attempt to build platforms/hubs.

Healtheon was one of the first companies to attempt to reengineer an entire industry — in its case, healthcare — and has since changed/expanded its business model and acquired eight companies. Vignette brought the ability to manage relationships throughout the online customer lifecycle. Ariba came to market focusing on procurement and has bolstered its offerings with the acquisitions of Trading Dynamics and TRADEX. Ask Jeeves focused on improving the efficiency of customer service and has changed its business model, acquiring three companies in the process.

Key Themes for B2B

1. **B2B will be much larger than B2C**, and the groundwork may be laid faster than it was for B2C, due partly to B2C lessons learned, and partly to significant opportunities for business efficiencies.

2. **The timing is now**; infrastructure is in place and company managements feel an urgency to act post-Y2K.

3. **Exchanges will introduce unprecedented market transparency** across industries — highlighting strong and weak competitors.

4. **Micromarkets will proliferate**; specialized markets can survive. **Leading service providers should excel**.

5. Exchanges will have to add collaboration to create stickiness. **Simple buy/sell transactions will be almost free**, like e-mail. **B2B winners will establish "platforms"** that link deeply with their customers — we call them **e-hubs**.

6. **Domain expertise will be key**; deep may beat broad.

7. **Many B2B business models look suspect and most probably will fail**; exchanges have low (middleman-like) gross margins. Most exchanges planning to survive off trading volume are in for a rude awakening and transaction prices get squeezed for simple order matching. **Hunting for high gross margins is key**.

8. **Equity sharing** with customers (i.e., win-win partnerships) and **M&A activity** will play a **critical role** early in attracting transaction volume.

9. Some middlemen will be critical participants in exchanges; they have important relationships and valuable domain expertise.

10. **Companies will substitute information for inventory** through improved supply chain transparency.

11. **A few key buyers can drive a market quickly**; large buyers siding with exchanges can create binary outcomes quickly. In B2B, **finding the "tipping point" is key**. Industry-sponsored exchanges are only viable if they are **win-win for both buyers and sellers** and create an atmosphere of independence.

12. **Buyers and suppliers win:** Buyers get more uniform, predictable pricing with real-time information on availability as well as better controls over their own procurement processes. Suppliers can more intelligently plan production, reduce inventory, customize promotions for buyers, and lower their order processing costs.

13. Partnering and specialization will be defining elements of the new economy and e-hubs will facilitate the transformation.

Ventro/Chemdex was the first B2B market maker and has nabbed two companies plus two joint ventures and has entered two new markets. Agile was focused on collaborative manufacturing and product life cycle management and acquired Digital Market. FreeMarkets was the first B2B reverse-auction market maker, and has also acquired iMark.com and Surplus Record and rapidly moved into new verticals. webMethods was the early leader in B2Bi (business-to-business integration) and XML software and services.

The benefit, or curse, of being early is that you have no comparables, you have very little history, your business model is more of a wild card than you'd like to admit, you aren't sure how rapidly potential customers will take your products, you are disadvantaged if you don't have the right partners, you aren't sure who your competitors might be, and you aren't even sure how the business is going to evolve… but you sense that the opportunity is big. And if investors are in a bad mood, they'll tell you that you are crazy… but if they are in a good mood, they will give you the benefit of the doubt.
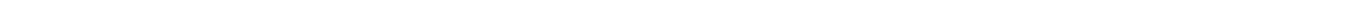
But with more than 200 million Internet users (with 95%+ new to the Internet in the last five years), the ecosystem is ready and the time looks right. The focus on the space hit its tipping point in CH2:99, and the big issue we are now focused on is figuring out when many of the vertical markets (from agriculture to raw materials) being affected by B2B will hit their tipping points (defined as when 20%, and rising rapidly, of business is conducted via the Internet).

We've tried to balance the exciting potential of e-commerce against the reality of a long road ahead, and the mandatory road kill along the way, in turning great concepts into reality. We believe the trends we outline in this report will be big, but they will take time to unfold. And not every business model will work, despite the large market opportunity. ***Current market valuations assume perfection across the board, so we advise caution and selectivity.***

> Three companies in each segment usually pull in 70% of the market share in technology markets.

We expect to see attractive winners in many segments, but our rule of 3/70 still applies. Three companies in each segment usually pull in 70% of the market share in technology markets, because of the inefficiencies associated with too many standards. But we think we've identified key leaders in the segments that are emerging in B2B.

Time is of the essence. We believe that a big chunk of the key positioning in the B2B landscape may be sewn up by New Year's Day 2001. Already, the $217 billion market capitalization (as of 3/24/00) of the 64 largely domestic Internet and B2B Software/Commerce companies (see Appendix VI) ranks third behind the $326 billion market capitalization of the 17 Internet Portal companies and the $243 billion market capitalization of the 64 Internet Infrastructure Services companies that we track.

Executive Summary

For Suppliers:

> Stand by… we expect that market efficiency resulting from business-to-business (B2B) e-commerce will provide buyers and sellers with unprecedented levels of market transparency via online exchanges. Market transparency should produce more uniform, but not necessarily lower, pricing for similarly situated buyers. Aberrant pricing will be reduced.

More important, all things can be measured once online. Everyone gets marked to market on performance — every day. This digital audit trail means suppliers can't count on the unknowledgeable buyer to prop up margins and will have to more carefully target customers that value their products and services. Consequently, we think micromarkets will proliferate and facilitate specialization and a focus on comparative advantages.

We don't think the world will implode because of massive price deflation as suppliers get pitted against one another. Large companies have largely perfected the art of price negotiation, and few have left anything on the table; moving the process online just makes it more efficient. In many cases we've seen, sellers get higher prices because they greatly increase the number of buyers competing for unique, value-added, or scarce products. Even in auctions, real-world data show that buyers don't select the low bidder in half the cases because they value other metrics in addition to price.

We believe suppliers will be able to discover new buyers more easily because of marketplace centralization. At the same time, they'll enjoy reduced order processing costs (online orders are much more accurate) and substantially lower the cost of interacting with customers. Moreover, suppliers will be able to present buyers much richer, personalized purchasing experiences complete with cross-selling, contextual advertising, and promotional opportunities.

For Buyers and Producers:

> It's early in the game. Companies that think big — beyond order matching — can garner competitive advantage by using an exchange to synchronize demand and supply chains with their partners.

For example, these companies could:

- create an integrated chain of commerce by tightly linking all partners in the demand and supply chain to improve process transparency and get the right products to the right place at the right time.

- reduce inventory sharply by using an online exchange as a platform for collaboration or an "e-hub" to publish production plans and demand data quickly, so trading partners can make real-time adjustments and live off lower safety stock.

- understand their own buying behavior and more uniformly implement procurement policy.

- automate collaborations between strategic partners, lowering the cost of intra-company interaction.

- use the Internet (via exchanges) to closely synchronize behavior with key partners to create tightly coordinated supply chains and reduce order cycle times.

In our view, these benefits are the first steps toward virtual corporations — federations of companies, tightly coupled via online hubs. Functional specialists can concentrate on their link in the demand and supply chains while taking advantage of recombinant business models to compete with larger companies. A tight federation of highly skilled SWAT teams flying in formation might approach the economies of scale of vertically integrated companies.

Companies will have highly instrumented cockpits from which to optimize the chain of commerce and make decisions more quickly and intelligently. Partnering will be a core competency in the new economy. Partners will

execute in unison with agility, intimacy, and efficiency. The costs of establishing and managing partner relationships should all fall sharply, while the efficiency of, and insight into, inter-company processes should improve exponentially.

For the Exchanges:

> Order matching will be free or nearly free. Think e-mail — routing and aggregating messages is useful but not terribly difficult.

Business-to-business exchanges that establish marketplaces should have an impact on the industry and serve as important public switching stations for commerce — but many lack economically interesting models, in our opinion. Transaction fees will come under pressure, and even if they didn't, a 1% transaction fee won't build a large company in most industries.

There is a reason that the New York Stock Exchange, the mother of all trading exchanges, established in 1792, supports $7.3 trillion and 169 billion shares in trading volume but generates only $101 million in income annually (1998 results). Most industries don't have trillions in volume to work with, and buyers won't pay much to transmit orders to suppliers they already know. *But we see an enormous opportunity for exchanges that target a wide range of interactions between enterprises, and there are some transaction types that exchanges can charge for.*

For the Investors:

> In our view, the majority of the 700 exchanges we're tracking are overvalued, but a handful are significantly undervalued.

We expect to see a handful of mega-winning exchanges, with the brick-and-mortar companies dominant owners among them — they aren't about to turn over this channel so easily. Look for market fragmentation, complex, inter-company collaborations best provided as a third-party service, and a firm commitment for trading volume from a few key buyers and suppliers. **Exchanges that handle complex, collaborative functions before and after the order (design, fulfillment, and coordination) can evolve into e-hubs with economics of interest to investors. In B2B, margins are a function of complexity and volume, not branding.**

It's Just Business — Avoid the B2B Junkies

Exchanges and related technologies are platforms and mechanisms to facilitate more efficient commerce. They won't replace the need for GM to design a cool car, for the Gap to know what teenagers are wearing, or for IBM to dream up the next technological breakthrough.

> At the end of the day, e-business is just business.

To borrow from Mr. Greenspan, we believe the "irrational exuberance" over three-letter acronyms dominated by the letter B will pass and that e-commerce will be put into its proper context — **an important platform that can be used wisely or unwisely.**

Many companies, including some technology firms, have suffered long depressions in their stock prices; **they are now desperately grasping at the B2B Holy Grail in hopes of being sprinkled with the magic dust of high-tech multiples.** We've met many a company that could tell us the multiples on Ariba and Commerce One but could not list their top ten customers or rank their products by profitability or revenue.

This looks like a classic technology hype cycle. The first phase of the cycle for a new technology is an incredible frenzy and land grab to be associated with the concept. Then comes the hard part, when making it work takes time and proves more difficult that anyone thought. Wall Street gets bored and the stocks languish. Phase three is the production phase, in which the benefits from the technology start to kick in as advertised — just not as quickly as anyone thought. Investors and customers come back to the technology, but with a more studied approach, and a few mega-winners emerge.

The Hype Will Wear Off

We believe the structural shift in the economy is real, but will take years or decades to play out. The CEO of VerticalNet, Mark Walsh, described the plethora of conferences for net market makers as a bunch of pudgy guys with pony tails and pullovers pumping their fists in the air, trying to convince each other they have a business. While we aren't as articulate or entertaining as Mr. Walsh, his point is well taken about the widespread B2B hype.

Who's the Net B2B Winner?

The key question for many investors is, Who benefits and who loses in moving commerce online? Who gets to retain the value created by a restructuring of commercial processes and increased transparency?

First, the participants: Buyer, Supplier, Marketplace Owners, and Technology Provider. **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**. So industries that purchase much of what they sell as opposed to manufacturing products might see the largest benefits for buyers. More information is always good for the buyer. The buyer may use that information to procure cheaper, better, high quality, or more readily available products. But actual results may differ from estimates.

But the "buyer wins" conclusion is overly simplistic, given that each industry has a different balance of power, degrees of transparency, and need for discovery. In some industries, suppliers are concentrated and not buyers (utilities, paper). In those cases, the supplier may derive more benefit.

Distributors are both buyers and sellers and vary widely by industry. In some industries they will control the agenda, although generally they don't have the same potential for value creation given their intermediary function.

The technology platform vendors are also probable winners, since an entire layer of commerce infrastructure has to be built and refined over the next decade.

Lastly, the marketplace owners that evolve into e-hubs can win as well, but we think there will be few of them. The remainder will likely remain useful intermediaries with low margins but serving a need for their industry and geography.

The net change for the entire chain of commerce is a huge positive, in our view. This isn't a game of musical chairs that simply shifts cost around. We expect a step-function improvement in efficiency and productivity for the entire chain of commerce.

Exhibit 1

Percentage of Value Retained from B2B E-Commerce

Industry Type	Buyer	Supplier	Marketplace Owner	Technology Provider
High Buyer Concentration	70	10	10	10
High Supplier Concentration	20	60	15	5
Fragmented Buyers and Suppliers	25	25	35	15

Source: Figure- Morgan Stanley Dean Witter Internet Research. Format- Ventro.

Exhibit 2

Vertical B2B Markets

	Sample Industries	% of Economy
High Buyer Concentration	Automotive Manufacturing	35
High Supplier Concentration	Plastics Steel	15
Fragmented Buyers and Suppliers	Healthcare Life Sciences Agriculture	50

Source: Ventro.

The Essence of E-commerce
Fundamental Concepts

Defining the Full Problem

To crystallize an opportunity, it's sometimes better to define the problems being solved. **Moving business commerce online can make significant progress toward solving three key problems most companies contend with:**

1. **Commerce is fragmented by geography,** which creates inefficient markets and uninformed buyers and sellers. Buyers want to know about suppliers that have better products or available inventory. Sellers want to be discovered by buyers who don't know they exist. Eliminating geography and market fragmentation as a barrier to commerce is the key catalyst to online B2B commerce.

2. **Most interactions between businesses are complex as well as labor- and information-intensive**. Businesses fund enormous inefficiencies because they tackle complex, collaborative processes manually. Getting the right information to the right constituency at the right time is a challenge in a single large organization, let alone between multiple complex enterprises. Enterprises would like to tap into the self-help model associated with the Internet to make business-to-business interactions — all collaborations, and not just buying and selling — more efficient. Channeling inter-company processes and information through a common management e-hub can create unprecedented levels of efficiency and process transparency.

3. **Supply chains are bloated with excess inventory because of an inability to see and plan for the right mixes and volume of products.** Participants would like to substitute information for inventory. Many suppliers have little information about when and how their customers use their products. They build inventory to cover all scenarios. Buyers have little ability to quickly find alternative sources of supply when markets change. Internet-based supply chains will have an ability to share information quickly and adjust to market conditions more easily.

It's All Becoming Clear: The Quest for Transparency

The first problem, the market fragmentation challenge, is the catalyst for B2B commerce. Efficient markets really mean transparency, and transparency can be a **powerfully transforming concept.**

Transparency is a knowledge-based concept that implies participants have intelligence about the markets around them. Market alternatives become transparent, and consequently, participants change their behavior. Aberrant behavior — artificially high prices or unusually low quality — gets isolated quickly and competitive alternatives eliminate the anomaly.

> Efficient markets constantly identify and eliminate the bottom 10% while pushing the mean upward.

Transparency is an age-old concept that transcends commerce. All networks of information create transparency. Broadcast networks helped us create the global village, and we all learned about how the rest of the country and the rest of the world lived. Television first taught us the perfect family lived like Ozzie and Harriet, and later some of us discovered we had regional accents that we hadn't noticed before.

We once read an article in *The Nation* magazine about the fall of communism in Eastern Europe, which, perhaps by happenstance, tracked the rollout of CNN throughout the region over a decade. As Eastern Europeans received previously unavailable intelligence about the rest of the world and discovered how the rest of the world lived (cultural and lifestyle transparency), they wanted to be marked to market. You don't know what you don't know until the market becomes transparent.

When the Erie Canal, another successful network, opened in 1825, shipping costs between New York and Chicago immediately fell by 85%. Those shovels you hear outside of your window are building a canal of commerce to your door.

Commerce Transparency

In the marketplace for goods and services, the concept of transparency manifests itself in four primary dimensions:

1. Price Transparency
> Does price vary significantly by geographic region or by size of customer?

> Am I getting the market price or the price I've come to expect?

2. Availability Transparency
> I need product now; who has it?

3. Supplier Transparency
> Who else out there makes this product?

4. Product Transparency
> Is there a substitute, alternative product?

Having nearly perfect information in all four of these dimensions can substantially change the behavior of the buyer and hence the consequences for the supplier. Once shared, information becomes even more powerful.

The Internet = Global Transparency

The Internet overcomes one of the vexing limitations to market transparency for centuries: geography. If networks provide transparency, the Internet is the mother of all looking glasses.

Limitations of geography have been the driving force behind the need for intermediaries. If buyers and sellers are physically distant from one another, the exchange of goods and services becomes inefficient, expensive, and difficult to coordinate.

This spatial challenge gave rise to the classic middleman that spanned geography and got customers the right product at the right time and at the right place. The elimination of geographical barriers eliminates turf ownership; the buyer becomes nomadic, and nomads find a home where they need them.

A cursory examination of US trade shows that after more than 200 years, our Canadian and Mexican neighbors still represent 47% of trade on the top ten list of US trading partners. The United Kingdom has more than twice as many people as Canada, but US trade with Canada exceeds that with the U.K. by a factor of five.

Exhibit 3
Top Ten Countries Total Trade (Import + Exports)

In Billions

	Total trade for September 1999	Total trade 1999 Year to date
Canada	31.22	266.06
Mexico	17.48	141.68
Japan	15.92	137.73
China	9.53	69.27
UK	6.39	57.58
Germany	6.27	59.59
Korea	4.90	39.04
Taiwan	4.53	39.44
France	3.51	32.92
Singapore	3.00	25.52

Source: U.S. Commerce Department.

Even now, with unprecedented mobility and stability, only 2% of the world's population lives outside of its own country, and most of those people are refugees.

Exhibit 4
Geographic Market Fragmentation
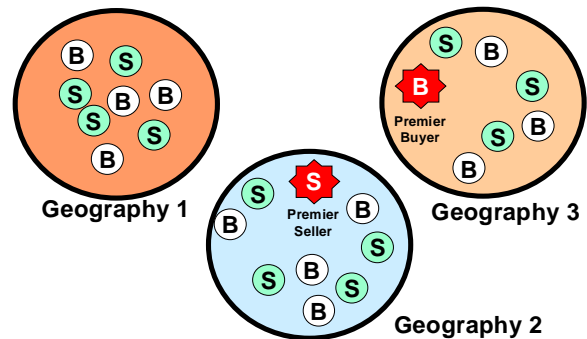
Source: Morgan Stanley Dean Witter Internet Research.

Many a business has prospered because of asymmetric information — the buyer's lack of information about alternatives. **The imposing costs, time, and effort required of the buyer to discover the true market environment outweighed the resulting benefit.**

The Internet greatly reduces the spatial gap posed by geography by logically connecting businesses regardless of location, which enhances market transparency.

Premier buyers (willing to pay a premium or buy in volume or some other metric important to the supplier) and **premier sellers** (with quality product in stock or unique skills or some

other metric important to the buyer) have difficulty finding each other in geographically fragmented markets.

The transparency introduced by the Internet removes these geographic barriers to premier buyers and sellers efficiently discovering one another. The high cost of discovering and researching new suppliers and the cost of attracting new buyers should fall. We expect that **discovery on both sides will be easier, but competition will increase as a result.**

Exhibit 5
Enhanced Buyer and Seller Discovery

Source: Morgan Stanley Dean Witter Internet Research.

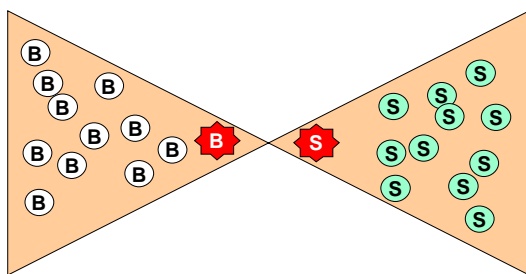**Information about market conditions historically has been completely separate from the purchase transaction.** Centralized marketplaces can bring market transparency information close to the point of the transaction.

The Implications

The aggregation of buyers and sellers in centralized e-markets has significant implications for competition, pricing, and efficiencies.

> These exchanges will likely reshape some industries greatly, depending on what transparencies were lacking and to what degree.

It will vary significantly by industry, and we think blanket assumptions are dangerous. It's like we're in Pamplona, and that click behind you was the latch on the gate for the running of the e-commerce bulls, and we'll see who gets trampled. A few predictions:

- **Strong competitors become dominant in efficient markets,** since their comparative advantages become known and applicable across the entire market.

- **Weak competitors get weaker as they lose geographic protection from stronger competitors.**

- **Intermediaries who profited from the geographic fragmentation** could be at risk if their only added value was bridging the spatial gap.

- **Suppliers become more specialized as they search for comparative advantages** by squaring off against the top tier of national or global competitors instead of regional competitors. Specialization will lead to more choice, service, and customization.

- **Buyers can initiate and terminate supplier relationships more easily**. The cost of searching for and establishing new commercial relationships will fall.

- **We don't think prices will be driven through the floor and suppliers pummeled into an abyss of margin-less existence**. Most large companies have already beaten their suppliers about the head and shoulders mercilessly. At most they can shift costs around in the supply chain, but it isn't sustainable in many cases.

- **There will be some savings, but it's more likely prices will become more uniform across similarly situated buyers.** Transparency roots out inefficiencies and aberrations. Buyers with less efficient processes to enforce uniform buying across their own organizations will now have the tools to implement and monitor procurement policy. Suppliers can't count on the unknowledgeable buyer to prop up margins and will have to more carefully target customers who value their products and services.

Collaborative Commerce Is Much Bigger Than Buying and Selling

While e-markets have served as a powerful catalyst for online commerce, B2B relationships are more complex than simple order matching.

We think the Internet will be even more momentous as a medium for business-to-business collaboration. The second and third problems we outlined at the outset should be the big wins in the longer term. Most B2B interactions aren't about the instant an order is matched between a buyer and seller.

> For every order-matching event, there are 15-20 other transactions associated with that order**.**

A small sampling of the other process flows include:

Before the Order
- Purchase approval and routing
- Promotions and campaigns
- Financing
- Inventory availability
- Pricing negotiation

During Fulfillment
- Order status
- Partial shipments
- Backorder information
- Substitute products
- Order explosion to multiple suppliers
- Scheduling delivery

After Delivery
- Warranty and maintenance
- Replacement parts
- Asset management
- Regulatory compliance
- Returns and incorrect ships
- Settlement
- Inspections

Often, a B2B transaction represents the intersection of two trading chains. The buyer is procuring product to incorporate into products resold to the buyer's customers. Conversely, the seller's goods are dependent on material and products from other suppliers. The growing branches of this complex tree create challenges of coordination and optimization to get the right product to the right place at the right time.

Internet exchanges can serve as independent hubs of coordination for multiple organizations. Companies simply haven't been able to build flexible technology that could link partners easily and inexpensively. The Web provides a convenient, ubiquitous platform to see and

coordinate the entire chain of commerce and will create a step function in efficiency and possibilities.

The flow of commerce in most demand and supply chains is a long series of complicated steps — most of which are unseen by other interested parties in the chain. To shine the light of insight on these steps by putting them online creates a basis for refinement, restructuring, and optimization. You don't know what you don't know until there is process transparency.

Exhibit 6
Finally Getting the Picture — the Chain of Commerce
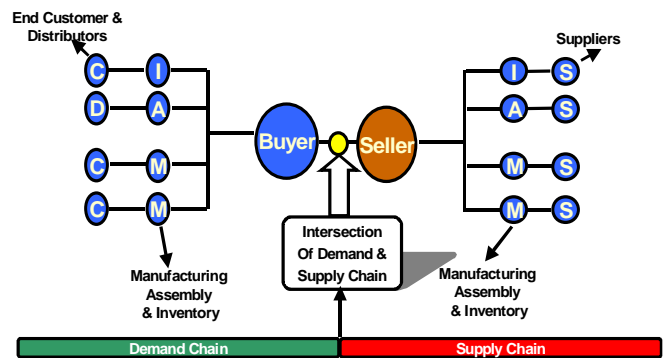
Source: Morgan Stanley Dean Witter Internet Research.

The evolution of systems to support e-commerce has largely been independent of technology to support collaborations. They've taken different paths but are ending up at a common destination. The same business portals that create community and market transparency can be used to support a wide range of collaborative processes that are large components of costs and determinants of market success and efficient execution.

> There is enormous potential to streamline inter-company processes, eliminate redundancies and manual procedures, coordinate logistics, and intelligently plan for changing market conditions.

We believe the Internet will bring unprecedented levels of process transparency — companies will be able to establish, monitor, and manage relationships and commerce much more easily and effectively.

Transparency into the supply chain has major implications for industry and the economy as a whole. The ability to see market demand in real time and the state of the entire supply chain creates an unprecedented opportunity

for efficiency and optimization. The price for not having a view of point-of-sale data is inventory — guess at what's needed and build enough inventory to cover most scenarios. Some manufacturers actually require their suppliers to maintain 120 days of inventory on hand. **The goal is to re-create the Dell and Cisco business models — book orders before making the product.**

Exhibit 7
The Components of Commerce
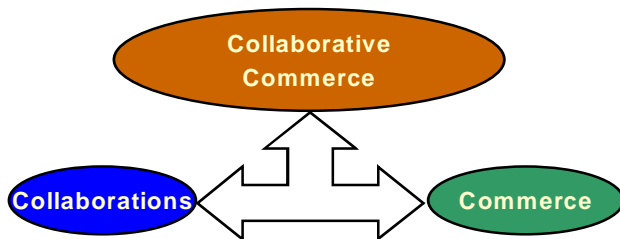
Source: Morgan Stanley Dean Witter Internet Research.

A New Species of Deadly Competition

Collaborative commerce via the Web will spawn a new generation of virtual chains of commerce (integrated demand and supply chains). Ubiquitous and simplified technology will create tightly coupled supply chains that thrive on specialization and flexibility. Functional specialists can concentrate on their link in the supply chain while profiting from recombinant business models to compete with larger, vertically-integrated companies.

The ability of these virtual chains to reach new levels of efficiency, combined with buyers' ability to discover market alternatives, could easily cause significant market-share shifts. Virtual chains of commerce and net markets fit quite nicely into the economic theory your college professor went on about. More than a century ago, British economists Adam Smith and David Ricardo laid down the principles of comparative advantage; in a perfectly competitive market, nations, industries, and companies would be forced to **concentrate in areas where each had comparative advantages** and avoid areas of disadvantage, resulting in higher aggregate productivity and greater efficiency.
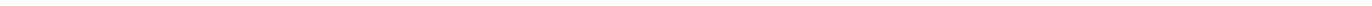
This theory of specialization could lead to a major restructuring of how managers and investors think about and value businesses, as well as cause us all to rethink the value of vertical integration.

A tight federation of highly skilled SWAT teams flying in formation might approach the economies of scale of vertically integrated companies. The change will likely force more specialization, partnerships, and outsourcing. Partnering will be a critical skill set in the new economy that rewards specialization. Companies can create value by using e-commerce infrastructure as the air traffic control center to manage groups of specialists in the chain of commerce.

High-Velocity Industries Show the Way

It's no coincidence that technology companies with high-velocity product cycles and swings in demand have aggressively embraced outsourcing and specialization. Seventy percent of electronics manufacturing use contract manufacturing. The ability to adapt to market changes quickly is inversely proportional to the investment in fixed plant assets. Cycle times can be reduced by eliminating set-up times by using a series of specialists for each product type. The proliferation of product categories and custom products will move more industries toward technology-like product cycles.

In a Perfect World…
The Financial Markets Show Us the End Game

We Have an Example…

The Financial Markets Show us the End Game. The global financial markets are already networked and integrated — far ahead of other industries. With the absence of a complicated supply chain or settlement process, capital can move freely across borders. The last decade provides useful insight as to where other industries are headed.

The New Rules of Market Discipline

The result of a highly efficient, global financial market has been an uncompromising perhaps even brutal discipline for its participants. Tom Friedman, international correspondent for *The New York Times,* documented the impact of globalization on the financial markets. It goes something like the following:

Country after country dipped into the global capital markets to finance growth or infrastructure. But once a country partakes, it becomes subject to new rules. Seemingly indigenous events — coups, internal conflicts, border skirmishes, nuclear tests — have market implications, causing debt-rating downgrades, higher interest rates, and capital flight.

The capital flight leads to severe and possibly catastrophic economic and subsequently social consequences. So leaders in those countries lose some flexibility. They either make decisions consistent with global market expectations of stability or risk a cascading sequence of events spurred by the flight of capital, which leaves them much worse off. It's as if their countries went public and suddenly became subject to shareholder expectations and discipline.

It's Crystal

Imagine this kind of transparency for every aspect of commerce. Small changes in price, product quality, availability, service, responsiveness, and even intangibles like reputation and partnerships could, in theory, immediately result in market share shifts. Taken to its logical extreme, buyers with much lower friction cost associated with switching suppliers could constantly mark their suppliers to market. **In reality, the switching costs in financial markets are nonexistent, which is not the case in most other industries.** Nonetheless, we expect the Internet will present an open market medium to move most industries closer to perfect transparency.

Suddenly, companies could feel like they've gone public for a second time — only this time, the customers are the shareholders that enforce market discipline in every aspect of the business.

And once you're in, you're in. A decision to participate in a centralized market ripples throughout a company, since it injects more information and volatility into strategy. Business partners and customers adjust simultaneously and relationships change. Joining the net market economy is a bit like checking into the Hotel California: you can check in anytime you like, but you can never leave.

Taking It to the Next Level

> History suggests an explosion in new exchanges followed by consolidation. The New York Stock Exchange had two dozen rival exchanges in lower Manhattan in the early 19th Century.

Each had its own twist: some were all-night markets and others were mobile and floated from location to location throughout the day.

We're tracking over 700 B2B sites now and expect the number to reach 2,000 by the end of this year and 5,000 by the end of 2002. Most have a trickle of volume and the bulk will remain of marginal import in the scheme of things. We saw an exchange for the worldwide market in Ferris wheels recently; we started to wonder if we are reaching the peak.

The explosion in the number of exchanges may continue, needed or not, as entrepreneurs exercise their constitutional right to the pursuit of happiness. But in the end, all markets are efficient over the long run — even the market for markets.

Fragmentation of trading volume for a single commodity works against transparency unless all markets are integrated and buyers always want transparency. A few exchanges figure out how to add more value beyond order matching and keep their key partners on board. A consolidated market lowers integration and maintenance costs for all members. Given the strategies of brick-and-mortar companies in several industries, the buying volume could concentrate quickly, since equity investments provide the motivation to shift spending to an exchange.

Micromarkets Proliferate

The Web has the seemingly magical ability to congregate distributed companies and people with similar interests into a community of critical mass. In that sense, the Web will foster specialization. The company that wants to make left-handed bowling balls just might find a big enough community to make a living when the relevant market is the entire planet instead of Peoria. Virtual communities allow more esoteric and focused communities to flourish, since they can gain critical mass that eluded them because of distance and fragmentation. **Consequently, we expect small, specialized suppliers to flourish by serving these newly discovered micromarkets that may be uninteresting to larger suppliers.**

> We could conceive of an exchange or two for each of the 2,500 SIC codes. Overlay the need for an exchange in each region because of the realities of transportation costs and duties and tariffs, and micromarkets could number in the thousands.

A Trader Behind Every Desk?

Not really. Visions of every product up for bid in a live trading auction aren't realistic. Not every product is important enough to justify the investment in time and effort to trade real time — we won't all be making markets in pencils and Snickers bars any time soon. We actually have to get some work done at some point.

Also, there are categories of purchases that are pre-configured — automatically triggered by known events (inventory replenishment levels, for example). These are efficient transactions fired off automatically from back-office inventory systems via EDI. We don't see a need to make these transactions less efficient by making them partly manual.

Moreover, some products simply don't have enough volume or liquidity to make marketmaking efficient or reasonable. **Highly engineered or custom products simply don't have enough buyers and sellers to create a market, since they aren't standard products.**

> The goal is to lower the overall cost of procurement and interactions, whether the requisition is by a pre-configured transaction, auction, real time bid/ask, or catalog order. There is nothing inherently better about one type of order over another, and all will be used.

It's Not All in Cyberspace

We believe that traditional sales representatives will still be key to the buying process. Some product segments still require detailed explanation and good, old-fashioned persuasion and negotiation. Even Internet pioneers Dell and Cisco feed their Web sites predominantly with direct sales contact and then fulfill through the Web.

Moreover, online commerce won't eliminate the need for superior process and decision-making. People will still have to implement intelligent procurement strategies and organize their own purchases.

Legal Infrastructure and Taxes

The legal infrastructure that made financial markets viable — regulated financial statements, enforcement, and standardization — don't yet exist for industrial exchanges. We expect the regulatory organizations to weigh in eventually and extend the UCC (Uniform Commercial Code) to address new relationships and processes. Commerce becomes inefficient without a supporting legal infrastructure to reduce the risk for all parties involved.

Additionally, we believe, the flap over Internet taxes will get resolved. B2B purchases should force the issue, given the large transaction sizes. We don't believe a backhoe bought over the Internet will be taxed differently from one bought from a direct-sales person. Online and offline taxes will be consistent and not favor either channel. Things are tough enough already for old-economy companies, and we believe that protecting Internet commerce from taxes could skew the transaction flow toward online sales.

The Time Is Right for B2B
Let's Light This Candle

Internet Framework — The Time Is Ripe for B2B

We think the stars are aligned for an Internet-driven restructuring of business-to-business relationships. Here's why:

Infrastructure Ready

Companies have built their Web infrastructure around de facto standards and have adequate security to interact with a public network. As recently as 1996, the top ten sites on the Web were university sites, according to Media Metrix, and included no e-commerce sites. Today, all top 15 sites offer community services and commerce. The number of Web site addresses (URLs) increased by 137% in 1999.

Board Room Acceptance

Dotcom mania has pushed technology into the board room. Some companies are intimidated; others see enormous opportunity. Both camps sense an urgency to act. In our CIO Survey series, we routinely ask how often the board of directors or the CEO meet with the CIO. Over the past year, we've seen the frequency of CIO-CEO meetings increase from never or once a year to four to six times a year on average. Many boards have a special committee for technology, just like they have committees for other specialized and important areas (e.g., compensation).

Speed and Simplicity

Systems are being built in a New York minute and users expect quicker results. The simplicity of Internet standards and technologies ushered in the "fast food" era of application development and away from agrarian development (grow the application in your back yard for three years). There's no time for nine months of analysis. *Internet standards facilitate speed, since applications are more uniform in appearance and centralized in administration and execution.* It's easier than ever before to change applications as business needs dictate.

Lure of Cost Savings and Efficiencies

Companies also see a chance to lower requisition costs with streamlined procedures and more efficient market pricing.

Early Adopters Common

There are always early adopters of technology in every industry, and the pioneers are already plowing ahead with their B2B plans. *A Duke University survey of CFOs suggests the number of US companies selling their products over the Internet will jump from 24% in 1998 to 56% by the end of 2000.*

Well-financed Start-ups; Strong Economy

The strength in the economy allows companies to take risks they might not otherwise consider. Venture capitalists poured a record $48 billion into start-ups last year (compared with $16 billion in the prior year) and two-thirds of that was Internet-related. Additionally, the public market is willing to aggressively finance early-stage companies and let them evolve in the public eye.

Year of Evaluation Behind Us

1999 was the year of discovery and evaluation of B2B e-commerce. The year 2000 is a year of action as companies get past Y2K projects and initiate new projects. The $90 billion spent worldwide on Y2K remediation over the last four years will get put to more imaginative uses. We expect that IT spending won't slow in this age of Web frenzy but will get redeployed post-Y2K.

Buyers are Getting Equity

The public markets are eagerly financing e-commerce companies and net markets. Buyers can realize some of the value created in the marketplace by demanding equity for their participation.

Market Cap Envy

Traditional companies see the extraordinary market caps associated with B2B start-ups and are aggressively forming and spinning out divisions that create value for their shareholders.

Vendors Pushing the Next Thing

Since most companies have upgraded their back office, many of the technology providers are looking for new areas of growth. E-commerce is the rallying cry for almost every technology company.

Getting Back in Control

Many a manufacturer feels beholden to a powerful retailer or distributor. These companies aren't about to let another important channel evolve over which they have no control. Brick-and-mortar companies are acutely aware of the stakes at hand and have their game faces on.

B2B *vs.* B2C
The Uniqueness of Enterprise Markets

Forget What You Know About Amazon

It's one thing for a consumer to order a book from Amazon but quite another to contract for a turbine engine over the Web. Relationships between customers and suppliers and partners in B2B are much more complex, long term, often contractual, and involve bigger dollars. Exhibit 8 shows a few of the contrasts between B2B and B2C orders.

Exhibit 8
B2B vs. B2C — The Contrasts

	B2B Orders	B2C Orders
Order Size	Average $75K currently	Average $75
Participants	Multiple companies and employees	Consumer direct to merchant
Pricing	Negotiated, long term contracts, auctions, and catalog purchases	Mainly catalog, fixed price
Decision maker	Approvals needed; business rules govern	Single consumer
Procurement catalyst	Demand chain driven for direct procurement; replenishment for indirect	Impulse/casual purchase; advertisement; word of mouth
Selection of e-market or portal	Value, partnership, or equity driven	Brand driven, word of mouth, price, or advertisement
Fulfillment perspective	Availability and fulfillment details more important	Lenient on fulfillment; more likely to wait for backorder product
Credit	Initially credit cards but more complex payments systems on the way that tap bank credit lines	All consumer credit cards
Infrastructure	Local, customized catalog; workflow rules	Browser with Internet access

Source: Morgan Stanley Dean Witter Internet Research.

- **Much Larger Infrastructure to Update:** The infrastructure in B2B is a major impediment to ramping as quickly as B2C. Many systems and business processes have to be restructured, and the associated technology-integration issues could take years to perfect.

- **More Complex Procurement and Fulfillment:** B2C orders are often impulse or spot transactions with a short life span. B2B orders involve many more participants,

are governed by complex business rules of the buyer and seller, have higher purchase amounts, involve products that are more complex, and require that order fulfillment be much more certain and predictable. B2B buyers are more likely to arbitrage multiple sources of supply to ensure availability and price. An Amazon-like message that something "usually ships in 2-3 days" won't cut it in B2B, since the buyer's customer may be waiting for the part.

Transactions in the B2B world engage two supply chains and not just two discrete market participants. Each side wants visibility into the transaction from inception to completion.

- **Portal Brand Means Less:** Branding is critical for B2C portals but only important in B2B. Business will send traffic where they derive value and solve more of their transparency problems while optimizing business processes. It's tougher to market your way around a shoddy product in B2B because there are plenty of people paid to find out the truth.

- **Pay to Play:** Business buyers know the value of purchasing power and will demand more than frequent flyer miles in return. Their decision to direct spending through a particular Web site will in fact make that site viable. That purchasing power has great value beyond the dollars spent, and more businesses will demand equity in return for their relationships.

- **It's Strategy Not Technology:** The decision of when and how to participate in the B2B revolution is a strategic choice and not a technology choice for every company. Assessing the markets in which to buy and sell has implications for channel conflicts, how a company will interact with its key customers, the cost of acquiring and keeping a customer, and which long-term partnerships are of value. These decisions will be made carefully — the complete opposite of the B2C impulse buy.

- **Larger Network Effect:** The network effect so frequently associated with B2C markets is actually even more applicable to B2B markets. B2C e-commerce sites become more valuable as the number of eyeballs on their site grows, but the value to the consumer is generally the same whether there are 5 million users or 10 million users on a site. But in B2B, both sides derive benefit from growth in the network. Suppliers' marketing costs go down as they find buyers more easily and buyers spend less time searching and evaluating the landscape for suppliers in their industry.

- **Domain Expertise Critical:** The complexity of the products as well as the extended pre- and post-transaction services in B2B will require third-party exchanges to demonstrate deep expertise to be credible.

The State of B2B Commerce
Past, Present, and Future — A Quick Summary

Phase 1 — Batch EDI

EDI (electronic data interchange) networks represented the first phase of electronic B2B e-commerce. EDI was designed to process high volumes of highly structured data and will support some $3 trillion in economic activity across more than 250,000 companies in the US in 2000, according to the Commerce Department. EDI sends structured transactions in batch mode. Three vendors — Sterling Commerce, Harbinger, and General Electric Information Services — represent 75% of the EDI market. EDI has had a major impact in reducing errors and shrinking processing times for certain types of transactions — but with significant costs.

Operators of proprietary, value-added networks (VANs) required all market participants to trade through their network using technically rigid, complex standards. VANs are efficient for transactions that fit the model but they are also expensive. Moreover, EDI technology is brittle and difficult to change in a dynamic marketplace. Transactions must be defined according to standards published by the United Nations Standard Messages Directory for EDIFACT (Electronic Data Interchange for Administration, Commerce, and Transport) and transmitted in a pre-defined sequence.

More important, the point-to-point connections of EDI provided no community or market transparency. EDI networks routed transactions between buyer and seller, but the buyer had to already know the seller and the precise product to be ordered and there was no sense of marketplace or community.

EDI transactions are expensive to maintain. Each company had to spend time and money mapping each of its applications involved in commerce to conform to this pre-determined standard. The mappings have to be kept up to date as systems and products change.

The price of entry boxed out smaller competitors. The economics didn't work for more fragmented industries without enough transactions to a given buyer to drive the investment throughout the supply chain.

Exhibit 9

A Quick Overview of the Evolution of B2B Commerce
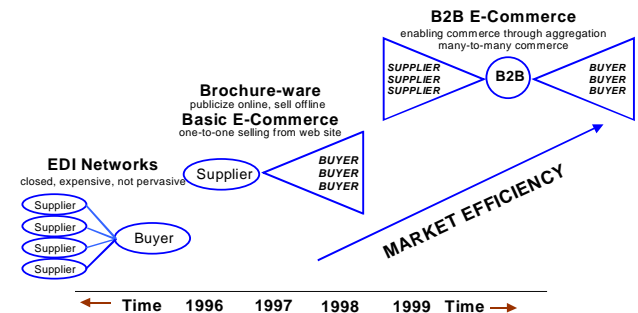
Source: Morgan Stanley Dean Witter Internet Research.

However, we expect batch-mode EDI transactions to have a long life. Many of these orders are **automatically generated out of an ERP system** based on inventory replenishment rules under long-term contracts. Many of these orders are more efficient without human interaction and are governed under long-term contracts. We expect a blended model to evolve in which EDI transactions check pre-selected sources in an exchange before generating an automatic replenishment order. Moreover, we expect many of the EDI networks will move their network participants to a marketplace metaphor over time.

> Pre-configured transactions have a role in e-commerce, and exchanges that ignore them will miss out on a big chunk of the real world.

These are efficient transactions with little need for the community aspects of a marketplace. However, the infrastructure for maintaining these EDI-like transactions will be easier to maintain and provide buyers with a unified view across all transaction types.

Phase 2 — Basic E-commerce

Phase 2 initiated basic e-commerce between buyers and seller without an intermediary. A few early adopters began pushing their Web sites as a primary sales channel (e.g., Cisco and Dell). The early adopters were largely technology companies with technology-savvy customers and little or manageable channel conflict. Dell's direct mail-order model

was a perfect candidate to move to the Web. Phase 2 for most companies was about displaying catalog content and publishing marketing collateral. Most of the initial and current Web sites still present marketing and catalog data with only 15% of them able to accept orders and only 6% able to provide order status information.

Phase 3 —Communities of Commerce

Phase 3 is unfolding and represents the rise of vortexes — *third-party* Web destinations that bring together trading partners into a common *community*. Communities of enterprises create market transparency. Once buyers and sellers start regularly arriving at a common destination, all sorts of possibilities arise, as we'll detail later. Communities

have a value unto themselves. The intersection of buyers and sellers with related interests creates an opportunity to serve a larger percentage of those interests.

Phase 4 — Collaborative Commerce

Collaborative commerce builds on Phase 3 by adding support for other business processes before, during, and after the order. The broad range of interactions that make the chain of commerce work can also be moved online.

Collaborative commerce fills in the gaps around e-commerce. C-commerce is a more complete reflection of the complex workflow between demand and supply chains. But it also accounts for the wide range of interactions, beyond the order, spawned from the chain of commerce.

Exhibit 10
The Four Phases of E-Commerce

	Phase I Batch EDI	Phase 2 Basic E-Commerce	Phase 3 Community Commerce	Phase 4 Collaborative Commerce
Flexibility	Low; rigid format	High, open standards	High, open standards	High, open standards
Costs	High; proprietary network	Low; leverage Internet	Low; leverage Internet	Low; leverage Internet
Business processes supported	Batch orders	Catalog orders	Catalog plus Auction and Bid/Ask	Multiple order forms; B2B interactions
Market transparency	Low; fixed supplier base	Low; no centralized market	High; intergeography transparency	High; intergeography transparency

Source: Morgan Stanley Dean Witter Internet Research.

B2B Exchanges
Functional Overview

Internet Trading Exchanges — Delivering Transparency

Internet trading exchanges are aggregation points that bring buyers and sellers together to create markets for exchanging goods and services. In a sense, exchanges do for commercial transactions what Cisco routers do for bits on the network — switching, routing, and concentrating traffic.

> Like other commercial exchanges throughout history, Internet-based exchanges enhance market liquidity and lower transaction costs by aggregating buyers and sellers in a single medium.

Exhibit 11 shows the classic functions of financial exchanges.

Exhibit 11
How the Markets Benefit From an Exchange

Buyer discovery	Aggregate buyers and discover new customers
Supplier discovery	Aggregate suppliers and discover new sources
Price transparency	Determine market price
Product/Service transparency	Determine product/service alternatives
Availability transparency	Determine product availability across the market
Transaction execution	Consummate transaction
Transaction integrity	Document and enforce transaction for both counter parties
Credit risk management/ assessment	Market financing

Source: Morgan Stanley Dean Witter Internet Research.

Bringing Exchanges to Industry

Although the stock exchanges have provided these benefits for quite some time, Internet exchanges require some specific features to make the concept viable in other industries. The key processes and technologies required to maintain the market include:

1. **Requisition routing and approval**
2. **Supplier sourcing**
3. **Order matching**
4. **Fulfillment**
5. **Settlement**
6. **Content Management**

1. Requisition Routing and Approval

The purchasing enterprise typically has an internal approval process for orders over a certain size, and they aren't about to let employees go clicking away unchecked. Procurement software codifies the approval process in workflow technology that can be modified as corporate policies change. Requests are routed to the appropriate managers for their approval. Companies like Ariba, Commerce One, and Oracle got a jump on the market by recognizing that this initial "procurement window" was the gatekeeper to the purchasing process and the interface that users see on the desktop.

Most Internet exchanges don't provide this feature, but instead, they partner with Ariba or Commerce One to hook in their workflow and approval process so the customer can keep business rules in one place. Companies aren't yet comfortable leaving these rules in the exchange and want them on site, behind their own firewalls, at the moment.

2. Supplier Sourcing

An exchange has to source suppliers to sell through its network, which is part of the value. Much like a distributor, the exchange does the legwork to find the suppliers and get them registered in the marketplace. Sourcing networks operated by consulting firms such as AT Kearney have long provided strategic sourcing to secure contracts for quality, availability, and price.

To get content quickly, most exchanges have simply bought supplier lists from aggregators and loaded them into a directory with no detailed product descriptions, availability information, or fulfillment capabilities.

Buyers demand to know more about the supplier as the importance and amount of the purchase grows. **This process**

will take longer than anyone thinks, in our view — someone has to knock on doors and sell thousands of suppliers on the concept and provide the technical integration services.

3. Order Matching

Order matching, a core exchange function, takes different forms depending on the market-making technique.

- **Catalog Order** — the buyer browses a catalog to identify a fixed-price item; most items are too low-priced to justify negotiation. This is the most popular order-matching technique. Some industries require advanced configuration technology to build an order to a working system (e.g., only order the monitor that works with the computer in the shopping basket).

- **Dynamic Pricing** — for product that trades frequently with volatile pricing; the exchange matches the order real time as bids and quotes come into the marketplace. Real-time bidding is most appropriate for commodity-like products with standard identification and semantics, volatile pricing, and substantial volume so that small changes in price are important to the participants. The volatile pricing might occur from changes in capacity, supply, or demand.

- **Auctioning** — the auction process usually involves infrequently traded or unique items that can significantly vary in value depending on the buyer. Equipment disposals represent approximately 15% of annual capital expenditures each year, so there is a lot to work with here. Less than 1% of corporate goods and services were obtained through auction last year. We expect that figure to reach 5% by 2003.

- **Request for Proposal** — technique to facilitate complex requisitions in time. A transaction in time with detailed specifications online and bids are consolidated and compared. Appropriate for project-oriented work — e.g., systems integration and construction.

We think the most successful exchanges will use a mix of all these models. Several software companies have packaged trading functionality to sell to any exchange. Moreover, some of the horizontal exchanges are buying these software companies (such as Ariba's purchase of Trading Dynamics and Tradex, Commerce One's purchase of Commercebid.com) to offer these services on a private-label basis or as a generic service within a horizontal exchange. Moai Technologies and OpenSite are independent companies specializing in auction software.

The trading applications will get more sophisticated with derivatives and forward contracts in some industries. Legislation is under way to regulate net markets as a result.

Exhibit 12
Industries Appropriate for Dynamic Pricing
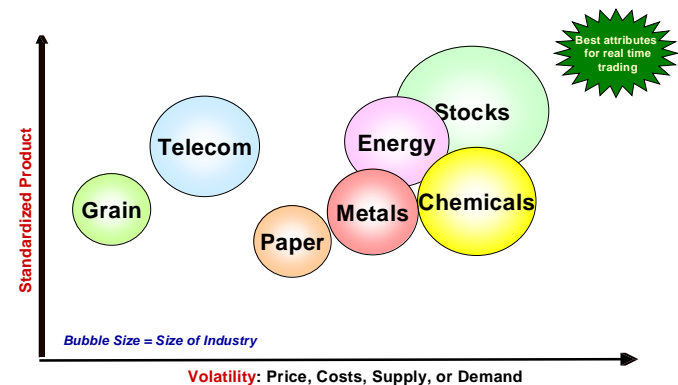
Source: Morgan Stanley Dean Witter Internet Research.

Exhibit 13

Types of Order Matching

	Temporal Matching	Pricing	Good Fit
Dynamic pricing	Real time, frequent trades	Volatile; real time	Commodities; narrow selection; spot buys
Catalog	Recurring orders	Standard or negotiated pricing	Standard products; broad choice; Industrial markets
Auction	Infrequent trades	Wide disparity depending on bidders	Standard and non-standard products; used equip; program buys
RFP	Weeks or months per transaction	Custom pricing; negotiated	Complex services and products; custom specs

Source: Morgan Stanley Dean Witter Internet Research.

4. Fulfillment

Fulfillment is the most complicated, costly step but also the step with potentially huge cost savings. A matched order sets off a complex series of events that lead to shipment and delivery of the product. B2B orders are larger and more critical for the buyer, since the buyer may have a customer waiting or a plant down waiting for the part.

Fulfillment gets complicated because of exceptions (backorders, partial shipments, returns, substitute products, incorrect orders, changed SKUs). The exceptions are expensive to resolve because they are so labor-intensive. Moving the fulfillment process online should lower the number of exceptions since the buyer or technology will be able to resolve many of the issues in real time.

> Buyers would like to confirm product availability before they hit the buy button, which isn't the case for most online orders today.

Manufacturers need broad product lines to be competitive and meet a wide variety of buyer preferences. Yet they can't afford to build all products in unlimited quantity and have to guess which portions of the product line will sell well for a given production horizon.

All that translates into stockouts and backorders or, conversely, excess inventory for the supplier. **As a result, buyers want to reduce their risk of getting a backorder or stockout.** They'd like to see detailed information about inventory and production capacity (available to promise, capable to promise). **Instead of ordering and waiting for order status information, buyers would like real-time availability information and the ability to reserve products by serial and bin number.**

To date, exchanges have at best served as a rudimentary communications mechanism for shipment status. Most exchanges send the order to the supplier and leave the rest of the fulfillment and settling process to the trading partners who handle things offline. Some exchanges require the seller to send order status within 24 hours, but the information isn't in real time or up to date, and more often, the buyer and seller handle fulfillment offline. Most exchanges can't verify inventory before the order because they haven't integrated tightly with the supplier's back-end systems.

Over time, the online fulfillment process will get much more sophisticated, as we'll discuss later. More suppliers will move toward build-to-order environments and allow buyers to reserve manufacturing capacity on the fly.

Certain markets need anonymous order matching (e.g., the seller may not want the market to know about an excess inventory condition). In that case, the exchange may have to take title and move the goods immediately to the buyer. In those cases, the exchange is much more involved in the fulfillment process.

5. Settlement

Exchanges are largely relying on P-Cards (procurement cards which are similar to debit cards) and credit cards for financial settlement of orders. Third-party vendors such as Cybercash and CyberSource handle credit card authorization and fraud detection, but they are designed for consumer credit. Purchase sizes are small at the moment; larger transactions will require larger credit lines and a different fee structure than consumer credit cards. Average order sizes vary between $50,000 and $250,000 for most of the exchanges we've seen.

However, more sophisticated payment systems are in the offing that are more attuned to business commerce. We expect to see payment systems that authenticate and escrow existing lines of credit real time. These systems may also

have to accommodate barter transactions. Companies like eCredit are building B2B payment networks with fee structures that reflect the lower credit risk of corporate customers.

6. Content Management

Displaying merchandise for sale through an online catalog is a fundamental requirement without which an exchange has a tough time existing. While a directory of suppliers can provide some supplier transparency, the catalog documents product, price, and sometimes availability transparency. Moving the catalog online makes it dynamic; suppliers don't have to wait for the next printing of a paper catalog to change products and prices.

> Catalog management is much more complicated than it sounds. Most of the catalogs were designed for paper publishing, where space is at a premium.

Consequently, most catalogs contain numerous, inconsistent abbreviations, and choppy descriptions. Many don't match the published prices. Additionally, the catalogs are full of errors that have mounted over the years — different units of measure or obsolete products. Before the catalogs can be moved online, they usually need major, manual conversion work along with a technology upgrade.

The content must be properly categorized for parametric searching. Categorization of content is a special skill set with direct implications on how easily customers of the exchange can locate products to procure. Mistakes here are hard to recover from.

Large customers tend to want to host their own multi-vendor catalogs behind their firewall, although many are discovering this is more work than they wanted. Companies add proprietary content and rules to the catalog to control purchasing behavior. Ariba, Commerce One, Requisite Technology, TCN, and Aspect Development market technology to help companies aggregate catalogs from their suppliers and add proprietary content. Customers then use procurement software to browse their own catalogs and submit orders that get routed to the supplier through the exchange's network.

As an alternative, the exchange can host catalogs from multiple suppliers in the network, a service that Commerce One, Grainger, and TCN provide. Hosted multi-vendor catalogs can still contain negotiated, private prices between business partners and other content that remains public. Aggregated catalogs don't imply all suppliers will be thrown into a common electronic pot and whipped into a competitive frenzy. Some suppliers will only show their content to selected customers. Some customers will not allow their suppliers to show certain content to the competition. **Whatever the mix of public versus private content, the procurement process will be richer and more efficient online.**

The last alternative is to let the supplier maintain its own catalog, and the exchange simply provides a high-level index of catalogs available, which is Ariba's approach. Ariba simply "punches out" to the supplier's catalog on its site, so that it is always current. Commerce One recently announced a Round Trip option as well.

Then comes the problem of keeping them current. On average, suppliers change 25% of the product descriptions each year and 125% of the prices. An indexing approach puts the burden on the supplier to keep the catalog current and readable. But there is a price to this approach — most suppliers aren't very good at maintaining catalogs. They contain many errors and are difficult to search.

Some exchanges are providing labor for catalog cleanup and prefer to host the content themselves (e.g., Commerce One). Others are providing suppliers with software tools to maintain their catalogs and integrate into the exchange. The burden of maintaining these catalogs will likely prove too much for most suppliers, and they'll end up outsourcing.

Exhibit 14

Where to Host the Catalog — The Trade-Offs

	Supplier	Exchange	Buyer
Latency	Low	Medium	High
Customization	Low	Medium	High
Administration	Medium	High	High
Setup	Medium	High	High
Richness	High	Medium	Low

Source: Morgan Stanley Dean Witter Internet Research.

What's in It for the Buyers?
Transparency and Control — but Spending Will Shift Slowly

Buyers always want market transparency, and if they can get that without sacrificing security, anonymity, reliability, product quality, or supplier relationships — it's almost irrational not to arm oneself with market intelligence. Buyers can discover new sources of suppliers, product availability, and accurate market rates.

Net markets can lower the cost of discovery for buyers looking for new supplier, product, or availability alternatives. Buyers will find it easier to identify, qualify, and measure the performance of new suppliers.

Buyers aren't always looking for new suppliers for every product. In some cases they may want the opposite — supplier consolidation. But it's difficult to aggregate market intelligence in B2B markets since the transactions and prices are private and negotiated. Beyond marketplace transparency, there are plenty of other goodies in the net market bag for the buyer to include, such as the following:

Corporate Policy Enforcement

Most companies have poor control over spending. They can allocate total budget amounts but have little control over exactly when and what employees buy.

Early adopters of procurement applications, after moving purchases online, have been surprised to learn how often they weren't receiving pre-negotiated discounts or rebates. Pricing and billing errors pop up all over.

Buyers can implement corporate purchasing policy by specifying workflow rules in software. The rules can specify approval procedures, purchasing limits, preferred suppliers, and volume purchasing agreements.

Control of Maverick Buying

The National Association of Purchasing Managers estimates that **one-third of all corporate purchases are out of compliance with volume purchase agreements.** Maverick buyers go outside of these contracts for reasons of convenience. **On average, maverick buyers pay 18-27% above the VPA price**. Procurement software integrated into a net market offers the potential of greater convenience and efficiency — even when compared to the maverick buy.

Moreover, companies can control the maverick buying by channeling all approvals and funding through the procurement software.

Lower Administrative Costs

The cost of processing a purchase order manually ranges from $125 to $175. Online procurement can lower that cost to $10-15 per order as a result of faster approvals and easier, asynchronous communication with suppliers that eliminate faxes and phone calls.

British Telecom estimates it has reduced its procurement costs from $113 to $8 per transaction via Commerce One's BuySite technology.

Process Transparency

Buyers can view and track the purchasing process since all steps are documented online. Frequent purchasers, high-volume products, problem business units, and poorly performing suppliers all stand out.

Availability Transparency

Finding product available for shipment today is of great value to business buyers. The assurance that product is available prevents double-ordering or frustrating stockouts.

Buying Consortiums

Large buyers can aggregate their purchases with a few select suppliers and get below-market prices in exchange for guaranteed volume. In turn, they can offer smaller companies a chance to enjoy the same low prices for a fee by forming a consortium. This Robin Hood effect of giving weaker buyers a chance to obtain lower pricing is limited to certain types of lightly engineered goods, since highly engineered products are considered proprietary differentiation.

Supplier Measurement

Buyers can measure the performance of suppliers like never before. Every detail from stockouts and delivery records to quality, return processing, and product selection can be documented and analyzed. As a result, the market will penalize poor suppliers more quickly and reward strong suppliers more handsomely.

Disposal Markets

Buyers turn into sellers at the end of the equipment life cycle when they have to dispose of used equipment. Exchanges with auction services offer a low-cost way to maximize the sale price on disposal, which is significant, since disposal equates to about 15% of capital spending each year.

End-to-End Procurement Cycle

Online procurement creates the possibility of an end-to-end integration of the purchasing cycle. Buyers can look deep into their suppliers' systems to check inventory before ordering, configuring products, scheduling production and receiving, optimizing logistics, and coordinating and planning supply chain activities.

Collaborations and Value-added Services

Once the procurement process is moved online, the infrastructure is in place for buyers to layer in other business processes.

Eliminate Redundancies

Buyers can eliminate redundant purchases within the same organization or double orders because of the lack of order-status information.

Money! Funny how giving away money always works as a marketing tool. Offering buyers pre-IPO equity for procuring products they already planned to buy through your marketplace is becoming a popular sales tool.

Stratification of Enterprise Buying

In our opinion, buyers won't move all their purchases online as quickly as the pundits are predicting. Buyers procure differently depending on the importance of the product, volume, urgency of the purchase, and cost.

- **Spot Buys:** Ad-hoc purchases for emergency needs, research, small orders, and inventory backfill. Convenience of purchase important. Potentially many suppliers.

- **Repeat Buys:** Recurring purchases but multiple supplier relationships. Usually rebid. Auctions and RFPs . More limited number of suppliers but relationships not strategic.

- **Program Buys:** Long-term contracts; strategic relationships; volume purchase agreements.

We believe spot buys dominate net market purchases at the moment, which is consistent with indirect materials taking off first in the market.

Repeat buys are more important and strategic and will start to move online next, in our view. Finally, program buys are strategic and long term in nature and tend to involve propriety or highly engineered products. The purchases are larger, and this segment of buying represents the largest dollar volume portion of the market. However, most of these purchases will likely be sourced and negotiated off line but executed and managed online.

How Far Could All This Go?

How extensive could the reach of all this digital collaboration go? Well there aren't many questions of the day that can't be answered at the barbershop. Yep, most things in life get a thorough examination via vigorous Socratic debate right there in the barbershop. Two years ago the barber said since he couldn't ship haircuts in the mail and his customers couldn't FedEx their heads, the Internet was useless for him. As of a few months ago, he is now ordering replacement supplies online and accepting appointments via e-mail.

Moving Spending Online… It Will Be a Trickle and Not a Flood

> Migration of spending volume to exchanges will be much slower than investors are presuming.

Based on hard contracts we've seen between brick-and-mortar companies (BAMs) and exchanges, even for

motivated buyers and sellers, there are significant impediments to moving commerce online quickly.

- **First, much of the spending in many industries is under long-term contracts** and pre-negotiated prices (up to 60% of the volume in some industrial and commodity markets). The program buys are already price-efficient in many cases, but strategic auctions from companies like FreeMarkets can still enhance transparency because sourcing can still be a key problem.. Trading partners might move program buys online as well if an exchange can come up with enough administrative savings and fulfillment functionality to justify the transaction fees. Transactions under program buys will take place with or without an exchange, so the exchange has to add value in other ways to justify taking a piece of the action. Partners could manage periodic drawdowns under long-term contracts through the exchange.

- **Second, the spending can't migrate until the exchanges build enough functionality** to handle the unique order management requirements of each industry. In some industries, each order needs detailed specifications and instructions that don't fit into a standard catalog. Specification and configuration of the order can get complex.

- **Third, buyers won't pay higher prices to use an exchange so the low-cost suppliers have to offer products online**. If the initial suppliers online are above market pricing and the lower cost suppliers, already leery of increased price competition, take longer to join, the pace of migration will be slow.

- **Fourth, some companies already have significant online relationships with their key customers.** Companies have built proprietary procurement and fulfillment systems that are tightly linked to backend systems. Some are selling or buying through their own or their partner's Web site. Many will be cautious about foregoing those investments. Additionally, most of these proprietary systems have more functionality than exchanges can offer today. We expect companies to retain many of these systems for their top customers and use the exchange for less important customers, smaller orders, and new customers. In many industries, the exchanges will have to survive off the spot buys for quite some time.

- **Fifth, many buyers and sellers want to preserve their options.** If they aren't equity owners in an exchange, they may be uncertain as to which exchange will dominate in their industry of it one survives at all. Many are fragmenting small spot purchases across several exchanges to experiment but haven't done anything strategic.

These are all real considerations that could cause buyers and sellers to move more slowly than molasses in the wintertime.

> Whether or not buyers plan to join a marketplace, they can still benefit from purchasing procurement software, and most of them plan to do so

Buyers may elect to use procurement software, host their own catalog, and submit orders to suppliers they already know. This option forfeits the benefits of a central marketplace — namely transparency and discovery functions — but some buyers don't feel they need those benefits. Under this scenario, buyers still lower the cost of procurement and implement procurement rules more easily.

In the latest **Purchasing Magazine** *survey, 17% of purchasing managers had bought procurement software, but another 70% planned to do so.* About 8% had joined an electronic marketplace, but 71% said they would use one in the future. Thirty percent were already using proprietary sell-side systems administered by suppliers, but find them difficult to use with no uniform interface.

Exhibit 15
Stratification of the Enterprise Buy
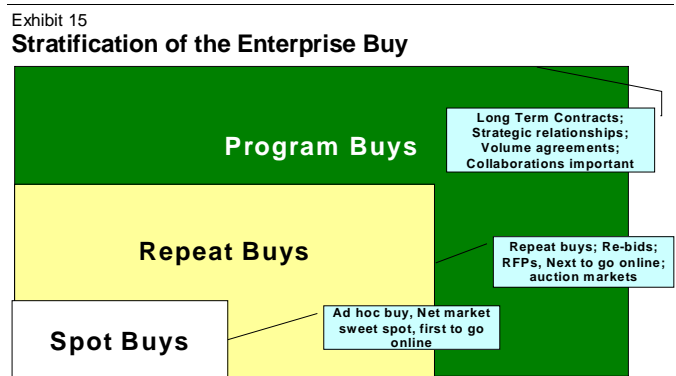
Source: VerticalNet, Morgan Stanley Dean Witter Internet Research.

Exhibit 16
The B2B Buyer's View
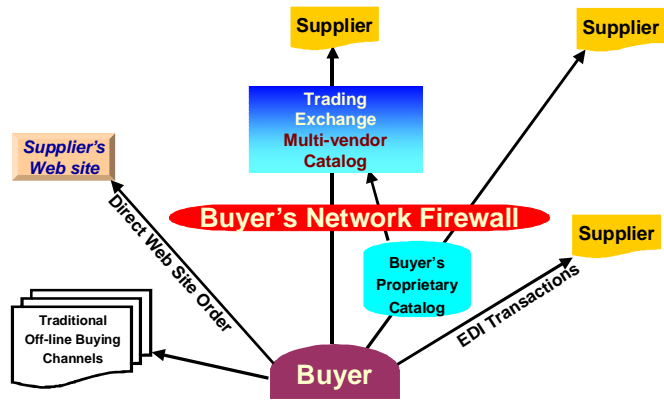
Source: Morgan Stanley Dean Witter Internet Research.

What's In It for the Suppliers?
The Strong Could Get Stronger; Aggregation

> A supplier we spoke with summed up the question best:
>
> "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 take my razor-thin margins down to microscopic level. Finally, I get to pay transaction fees for this privilege. What am I missing?"
>
> — *Company name withheld on request*

Well we didn't say this B2B thing was perfect. But hear us out. Suppliers do get some significant benefits. The initial evidence doesn't suggest that all sellers will get ground to bits in relentless online auctions.

After examining data from several online auctions, we noticed that the low bid was selected only about half the time. For some product segments, the low bid was rarely selected. Different buyers respond to different selling points. Price is a key metric but so are quality, availability, quantity, warranties, total life cycle costs, service, relationships, and brand.

Buyers can procure with more confidence in the prices they receive and will likely enjoy more uniform pricing. Online pricing serves as a check on the system to prevent aberrant pricing. But not everything fits the "beat them until they break" pricing approach. You might reverse-auction services for yard surgery but not for brain surgery.

Besides, sellers should realize some key benefits as well:

- **Aggregation of small orders:** Suppliers have used distributors for years to avoid servicing small clients and small orders, which are expensive. Suppliers get to ship in bulk and concentrate on producing quality products and servicing large customers and distributors.

- **Lower customer acquisition costs:** Suppliers can discover new buyers at much lower costs as compared to traditional marketing avenues. If customers are already in a centralized market, half the journey is complete since they can be found.

- **Convenient ordering generates more transactions:** If buying is convenient and information about the product, company, and market is readily available, buyers tend to purchase more often and in larger quantities. *In fact, some of the early adopters of procurement systems have complained that employees have gone "click crazy", as if they are using Amazon.com.* They're less likely to scrounge for the box of pens in the back closet if they can click once and have it delivered to their desktop.

- **Lower selling costs:** Orders configured online contain fewer errors. By some estimates, up to 40% of all orders have to be reworked because of errors, incompleteness, miscommunication, or mishandling. Moreover, buyers are likely to see all available options and expand the order. **Competitive advantage will be discovered more quickly:** Strong suppliers with differentiation will welcome a centralized market. Like great athletes that can showcase their talent at the Olympics, a global marketplace is more opportunity than risk if a supplier has the goods. Businesses built around buyers' ignorance of alternative choices will have to revamp.

- **Anonymous posting of excess inventory:** Suppliers sometimes need anonymity in a market. Some exchanges exist solely to distribute excess inventory anonymously (e.g., VerticalNet NECX — memory chips). Suppliers don't want competitors or buyers to know they have excess inventory, and the buyer may in fact be a competitor who is in short supply.

- **Market Intelligence:** Exchanges will give suppliers a much better view of market conditions, and savvy suppliers, as always, will serve unfilled needs in the market as they identify them. The ability to conduct promotions, measure the result, and continuously adjust to new information will increasingly be a core competency for suppliers.

- **Online collaborations could bring suppliers and buyers closer:** This is the real win. Remember the second and third problems that businesses were trying to solve. The first was market transparency but the second and third had to do with business-to-business interactions — lowering administrative overhead and

reducing channel inventory. **Many collaborations don't generate a purchase transaction immediately but are nevertheless critical to B2B relationships (planning, scheduling, product life cycle management, support, etc).** As trading partners move their business online, they can move other labor-intensive processes online and streamline their entire supply chains. **All the events before, during, and after the order can also move online. We'll discuss these collaborations in more detail later, but the key point is suppliers can tie themselves in more closely to buyer supply chains.**

- **Some sellers will see higher prices.** Resale data from online auctions and scrap pricing already show an uplift. These sellers have had difficulty finding the appropriate buyers for their unique materials. The price in this scenario is driven by how many buyers show up which is partially a function of how many of them know about the sale.

Of the 56 commodities tracked by *Purchasing Magazine* across seven categories (ferrous metals, nonferrous metals, pulp, paper & paperboard, wood, chemicals, plastics, and electronic components), all but five commodities are higher in price versus a year ago.

> Exchanges won't change the basic precept that prices are a function of supply and demand, and prices have been trending up for many commodities.

The Seller will view marketplaces as one more channel of many channels to discover customers and accept orders. Most will still market their wares on their Web sites and through off line channels.

Exhibit 17
The B2B Seller's View
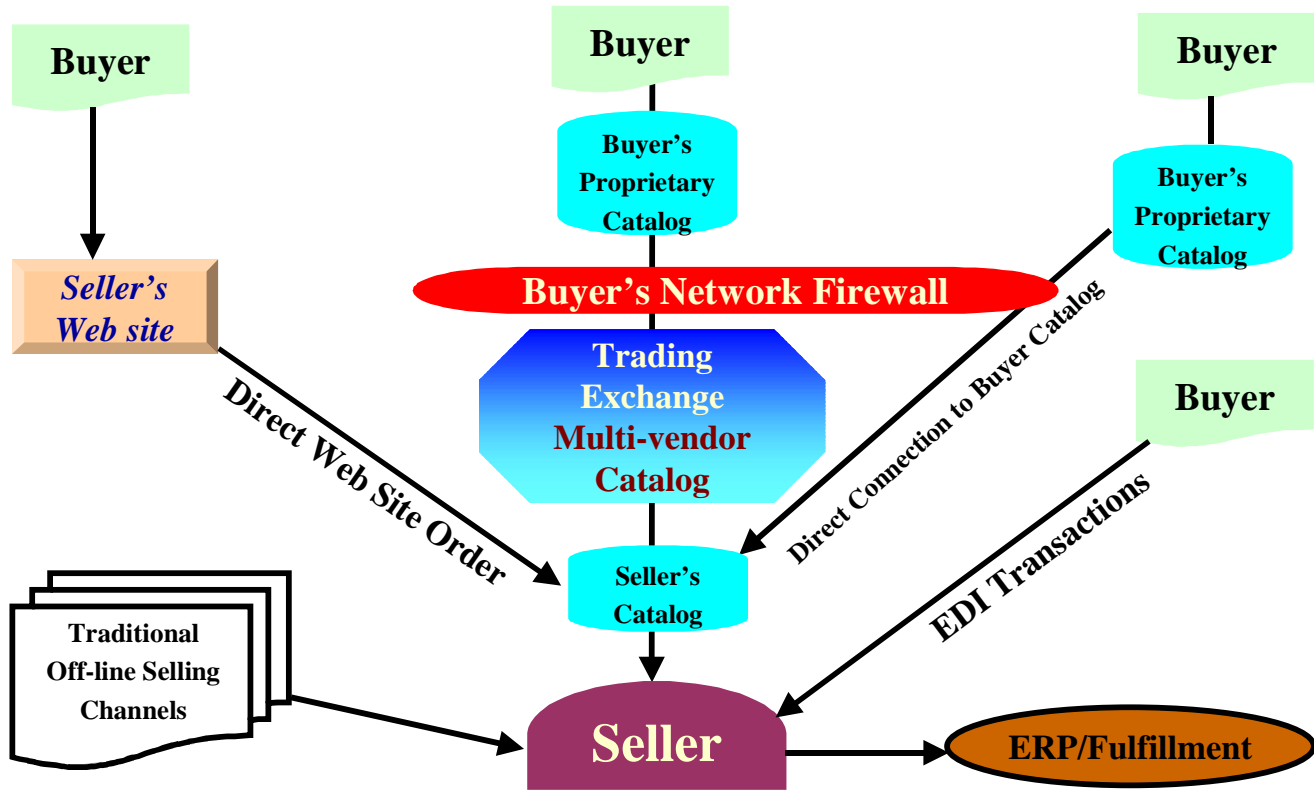
Source: Morgan Stanley Dean Witter Internet Research.

Market Sizing
Big Potential, but It Will Take Time

Great Expectations

There are almost as many estimates for the size of the B2B commerce market as there are businesses operating in it. The hype is big, but the numbers are small today by any measure. Yet the potential market as measured by the amount of B2B spending that could shift to a new channel is quite impressive.

Our Approach to Sizing the Market

We've met with dozens of brick-and-mortar companies as they construct and finance their e-commerce plans. We've seen hard numbers and specific rollout plans from some of the world's largest companies.

Based on that perspective, we've extrapolated aggregate assumptions on how quickly industry at large could shift spending online. We built in a small discount in the growth rate, since we've been speaking with the early adopters. Moreover, many of the companies we spoke with were motivated because of equity ownership in the exchanges in which they participated.

Not all procurement can move online easily. Spot buys are one thing, but longer-term program buys are more difficult, as we detail later.

Exhibit 18
Global Revenue of Large Companies
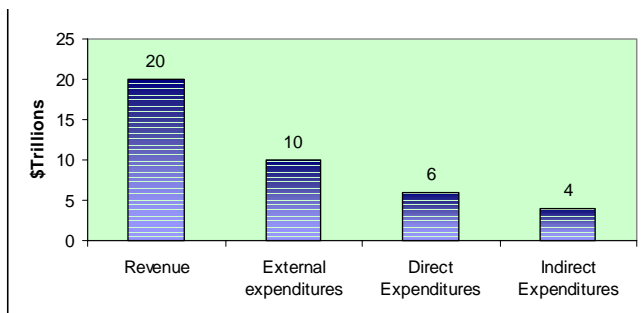
Source: CoNext, Morgan Stanley Dean Witter Internet Research.

We examined available external spend for products and services among all companies with $500 million or more in revenue. On $20 trillion in revenue, those companies spend $10 trillion. We made no adjustment for double counting (distributor revenue, etc.).

Using the spending plans of the brick-and-mortar companies we've met with, we assumed 2% of this spending can move online in 2000 with a step-up to 7% and then 13% in 2001 and 2002. Those numbers suggest $200 billion in online B2B purchases in 2000, growing to $720 billion and $1.4 trillion by 2001 and 2002, respectively.
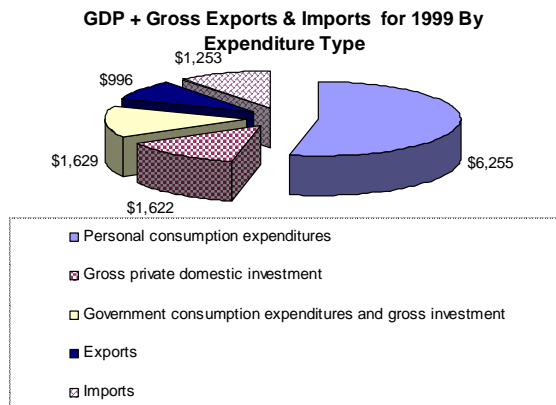
Exhibit 19
B2B Market Sizing

	2000	2001	2002
Revenues ($billions) for companies > $500 million in revenue	20,000	20,600	21,200
External Expenditures ($billions)	10,000	10,300	10,600
Percent Online	2%	7%	13%
Gross Online transaction volume ($ billions)	200	721	1,378

Source: Morgan Stanley Dean Witter Internet Research.

As another check, we looked at B2B from a macro-economic perspective. In 1999, the US gross domestic product reached $9.3 trillion in an economy that continues to surprise on the upside. Looking at the components of GDP, the consumer segment represented by personal consumption expenditures comprised 68% of the total. Clearly, consumers are still the engine that drive the economy.

However, that figure doesn't portray the full B2B, since exports and imports are "netted" to arrive at the domestic output figure. To get a view of the total transaction capability associated with the exchange of goods and services between businesses, we combined the non-consumer segment of GDP and added gross imports and exports, which are predominantly B2B transactions.

Exhibit 20
U.S. GDP Segmented by B2B Commerce Category

GDP + Gross Exports & Imports for 1999 By Expenditure Type

$1,253
$996
$1,629
$1,622
$6,255

- Personal consumption expenditures
- Gross private domestic investment
- Government consumption expenditures and gross investment
- Exports
- Imports

Source: Morgan Stanley Dean Witter Internet Research.

GDP plus exports and imports suggest relevant B2B economic activity of $5.5 trillion. We estimate 1% or $55 billion of that activity was facilitated through an online medium (online marketplaces, catalogs, Web storefronts).

An important point to appreciate is that the bulk of the growth in GDP is likely to come from e-commerce. The absolute change in the GDP in 2003E is roughly the same as the contribution from e-commerce. We expect that online channels will begin to eat into traditional channels at an accelerating pace.

Exhibit 21
Gross Domestic Product

(Billions of dollars)	**1999**
GROSS DOMESTIC PRODUCT	9248.4
Personal consumption expenditures	6254.9
Durable goods	758.1
Nondurable goods	1841.1
Services	3655.7
Gross private domestic investment	1621.6
Fixed investment	1577.4
Nonresidential	1166.5
Structures	272.6
Equipment and software	893.9
Residential	410.9
Change in private inventories	44.3
Net exports of goods and services	-256.8
Exports	996.3
Goods	697.5
Services	298.8
Imports	1253.1
Goods	1048.9
Services	204.2
Government consumption expenditures and gross investment	1628.7
Federal	570.8
National defense	364.7
Non-defense	206.1
State and local	1057.9

Source: U.S. Commerce Department, Morgan Stanley Dean Witter Internet Research.

Exhibit 22
B2B Economic Overview

	1999	2000	2001	2002
US B2B GDP	5.5	5.7	5.8	6.0
ROW B2B GDP	12.8	13.2	13.8	14.4
Global GDP	18.3	18.9	19.6	20.4
% of Global B2B GDP from E-commerce	.3	1.1	3.7	6.8
Total Global B2B E-commerce	50	200	721	1378

Source: U.S. Commerce Department, Morgan Stanley Dean Witter Internet Research.

B2B Exchange Taxonomy
Functional Profiles and Pricing Models

Taxonomy of B2B Exchange Models

We've identified four general exchange types under which there are many variations

• Buyer-Managed

• Supplier-Managed

• Distributors/Market Makers

• Content Aggregators

Buyer-Managed

Large buyers have established their own exchanges, most of them private, and usually in conjunction with technology partners. Sourcing networks, a consortium of buyers aggregating their purchases (e.g. CoNext), would also fit under this model. In most cases, the buyer is looking to more efficiently manage the procurement process, lower administrative costs, and ensure more uniform pricing. Most of the buyer-managed exchanges are private and inside the firewall of the buyer. Content is hosted and managed by the buyer.

However, some are public, placed in a separate venture, and are meant to attract other buyers in the same industry (e.g. GM/Ford/DaimlerChrysler). Suppliers are getting requests to push their catalogs through these private and public exchanges. These exchanges are easier to set up since the buyer often has the power in the relationship.

Supplier-Managed

Producers with dominant market share or limited, proprietary product establishes supplier-managed exchanges. Large suppliers or distributors (e.g. Works.com and Grainger.com) that serve fragmented, small buyers may be better served by running their own marketplace since their customers might alternatively set up a series of small buyer-managed exchanges.

Distributors/Market Makers

Distributors/Market Makers are independent exchanges not dominated by buyers or sellers. These firms tend to be venture-backed and were early dotcom innovators (e.g., Ventro, Instill, Healtheon/WebMD). The distributors take title to provide anonymous delivery and live off product mark-up. Market Makers are pure exchanges that thrive off order matching and transaction fees. Some of these can be specialized by transaction types (auction houses versus real-time bid/ask).

Content Aggregators

Content aggregators take on the messy job of building and maintaining multi-vendor catalogs. Our research suggests that some 60% of suppliers maintain their catalogs on paper. The remaining 40% have digital catalogs that are in poor shape with tons of abbreviations and redundancies and were designed for machine to machine interaction. Companies like Requisite Technology are willing to scan in content off paper, clean it up, categorize it, and structure it for parametric searching. The inability to move catalogs into a digital, user friendly format for mass searching and use is a major stumbling block for net market makers.

Once the content is cleaned up, content aggregators maintain the catalogs as a service and allow customized content per viewer/customer. Supplier can submit changes to the content with powerful tools and the content aggregator approves it before placing it online.

In some industries, the content aggregator can create significant value because of inconsistent semantics across the industry. Instill.com, for example, has spent the last couple of years sifting through all the incompatible product codes across multiple distributors in the food industries. Buyer-operators have to use dozens of different product codes, descriptions to order a single product for all their food establishments across multiple distributors in different regions. Because of the lack of common semantics across

the industry, the food establishments can't track spending across product categories to monitor negotiated rates and rebates. An industry catalog that aggregates and normalizes that content has significant value.

B2B Exchanges: Some Functional Profiles

Several market roles for exchanges have emerged already and we expect the more successful exchanges to take on multiple roles over time. To date, we have seen the follow*in*g market roles:

- **Capacity Brokers** — rid the industry of excess capacity; solves a problem and helps pricing; anonymous trading

- **Gray Market Facilitators** — for used and resold equipment away from the original manufacturer

- **Collaboration Platforms** — enterprises Internet use the exchange as an integration and collaboration platform for improved efficiencies and process visibility; many business processes beyond buying and selling

- **Spot Buying** — emergency supplies and ad hoc needs for research

- **Distributor Networks** — distributors can load-balance inventory with each other; car dealer model

- **Proposal Publishing** — Request for Proposals to initiate complex transactions in time; start of process but post contract project management continues for months

- **Private Exchanges** — closed communities; supply chains dominated by one anchor tenant; private sourcing networks; closest to EDI

- **Industry Community Boards** — Industry meeting place; trade journal replacement; discussion forums; Web conferences

- **Auctions** — matching between buyers and sellers of unique items of uncertain value such as used equipment and perishable products

- **Market Makers** — matching of buyers and sellers for real-time pricing of commodity items with known attributes

- **Barter Markets** — product for product trade for inventory balancing, replacement of currency in inflationary economies, or trading partners looking for alternative liquidity

The revenue streams from successful exchanges will come from a broad array of services. The initial focus has been on transaction fees or commerce revenue as goods and services are procured through the exchange. But we've identified four categories of revenue for exchanges as follows:

Commerce Revenue:

Transaction fees — Usually range from 0.5% of the transaction to 8% on more complex transactions. Most of the exchanges seem to be settling in the 1-2% commission range for catalog orders. Commerce One charges flat fees for processing transactions - $1.00 for a purchase order. But it charges for different types of fees (invoice, payment, shipping document, bill presentment, and cash transfer). In a sense these approach is more like a document toll gate and isn't tied to the size of the transaction

Subscription fees — Some exchanges, such as AMO, have opted for flat subscription fees for the full year on anticipated usage. Most will try to migrate those subscriptions to per transaction charges when the time is right, but that will be a challenge. One exchange lost half its sellers after instituting these fees. Flat fees encourage use and avoid the use tax associated with straight transaction fees.

Auction services — Auctions have been commanding a higher premium since there is sourcing work required. Generally, exchanges have gotten 3% on auctions, but those fees are headed down as well as auction services become commonplace. Commerce One is offering auction services for 1%.

Mark up — Some exchanges take the title to goods and mark up the goods to what the market will bear. This a typical reseller agreement; the markup ranges from 5-10% but varies widely. Markup introduces additional risk for the exchange since the margin for the exchange is dependent on the product pricing above costs instead of fixed transaction fees.

Membership/Storefront fees — Charges to a merchant to list its catalog and promotional material in a segmented storefront in the exchange; to date these fees have ranged from free to $15,000 annually from what we've observed.

VerticalNet pioneered this model by selling a member supplier a separate segment in the marketplace to post its wares. The arrangement is somewhat like a personal Web site within the marketplace.

License Fees

Some exchanges develop proprietary software for use at the buyer's or seller's site.

Show Me the Money — How Do Exchanges Pay the Bills?
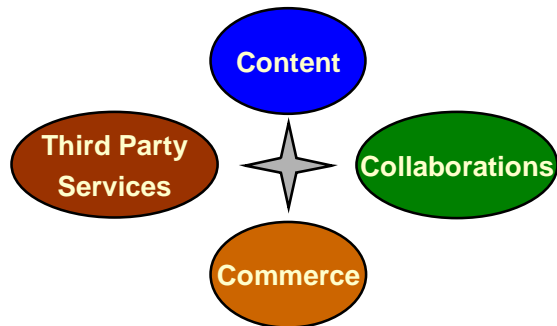
Content Revenue

Advertising fees — similar to B2C; usually a smaller target audience but highly qualified. The rate depends on the number of impressions and the audience.

Catalog — service charges for cleaning up, loading, and maintaining product catalogs for merchants and buyers who want their own proprietary catalogs hosted in the exchange.

Data Mining and Industry Metrics — The exchange will collect valuable statistics about all aspects of market behavior. Much of those data will be sold in aggregate form to a highly receptive audience.
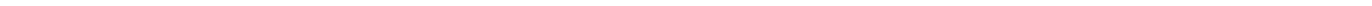
Collaborations Revenue

A broad range of interactions between trading partners coordinated by the exchange. In this role, the exchange facilitates coordination and synchronization of workflow between members of the demand and supply chain.

Third-Party Services

We expect the market for add-on vertical and horizontal services to explode. These specialists will likely market their services to multiple exchanges and share the service fees with the exchanges. The exchanges will act as a reseller and good seal of approval for third party services offered in the marketplace.

Start-up Costs

From what we've seen to date, start-up costs range from $12-$50 million to get an exchange operational with basic functions. The costs are falling as more standardized software for market making becomes available. Moreover, exchanges can outsource the entire infrastructure to Ariba, Oracle, or Commerce One.

Winning Business Models
## *Look for Collaborations — Not Just Order Matching*

It Will Be Hard to Survive On Transactions Alone

> There is a reason that the New York Stock Exchange, the mother of all trading exchanges established in 1792, supports $7.3 trillion and 169 billion shares in trading volume but only generates $101 million in income annually (1998 results).

Order matching is inherently a low-margin endeavor, it takes enormous volume to make it a viable business, and many industries simply lack enough trading activity to generate significant commissions.

Neither buyers nor suppliers will pay much to transmit orders to companies they are already doing business with. Think email — routing price, quantity, and item number isn't that difficult. To be sure, without transaction volume, none of the strategies, positioning, and theories matter. No one hangs on to retail space in an empty mall. **The transaction volume is the catalyst to create the community.** But intermediaries have always survived on razor-thin margins since that function isn't as valuable as other steps in the chain of commerce. Given how quickly an exchange can set up shop, the barriers to entry are low and will keep the fees in a tight range.

Some exchanges have an explicit order-matching-only strategy. For example, ChemConnect doesn't even handle

Revenue Sources for an Exchange
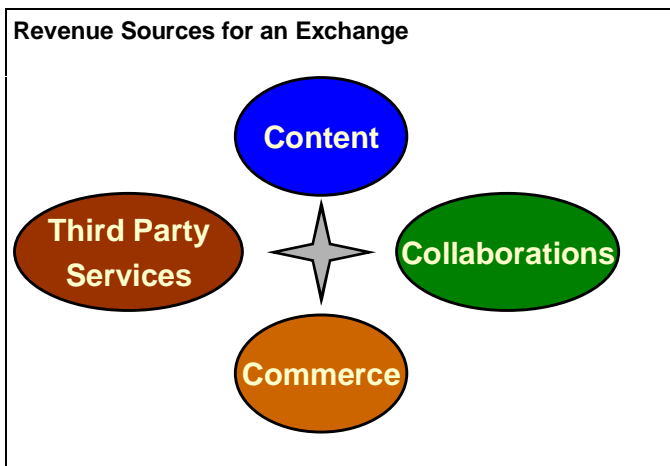
settlement. Buyers and sellers order match online and then handle details of finance and fulfillment off-line. ChemConnect makes sure it gets paid by not revealing the identities of the counter parties until they agree to put the trade through the exchange and pay the commission. Chemicals is a large industry, with probably a 15% spot buy ratio, which may be enough to turn profitable eventually.

Given all the challenges we've described for exchanges, we think they have to add more services to go beyond the commodity discovery functions. Being in the transaction business, we can assure you that commissions on pure trading are **headed down,** not up as they have been since fixed commissions were abolished in 1975.

Sources of Revenue

We think exchanges have opportunities to have significant value once they look beyond the order matching event.

Content: Exchanges can be central repositories of important industry content. Aggregating catalogs from multiple vendors to publish to all buyers adds value by centralizing the content and standardizing the searching methodology for buyers. Exchanges will also collect vast numbers of transactions from which they can benchmark the performance of the industry. Such data are extremely valuable and can be resold in many ways. Additionally, industry news, relevant regulatory information, and analysis help make the exchange a community.

Third-party services: The market for add-on services to an exchange is exploding. Start-up companies are creating horizontal services to plug into an exchange and will share the revenue with the exchange. Some of these services, once software applications installed inside the buyer or seller's organization, are migrating to the network as a service. Some of the same software companies will turn their products into services to layer into an exchange. These applications include things like contract administration, financing, insurance, credit ratings, and shipment validation. Some will be native services provided by the exchange itself, and others will fall to third-party specialists.

Commerce: Transaction fees generated from commerce will vary depending on the type of transaction. But generally we expect price erosion toward fixed fees per transaction as opposed to percentage commissions. Routing a $1,000,000 order is no more expensive that routing a $1,000 order.

Collaborations: Automating all the interactions between businesses will be a major source of revenue for exchanges as we detail in the next section. Exchanges, by virtue of their position as a central meeting place for businesses, can provide much more context to B2B relationships by traversing all dimensions of the relationship between two businesses in the chain of commerce.

Look for Exchanges that Automate Relationships and Not Just Transactions— the Collaborations

Exchanges can have the opportunity to address the full range of processes that characterize business-to-business interaction. Buyers and sellers are more than buyers and sellers. They are enterprises with a full range of complex interactions that lead to or stem from commerce. They are part of larger demand and supply chains that are dependent on many of these processes.

The buyer isn't just a buyer but is thinking of a full process of researching, financing, ordering, tracking, receiving, inspecting, installing, testing, maintaining, and retiring a piece of equipment**. Forcing the buyer to separate the commerce element from all the other related processes is inefficient.**

We use the term "**e-hub**" to describe exchanges that add important collaborations that represent the full range of business processes and interactions between trading partners.

Exhibit 23
Evolving From Exchanges to E-Hubs
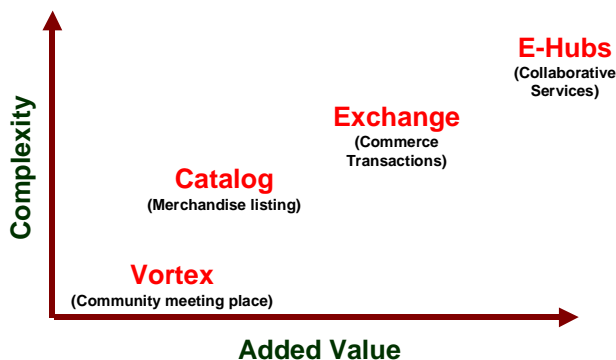
Source: Morgan Stanley Dean Witter Internet Research.

These collaborations give the exchange more relevant context, community attributes, and value.

Exchanges have the opportunity to integrate themselves more seamlessly into the existing chain of commerce and provide customers with the best of both worlds — a tightly integrated demand and supply chain that spans all relevant workflows and still taps into the market transparency offered by exchanges.

Plenty of Collaborations to Go Around

> Almost every business process between business partners can be improved or completely restructured by taking it online.

B2B is closer to a construction project with many synchronized processes between specialists, whereas B2C is closer to buying the house once all that's been completed. Unlike B2C, there's a lot more to relationships between trading partners in the B2B world. **These "collaborations" — shared, essential business processes, which facilitate commerce — represent obstacle and opportunity**.

Exhibit 24
The Mighty E-hub
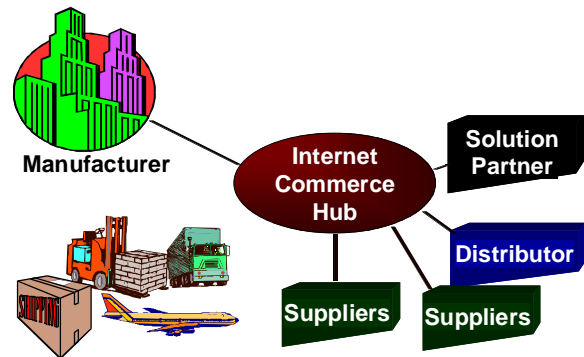
Source: Morgan Stanley Dean Witter Internet Research.

Real-time information directly linked to systems of record on both ends can eliminate inefficiencies and fill in information gaps along the way. However, point-to-point connections between trading partners isn't a workable approach. Good architecture design, built to scale, would suggest an integration e-hub through which all connections must pass. New connections can be added and removed more easily if each new member of the network doesn't initiate N more connections that have to be built and maintained.

Many functions are naturally shared business processes. Other functions are highly specialized and not strategic to the core business and can be outsourced to an e-hub.

For example, the calculation of tariffs and duties is complex and not many companies do it well. Amazon warns international buyers that they "may be subject to import duties and taxes once the package reaches your country… and we cannot predict what they may be." Dell only ships direct to addresses in the United States, and refers international buyers to their local Dell office. eToys only ships to the US and a half a dozen other countries because of the complexities in assessing duties and taxes. Cisco ships international Web orders COD. The overhead of tracking ever-changing tariffs and duties for each country is burdensome. Specialized portals for tracking these changes by country are emerging (Syntra and Vastera), and other exchanges can integrate to these hubs.

The answer isn't "let them eat cake" These are real requirements that won't go unanswered. Look for the commitment from the market participants. Jim Barksdale used to say that in a ham and egg breakfast, the chicken is involved but the pig is committed. Look for the meat in the form of collaborations.

Exchanges have the opportunity to serve as the integration e-hubs for all this commercial activity. These collaborations represent tremendous opportunity for exchanges to carve out a more important role with the members of its trading network. The trading network becomes more than one more wire to patch through requisitions. Collaborations represent added value and constitute the "stickiness" for B2B sites as opposed to brand names and slick graphics.

If the buyers have hundreds or thousands of suppliers, they may still find it easier to manage those suppliers through the exchange, but the exchange has to offer extended services to meet that need. If not, the exchange wilts into a simple yellow pages directory used occasionally to look for new suppliers and verify market price but fails to capture the good stuff — the high volumes.

Exchanges that lack these collaborations will end up running a convenient dating service. The problem with dating services is that they don't get to stick around for the best part of the date. Exchanges trying to survive off listing catalogs will have a tough go. In the old "Kung Fu" TV show, David Carradine's character had to snatch the pebble from the hand of the master of the Shao Lin temple to know when it was time to leave and move on the next level. All these extended services are the collective pebble (or perhaps a boulder) the exchanges have to swipe away before these grasshoppers can morph into something more viable.

Exhibit 25

E-Hub: Collaborations and Value Added Services

- **Order entry —** order capture with applicable discounts and substitute products.

- **Sourcing of products —** certifying suppliers and obtaining committed volumes and discounts.

- **Order fulfillment —** transaction settlement, track and trace.

- **Transportation management —** merge in transit; cross docking; consolidation, and diversion. Shipping optimization via real-time integration with transportation exchanges.

- **Purchase profiles —** Historical purchase data; convenient reorder.

- **International trade logistics, customs, duties, tariffs; compliance check; landed cost analysis and export document production.**

- **Promotions management and marketing automation; advertising.**

- **Contracts management —** terms and conditions, renewals, volume agreements, compliance.

- **Product life cycle collaboration —** joint design processes, advanced part change notification, effectively dates, transition planning.

- **Regulatory filings —** coordinated across supply chain.

- **Planning —** high-level supply chain design and warehouse positioning.

- **Scheduling —** production scheduling and optimization across multiple partners.

- **Forecasting —** demand, production, and promotion responses.

- **Asset management —** tracking, MRO, depreciation schedules, and disposal.

- **Meta catalog/content management —** multi-vendor catalog rationalization, SKU mapping and resolution, part substitution and suggestion.

- **Electronic bill presentment and payment**

- **Community functions —** news, job postings.

- **Escrow warranties; risk management**

- **Receivables management**

- **Performance management —** best and worst delivery records, quality, rework across the trading community.

- **Reverse logistics —** Returns processing and rebates; exception handling and customer support; return authorization.

- **Payment reconciliation**

- **Scrap processing —** efficient disposition of scrap material into the marketplace.

- **Interactive online selling —** Product configuration; validate viable configuration of options for each order; tie in availability and substitutes from multiple vendors; comparative product analysis.

- **Integrated, multi-vendor order processing**

- **Application hosting**

- **Complex pricing —** negotiated rates; volume discounts; promotions; tiered pricing; future pricing with effectively dates; multiple price lists; quote management and status.

- **Digital certificate management**

- **Inventory availability —** capable to promise; available to promise across multiple suppliers.

- **Clearing services**

- **Payment processing —** payment system integration and settlement; credit line check and reservation; cost code analysis.

- **Carrier notification and acknowledgement**

- **Bill of material explosion/confirmation —** routing separate line items in a single order to multiple suppliers and handling fulfillment; confirming delivery and status.

- **Procurement workflow rules**

- **Content filtering**

- **Comparison shopping**

- **Feasibility modeling and scenario planning**

Collaborations
for E-HUBS In It to Win It

- **Derivative instruments —** forward contracts, options on commodities and manufacturing capacities

- **Market intelligence —** benchmarking.

- **Personalization/profiling of customers and market segments**

- **Channel management services —** lead sharing; warranty registration.

- **Fulfillment modeling —** across customer, seller, and product hierarchy to forecast impact of pricing changes and product configuration changes.

- **Wire services**

- **Links to other exchanges —** e.g., transportation capacity exchanges.

- **Quick pay services (take receivable) to increase liquidity**

- **Uniform customer entitlements across all customer channels**

- **Anonymous inventory posting —** take title.

- **Private-label exchange services —** hosting partner communities.

- **Route optimization**

- **Integration with back-end systems —** support for rich data transfer with major ERP systems; support of native APIs (application programming interfaces).

- **Trade credits**

- **Education and training —** Multimedia training of complex processes; how-to videos tied to product configuration process.

- **Factoring services**

- **Specialized market making —** Auctions, reverse auctions, consortium purchases, program buys, and contract buys.

- **Buyer and supplier profile validation**

- **Affinity programs**

Source: Morgan Stanley Dean Witter Internet Research.

Collaborations in Action
Hub and Spoke Always Beats Point-to-Point

A Re-tooling of the Economy —
Collaborative Commerce for All Industries

The key to our thesis here is an assumption that most industries will evolve toward a collaborative commerce model. Industries that were once vertically integrated and manufactured product to stock are evolving into virtual corporations with legions of specialists producing products and services for current demand. Demand and supply chains are evolving into flexible, technology-enabled partnerships that can produce custom products.

Consequently, traditional manufacturing should move closer to project, flow-based manufacturing across multiple partners. More components and services will get outsourced because it will be easier to coordinate and synchronize with partners.

Likewise, services organizations will be able to coordinate with channel partners and independent agents more easily to present a united front to the customer.

> This e-hub and spoke architecture eliminates the point-to-point connections, and suddenly all suppliers, customers, and trading partners only need one connection — to the cloud in the sky (the exchange).

Historically, computer networks evolve toward e-hub and spoke connections instead of point to point because the latter is more complex, expensive, and hard to scale. **The migration of these interactions to a third party e-hub (e.g., e-hub and spoke architecture) is the basis of what collaborative commerce exchanges can provide** — hence our terminology of an e-hub (with collaborative services) versus an exchange (simple order matching).

Enterprises are getting comfortable with the idea that software is moving into the network at an accelerating pace. Companies are moving important processes to a portal. The benefits are compelling, in our view. Someone else, presumably an expert, maintains the software instead of your IT staff, which means updates can be applied daily instead of annually.

Examining the interactions among participants in a few industries is illustrative of how tedious these interactions can get.

Groups of companies will be forced to decide where to automate their inter-partner business processes now that they've finally gotten their own back offices in order. The choices are to continue the manual processes, which are point to point, or to move them into the network in a hub and spoke architecture. The decision may be based on strategic or equity relationships with the e-hub rather than on pure functionality.

Exhibit 26
E-Hub Layers of Value
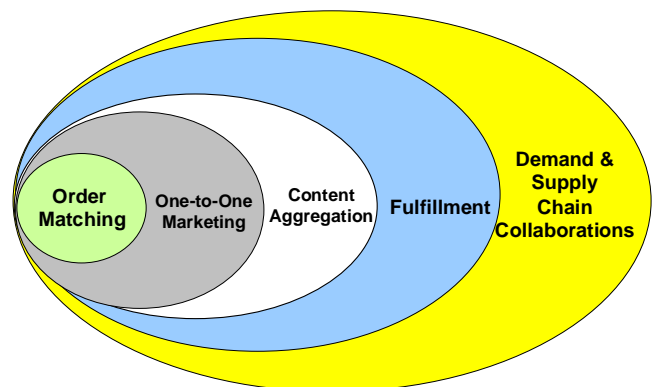
Source: Morgan Stanley Dean Witter Internet Research.

Developers must communicate constantly with general contractors who have to manage suppliers and subcontractors, who all need ongoing input for engineers and architects. This is all a highly dynamic process with constant changes to the plan and synchronization of business events. buzzsaw.com and Cephren are addressing collaborations in construction.

Exhibit 27
Collaborations in the Construction Industry
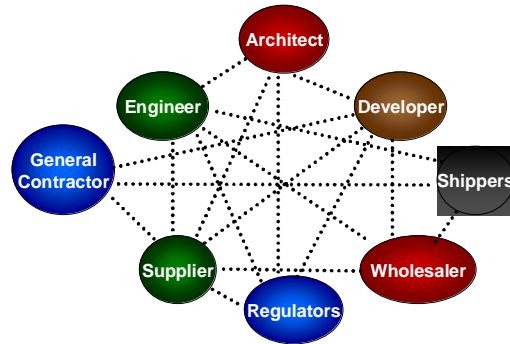
Source: Morgan Stanley Dean Witter Internet Research.

Printers receive input from print buyers, but those buyers have to construct that content from many sources. The marketing department may request the design, but an outside consultant may author it and a print jobber may source it. The print job has to be approved by purchasing and passed by the advertising agencies. Job specifications are detailed, subject to change, prone to error, and often result in misprinted materials with finger pointing later. Impresse and Noosh are running hubs for the printing industries.

Exhibit 28
Collaborations in the Printing Industry
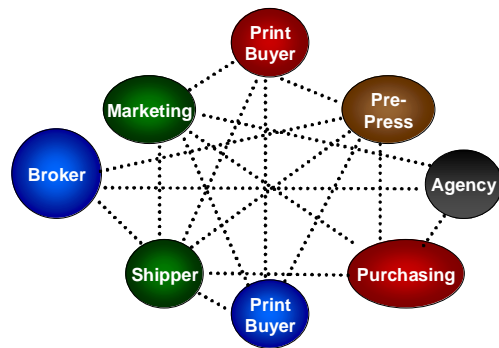
Source: Morgan Stanley Dean Witter Internet Research.

Aerospace companies are really systems integrators on extremely complex projects that last years and not weeks. Each plane is unique and customized. The constant need is to share detailed technical information and project status with component manufacturers, maintenance organizations, the airlines, regulators, and an extensive documentation function. Products have famously long life cycles with ongoing maintenance and parts services that represent on-going collaboration needs. i2 and Commerce One are partnering with BAMs to host hubs in this sector.

Exhibit 29
Collaborations in the Aerospace Industry
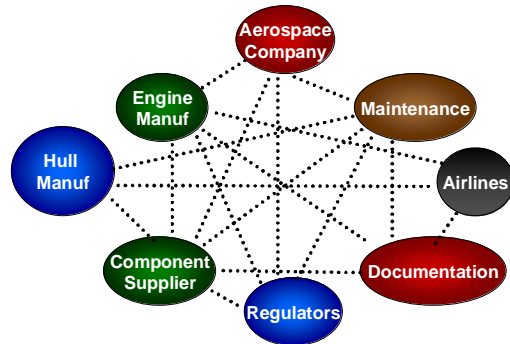
Source: Morgan Stanley Dean Witter Internet Research.

The common theme among these and other industries is complex, manual collaborations currently handled via point-to-point communications with little transparency to the entire process.

Over time, all point-to-point connections migrate to hub and spoke arrangements in the technology world, and once these relationships move online, we expect a similar evolution.

Exhibit 30
Hub and Spoke Wins
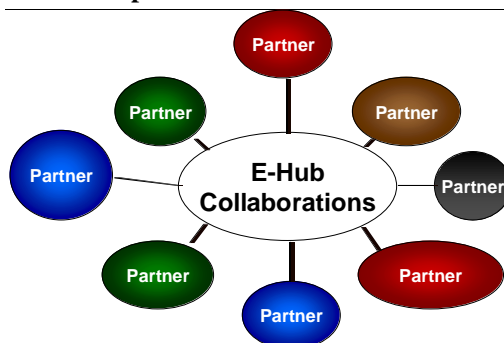
Source: Morgan Stanley Dean Witter Internet Research.

Federated Net Markets
Inter-Market Integration

Much like ATM networks, B2B markets are developing in islands. ATM networks were eventually forced to integrate with one another for the convenience of the consumers. Sooner or later, B2B buyers and sellers will grow weary of establishing and maintaining interfaces to multiple exchanges.

While the number of net markets is expanding rapidly into thousands of specialized micromarkets, we anticipate a reconsolidation one to two years out. The complexity and overhead of establishing strategic buying relationships with hundreds or thousands of exchanges is daunting and impractical for most buying organizations.

At the same time, the early leaders among the exchanges are looking to broaden their content as quickly as possible. Once you have the buyer, you'd better make sure there is enough content in your network to satisfy the bulk of their requisitioning needs.

The logical solution to these problems, we think, is for the larger horizontal networks to fortify their content by integrating with the specialized markets. Oracle, for instance, recently announced a relationship with SciQuest so that buyers in Oraclexchange.com have access to the specialized market of laboratory instruments. Oracle will never know as much about laboratory instruments as SciQuest, and SciQuest would love to leverage the broad corporate relationships Oracle already has in place. Likewise, Ariba has linked with Chemdex.com to give its customers access to the specialized products and services in the chemical industry. Exchanges like Chemdex and NetBuy have built APIs (application programming interfaces) into their exchanges to encourage integration.

These "federated markets" aggregate horizontal markets with specialized vertical markets and reduce complexity for the buyer.

If the buyer has selected a strategic marketplace in which to concentrate its purchases and collaborations, it would prefer not to duplicate the integration links with other sub-markets it may occasionally need access to. The buyer's strategic marketplace of choice might be on the basis of its enterprise

applications (e.g., oraclexchange.com or mySAP.com). The integration of its back end applications with these related exchanges for complete online order processing has some appeal. Employees can retain a common look and feel to access all marketplaces and reduce the integration tasks to a single e-hub instead of hundreds. mySAP.com could link SAP R/3 customers to hundreds of third-party exchanges while keeping some markets for itself, depending on customer concentration and domain expertise.

i2 Technologies is marketing a product suite specifically targeted at creating a federated market. The product, TradeMatrix, is designed to sit between markets. It can also serve as a gateway for a seller or buyer to interact with multiple markets. The product is before its time and most prospects aren't sure why they need it today, but we think the concept is right on point.

VerticalNet is unique in creating a federated market of its own. The company has 53 industries in its marketplace and hosts "storefronts" for different vendors inside of those vertical marketplaces. The buyer can register once and procure from a wide range of suppliers in different industrial segments. An early innovator in the segment, the company is targeting mid-sized buyers and suppliers who don't want to install a lot of software or host their own catalogs, although VerticalNet supports that model. Buyers only need a Web browser and no special procurement window software, although we expect VerticalNet to partner with Ariba or Commerce One to offer that option.

Exhibit 31
Federated Markets Emerge
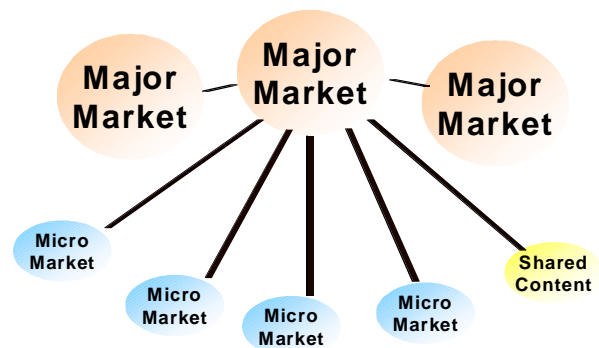
Source: Morgan Stanley Dean Witter Internet Research.

Exhibit 32
No Allegiances — Multiple Partnerships in B2B

Supplier	Market Place Partnerships
Boise Cascade	Clarus, Commerce One, Ariba
BT Office Products	Clarus, Commerce One, Ariba
Cisco Systems	Commerce One, mySAP.com
Corporate Express	Clarus, Ariba, mySAP.com
Dell Computer	Ariba, mySAP.com
Flowers Online	Clarus, Ariba
Grainger	Intelisys, Commerce One, Ariba, mySAP.com
Neoforma	Ariba, mySAP.com
Office Depot	Oracle, Ariba
Staples	Oracle, Commerce One

Source: Morgan Stanley Dean Witter Internet Research.

Federated markets can also filter and certify content and micromarkets. Buyers face a bewildering array of markets popping up by the day, and a trusted intermediary can provide filtering and qualification services.

Many BAMs are already participating in multiple marketplaces, partly as a hedge, but also because customers will require it. Commerce One Global Trading Web is the same concept — a common framework of communications for multiple markets in different regions.

The Internet Cycle in Brick and Mortar (BAM) Companies
Getting More Strategic

The Web hit the BAMs in phases, but we think the infrastructure, experience, and motivation is in place for these companies to aggressively embrace B2B.

Phase 1 — Internal Cost Savings

Companies started with the low-hanging fruit close to home, and that meant focusing on internal cost savings and business processes. There were obvious home runs such as simplifying e-mail exchange between different divisions, or centralizing information on Web sites that was previously in spreadsheets or on paper. If anything, Web sites represent easy points of aggregation.

Phase 2 — Intra-Company Collaboration

Aggregation of information on Web sites provided insight. For the first time, in some cases, employees from different divisions could see the full context of a given workflow and understand the structure of the underlying business process and, in some cases, the organization. In enterprise settings, information is much more powerful when shared.

In other words, Web technologies even provided enterprises with internal transparencies to share information, expose good business processes, and document business rules. As companies become more global and dispersed, the need to re-aggregate business processes became apparent.

Larry Ellison of Oracle likes to say that companies pay top dollar to not know what's going on in their businesses. What he means is that by distributing computing systems by geography with no centralized view, companies incur additional costs and lose the value of the information these systems are collecting because it's difficult to re-aggregate the data for decision-making.

The Web is a good aggregator, and information and insight flows from aggregation. Companies have attempted to deploy collaborative technology in the past, but it was a daunting task with the lack of standardization.

Exhibit 33
The Internet Cycle in Brick and Mortars
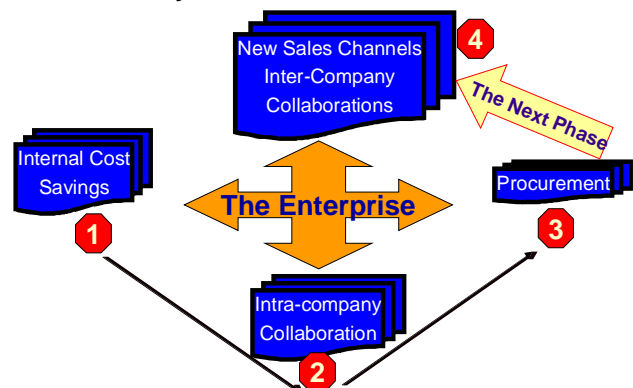
Source: Morgan Stanley Dean Witter Internet Research.

Many network-based ideas that didn't work under client/server fit nicely on to Web-based platforms. The Web architecture is simply a superior method for sharing information and process.

Phases 3 & 4— Procurement and Inter-Company Collaborations

This newly discovered internal transparency led to a rethinking of collaborative functions between divisions. Those transparencies had to be extended to customers and partners to complete the business process in many areas.

The natural place to start were functions that occurred frequently, required modest infrastructure changes, and immediately affected customer and partner satisfaction. All that translates into "self help" applications — allowing customers and partners to obtain frequently needed information on their own (e.g., order status, inventory availability).

It's now time to look outward. Enterprises have traversed through arduous upgrades of their back-office applications partly initiated because of Y2K.

Companies have spent the last five years integrating their internal computing systems to break down the walls between business units. Many are now in the midst of consolidating and restructuring their front-office (customer facing)

applications as well. The next phase is about processes that are more closely linked to external organizations.

The focus is now external, because enterprises now have a medium to synchronize inter-enterprise business processes — most of which are dreadfully inefficient and manual — across an inexpensive, global network.

Many of the BAMs have initiated internal procurement projects and are talking with Ariba, Commerce One, or Oracle, and sometimes all three.

Web-Based Self-Help: A Defining Feature of the Networked Economy

What companies are really discovering is that the Web can lower the cost of interaction. The time and effort for searching, sourcing, coordinating, monitoring, and servicing interactions with external constituencies has been a bottleneck to changing and optimizing those relationships. B2B commerce is inherently inter-enterprise, and it moves too quickly to coordinate manually. No one has time to stop and call, fax, and email partners.

The rate and number of interactions can be mind-boggling. One large electronics manufacturer processes 180,000 orders per month and each order changes, on average, 3.2 times from inception to delivery. That's a lot of phone calls, emails, and faxes.

Exhibit 34
From Internal to External Focus

1994		2000
Internal to the Enterprise		**External**
Back Office	**Front Office**	**Interprise**
▸ Limited, known users	▸ Intra enterprise process	▸ Inter-enterprise collaborations
▸ Intra enterprise process	▸ Limited, known users	▸ Unlimited, unknown users
▸ Client/Server, EDI	▸ Client/Server; limited Web	▸ Internet standards, XML
▸ Power users	▸ Customer facing employees	▸ Virtual supply chains
▸ Backoffice efficiency	▸ Customer management	▸ External integration
▸ Cost savings	▸ Customer service	▸ Market share, growth
▸ Integration/one stop shopping	▸ Integration/ centralized view	▸ Specialization

Source: Morgan Stanley Dean Witter Internet Research.

The Web is sharply reducing the cost of interacting with customers and suppliers and, we believe, represents a compelling alternative to the historical avenues of external interaction — phone (call centers), fax, mail, EDI, e-mail, and on-site visits. The objective is to lower the cost of establishing and monitoring relationships with other enterprises.

Exhibit 35
The High Costs of Business Interaction
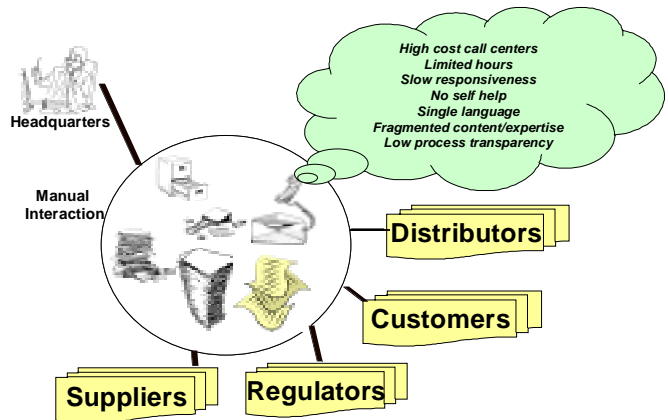
Source: Morgan Stanley Dean Witter Internet Research.

The only way to scale interactions is to let the customer or partner help themselves.

Web-based self-help is a key defining feature of a networked economy.

Self-help is a simple concept but should have a huge impact. According to the US Bureau of Labor Statistics, interactions between companies represent 51% of the US labor force. The ratios will likely rise as the economy becomes more information-based and as competition intensifies. Moreover, specialization and outsourcing create a need for increased interaction and synchronization of trading partners.

A Web-based support transaction averages $0.50 per transaction, compared with $2.25 for a human-assisted transaction, according to Giga Information Group. And often, the Web alternative provides more accurate, accessible information.

Yet a market economy implies the ability to establish, **coordinate, and reestablish those relationships and interactions quickly.** Historically, a company's ability to collect and manipulate data far exceeded its ability to

communicate and interact with partners because of the diversity of systems technology and high costs of private networks.

Self-help is a win-win for everyone. Pre-Internet days, Dell Corporation received three order-status calls/questions from customers on average. Once the company put a customer care, order status, self-help application on the Web (tied to its supply chain) Dell received eight inquires per customer on average. What that told Dell was that the customer was being under-served and wanted more information. Order cancellations went down. Dell cut costs while improving service and pleasing customers. **It doesn't get any better than that.**

The choices for interacting with external constituencies have been limited: expensive labor or to simply provide poor service (which many did). Web-based self-help fills in the gap.

The Groundwork for Third-Party E-Hubs Is Now in Place

Most organizations have provided self-help for customers and partners via their own Web sites. However, online exchanges offer an interesting alternative to this point-to-point approach. What if all partners and customers connect to a third-party Web destination?

MORGAN STANLEY DEAN WITTER

Prioritizing the Verticals and The Industry Utility Model
The Industries Most Primed for Net Markets

Going Vertical

Exchanges are forming along vertical industries. We believe there will be few horizontal exchanges that serve multiple industries. **MRO** (maintenance, repair, and operations) supplies (Grainger.com) and **indirect** (administrative, e.g., OrderZone.com) products and services can be served up via horizontal exchanges, since those products are somewhat generic and used in multiple industries.

The horizontal exchanges should also serve as services within vertical exchanges. A vertical exchange focused on say, plastics, may plug in an MRO or office supply online catalog as a service to the customers of the exchange. Broadening the exchange to include non-core products creates more stickiness for the site.

But the bulk of the spending is for direct, industry-specific products. Consequently, buyers and sellers need a specialized exchange customized for their industry with the appropriate taxonomy, terminology, metrics, product expertise, and services.

A blanket presumption won't work. Transparencies are lacking in varying degrees by vertical market, depending on a wide range of factors (e.g., buyer and supplier fragmentation, product standardization).

Attractive Industry Attributes for an Exchange

Vertical exchanges serve a specific industry and provide deep expertise and content for a given domain. Examples include Chemdex (chemical distributor), PaperExchange (paper), and PlasticsNet.com (plastics). We look for the following attributes to identify industries that lend themselves to vertical exchanges:

- **Low concentration of buyers** — fragmented market

- **High number of geographically dispersed suppliers**

- **High number of existing intermediaries (distributors and resellers)**

- **High number of trades** per $1 million of trading volume

- **Low touch, standard products** (that lend themselves to online identification) as a high percentage of total production

- **High number of repeat trades per product** (e.g., stocks) versus one-time sale (some perishables)

- **Industry with few self-service options and low customer service levels**

- **Frequent excess capacity** that is inefficiently re-allocated; industries with unpredictable demand and hence production needs

- **Regional markets that could potentially go global**

- **Low brand-name impact;** product availability more important than seller's identity

- **Volatile supplier/buyer relationships —** suppliers and buyers routinely do business with unpredictable mix of trading partners; availability and price drive the trade and not relationships

- **High value to transparency;** buyers have trouble getting accurate information as to market price, quality, reputation, reliability, speed, and service prior to committing to the transaction; *purchasing managers with a pile of catalogs on their desks*

- **Global industries accustomed to cross-border trade and logistics,** which increases the prospects for a global exchange

- **Low shipping costs/packaging** relative to cost savings potential

- **Absolute level of cost associated with the function in time or money** (significant and growing versus marginal)

- **Frequency of the trade in most companies** (once a year versus every day)

Segment the Buyers and the Spending

Another approach is to analyze which industries spend the most with external suppliers. Vertically integrated industries or those that are labor-intensive may not benefit to the same degree.

Binary Outcomes and Buyer Concentration

The concentration of buying power is also a critical variable as to when and if an industry moves toward a centralized exchange. The concentration of buying makes the decision more binary — winner takes all. If large buyers move their spending suddenly, the decision has been made, since there isn't enough left over for alternative exchanges at that point.

More recently, groups of buyers and sellers have come together to establish their own exchange (auto industry) or support a selected vertical exchange already in place (MetalSite in the steel industry). This movement toward an industry-sponsored utility exchange makes the market even more binary. If five buyers representing 60% of the spend in an industry make a commitment to the same exchange, competing exchanges will be relegated to niche status and will never be front-page news.

We expect that vertical exchanges serving these micromarkets will find it hard to diversify beyond their industries, given the high level of domain expertise required. That expertise is both their differentiation and barrier to diversification. Consequently, we think, as an exchange it pays to follow the Willie Sutton theory and pick a big industry with a high number of well-funded buyers and sellers. We think a few companies have strong strategies to make a go of it in multiple verticals. Ventro started off as Chemdex, focused solely on the chemicals market. The company created a holding company and is using its early experience and technology infrastructure in chemicals to enter life sciences and other verticals. The company plans to hire experts in the new verticals with a separate CEO and management team for each vertical. VerticalNet also has a promising model of grouping multiple industrial markets together under a common electronic mall.

Some Examples:

Plastics

The prototype of an industry ripe for an exchange would have a large number of suppliers and buyers, a broad array of products that can be precisely described via standard measurement systems, and reasonable delivery costs in relation to the direct costs. The plastics industry is a good example. PlasticsNet is aiming at an $85 billion market with 5,000 plastics suppliers and 18,000 plastic processors who trade in 30,000 grades of materials in addition to specialized equipment like blenders, feeders, heaters, loaders, granulators, and pulverizers. Distributors in that industry routinely get 30-40% commissions. However, four or five plastics manufactures are crucial to the process, and PlasticsNet can't go far without their buy-in.

Food

Another example is the food service industry. With 2,000 food manufacturers selling through 20,000 distributors to 750,000 operators (restaurants, hotels, and chains), there is very little product transparency. Different distributors have different product codes and descriptions for identical products from the same manufacturer. Because of the lack of product transparency, operators have difficulty tracking rebates, credit memos, and discounts for a given product, given the different product codes depending on the distributor. The industry is too fragmented for the manufacturers to deliver directly to the operators. Instill.com has compiled an industry database that normalizes all the product codes and lets operators order from one site but fulfill through multiple distributors. Buyers get a consolidated view of their procurement, pricing, and consumption. However, the distributors are powerful in this market, and any industry exchange would have to win them over.

Printing

The printing industry has moved more slowly than some other industries, but the workflows are complex. This industry is more interested in reducing the cost of interacting, since so many constituencies in different companies have to collaborate to design, approve, and print a job. The procurement is a derivative of the workflow. A pure e-commerce model wouldn't work in this industry, but one that reduces the manual steps to get an accurate print job delivered to the right place at the right time has value.

Exhibit 36
Concentration of Buying
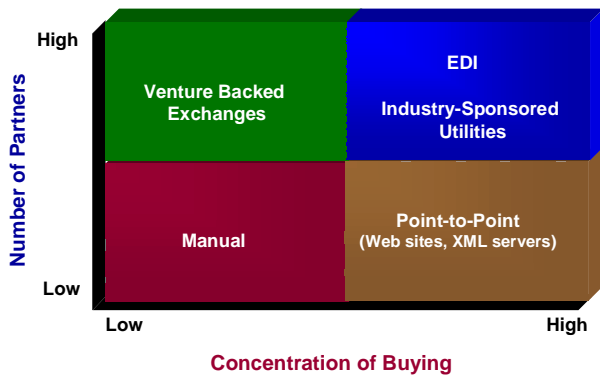
Source: Morgan Stanley Dean Witter Internet Research.

Metals
The metals industry is characterized by producers who sell to service centers who further process the steel or to distributors who simply find a buyer. The buyer may in turn process the steel into derivative product. The products are difficult to describe, and a single coil can represent several different products because the grade changes from end to end. The complexity of the distribution systems and high transportation costs create a need to find supply or demand locally and optimize transportation costs.

Chemicals
Chemicals are characterized by huge volumes and a wide variety of products. Many are standard or branded, and lend themselves to dynamic pricing. Small changes in price make a big difference because of the volume, and the volatility of price and supply create a need for more market transparency. This is a market where all forms of market-making activities apply. Some products will be catalog orders, others require real-time dynamic pricing, and still others will be sold via auction. Chemicals was one of the first industries to embrace exchanges, and multiple exchanges will probably co-exist here (E-chemicals, Chemdex, and CheMatch).

Telecommunications
With over 10,000 telecommunications firms in the market and a continued boom in capacity requirements, the need to load-balance capacity among these firms is acute. Today, they meet at conventions to trade capacity commitments, but they are now beginning to move that process online. The volatility of capacity needs by region creates the need for a centralized market.

Systems Integration and Consulting
Systems integration and consulting is highly fragmented by talent category. Buyers have difficulty finding the right skill set for a particular project. Additionally, buyers have a need to coordinate projects, which often consists of outside consultants and internal staff working in concert. Managing projects to rollover talent to new projects and avoid downtime is critical to the process. A centralized pool of talent and project management services is likely to be widely accepted in this segment. Several exchanges have already surfaced; some focus on workforce automation (Icarian), while others emphasize project management (BusinessEngine) or more recruiting and bid management (Niku and Portera).

Healthcare
Healthcare has one of the most complex set of workflows of any industry. Insurers, providers, payors, patients, and employers are all key participants and the process is famously inefficient. Moving these collaborations online will take time but could be a major productivity enhancement. Collaboration outweighs commerce here. Healtheon has a lead in this market and a robust solution, but several of the large healthcare providers and insurers have formed an industry-sponsored exchange.

Energy
The energy industry is one that lends itself to collaboration given all the joint ventures to mitigate exploration risks. However energy has many distinctly different segments. Oilfield services has different needs from upstream and downstream operations, which is different from refining and marketing. Given the diversity of operations and complexity of the collaborations, this industry might support several exchanges for the different sectors. However, an efficient alternative would be one exchange with multiple views using shared plumbing. The energy industry has transportation inefficiencies that could be solved by putting the fulfillment chain online and by providing more buyer and supplier discovery.

Utilities
Utility companies tend to be smaller than their suppliers and generally serve regional markets. Deregulation is forcing them to get more competitive and pay attention to costs. E-hubs could serve this industry by streamlining collaborations with their suppliers and coordinating add-on products and services with third parties. Moreover, they are in constant need of better product and availability transparency given the high cost of shortages and price fluctuations.

Exhibit 37

Summary of B2B Activity/Suitability by Industry

Industry	Fragmentation	Sample Exchange	Need for Transparency; Collaborations
Metals	Largest producer controls only 10% of the market; thousands of refiners	MetalSite.com e-steel.com	Large capacity overages from scrap products from inefficient production process; need for availability transparency
Chemicals	500 global producers of thousands of complicated products; complicated distribution through intermediaries; volatile prices on huge volume	Ventro Industria CheMatch.com ChemConnect	Diversity of products makes it difficult to locate right product; need for product transparency; volatile supply and prices create need for centralized market
Telecommunications	Thousands of regional carriers with globally relevant product; conventions held to trade capacity	RateXchange Band-X Arbinet	Significant capacity and price swings; need for greater price and availability transparency
Food Services	2,000 producers; 20,000 distributors, and 750,000 restaurants/operators	Instill.com	Operators have to use multiple distributors for product availability reasons; no ability to normalize product codes across distributors; poor availability transparency
Printing Services	Over 50,000 regional printers in the US alone	Impress Noosh	Difficult to locate suppliers with requisite skills and capacity; error-prone processes between many constituents
Oil & Gas Refining	Multi-tier distribution systems; complicated product with many grades and uses; history of joint ventures and collaboration	Petrochosm IntercontinentalExchange Industry Consortium	Volatile price and large capacity swings; need for availability and price transparency
Paper	$300 billion global industry; multiple grades of paper sold through distributors	PaperXchange Industry Consortium	Enormous variety of derivative products and thousands of suppliers; need for supplier, price, and product transparency
Healthcare	Complex, regulated products sold through 7,500 distributors to 275,000 hospitals; fragmented, inefficient industry	Neoforma Healtheon	Complicated process with wide variety of possible constituencies
Construction	Complex workflows, project oriented	buzzsaw.com Cephren	Need for improved synchronization of purchases timed to construction projects
Transportation	Thousands of carriers and intermediaries that fill capacity	FreightMatrix (i2) Transplace.com (IC) IATN LoadMatch Eflatbed FreightQuote NTE GetLoad GFX	Need for availability transparency to optimize freight capacity
Systems Consulting	Thousands of consultant firms and independent practitioners with wide variety of technical skills; complex RFP process	Procada Niku Portera	Need for product, supplier, and availability transparency. Difficult to locate right skill set at the right time and manage project
Energy	Complex process through multi-tier supply chain; frequent collaborations via joint venture	Altra APX Continental Power Houston Street	Availability transparency is key, given high cost of shortages
Plastics	5,000 plastics suppliers and 18,000 plastic processors who trade in 30,000 grades of materials	PlasticsNet	Need for product, supplier, and price transparency
Autos	World's most complicated supply chain; four levels of suppliers	GM/Ford/DaimlerChrysler Exchange	Bloated inventory and inability to get right models to the right location at the right time

Source: Morgan Stanley Dean Witter Internet Research.

Representative Approaches to Vertical Expansion

One of the early discussions in the B2B space has revolved around the question of "Who's in the power spot?"

Is it better to be a horizontal player focusing on many vertical markets? Is it better to be a strong vertical player and expand horizontally later? Is it better to create a software platform and move to services in a horizontal and vertical way? For start-ups, is it better to attempt to develop "domain expertise" internally or partner with traditional leaders? For traditional companies, is it better to work alone or in partnership?

Here, we highlight how three B2B pure-plays have expanded their product offerings into new vertical markets: Ventro has adopted a build/buy/invest approach to expanding beyond its core life sciences efforts; VerticalNet hosts "communities"

for a large number of verticals; and FreeMarkets has rapidly expanded its service offering to a number of vertical markets.

Exhibit 38
Summary of Ventro's Vertical Expansion
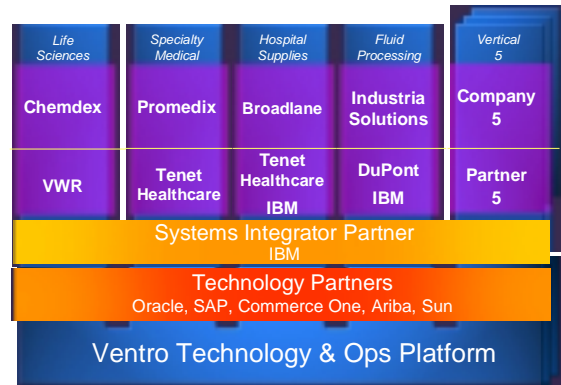
Source: Ventro.

Exhibit 39
Summary of VerticalNet "Communities" as of 4/5/00

Advanced Technologies
Aerospace Online
Auto Central.com
Electronic Engineering.com
Embedded Technology.com
Plant Automation.com
Semiconductor Online
Test and Measurement.com

Communications
Digital Broadcasting.com
EC Online
Fiber Optics Online
Photonics Online
Premises Networks.com
RF Globalnet
Wireless Design Online
Wireless Networks Online

Environmental
Electricnet.com
Pollution Online
Power Online
Public Works.com
Solid Waste Online
Water Online

Food & Packaging
Bakery Online
Beverage Online
Dairy Network.com
Food Online
Food Ingredients Online
Meat and Poultry Online
Packaging Network.com

Food Service/Hospitality
E-Hospitality.com
Food Service Central.com

Healthcare & Science
Bioresearch Online
Drug Discovery Online
E-Dental.com
Home Health Provider.com
Hospital Network.com
Laboratory Network.com
Long Term Care Provider.com
Medical Design Online
Nurses.com

Manufacturing & Metals
Machine Tools Online
Metrology World.com
Safety Online
Surface Finishing.com
Tooling Online

Process
Adhesives and Sealants.com
Chemical Online
Hydrocarbon Online
Oil and Gas Online
Paint and Coatings Online
Pharmaceutical Online
Pulp and Paper Online

Public Sector
GovCon.com

Service
HR Hub.com
Logistics Online
Property and Casualty.com

Textiles & Apparel
TextileWeb.com

Source: VerticalNet.

Exhibit 40

Summary of FreeMarkets Vertical Expansion, 1995-1999

1995	1996	1997	1998	1999
Injection Molded Plastics	Chemicals - Specialty	Chemicals - Specialty	Aerospace Machinings	Aerospace Machinings
	Commercial Machining	Coal	Capacitors	Ball Bearings
	Injection Molded Plastics	Commercial Machining	Chemicals - Specialty	Blow Molded Plastics
	Metal Castings	Fasteners	Coal	Capacitors
	Metal Stampings	Forgings	Commercial Machining	Chemicals - Bulk
		Formed Rods	Control Assemblies	Chemicals - Food
		Injection Molded Plastics	Die Castings	Chemicals - Specialty
		Metal Castings	Die Cut Foam	Clover Honey
		Metal Stampings	Dimensioned Hardwood	Coal
		Plastic Extrusions	Fasteners	Commercial Machining
		Printed Circuit Boards	Forgings	Construction & Maintenance Svcs.
		Service Center Metals	Formed Rods	Control Assemblies
			Injection Molded Plastics	Computer Monitors
			Insulators	Corrugated Packaging
			Metal Castings	Crankshaft Gages
			Metal Fabrications	CRT Monitors
			Metal Stampings	Die Castings
			Molded Rubber	Die Cut Foam
			Non Ferrous Metals	Diesel Fuel
			Plastic Extrusions	Dimensioned Hardwood
			Printed Circuit Boards	Distributor Chemicals
			Resistors	Electrical Components
			Rubber Seals	Electricity
			Scrap Metals	Electromechanical Transformers
			Service Center Metals	Engine Assembly Parts
			Solenoid	Fasteners
			Springs	Fluid Processing Equipment
			Switches	Food Grade Salt
			Tube Form	Forgings
			Valves	Formed Rods
			Wire Form	Glass
				Hotel Services
				Injected Molding Machines
				Injection Molded Plastics
				Insulators
				Labels
				Liquid Crystal Displays
				Material Handling Equipment
				Metal Castings
				Metal Fabrications
				Metal Stampings
				Molded Rubber
				Motor Freight
				Non Ferrous Metals
				Ocean Freight
				Pallets
				PC Peripherals
				Plastic Extrusions
				Polyethylene Bags
				Printed Circuit Boards
				Promotional Items
				Rental Equipment
				Repair Services
				Resistors
				Road Salt
				Rubber Seals
				Sample Packets
				Scrap Metals
				Service Center Metals
				Solenoid
				Springs
				Sugar
				Switches
				Telecommunications
				Temporary Services
				Transformers
				Transmission Parts
				Tube Form
				Valves
				Vitamin Premix
				Wire Form
				Wire Harnesses
				Wire Mesh
				Wood Furniture Parts

Source: Morgan Stanley Dean Witter Internet Research.

Industry-Sponsored Exchanges (ISEs)
The BAMs are Large and Weighing In

They're Back

The BAMs (brick-and-mortar companies) are holding VIP passes to the net market party. Sure, they were stunned by how quickly B2B markets developed initially but they aren't curling up in the fetal position. Most are intimately familiar with Jack Welch's advice - when the rate of change outside your business is greater than the rate of change inside of your business, there's a problem. So the BAMs are moving quickly to capitalize on e-commerce opportunities.

Unlike B2C markets, they know nothing happens without the transactions that only the BAMs can bring. Most exchanges have had to partner with BAMs and give them warrants or equity in exchange for some goals on minimum volume. Most of these agreements aren't exclusive or binding.

The Pendulum Swings a Bit

BAMs all want to be the first in their industries to establish an exchange and hope to be the first to take it public in their sector. They also want to preempt competitive announcements and create a center of gravity before competing exchanges emerge. In the rush to get out announcements, most BAMs have focused just on the front-end procurement with a partner such as Ariba, Commerce One, or Oracle.

Some of the frenzy is related to market-cap envy. Many industrial companies have watched their stocks slide sideways for years while technology stocks reach mind-boggling valuations overnight. Few see a good reason to let venture-backed start-ups generate billions in market cap by routing the BAMs' transactions over the Internet.

History has shown that the stocks of the BAMs haven't moved on these announcements. The stock that has moved has been that of the technology partner.

We believe the market has correctly concluded that simply putting existing spending through an Internet portal hasn't significantly changed much for the BAM. Instead, the market is demanding more substance and wants evidence of substantially lower cost and margin improvement

from procurement cost savings, or something more structural in the management of the supply chain.

Instead of the historical approach of pushing inventory back to suppliers, companies now sense the opportunity to permanently remove an order of magnitude of inventory from the entire chain of commerce.

The BAMs may not get a near-term benefit in the equity markets, but they should realize a material benefit over time as restructured operations begin to produce returns. Given the lead US companies have in this segment, earnings and profitability might be significantly understated for the S&P 500.

The Industry-sponsored E-Hub: GM-Ford-DaimlerChrysler Sets the Pace

The auto industry is somewhat a case study on what could happen in other verticals. Two of the largest manufacturers announced their own exchanges and then shortly thereafter merged them and invited in a third company, DaimlerChrysler, to join for a three-way announcement of an industry exchange.

(Morgan Stanley & Co. Incorporated ["Morgan Stanley Dean Witter"] is currently acting as financial advisor to GM and Ford in the formation of the General Motors/Ford/DaimlerChrysler joint venture.

(General Motors and Ford have agreed to compensate Morgan Stanley Dean Witter for its financial services, including transaction fees which are contingent upon the consummation of the proposed transactions.

(This report was prepared solely upon information generally available to the public. No representation is made that it is accurate or complete. This report is not a recommendation or an offer to buy or sell the securities mentioned. Please refer to the notes at the end of the report.)

Some of the benefits that such combined exchanges can enjoy are as follows:

- **Suppliers sign up more quickly** because there is less confusion on which exchange will win.

- **Suppliers have lower infrastructure** costs since they can build connections to one exchange instead of three or four.

- **The benefits of a centralized collaboration hub accrue much more quickly** — instead of each exchange hiring 500 people to build the same exact plumbing, 1,500 people can build the plumbing once.

- **The value of the exchange increases sharply**. Since the revenue and transactions are aggregated in one place and occur more quickly, because the plumbing is built faster, the value of one exchange could be an order of magnitude greater than the sum of the value of five competing exchanges with low volume.

- **Market transparency is enhanced**. Multiple, fragmented exchanges work against discovery and market transparency, which was the original problem being solved for.

> The exchanges and hubs are simply plumbing or centralized utilities. Companies can implement policies and strategies completely differently within the exchange.

Data and processes aren't shared between competitors. Suppliers can still offer custom pricing and promotions to their buyers, and buyers can still collaborate on proprietary product designs and supply chain relationships with key suppliers, without compromising that information. The cost of the plumbing is allocated across the industry instead of to one company. In fact, much of the activity in an ISE may simply automate private relationships and create what VerticalNet CEO Mark Walsh has termed "EDI in drag" in which we see significant value.

We don't expect all spending to go through the industry-sponsored e-hubs or any other exchange for that matter. Companies will use multiple channels to procurement for years to come. And we expect many to reserve their most strategic purchases for off-line negotiation since much of that is locked up in long term contracts.

Moreover, dotcom start-ups with a material lead in the market, key partners, and focus can still rival industry-sponsored exchanges.

Can Industry-Sponsored Exchanges Work?

The BAMs have to prove these coalitions can work over time. GM and Ford represent an unusual concentration of buying power that isn't present in many other industries, so it was easier for the two to create critical mass. Morgan Stanley Dean Witter is advising more than a dozen of the ISEs in the process of being formed, and they are all somewhat different.

The BAMs are using the same strategies and structures as the start-ups — separately financed start-ups with independent management teams incentivized with options and a potential IPO. These independent start-ups, complete with a separate management team and separate facilities, can derive some of the same benefits as venture-backed start-ups. ***We think the key will be attracting the right talent — the entrepreneur who would have started an exchange on his own, but saw a more attractive opportunity with the industry-sponsored exchange***.

We still think the industry-sponsored exchanges are problematic unless **both** buyer and seller see value in joining the exchange. Buyer-managed exchanges may have to cut the suppliers in for some equity, and vice versa. The buyer-managed exchanges are easier to establish, since the buyers normally have the balance of power — but not always. Some industries have highly concentrated suppliers and fragmented buyers (e.g., utilities, metals, and systems integration).

> Industry-sponsored exchanges that only benefit one side — e.g., only the buyers — will likely hit a brick wall of resistance. These coalitions are still fragile, and without some reinforcement from suppliers, they could atrophy.

The venture-backed dotcoms have had the talent focused on this sector for the last year or two. But even if the ISEs fail, the dotcoms could see a slow two years while the ISEs go through that experience.

We think the more logical outcome is for the dotcoms to find a way to add value to the ISEs in the mean time, which won't be possible in some cases. In other cases, the dotcoms are so far along and have reasonable traction, they can be a strong alternative to the ISEs — particularly for the companies who aren't equity members in the ISE and who are looking for an alternative platform.

The other interesting derivative impact is the new avenue of financing exchange start-ups. Instead of traditional venture capital, the ISEs represent potentially influential exchanges funded totally by industrial companies, with no help from the venture capital community. The easy access to capital and an attractive IPO market have created new competitors for the VC community, which is simultaneously exploding in the number of new firms created and capital raised. So much money, so little time.

The Haves and Have Nots Problem

To attract the right talent and foster innovation, companies normally segment their e-commerce operations into new, distinct units.

Traditional companies looking to segment and spin out their e-commerce operations and marketplaces can potentially create a huge disparity among employees. Two employees who sat side by side the previous week are now worth vastly different sums when one is assigned to the e-commerce division and receives options in a potential spin-

off. Naturally, everyone wants to jump ship to the new venture with the upside of a start-up but without the risk given the backing of the parent company. The inequities created can result in significant morale problems and internal competition.

Spreading the wealth around to align everyone's interest is one answer, but potentially dilutive of the new venture and hard to allocate fairly. Usually, the parent company quickly moves the e-commerce operation to separate facilities to reduce the friction and foster innovation.

Given the choice between cannibalizing the old business and being late to the new business, the innovators are choosing to live with the cannibalization problem and harmonize the channels later. **There is no perfect answer, but most have concluded the wrong answer is to wait and try to eliminate all the conflicts by restraining the charter and market reach of the online venture.**

Exhibit 41

Price Change — BAMs vs. Tech Partners on Exchange Announcements

| Company	Date of Deal	Deal Day - 1	Price Deal Day	1 Day	2 Day	1 Week	1 Month	3/30/00
Ford	11/2/99	55	54	54	53	54	51	44
% change			0%	-2%	-3%	-1%	-8%	-20%
Oracle	11/2/99	26	27	29	29	29	38	84
% change			4%	12%	14%	14%	48%	228%
GM	11/2/99	69	68	68	69	69	72	82
% change			-1%	0%	1%	1%	5%	19%
Commerce One	11/2/99	68	69	85	83	107	115	207
% change			1%	24%	22%	56%	68%	202%
Ventro (Chemdex)	12/13/99	92	99	90	93	90	75	124
% change			8%	-3%	0%	-3%	-18%	34%
Tenet Healthcare	12/13/99	24	24	23	23	23	27	22
% change			-3%	-3%	-5%	-7%	13%	-9%
i2	12/21/99	77	90	102	99	95	129	182
% change			18%	33%	29%	24%	69%	138%
Hewlett-Packard	12/21/99	104	109	107	113	111	113	131
% change			4%	3%	8%	7%	9%	25%
Compaq	12/21/99	25	28	27	29	27	31	32
% change			11%	9%	14%	7%	25%	27%
Ariba	1/10/00	85	97	96	87	87	98	131
% change			15%	13%	2%	2%	15%	54%
EDS	1/10/00	60	63	66	67	66	74	70
% change			5%	12%	13%	12%	25%	18%
Ventro (Chemdex)	1/24/99	92	101	99	107	98	230	124
% change			10%	8%	16%	6%	150%	35%
Du Pont	1/24/99	54	54	55	54	51	53	52
% change			0%	1%	0%	-5%	-2%	-4%
Ariba	2/9/00	94	95	98	106	108	161	131
% change			0%	4%	13%	15%	70%	39%
Dana Corp	2/9/00	23	23	23	21	23	22	26
% change			0%	0%	-10%	-2%	-7%	10%
Honeywell	2/14/00	42	44	46	45	44	45	52
% change			3%	10%	6%	5%	7%	22%
United Technologies	2/14/00	48	50	52	52	52	50	61
% change			4%	8%	8%	8%	3%	27%
i2	2/14/00	120	130	125	136	146	170	182
% change			8%	4%	13%	21%	41%	51%
Toyota	2/23/00	4,460	4,480	4,550	4,540	4,370	4,940	5,280
% change			0%	2%	2%	-2%	11%	18%
i2	2/23/00	170	170	176	150	163	172	182
% change			0%	4%	-11%	-4%	1%	7%
Sears	2/28/00	26	27	28	28	27	30	30
% change			5%	6%	6%	5%	14%	15%
Carrefour	2/28/00	153	150	158	152	146	166	150
% change			-2%	3%	0%	-4%	8%	-2%
Oracle	2/28/00	71	69	74	72	76	87	84
% change			-3%	5%	1%	7%	23%	19%
VF Corp	2/28/00	12	12	12	12	12	12	12
% change			-1%	-1%	-2%	-1%	-1%	0%
i2	2/28/00	150	169	164	163	172	161	182
% change			13%	9%	9%	15%	7%	21%
Sabre	3/1/00	40	44	45	47	45	35	35
% change			11%	13%	18%	12%	-14%	-14%
Ariba	3/1/00	133	140	150	165	166	110	131
% change			6%	13%	25%	25%	-17%	-1%

Exhibit 41 *(continued)*

Price Change — BAMs vs. Tech Partners on Exchange Announcements
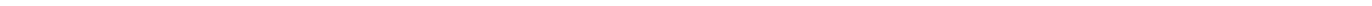
Company	Date of Deal	Deal Day - 1	Price Deal Day	1 Day	2 Day	1 Week	1 Month	3/30/00
Chevron	3/8/00	81	81	83	80	84	92	92
% change			0%	3%	-1%	4%	14%	14%
Wal-Mart- McLane Unit	3/8/00	48	48	49	48	51	59	59
% change			2%	3%	1%	8%	24%	24%
Oracle	3/8/00	75	83	84	82	79	78	84
% change			11%	12%	9%	5%	5%	12%
J.B. Hunt	3/14/00	14	14	15	16	16	15	15
% change			6%	10%	14%	14%	13%	13%
Covenant Transport	3/14/00	11	12	15	14	15	16	16
% change			8%	35%	31%	32%	44%	44%
M.S. Carriers	3/14/00	23	24	25	25	25	23	23
% change			3%	10%	12%	10%	2%	2%
Swift Transportation	3/14/00	15	16	18	17	17	20	20
% change			5%	18%	12%	12%	31%	31%
U.S. XPRESS	3/14/00	6	7	9	10	9	9	9
% change			19%	36%	54%	38%	42%	42%
Werner Enterprises	3/14/00	13	13	13	14	15	17	17
% change			1%	3%	14%	21%	33%	33%
Cargill	3/14/00	30	31	31	31	31	30	30
% change			2%	2%	2%	2%	0%	0%
Ariba	3/14/00	149	141	135	132	121	110	131
% change			-6%	-10%	-12%	-19%	-26%	-12%
Morgan Stanley	3/21/00	88	89	90	95	88	84	84
% change			1%	3%	8%	0%	-4%	-4%
Royal/Dutch/Shell	3/21/00	56	58	56	57	55	58	58
% change			3%	0%	1%	-2%	2%	2%
Goldman Sachs	3/21/00	113	118	117	119	113	107	107
% change			4%	3%	5%	0%	-6%	-6%
BP Amoco	3/21/00	5	5	6	5	5	5	5
% change			1%	1%	-1%	-5%	0%	0%
Totalfina Elf	3/21/00	70	72	70	69	68	77	77
% change			3%	0%	-1%	-2%	10%	10%
Deutsche Bank	3/21/00	73	71	72	70	73	70	70
% change			-2%	-1%	-3%	1%	-3%	-3%
Societe Generale	3/21/00	39	39	38	38	39	38	38
% change			0%	-2%	-2%	0%	-2%	-2%

Source: FactSet and Morgan Stanley Dean Witter Internet Research

Average Price Change
BAM vs. Tech Partners on Exchange Announcements
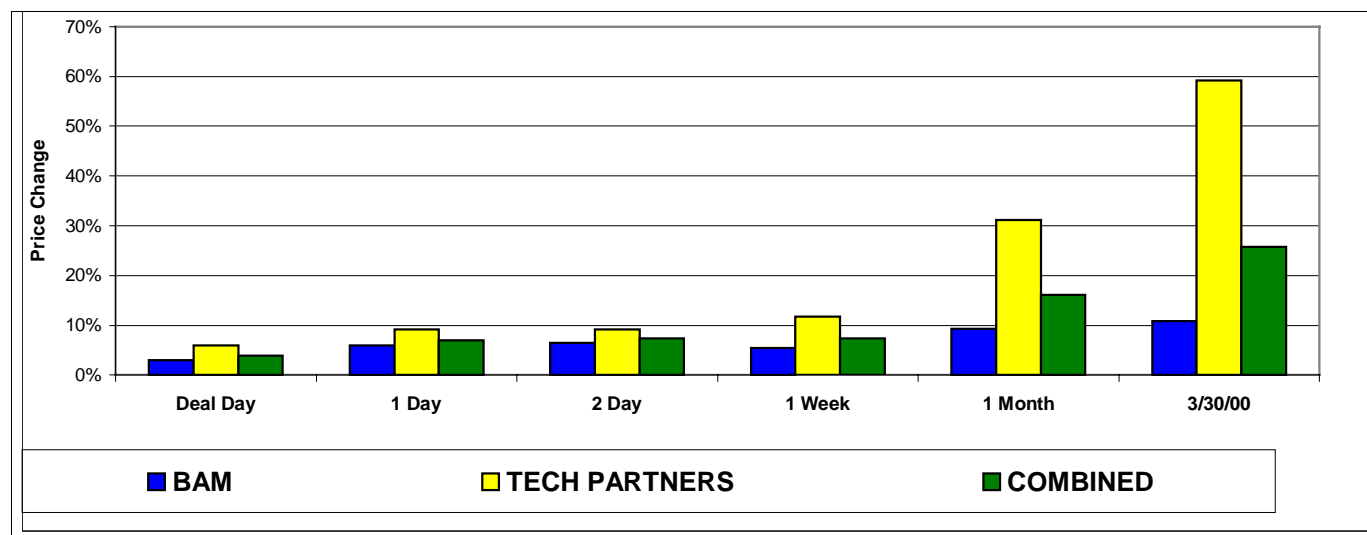
Source: FactSet and Morgan Stanley Dean Witter Internet Research:

Is the Channel Dead?
Only Weak Middlemen Will Be Eliminated

Playing With Fire

Any medium that can get so many buyers and sellers together in one place so quickly and so easily, no matter its shortcomings, is a player by default and neither buyer nor seller can ignore it. Refusing to eat green eggs and ham, with a mouse or in a house, is highly theoretical if that's the only meal in town. So the obvious question is if buyers and sellers can find each other online, why does the world still need distributors and other intermediaries?

> Despite the flurry of analyst reports predicting the death of middlemen, our take is that channel partners and distributors will still be critical to fulfilling customer demand.

The Web will serve as an important platform for organizing and synchronizing those partners, in our view. We would not bet on a mass disintermediation theme.

Certainly, some existing intermediaries will be eliminated because their value was too closely tied to inadequate distribution of rudimentary market information (pricing and supplier and buyer discovery). If these intermediaries don't move their relationships online to help create the new marketplace, they could quickly wind up empty-handed waiting for their 40 acres and a mule.

However, we don't buy into the pure disintermediation thesis, which presumes all the existing middlemen will be eliminated. Plus, we expect new intermediaries will be created because, after all, exchanges are middlemen of a new genre.

Additionally, many of the exchanges are adding some of the same no-tech assets associated with traditional middlemen. The larger exchanges have direct sales forces who are tasked with marketing the exchange's services to key buyers and sellers. Some of the exchanges take title to product, which is a necessity for anonymous buying and selling. The new and the old intermediaries may end up more alike than different in a short period — just with different comparative advantages

Good Distributors Do More than You Think

The world of distributors is a hidden one not written up in business school case studies. It's a business where the gritty execution details rule the day and not strategic breakthroughs plastered on bubble charts, so MBAs aren't too interested. But at the end of the day, someone has to pick, pack, and ship those ten wing nuts to the retail hardware store in East Peoria, and not too many folks want to do that.

Moreover, someone has to handle all the exceptions — wrong credit cards, partial orders, follow-up support, discrepancies, changed SKUs, and a ton of other things that just happen. And again, not too many manufacturers want those activities on their income statement, since Wall Street doesn't pay a lot for those low valued-added activities. But someone has to answer the phone when the hardware store in Nebraska wants to know where to return box three of that four-box order of roof shingles. Even leaders in the Web-based selling say only 15% of their online orders are completely digital. Customers still call to check on the order, make changes, or to clarify issues.

Additionally, retailers/buyers may order products from hundreds of suppliers, and they aren't too keen on forming that many different business relationships for low-touch products. In many industries, distributors aggregate those relationships in one entity and simplify life for both the manufacturer and the retailer/buyer.

However, many of these middlemen provide services that their customers value. Some of the value these intermediaries bring to the tables include the following:

Continuing Value-Add for Distributors

- Supplier sourcing
- Certification of products and suppliers
- Aggregation of small orders
- Exception handling
- Displaying catalog content from multiple suppliers

- Finding difficult-to-locate products

- Serving unique needs of preferred customers

- Advising customers on product life cycles (ordering existing versus pending products)

- Light assembly

- Premium delivery services; same-day delivery for centralized order at the supplier level

- Premium maintenance and repair

- Receivable financing

- Installation and configuration

- Third-party parts and accessories

Many Producers Can't Handle "Eaches"

Many manufacturers have only shipped in pallets to distributors or large customers, and simply aren't set up to handle high-volume small orders. The problem of "eaches", as they're called, can cause significant production inefficiencies and carrying costs. Picking, packing, and shipping for bulk delivery is a completely different animal from an operation set up to handle many small orders from consumers or small businesses.

Producers that have gone direct without previous experience have struggled with inventory turns, customization requests, follow-up customer support, and a higher error rate on orders than they are accustomed to.

Exhibit 42
Distributor Viability Matrix

Key Considerations	Disinter mediation Likely	Distributor Entrenched
Inventory	No physical inventory held/shipped	Physical inventory; drop ship for producer
Multivendor	Few or one product line	High number of vendors/product lines
Order fragmentation	Concentration of orders; small in number high in dollars	Fragmentation of orders; small in dollar size but high in number
Customer support	No or little customer support	Customer support; call centers
Customer Relationship	Identity of customer known to producer	Identify of customer unknown to producer

Source: Morgan Stanley Dean Witter Internet Research

Exhibit 43
Hubs Integrate Multiple Facets of Commerce

INVENTORY CHOICES	DESCRIPTION
Self Stock, Integrated	Integrate consumer orders with bulk orders; logistically impossible for many; creates inefficiencies and raises costs
Self Stock, Separated	Create separate inventory facility for small orders; added costs but retains control
Outsourced Warehousing	Third party handles consumer orders; predictable costs; better response time
Drop-Ship	Supplier/distributor ships directly to consumer; not always applicable

Source: Morgan Stanley Dean Witter Internet Research.

Instant Delivery — a New Role for Intermediaries

One popular solution is to let the distributors continue to do what they do well, and that's aggregate demand to create efficiencies. Producers can take advantage of the fulfillment that infrastructure distributors and retailers have in place.

Because distributors and retailers already have inventory positioned close to the point of consumption, they can be instrumental in creating a "virtual warehouse" for the producer. As the producer receives direct orders from consumers or small businesses, those orders can be managed centrally but fulfilled through the partner in closest proximity to the order. Well-organized producers can use distributors and retail outlets to instantly deliver products ordered online. A similar arrangement could apply to returns, which can be handled by the local retailer or closest distributor and reconditioned for stock.

Virtual warehousing lets producers retain their long-standing relationships with distributors but move the relationships online. Producers and distributors coordinate interactions online and create demand and supply chain transparency among themselves.

At the same time, producers get something they've wanted for long time — a direct relationship with the ultimate consumer of their product. Producers get direct branding with the end-customer, demand and profiling data, and actually find out who is using their products. Producers simply pass the small orders off to a distributor, perhaps unknown to the buyer, for fulfillment but retain the valuable insight. Such a strategy lets the producer take

advantage of the distributor's greatest asset — proximity to the ultimate buyer. What one would hope for under these circumstances is for a competitor to buy into the disintermediation theme and push business your way.

Channel Management Will Boom

We believe the channel will become significantly more efficient and informed by moving channel operations online. While companies have focused on supply chains because of the huge cost savings potential, the selling chain has gone virtually unchanged for decades. Channel partners in all industries have similar problems:

- **Dropped leads:** Sales leads from the manufacturer to the channel partner are not passed on or tracked efficiently. Forty percent of all leads are completely dropped, and manufacturers don't know what happened to the other 60%.

- **Poor product information:** Channel partners have a tough time figuring out what's for sale, since products and prices are changing frequently.

- **Poor channel service:** Manufacturers provide shoddy service to channel partners with limited hours of operation, single language support, dated catalogs, poor product documentation, and little or no communication with product experts who can respond to problems and explain products.

- **No selling assistance:** Manufacturers provide little assistance on how to best sell and position products with the customer, including little cross-selling advice or sophisticated campaign management.

- **No Customer Intelligence:** Manufacturers working primarily through channels tend not to know who their customers are and have little or no profile and customer segmentation data on which to base marketing and product decisions.

- **Poor aftermarket support:** Parts and accessories are frequently the most profitable segment of a manufacturer's business by an order of magnitude. Customers usually prefer P&As from the manufacturer and will often pay a premium for them. Yet, many channel partners resort to third-party parts and accessories because they are easier to procure and

service. Consequently, many manufacturers have miniscule P&A market share for their own products.

> The Internet is the perfect channel management platform. Channel partners are largely already connected and start-up costs are low.

Web-based channel management applications are centralized with the manufacturer, so the channel partners don't have to install complex, heavy-duty software.

With new channel management applications from companies like Click Commerce, Siebel, and Comergent, the channel partner can peruse the producer's partner e-market, get information at any time, share leads, and communicate more frequently with the most important business partner. Channel partners can use the marketplace to schedule service request, capture leads, and order P&A.

> Besides efficiency gains, partner relationship management (PRM) applications over the Web could completely restructure channel relationships.

Manufacturers will learn a lot more about their channel partners, including which ones are producing the most economic value inclusive of P&A and service. With that information, manufacturers can make more informed decisions about distribution depth and breadth. Some areas are overdistributed, which sometimes leads to high market share for the manufacturer but lower margins for all involved. These sub-optimal conditions evolve primarily because of an inability to accurately and efficiently share lead activity and customer profiles.

We expect the stronger channel partners to get stronger, since manufacturers will channel leads based on a combination of performance and location. Since the manufacturer can add more value to the channel with better information, leads, and support, they'll likely extract more commitment from their partners. The end-result — a smaller, but higher quality, more efficient channel.

Disintermediation — A *Huge* Difference between Services and Manufacturing Industries

There is an enormous difference between intermediaries that carry inventory and fulfillment product and those that just match buyer and seller. It will be much easier to disintermediate middlemen in services industries because the fulfillment and inventory issues are much less daunting or not applicable. Insurance companies are eyeing ways to get around their agents, and brokerage firms have been forced to accept online trading directly from consumers. It will be essential to analyze the disintermediation theme industry by industry, and we don't think a blanket assumption will work.

The Strong Get Stronger

Existing intermediaries aren't standing by waiting for the Grim Reaper to invite them to tea. Many large distributors are just now making a move, but they'll come with order flow in hand and Machiavellian powers to protect relationships. For example, Avnet, Arrow Electronics, and Marshall Industries (acquired by Avnet), the three largest electronics distributors, jointly introduced their own site, Chipcenter.com, to counterattack the exchanges popping up in their industry.

In many industries, exchanges should find it easier and more effective to hire or work with existing intermediaries before they end up as direct competitors. Even in this digital world, relationships will still drive "dine 'em and sign 'em" deals. Some exchanges (Arbitnet and ChemConnect) have hired traditional brokers to round up buyers and sellers for their markets.

B2B Reality Check
The Problems — It Won't Be Easy or Quick

Exchanges — The Problems Ahead

The structural shift we've described won't be without friction and significant challenges. It sounds easy to construct a vision of a digital Valhalla where we'll all exist in cyberspace. But there are major bridges that have to be constructed between the digital world of e-commerce and the analog world in which products get delivered and customers get served.

The November 1999 *Purchasing Magazine* survey of purchasing managers shows that few of these executives are pushing the buy button on the Web today. They use the Web primarily for research on products and suppliers and for communication with suppliers. But the transactions are still off-line to date.

Exhibit 44
Frequency of Purchasing Activities for Which Buyers Will Use the Internet

(% of total responses)

	Frequently	Moderately	Not at all
Research potential suppliers	34	59	7
Discover what parts a supplier makes	22	56	22
Get technical data	25	54	21
Communicate with suppliers	41	41	18
Keep abreast of technology trends	20	49	31
Check supplier financials	9	47	44
Use online catalogs for contracted parts	23	50	27
Conduct spot purchases	13	29	58
Conduct contracted purchases	12	16	72
Job search	11	39	50

Source: Morgan Stanley Dean Witter Internet Research.

Exhibit 45
What Type of E-Commerce Models Do You Plan to Use

(% of total responses)

Individual supplier catalogs	69
Electronic data interchange	38
Aggregated multi-supplier catalogs	29
Commerce-enabled extranet with select suppliers	15
Online trading communities (portals)	15
Online collaborative negotiation with suppliers	15
Open buying on the Internet (OBI) systems	15
Buy side systems for non-production goods	14
Commerce-enabled ERP	11
Internet auctions	10

Source: Purchasing Magazine November 1999.

Additionally, buyers currently appear to be content with browsing catalogs vendor by vendor, according to the survey. Sixty-nine percent plan to browse individual supplier catalogs, 29% will browse aggregated multi-vendor catalogs, while 15% plan to use an online trading exchange. Fifteen percent is a not a bad number this early in the game, but the survey didn't ask what type of services they'd use within the exchange (possibly just price comparison and browsing).

Here are some of the stumbling blocks, in our view:

Who are You Going to Call? The issue of support hasn't come up much in evaluations. What happens if an order doesn't go through or the system is down? Who is responsible if there is a dispute about what was sent and what was received? Marketplace operators will have to build support staffs to answer some of these questions real time. TeleTech has built a strategy around providing a turnkey offering in this area.

Directory Listings Not Proprietary: Simply aggregating listings of suppliers for discovery purposes isn't proprietary. Many of these lists can be bought and loaded fairly quickly. Exchanges are already running into a phenomenon called "poaching," where competitive exchanges duplicate listings from each other's sites. Catalogs, on the other hand, with detailed information about products and pricing, can have significant value in industries where that information is difficult to aggregate, categorize, and maintain across multiple vendors.

> Buyers can derive significant benefit by just looking and not booking orders.

Look but Don't Book: Exchanges haven't planned for "drive-bys" — customers who learn of a supplier through an exchange but go directly to the supplier's Web site for all future transactions. Nothing prevents drive-bys other than having a robust set of services that make it easier to go to the exchange than going direct, or perhaps having a naturally fragmented industry that makes going direct impractical. Some exchanges have resorted to not revealing the counterparties to the trade until the parties commit to trading

online, which works if anonymous trading is applicable in that industry.

Inadequate Payment Systems: Payment systems are a significant issue for exchanges. The traditional credit card companies are applying consumer-market pricing models and expect to get 2% of the transaction. That won't fly with buyers or suppliers — some of which have to live off of 3% margins. We believe the credit card companies will have to lower their fees to have a play in the B2B world. But the credit risk is much lower and the transaction sizes are much higher. Moreover, a hard asset can back the purchase in many cases. Some of the exchanges plan to solve this problem themselves. Another alternative is to integrate the exchange directly into the normal back-office payment module of the buyer, which would fire off a normal payment process. E-Chemicals uses SunTrust to qualify market participants' credit.

Lack of Sourcing Capabilities: The growth of new exchanges won't replace the need for long-term sourcing relationships that provide some guaranteed volume for both suppliers and buyers. Buyers can't submit large orders for important products used in their own products without knowing an awful lot about the potential supplier on the other side of the trade. Exchanges are just now building sourcing skills to locate, certify, and rate suppliers for buyers to lower their risk. Most large companies have internal experts that have sourced for years, so the exchanges have a high bar to get over. Companies like FreeMarkets and CoNext have extensive sourcing networks and the skills needed to find quality suppliers for bids.

Supplier Resistance: Suppliers need convincing that marketplaces are more than snake pits into which they are being drawn for further price haggling. The suppliers in some industries have significant pull because of unique products and long-term contracts.

Mixed Reviews to Date: In the November 1999 purchasing manager survey, buyers complained about product searches that return too much irrelevant information. Some were frustrated with the speed of the searches and the overall response time. On balance, most think the advantages outweigh the disadvantages and plan to use exchanges as one more tool. Few saw exchanges as their primary commerce channel, but that could change as these exchanges become strategic priorities because of equity ownership and host collaborative processes.

Lack of Integration: Most exchanges offer no integration to the back-end systems of the buyers and sellers in their marketplace. There are a couple of exceptions, like the National Transportation Exchange and NetWorld Exchange. Lack of integration means redundant work and manual transfer of data from one system to another. GM and Ford are estimating it will cost $200 million to integrate their suppliers into the auto exchange.

Picking Up the Phone Is Still Easy, and It Works: Senior purchasing executives don't have a lot of time for complicated searches. Designing a good exchange interface and properly categorizing the content for easy searching are critical.

Some of the initial buyers found catalogs on exchanges cumbersome, and it was much easier just to pick up the phone and let an expert intermediary do that work for them. The expert on the phone can let customers know if the drill bit they are about to order doesn't work with the drill on the same invoice — most exchanges can't do that today. The paradox, of course, is that great customer service and a cranky Web site might actually encourage customers to rely on low-tech phone service.

Relationships Still Important: Suppliers and intermediaries obviously value their relationships with buyers, but some of the buyers value their supplier relationships just as highly. Not all buyers want to move those relationships online, and some of the comments from the *Purchasing Magazine* survey mentioned loss of personal relationship as a negative. Although much of this can be recreated online, those features aren't fully baked yet into most exchanges.

Barriers to Entry Low: EDI and hosting companies such as Harbinger.net, Sterling Commerce, IBM global services, and Ariba with its IBX service, can host turnkey exchanges on a private-label basis. Net market makers can get up and running fairly quickly if they outsource the service.

The Buyer and Supplier May Already Have Transparency: In some industries, buyers already have a list of the few suppliers they want to deal with and aggressively negotiate contracts. Neither the buyers nor suppliers will pay much to do business with people they already know. A good case in point is Ventro's partnership with a major distributor in the chemical industry. The top 40 customers of the distributor pay no transaction fees whatsoever, but Ventro wanted the relationship and the volume.

Initial Evidence Suggests that a Large Supplier Can Deliver Some of the Value of an Exchange: The ability to search catalogs online, submit orders, modify orders, track shipments, and schedule delivery is a service most companies will want to offer their direct customers. The buyer may consider an exchange if they have many suppliers and want to avoid traversing hundreds of Web sites.

Moreover, companies will be able to private label a portion of an exchange and hold it out as their own and control the relationship with the customer. A good example is Eastman Chemicals — an early mover to e-commerce. The company already has its top 200 customers buying directly from its e-commerce site, which generated $10 million in online sales through September 1999.

If customers are buying off negotiated contracts, why bother with the exchange if your key suppliers give you fresher catalogs and tighter back-end integration? If the buyer already knows they are unlikely to switch suppliers, or if none realistically exists outside of the current vendor list, the direct connect route has some advantages (tighter supply chain integration, customization, better service). **Would you rather buy from Dell's site directly or through a one-year-old intermediary that links you to Dell? That depends on the industry.** If there are 8,000 Dell's to work through, then the exchange is the obvious route. If there are only five Dells, then maybe not, since the search costs would be low.

We think it's early days for large companies to abdicate their customer relationships to unproven intermediaries. Long-term contracts will take time to move online. And companies can pursue multiple strategies — Eastman Chemicals also owns an equity stake in ChemConnect, a trading exchange.

Pricing B2B Merchandise Online Is Difficult

Fixed catalog prices work fine for small volumes of low-ticket items — because it's too costly to negotiate for each item. But if the dollar volume gets large because of higher units or higher ticket items, no one pays list and that means negotiation. Higher dollar program buys may work better if volume-buying agreements have already been negotiated and the execution under that contract is taken back online.

The problem is that negotiating online can be inefficient, awkward, and uncomfortably on the record for many executives. Moreover, not all suppliers want its prices online even with the assurance of privacy, and prefers to negotiate based on the unique needs of the customer. Some industries can get away with that approach, but exchanges will shine the harsh light of transparency in many industries.

An alternative is to turn the negotiation into an auction and let the sellers play rock 'em, sock 'em robots until someone's head pops up. But auctions aren't the most reliable sourcing channel. Suppliers don't reserve capacity for buyers who won't make a commitment. Additionally, in some cases, the relationship with the supplier is so critical, and only a few alternatives exist, so the negotiations are necessarily more delicate than the brutal confines of an auction.

ERP vendors have had advanced pricing modules for years to document agreements, apply discounts, and set service levels for different customers, while factoring in promotional pricing and margin constraints during the negotiation. Exchanges will have to add this critical element quickly.

B2B Technology Infrastructure
Software Is a Key Engine of B2B

If anything's clear from the rush of exchange announcements in recent months, it's that software companies are key to powering the early evolution of the B2B market. And we expect to see a rapid evolution for companies providing key B2B services (such as FreeMarkets) which will help the software hum. The Internet provides the highway, but software is a key engine. It's striking that none of these major marketplaces has been owned or run by hardware companies, systems integrators, or other firms that cloak themselves in e-commerce marketing banter. So far, they've all come up with snake eyes on marketplaces.

The Big Five integrators are so tarnished with multi-year ERP implementations that ran over costs, they don't have Internet marketplace credibility yet. They can get it over time, but the new generation of consulting companies is involved more often that not, although they don't have the scale to be the driver of transactions. The hardware companies don't have the relevant technologies to build and manage marketplaces, and weren't close enough to the business process side of the business to see the opportunity.

The technology infrastructure required for a net market is rapidly evolving because the requirements are changing as buyers and sellers become more sophisticated. Building an exchange isn't cheap, easy, or fast. Ventro spent $10 million and 18 months building its first site. The company then spent another $25 million updating the technology. Increasingly, exchanges are likely to use off-the-shelf products to speed time to market. Ventro now uses several Ariba applications and claims it can integrate a newly acquired market maker in three to six weeks.

Commerce Servers

The basic commerce server is the natural starting point to an e-commerce infrastructure. However, because of the proliferation of products labeled "commerce servers," there is much confusion as to which does what. We categorize commerce platforms into three main segments:

- **Buy-Side Commerce** — Workflow engine for procurement rules for a single buying organization; reports on procurement history; aggregation of multiple supplier catalogs inside the firewall.

- **Sell-Side Commerce** — Creating purchase orders, payment processing, catalog hosting, and merchandizing for a single seller to host on its Web site.

- **Market-Making Platforms** — Order matching across multiple buyers and sellers; catalogs from multiple suppliers.

The initial "commerce servers" on the market were designed for business to consumer markets, since that segment evolved before B2B. They were designed with a single seller in mind selling to multiple buyers and, consequently, focused on single catalog, order processing and merchandising systems. These products weren't designed for communities but for suppliers to sell directly to buyers, which was the dominant model in "Phase 2" of our e-commerce evolution model. During Phase 2, sellers were essentially building Web storefronts to display their catalogs and hopefully capture a few orders.

IBM was early in the sell-side commerce software market with a strong marketing presence and its Net.commerce product (now folded into WebSphere) — which is more of a toolkit than an application. Likewise, Microsoft and Netscape, platform and technology companies as well, introduced toolkits that were versatile but required significant customization to deliver a sell-side solution.

The next generation of commerce servers from companies such as BroadVision, InterWorld, and Art Technology Group were packaged applications instead of toolkits, which is why they've taken off. The natural evolution of software markets is from consulting projects (Stage 1) to toolkits (Stage 2) to packaged solutions (Stage 3).

The Buy Side Arrives

Ariba, Clarus, Intelisys, and Commerce One saw an opening on the buy side. Commerce servers were aimed at sellers.

Buyers had a different set of requirements; they wanted to aggregate multiple catalogs behind the firewall, control the

procurement process with business rules, and select which suppliers their employees bought from.

Large buyers didn't want to go to their suppliers' Web sites, but instead wanted to bring selected parts of those Web sites within their own proprietary, superset catalog.

ERP packages had procurement modules, but they were extremely weak and an afterthought. Those packages had little catalog management technology and didn't contemplate real-time connectivity to suppliers.

Market-Making Software

> While there is a large market for sell-side commerce servers, these products lack the essential ingredient for building an exchange — order matching between <u>multiple</u> buyers and sellers.

Market-making software has to maintain multiple catalogs from multiple suppliers and match orders across all participants in a marketplace. The commerce servers may be used as the order processing engine inside of a market place (BroadVision has pursued this angle).

Some specialist software vendors focused on market-making software (Moai Technologies, Tradex, Trading Dynamics, Open Site Technologies, and Connect Inc.). Many of these vendors have been acquired — mainly by the buy-side commerce vendors because these vendors were viewing things from the buyer's perspective. The buyers already saw the attraction of aggregating their suppliers in a central marketplace.

The original sell-side vendors — focused on sellers — naturally weren't being urged by their customers to create marketplaces, so they were late to recognize the opportunity. Some of the sell-side platforms will likely evolve into marketplace platforms over time.

Exhibit 46
Sell Side, Buy Side, and Market Making Products

	Single Sell Side	Single Buy Side	Market Making
IBM WebSphere	Yes		
Microsoft Site Server	Yes		
Open Market Transact/Live Commerce	Yes		
Art Technology Group	Yes		
InterWorld	Yes		
BroadVision	Yes		
Moai			Yes
Commerce One		Yes	Yes
Ariba ORMS		Yes	
Ariba Tradex		*Yes	Yes
Netscape CommerceXpert	Yes	Yes	

Will likely be phased out in favor of Ariba ORMS.

Microsoft and IBM have promised to add auctioning capabilities to their commerce platforms. The natural evolution beyond that is to other order-matching techniques (real-time bid/ask and RFP). But the market is moving fast, and the specialists in this area are being acquired quickly.

Moreover, the sell-side platforms still have significant work to do on their base products. IBM's Net.commerce isn't integrated with its own WebSphere applications server although it recently took the same name for marketing purposes. Microsoft Site Server has no out-of-the-box capability to check order status and only has loose integration to Microsoft development tools. Netscape's e-commerce products aren't integrated with any of Sun's application servers and have no merchandizing features (e.g., cross-selling, up-selling, discounts, and advertising). Open Market has a single database point of failure and no transaction monitoring features. Most have problems with partial and micro-payments.

Custom-Built Markets

Many of the first net markets had to roll their own software infrastructure, since there were no commercial packages available. Many found the task to be daunting and turned to systems integrators with experience in building marketplaces. Some of the more visible integrators in the net market arena include:

- *Computer Sciences Corp,* the most visible, has built 25 marketplaces including VerticalNet, e-STEEL, and CheMatch.

- *Andersen Consulting* built ChemConnect's chemical exchange.

- *EDS's* CoNext announced an agreement with Ariba for leveraged sourcing network buying.

- *PricewaterhouseCoopers* built e.conomy, a cross-industry B2B buying consortium. It's also a consultant on several industry-sponsored exchanges.

- *Proxicom* built Transport4, an oil and gas industry market.

- *Sapient* built Houston Street Exchange in the electric power generation industry.

Exchange Hosting

> Once the market is built, a third party may operate it.

Touting proven network infrastructure and reliability, IBM, Sterling Commerce (MedOutlook, Buy.com, Health.com), Harbinger (Plumbing On-line, GrocerLink.com), and others have established practices to host exchanges.

Commerce One has generally hosted marketplaces in the U.S. which has helped move some exchanges along more quickly. Ariba generally has sold to net market makers who want to host their own markets. Ariba is taking on more of a hosting role with its IBM/i2 partnership.

Oracle also prefers to host the marketplace as opposed to selling tools to others to build marketplaces. Both Ariba and Commerce One are partnering with telecom companies in Europe and Asia to build out hosting capacity quickly. The telecom companies in these regions are operating the marketplaces and reselling the service on a regional basis.

The Architecture — Putting It All Together

Building a logical construct in which to view all of these services is a challenge. But our Service Matrix for E-Hubs segments layers of services and their components as shown in the figure below. Almost any of these services can be sourced through a third party. The major layers to navigate through the exchange are

- *User layer* — The member's (buyer or seller) view of the exchange which is customized for their profile, workplace role, security rights, and interests.

- *Application layer* — Functions available to the marketplace but viewed in the context of the user's profile.

- *Platform layer* — Infrastructure services available to all applications to facilitate communication with external entities and journal all activities to create a digital audit trail.

Anatomy of a Transaction

1. The buyer browses a catalog hosted behind its own firewall. That catalog has products from multiple vendors. The catalog was built with Ariba ORMX or Commerce One BuySite tools and suppliers send periodic updates for SKUs, prices, and availability.

2. The buyer selects a product with several optional components. The online configurator checks the order to make sure the configuration is valid and all the components work together and with the end product.

3. The order is routed to a supervisor for approval. The supervisor(s) can approve the product or make changes and add notes.

4. The order is submitted and routed either (1) directly to the supplier over the Internet or increasingly (2) routed to Ariba.com or Commerce One MarketSite.

5. The order is checked for validity and credit. Ariba.com or Commerce One MarketSite formats the order in the preferred format of the supplier. The order may get exploded into multiple pieces targeted for several different suppliers. The order(s) are sent to the suppliers over the Internet.

6. The suppliers receive the order and send shipment status back to Ariba.com or Commerce One MarketSite (advanced ship notice, backordered, partial ships, etc).

7. The buyer sees shipment status updated in its buy-side application (Ariba's ORMX or Commerce One's BuySite).

8. The supplier handles fulfillment and ships the product.

If the buyer chooses not to host its own catalog, the process would be similar, but step one would involve ordering directly from the marketplace Web site.

Exhibit 47
**E-Hub Architecture: The Service Matrix**
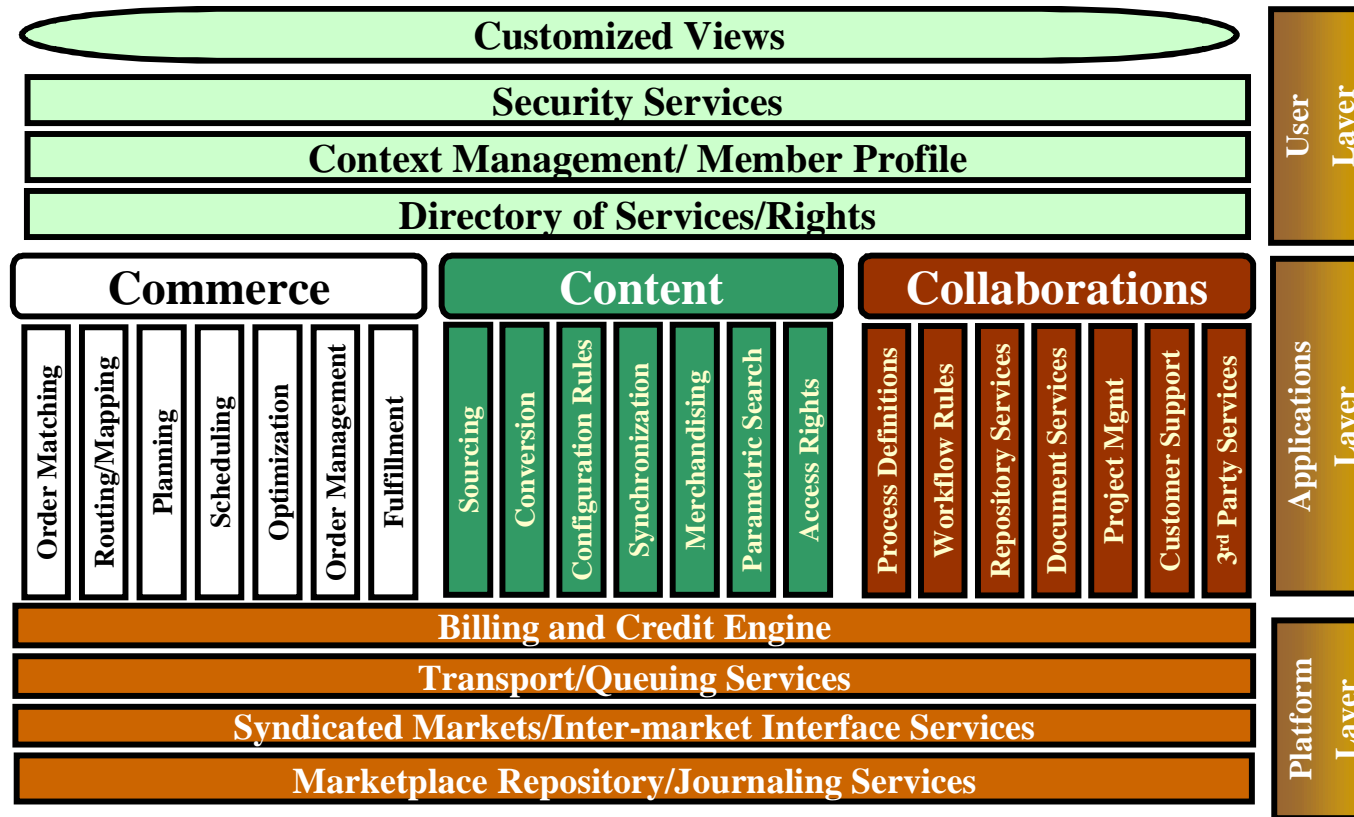
Source: Morgan Stanley Dean Witter Internet Research.

Integrating the Exchanges into the Rest of the World

Right now the exchanges are peripheral to the workflow and offer little or no technology integration to help make that happen. Someone has to provide that link. Many exchanges are sending e-mail to suppliers for orders, who in turn re-key that information into their back-office systems for fulfillment — not a very scalable model. About 5% of the exchanges have some integration with ERP back-end systems.

Exhibit 48
The Missing Link: Transactions Aren't Flowing Automatically to the Back End Systems
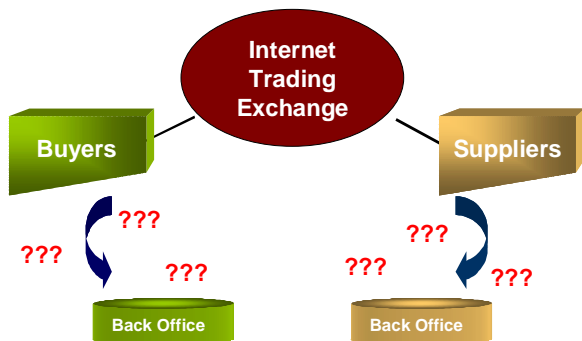
Source: Morgan Stanley Dean Witter Internet Research.

Much of the information a buyer cares about is stuffed away in those SAP, JD Edwards, PeopleSoft, Baan, and Oracle applications. It's the ERP package that has the pricing module to let the user know what the contracted price is for a specific customer — not the generic price. It's also the ERP application that tells you if the product is in stock, is being produced, can be produced at all (properly configured), or has valid substitutes. Those are nice things to know before you place a big order, and buyers aren't going to give that up. So the only question is how does that information migrate to the exchange?

Additionally, new software integration tools based on XML are critical to the process. webMethods is the leader in this segment. The first generation of tools was focused on intra-enterprise integration, but the second generation aims at inter-enterprise integration based on standards. System diversity has always been a significant integration cost and barrier to innovation within the enterprise. The problem doesn't go away for inter-enterprise systems. The historical integration choices were to get everyone using similar technology (wholesale ERP conversions) or hardwiring connections between dissimilar systems not designed to work together.

Exhibit 49
Valuable Info Stuffed in the ERP System
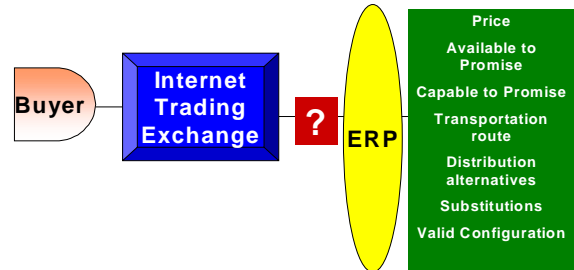
Source: Morgan Stanley Dean Witter Internet Research.

Systems integration companies could profit from the integration void as well. But it may be the new generation of e-commerce consultants that get the prize here, since the Big 5 have ERP baggage. The Big 5 are in scramble mode to retrain people and not miss this market.

Enterprise Applications Companies Feel the Heat

As companies start to rely on e-hubs for more services, more functions that were once contained in a packaged application start to migrate outside of the enterprise. These applications are no longer applications in the classical sense. Instead they are networked services embodied with the same business process and domain expertise once packed inside the application.

> The era of boundary-less applications is upon us. The migration of enterprise functions outside the firewall to an Internet service is a threat and opportunity for software vendors.

Applications are evolving from an enterprise focus to an inter-enterprise architecture. Companies like Bowstreet Software and Loud Cloud are providing products and services to turn software into a community service. A variety of specialized services on the Internet may serve the enterprise and totally recalibrate how companies think about applications. Applications become version-less and systems can be upgraded weekly or daily.

The enterprise software application companies are in a strong position to help make that migration happen, since they already host rich content and business processes for their customers. They probably understand the business processes better than any other market participant, since

they've codified it and implemented it across multiple organizations in the same industry. The application companies are staffed with vertical market experts because that was a necessary condition for automating business processes in these industries.

Yet the batting average for software companies migrating to new business models and technology infrastructure has been decidedly low. There are simply too many internal antibodies fighting the new agent of change. To date, only Oracle among the ERP companies has established credibility as a Internet market maker. JD Edwards looks more credible with its Ariba partnership, investment in Tradex, and recently acquired supply chain technology that will be directly applicable to e-hub collaborations.

The application companies that recognize and embrace this mutation to an application service are more likely to lead the evolution, in our view. We expect application companies to evolve into hybrid content and services companies that build and host their own domain content for customers.

A Framework for Connecting to an Exchange

Buyers and suppliers have a confusing array of choices to connect to an exchange and it's helpful to lay out a framework before diving into the exchange types.

Many large buyers have embarked on building a private exchange in which they connect to their own suppliers and get some of the benefits of a public market place. Alternatively, they can connect to a third party public exchange managed by a separate company outside of their firewall. Furthermore, they will continue to have EDI connection for batch orders kicked off from the ERP system based on present inventory thresholds for some products.

The market is going through a phase in which large buyers are reconsidering whether they need to host their own exchange or partner with other buyers, even competitors, to obtain even more transparency while sharing the network plumbing to lower costs.

Exhibit 50
From Applications to Network Services
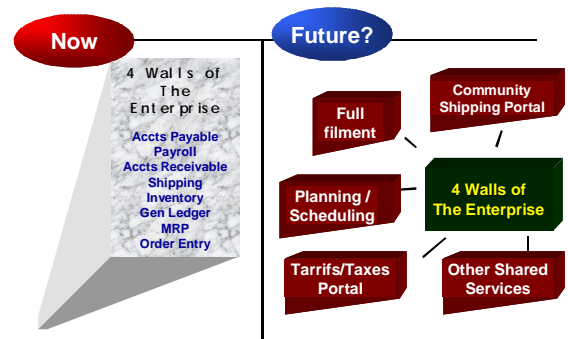
Source: Morgan Stanley Dean Witter Internet Research.

B2B Technology Infrastructure — The Snapshot

B2B E-Procurement
- Ariba
- Commerce One
- Oracle
- Clarus
- Intelisys
- RigthtWorks
- FreeMarkets

B2B Order Management
- Comergent
- Ironside Technologies
- OrderFusion
- SpaceWorks
- Oracle
- JD Edwards

B2B Integration
- CommerceQuest
- Extricity
- Sterling Commerce
- Vitria Technologies
- webMethods
- STC

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

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

Web Site Content Management
- Interwoven
- Vignette
- Documentum
- BroadVision (Interleaf acquisition)

Collaborative Product Life Cycle Management
- Agile Software
- Matrix One
- i2

Personalization
- BroadVision
- NetPerceptions
- Vignette
- Documentum

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

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

Market Making Software
- Ariba (Tradex and Trading Dynamics)
- Open Site Technology
- Calico (Connect acquisition)
- Commerce One
- Moai Technologies
- FairMarket Inc

Marketing Campaign Management
- Broadbase
- E.piphany
- Siebel
- Exchange Applications

EDI
- GEIS
- Harbinger
- SPS Commerce
- Sterling Commerce/SBS
- The EC Company
- XML Solutions

Application Servers
- IBM WebSphere
- BEA WebLogic
- SilverStream
- Sun/Netscape

Supply Chain
- i2
- Manugistics
- JD Edwards

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Competitive Overview
High Stakes, Big Promises, Deadly Tactics — All at Internet Speed

Not many rivalries can match the brutal competition among software companies to dominate the B2B infrastructure markets. This is an industry full of A-type personalities armed with flak jackets and grenades. Maybe the Army-Navy football game approaches a similar intensity, but that one may be dated, since Air Force rolls over them both every year.

The Playing Field

We evaluated products available for purchase to build a complete procurement and marketplace solution. The key products examined include Ariba, Commerce One, i2, Oracle, and SAP.

Other products handle some components very well, such as RightWorks and Clarus. But we stuck to broader platforms examined most frequently by large organizations. Additionally, other specialized services, like FreeMarkets, have their own platforms which are solid in their own right, but they aren't sold to third-party market makers. FreeMarkets doesn't view itself as a technology provider, and is agnostic about the technology, but it had to build robust tools because none existed when the company first entered the market.

A New Technology Metric

Equity ownership and the hot IPO market are playing an unprecedented role in technology partner selection in the area of e-commerce. Investors' enthusiastic reception for IPOs of nascent Internet-related companies creates wealth-building opportunities for the brick-and-mortar companies, and these opportunities are in the multi-billion-dollar range for projects the companies would have to undertake anyway.

Commerce One created instant momentum for itself in the market by giving GM 20% of the company in warrants. The endorsement by GM in turn increased Commerce One's market value by $2 billion overnight, and GM was already in the black on that relationship.

However, the equity pull is also creating an unprecedented, somewhat peculiar, relationship between the customer and the technology provider. When the technology provider is also an equity investor, the buyer loses the ability to select

market-leading technology based on merit and performance. The technology supplier can't be fired. The relationship starts to resemble that of a captive supplier that the parent must use for relationship interests as opposed to performance, which is what GM had with EDS.

> The other curious development is the perception that the owners of the marketplace, increasingly the brick-and-mortar companies, must give the technology provider an equity stake in the exchange.

The same companies certainly didn't give SAP, Oracle, and JD Edwards equity stakes to run their back-office software. Over time, the technology suppliers will be viewed as — well… technology suppliers. The value of the exchange is the commerce and community it can aggregate, and those both come from the brick-and-mortar companies participating in the exchange. We believe the BAMs are giving too much credit to the technology players, and there will be a broad array of choices to run marketplaces.

For Commerce One, we think the decision to give equity to GM was a brilliant one to catapult the company into the spotlight. While other technology providers balked at the prospect of giving away so much equity, to date, it has been a winning trade-off. The challenge will be to do the same for other large buyers in other industries, without diluting existing shareholders unacceptably. But given the market-value increases from these announcements, the trade-off has been favorable for Commerce One shareholders as well.

The Procurement Window

The first thing buyers want to see is how the screen for building a shopping basket looks. How easily can I select items from a catalog and get confirmation on an order? The procurement application visible on the desktop is important because it won't get used widely if it's overly complex. This is technology that sits at the buyer's location; it's the "on ramp" to the marketplace.

Ariba is the ease-of-use leader, although Commerce One and Oracle have closed the gap substantially with their latest products. Oracle's product improved substantially after a few months of working with Ford, based on the demonstration we saw. The SAP procurement window isn't as elegant or as tested, but it is evolving. i2 partners with RightWorks, which isn't a leader in the space and may need to get a stronger partner.

Not all marketplaces have or need front-end procurement software. To use VerticalNet or Grainger.com, buyers only need a Web browser, and all the interaction takes place within the marketplace site. Oracle also markets the option of building marketplaces that need no front-end procurement window and hosting all of that functionality directly in the marketplace.

However, large companies like to add business rules that use the front-end procurement windows as an integration point for multiple procurement sources so that users have a common look and feel. VerticalNet and Grainger.com as well as other marketplaces without procurement windows will integrate their services into the Ariba and Commerce One procurement windows to reach large buyers.

Workflow

Workflow technology is a key buy-side component to a procurement solution. It's the technology that allows buyers to specify procurement rules — how orders get routed for approval. Buyers want advanced features like the ability to route orders in parallel to multiple approvers, attach documents, delegate approvals, change the content of orders, and lay out the process graphically.

Ariba has powerful workflow, which is part of the reason for its initial success on the buy-side, since it can handle complex procurement rules. It's easy to set up and maintain and can be used for non-procurement-related workflow as well, although it can't integrate with third-party workflow products.

Commerce One has significantly improved its workflow but lacks several of the above features. Oracle's workflow is solid and Web-based as a result of the workflow technology it had to build for its ERP product line. SAP has the advantage of leveraging the workflow technology in R/3, which many companies are already using. However, Ariba has the edge in this area based on ease of setup, flexibility, and ease of administration.

Exhibit 51
Functionality Report Card

	Ariba	Oracle	SAP	C-One	i2 Tech
Real Time Bid/Ask	A	-	-	-	-
Content Management	B	B	C	B+	C
RFP	-	-	-	-	-
Auctioning	B	-	-	B	-
Procurement Window	A	B	C	B	-
Workflow	A	C+	C	C+	-
Integration	B	B	C	A	C
Fulfillment Expertise	-	C	B	-	A
Supply Chain Mgmt	-	C+	C+	-	A
Demand Chain	-	B	-	-	C
Consulting resources	C	A	B	C+	B
Network Platform	B	C	D	A	C
Scalability	B	A	C	C	C

Source: Morgan Stanley Dean Witter Internet Research.

Open or Closed

As usual, there is a raging standards battle — this time around XML. All the vendors base their interfaces on XML technology. But XML isn't completely defined for a specific use by industry. As a result, the marketplace platform vendors, primarily Ariba and Commerce One, are in a standards battle with conflicting claims over which one is more "open" and which is proprietary.

From the number of times we've heard customers parrot back what they've heard from the vendors in the selection process, Commerce One is winning this argument. Commerce One's xCBL (Common Business Library) is a set of reusable building blocks based on XML. xCBL connects to the same data sources as Ariba's cXML (such as EDI).

We think Commerce One's argument for being more open is sticking for several reasons:

- It acquired a company called VEO that was conducting research for the National Standard Institute relative to XML.

- The company participates on several standards boards, such as RosettaNet, Commercent, and World Wide Web Consortium.

- Commerce One has relentlessly marketed these relationships as some sort of endorsement of openness for what are, in fact, its proprietary extensions to XML.

The reality is that the XML standard wasn't designed to standardize all interactions between companies but to give them a standard language for expressing the

interactions. We have a common language, but exactly what two companies decide to say to each other will vary, and Ariba, Commerce One, Oracle, and others will design different conversations for companies to conduct business. The schemas prefabricate common conversations. The underlying language standard of XML will make it easier to maintain the technology, but we believe the idea of plug-and-play commerce without customization isn't realistic for the foreseeable future.

In other words, everyone has to extend XML in some way to get work done and generate proprietary conversations with useful content. The standards bodies haven't endorsed anyone's standard, but Commerce One's aggressive marketing of its membership and alignment with these organizations has been helpful. Ironically, Commerce One's xCBL only works with its own parser (language interpreter), while parsers from Sun, IBM, webMethods, and others can use Ariba's cXML.

The standards issue will likely fade quickly as a differentiator, as companies come to understand the details and realize there is no such thing as a standard schema. Second, if there is a standard, it will likely be a superset of all popular dialects, and everyone will have to do some mild migration and upgrading. **Customers can still get work done since all the vendors support the routing of orders to suppliers in their preferred format, including EDI, OBI, e-mail, fax, or HTML.**

The technology industry has the closest thing to a common schema via an organization called RosettaNet, which had defined some 3,000 common conversations over the last two years. Many technology companies are adopting the RosettaNet standards, but they aren't specific to any single vendor's technology.

Microsoft's BizTalk framework is a set of XML specifications and extensions the company would like to make a standard. But it's not available yet and the market is moving quickly, and it doesn't come up in evaluations yet. However, Microsoft is Microsoft, so we aren't counting it out as a possible influencer in the future, although we've been surprised at how little presence the company has in the B2B market.

Commerce One was early to support procurement windows from other vendors and has a legitimate claim of openness in this area. While it doesn't run around endorsing Ariba's cXML, Commerce One does market its willingness

to integrate with other front-end products — if that's a concern in the sale cycle. That openness has some appeal, since large organizations may have different procurement windows but want to use a single marketplace and catalog. The company hasn't actually had to integrate with an Ariba front end yet but just the willingness to do so has helped. Commerce One has certified 15 third-party applications to work as front ends to MarketSite.

Ariba has responded and has stated it will support third-party front ends, but it hasn't said so loudly enough; this has allowed Commerce One to capture the openness debate, but from a technical standpoint, both companies know there is no difference. Until buyers come up the learning curve, this should work for a while.

Oracle was pushed into supporting third-party front ends with the GM-Ford-DaimlerChrysler exchange, since Oracle and Commerce One are working together on that project. Oracle hasn't marketed the openness card either since it prefers its one-stop shopping message. While there are many specialists around net market technology, Oracle is the only one with a credible entry in all the relevant segments. Most of them don't get A+ ratings, but they are competitive and along with Oracle consulting, offer a broad solution that avoids multi-vendor integration work.

i2 has been silent on the issue, since it's usually not in deals that are so focused on the procurement front end. The recent partnership with Ariba and IBM has now skewed i2's strategy toward the Ariba front end. i2 already had a strategic relationship with RightWorks, another procurement vendor, but decided to blow that partnership up to get something of more value with Ariba and IBM.

The first release of SAP B2B procurement required customers to have the R/3 materials management module on the back end. The second release is more open and can support multiple back ends, but SAP hasn't publicly committed to supporting multiple procurement windows yet. The SAP procurement window is still rough around the edges and improving, but time is running out. SAP still has a huge, important installed base and may choose to leverage that into a relationship with one of the e-procurement vendors.

Direct vs. Indirect

> The largest area of confusion for customers is understanding which vendors can only do simple indirect requisitioning, versus enabling direct procurement.

Indirect procurement is fairly simple. Customers normally install procurement software that tracks procurement rules and hosts an internal catalog. Orders from that catalog are sent out over the Internet to the appropriate suppliers, and then the buyer waits for delivery.

The direct world is much more complicated. It's the largest percentage of corporate spending, and the materials being procured go into the buyer's end-products for resale in the market. Direct materials impact revenue, market share, and product quality, not just administrative cost. The cost of direct materials is inseparable from the supply chain. A major component of cost is inventory, and to reduce inventory in the supply chain, manufacturers have to communicate with their partners.

Exhibit 52
Differences Between Direct and Indirect Procurement

	Direct Purchases	Indirect
Predictability of purchases	Volatile; external market driven	Predictable; internal admin support
Price	Swings with availability; market demand	Less volatile; lower cost
Order Size	Larger lots for volume production	Smaller, individual purchases by each department
Collaboration on product bought	High; partners co-design and produce	Low; standard, off the shelf product is acceptable
% of Purchases	80%	20%
Revenue Impact	High; revenue generating product	None; for internal use
End Consumer	External customer	Internal employees

Source: Morgan Stanley Dean Witter Internet Research.

Direct procurement is more volatile since it's tied to fluctuating end-market demand. Indirect procurement is more predictable since it's for ongoing administrative needs. *A simple summary from the buyer's view is that direct purchases are:*

- 100 times more complex, since they involve coordinating activities of component suppliers, and

- 1,000 times more volatile, since they are tied to external market consumption.

Anything that costs a lot and has volatile pricing, availability, and demand cries out for optimization. **Indirect and direct procurement are apples and oranges.**

Yet companies that grew up on the indirect side with no supply chain experience are also trying to sell into direct procurement. Can they do direct — well, yes, if the customer wants to treat direct like indirect, which wouldn't be a rational strategy if they care about little things like margins and earnings. There is no way to gain decades of logistics know-how in one quarter.

Many of the decision-makers aren't valuing or giving any consideration to longer-term issues such as fulfillment or restructuring the supply chain via collaborative commerce. The decisions are often driven more by equity considerations and the haste to get an announcement out. In many cases, the professionals that worry about the detailed execution, inventory, and costs aren't at a level to be involved in the evaluation.

Over time, the fulfillment considerations will become more important. There are lots of ways to skin that cat, and the hubs can add these services through partnerships and licensing arrangements over time. But it will require bringing in partners that know the right questions to ask about the supply chain and fulfillment process.

Manugistics, JD Edwards, i2, and Oracle have deep supply chain experience. i2 has carved out some thought leadership in marketplace technology but is weak on content management and the procurement window, which should be improved via is partnership with Ariba.

FreeMarkets has developed expertise in direct material supply markets — its primary focus is in offering reverse-auction procurement solutions, which help its primarily Fortune 500 customers save 5-25% on procurement prices of key products. Direct material markets have been characterized by inefficiencies resulting from the lack of standard prices, the importance of non-price factors (such as component quality), and highly fragmented supplier bases. To date, FreeMarkets has operated in over 70 supply vertical markets, such as injection-molded plastic parts, metal fabrications, and corrugated packaging.

Content Management

As we've discussed earlier, content management isn't easy.

> Getting supplier catalogs loaded quickly is a bottleneck, given the poor condition that most of such data are in and the lack of standard product codes for every industry.

This technology can sit at the buyer's site, within the marketplace, or the content can stay with the supplier. Many products don't fit into a catalog. Customized products, usually for direct procurement, won't usually make it into a catalog, although over time, custom line items in catalogs could appear. Moreover, many direct purchases are fired off by the ERP system based on replenishment rules. These purchases don't go through a catalog and may not need to go through an exchange.

Commerce One offers to do the dirty work and clean it up and then host the content. Commerce One has strong tools for cleaning up content and loading it into digital form quickly, although they store data in flat files, which raises scalability questions. The company is also challenged to handle all of the content cleansing itself, given the sheer volume and complexity.

Ariba refers suppliers to several third parties (TPN, Requisite, e-content) and doesn't want to do that work, which is a higher margined strategy, but pushes that work back to the supplier or to the marketplace itself.

Oracle was working with TPN but more frequently with Requisite Technology, a specialist with strong content management tools. Oracle will provide some consulting work around the content, but doesn't want to do the cleansing work either.

SAP has selected Requisite as well. Both SAP and Oracle were slow to come up with strong content management strategies and were getting out-flanked by Commerce One in sales cycles. The tools from Requisite should help, but both companies need more experienced people who know the process behind managing content. It is a special skill set that companies like Grainger have perfected..

i2 has been weak in content management, so it recently announced its intention to acquire Aspect Development. Aspect helps but is a mature product that is being retooled for current net market requirements. Aspect has 18 million parts pre-loaded into its database, which an individual buyer can host behind its firewall (the historical model) or a net market can host. Given the frequency of changes in much of this content (price, SKU, design specs), having millions of parts only means so much, since the content begins aging as soon as it hits the database. Moreover, i2 will have to make this a generalized product that can quickly convert content and keep it synchronized with the original source — an area in which Aspect has struggled a bit. We think it will be a year before i2 can assert a solid content management strategy.

We believe Requisite has the newest and most elegant content management software. Oracle has embedded the technology into its content management solution, and SAP and Grainger are using the same technology. **Generally, we think most of the B2B vendors have underestimated the importance of content management, and many buyers and suppliers want help**.

On the other hand, some suppliers don't want their catalogs hosted by a third party. They are learning that the content is strategic and don't want it tied to any particular marketplace. Ariba's approach works well in that scenario because the content doesn't have to move. Ariba just points the buyer to content at the supplier's site with "punch out" technology. Moreover, the punch-out approach allows vendors to keep selling directly from the Web site with the same content.

Commerce One recently announced "Round Trip" technology to do the same thing, although it hasn't delivered a working site using this technology yet. Oracle has begun talking about a similar capability, and i2 and Aspect will have to offer a similar technology. But Ariba has over 120 successful implementations of "punch out", and the company invented the concept.

On the buying side, large companies almost always want to host their own catalogs inside their firewall. Suppliers are being inundated with requests to contribute their content to each large customer's proprietary catalog. This approach isn't scalable over the long term and is difficult to maintain. BAMs are ill-prepared to manage all this content, and the suppliers can't afford these point-to-point connections if they have hundreds or thousands of customers.

Over time, we expect more organizations will get comfortable with letting their catalogs live inside of the exchange with customized views and business rules

providing the same control they were trying to achieve. Some buyers are already discovering that the hardware resources to host these enormous catalogs are costly. But for now, the ability to help buyers build a catalog of their suppliers' products behind the firewall is key, in our view. Both Commerce One and Ariba have technology to help buyers in this area.

Breadth and Scale

Given the number of deals Commerce One had signed up and its limited bandwidth, prospects are beginning to ask if it has the scale and resources to handle another large, complex project. We'd expect the company to have to partner to get some infrastructure quickly in light of the Ariba, i2, and IBM announcement.

Ariba's marketplace technology, procurement windows married with i2's supply chain expertise, and IBM hosting capabilities offer a potent combination if they can keep the team synchronized. Managing three-way partnerships is difficult, but IBM is focused on this area and eager to get a seat at the table. Ariba and i2 will incorporate technology from IBM in their products while IBM looks to generate hosting, integration, consulting, and technology platform revenue. Keeping the products synchronized in a fast-changing market will be a challenge, and the threesome has plans for complete integration a year out, which is a long time these days.

Exhibit 53
Track Record for Marketplace Wins

	Marketplace Wins	Industry Sponsored Exchanges
Ariba	60	2
Commerce One	35*	3
i2	3	1
Oracle	5	3
SAP	13	1

Source: Morgan Stanley Dean Witter Internet Research.

* Commerce One has published its win count at 75 marketplaces but that includes multiple marketplaces with a single customer (e.g. telecom companies with the rights to resell C1 technology). We've adjusted the number to reflect the number of marketplaces a prospect could get a name and phone number of a reference.

Oracle is the largest competitor with products and some marketplace wins and has by far the most resources with 17,000 consultants. Given how quickly these markets are established and the aggressive goals for getting operational, Oracle's ability to instantly produce a couple of hundred consultants is a competitive advantage.

Trading Applications

Ariba has the most advanced platform for dynamic pricing via its acquisitions of two best-of-breed products (Tradex and Trading Dynamics). Third-party marketplaces (Chemdex and PlasticsNet) were already using these platforms for real-time pricing, auctioning, and reverse auctioning.

Commerce One also has a solid trading platform bolstered by its acquisition of CommerceBid (auctions and RFPs) in December 1999. Commerce One isn't as strong in dynamic pricing, but many marketplaces may not need that type of pricing in the near term.

Oracle, SAP, and i2 have basic catalog ordering but have not yet demonstrated more advanced trading applications, although they are scheduled to arrive shortly. These vendors have some time, since most of the volume hasn't arrived and many industries are or will be dominated by catalog purchases. Several third-party products can provide dynamic pricing technology as well (Moai and OpenSite). Commodity-like industries (e.g., chemicals and telecommunication capacity) may be more focused on dynamic pricing features.

Distribution Capabilities

The suppliers expected to contribute content and participate in the market will need help integrating their back-office systems into the chain of commerce. That upgrade process will require an outbound sales force to move them along, integration technology, and consultants to do the heavy lifting.

Oracle's large sales force can be a good conduit for reaching the suppliers since the Oracle reps are eager to open new accounts and sell integration, back-office, and add-on products. IBM has significant distribution and account presence but has less expertise in selling these.

The distribution capabilities come into play when buyers want more of the fulfillment process and collaborations online.

Support Considerations

There is more to operating a marketplace than just routing orders over the Internet. Someone has to pick up the phone, and that means call centers and customer support.

Even Dell, a pioneer in Internet-based selling, says only 15% of online orders are completely "touchless." And what about anonymous postings — someone has to take title and inspect the product before shipping it to the buyer, and it has to be a neutral third party.

Fulfillment

Fulfillment is a broad subject addressed later in this report. However, marketplaces that provide fulfillment as one of the most important collaborations are much more likely to become important participants in the chain of commerce. If the buyer and the seller have to go offline to arrange financing, shipment, and settlement, then the repeat transaction has a good likelihood of taking place offline, since the exchange stops adding value at that point. It has completed its discovery function for the two trading partners.

Given the newness of the industry, none of the vendors can demonstrate a strong story on fulfillment at the moment. But we think this area will be a key battleground for differentiation. To get many of the supply chain efficiencies the BAMs envisioned, the exchanges will have to offer real-time fulfillment so that the buyer can see all product, availability, transportation, and pricing alternatives at the time of purchase.

> The buyer wants to look into the inventory in the supplier's warehouse in real time.

i2 has more relevant technologies to build such a solution but has to demonstrate that expertise in the context of a marketplace. Many of i2's technologies are powerful but built on client/server technology with several data models. Those are things that can be fixed but they have to be modified quickly to deliver on the promise.

Oracle has experience in supply chain technologies and fulfillment. It worked for several years with i2 and Manugistics and now has its own suite of products with a major supply chain suite upgrade scheduled for this spring.

Commerce One and Ariba plan to offer rudimentary fulfillment coupled with order status checking. For advanced optimization, Commerce One has partnered with Adexa, a small private supply chain vendor started by former i2 employees. Ariba has partnered with i2, which has a much stronger brand and more resources at $600 million in revenue last year. IBM will also contribute some supply chain and

fulfillment technologies it has developed; those features will be incorporated directly into i2 and Ariba products.

Configurability

Almost everything in the system will have to be configurable, so that different companies can tailor the systems to match their business strategies, and systems with lots of switches usually means consulting and advisory services are needed. Someone has to pick up the phone when there are problems. What type of service-level agreements will the exchange be willing to sign? What storefronts (different categories of products — e.g. container board, forest products within a paper industry exchange) will be established in the exchange?

Someone has to design and architect change-management and version-management procedures — what happens when the new payment options become available? How are changes implemented and how are users notified, and do they have options as to what features they want to turn on?

Add-on Services

Exchanges can add value by plugging in third-party services for a fee. A flurry of companies are currently building horizontal services for multiple exchanges. Other software specialists with vertical market expertise are rushing to re-purpose their products as services within the exchanges that emerge in their industry. It's the best alternative to seeing their product eroded by competing services in the exchange.

Ariba is furthest along in creating an architecture built for extension. The company has published interfaces and has already integrated with several third-party services and marketplaces. Commerce One is following a similar strategy and isn't far behind.

i2 and Oracle haven't detailed their plans in this area yet and haven't published APIs.

Scalability

No exchange is handling millions of transactions per day, so it's difficult to be conclusive on this important metric. Nonetheless, Oracle has a long history of building some of the most scalable systems on the planet, so we gave them an edge in this category. Ariba's platform runs on Unix, while Commerce One runs only on Windows 2000, which we viewed as a limitation on scalability for Commerce One until

proven otherwise. i2 and SAP both support Unix platforms as well, although SAP has more experience in scaling transaction-intensive applications. i2 comes from an applications background which is computer-intensive (advanced optimization algorithms running on a server with large amount of memory) and doesn't have as much experience with heavy transaction-processing environments.

Supplying vs. Hosting a Marketplace

There is a big difference between supplying technology to an Internet market maker and operating a marketplace. Some Net market makers, typically the VC-backed start-ups, want to operate their own marketplace and look to Ariba or Commerce One to buy some leading-edge tools to speed time to market.

Conversely, the BAMs tend to feel less comfortable operating the marketplace and being responsible for integrating the tools and technologies that comprise a solution. Consequently, they have hired the technology vendors as partners, sometimes as equity partners, to operate the marketplace.

Ariba doesn't operate many marketplaces but has historically wanted to sell to them and be the arms merchant in a big war. The basic assumption is that there will be thousands of marketplaces, and Ariba wants to be the arms dealer in the wars ahead. Ariba will host a marketplace and operate it for the exchange that wants it, but that hasn't been something it has pushed aggressively.

Commerce One was early in putting together fully hosted solutions via partnerships with telecom companies. The start-up Net market makers are more likely to view Commerce One as competition, since they are operating competitive exchanges for the brick-and-mortar companies. On the other hand, that's what the BAMs want — the hosted, turnkey solution Commerce One offered. Commerce One, Oracle, SAP, and i2 are all focused on getting the market hosted, although Commerce One will sell its software on a stand-alone basis but still wants revenue sharing in some form.

Part of the motivation behind the Dream Team announcement — Ariba, i2, and IBM — was to provide international scale to the hosted option for Ariba and i2. Ariba will adjust its message to focus more on hosting as the presumption of thousands of viable marketplaces looks less solid in light of the industry utilities being formed.

Nonetheless, Ariba is closer to a software company with a recurring revenue model than it is to a services company with a big desire to operate marketplaces. Oracle is at the other extreme and will aggressively offer hosting services to exchanges on its own infrastructure.

Integrated vs. Fragmented Marketplaces

Whether the marketplace is outsourced or operated by the marketplace owner, the marketplace should fit into the broader federated market.

> In a perfect world, registering a supplier or buyer in one marketplace would make that member visible to everyone on the network with all relevant profile information.

Buyers can opt to route their orders directly to a supplier or through the network of the B2B platform supplier (Ariba, Commerce One, etc.). A large buyer might have a catalog behind its own firewall. Orders from that catalog might be routed directly to a supplier. More likely, the order is routed to the Ariba Network or Commerce One, which authenticates the buyer and seller and then routes the order to the seller in the preferred format. The platform supplier maintains a central directory of all members of all Internet markets in the network. Additionally, as new services are added, all markets should be able to participate.

Commerce One has franchised its technology to telecom partners who are setting up and operating marketplaces on their own by customizing the software. Commerce One gets transaction revenue from these franchisees and plans to tie these marketplaces together over time. The benefit of this strategy is rapid market share gains as partners establish markets on their own. The challenge is keeping all these markets on the current releases of the technology to create an integrated view and add new services over time. Some participants may not care if they can see any other market than the one they joined, but others might.

Ariba controls its platform more and has a good architecture for managing and upgrading multiple markets using its technology. Oracle and i2 aren't as far along on the federated markets concept, but we believe they will be forced to flush out their strategy here as competition heats up.

Oracle should be in a solid position in this area, since it plans to host all of the markets it is involved in, which

makes it easy to tie them together. Moreover, Oracle's fully hosted approach allows the company to inject new features and services across its entire marketplace domain without struggling with version management problems. Once software code reaches third parties, it always gets customized, and upgrades are subject to all sorts of other constraints. The hosted approach also speeds deployment, and Oracle is now marketing its ability to get any market up and running in 14 days.

Market Platforms vs. Market Operators

It's critical to distinguish pure Internet market makers from companies that also sell market-making platforms, which are primarily software companies. Dotcom start-ups focused on a vertical might purchase a market platform from Commerce One, Oracle, or Ariba. The technology needed to host catalogs, conduct auctions, and then dive into add-on collaborations is only available from a handful of companies. At this stage in the game, it makes little sense to start building these applications from scratch. Most new start-ups will look to buy this technology off the shelf, instead of spending valuable funding on infrastructure that already exists.

Commerce One and Ariba will charge the dotcom transaction or hosting fees. Oracle will license a version of its marketplace for a software fee but also provide hosting and operating services. In addition, these companies also operate marketplaces themselves or with partners.

> The market platform companies are fundamentally different from the dotcom start-ups because the platform companies can derive revenue from multiple verticals, multiple markets, and multiple services.

Additionally, the platform companies are busy adding other services they can charge for as well. Some of their revenue will come from multiple transaction types and collaboration. Other revenue will be derived from operating and hosting fees as well as some revenue-sharing arrangements.

The platform companies are also getting reasonably attractive contracts from the industry-sponsored exchanges as well. Many of these deals include equity for the platform vendor as well as off-the-top revenue-sharing arrangement. Other contracts we've seen focus on royalty arrangements and operating fees tied to a set of services.

The key point is that BAMs value the technology and have no intention of building it themselves. They are also motivated to find the best technology, since many of them want the exchange to add value quickly so it can go public. The market platform companies are facing an identity crisis that probably will get resolved in fairly short order.

> The software companies are trying to walk a fine line. They'd like to sell software to as many Internet market makers as possible. On the other hand, they are being asked to host and operate markets by some of their larger customers, which would mean they are competing with their Net market maker customers.

The platform vendors are trying to strike a balance and sell their software platform to multiple exchanges and leave the bulk of the operating responsibilities to third parties — telecom companies for Commerce One and IBM and other partners for Ariba. **The dividing line is blurry, since both companies have taken equity positions in some Net market makers while selling software and services to competitors of those same market makers.**

The historical distinction between software and services companies will get tested. That dividing line was already under attack in traditional software markets as customers look to host more of their software directly with the software vendor. Customers had already grown tired of software companies dropping off complex software packages and referring the customer to a consultant with one week of training and a flimsy certificate.

In response to customer backlash, the major software companies have aggressively built large consulting organizations and hosting services to take more responsibility for the implementation services and total solution. At the same time, software companies are desperate to build recurring revenue and get out of the perpetual-license trap that leads to all-you-can-eat contracts and no follow-on business.

Oracle is less worried about the conflict since it has long had an IBM-like strategy that strives for one-stop shopping. Moreover, Oracle is accustomed to competing with its partners just as IBM has for years. The fully hosted

approach Oracle is taking has many advantages and creates a more controlled solution with fewer integration points.

> The threshold question as to whether a platform vendor is operating or simply supplying a marketplace is who signs the service level agreement with the exchange owner?

If the platform vendor is responsible for delivering a certain level of responsiveness and availability of the entire exchange service, it is in effect operating the marketplace, even if it outsources components. The secondary question is who handles support and runs the customer interaction centers. Oracle is willing to do both, as is IBM. The others will take on the SLA in some cases (more so for Commerce One) but don't want the customer-support responsibility.

Pricing

Pricing varies widely and is custom by contract. All the contracts we've seen have some element of recurring revenue which might be transaction fees (fixed or a percentage of the purchase), service contracts, or a percentage of revenue or operating profit.

The start-up Net market makers need a low initial fee and are willing to pay the transaction fees in return for low or no start-up costs.

The ISEs have been open to transaction fees as well; rightly or wrongly, they think someone else will be paying the fees. We expect the transaction fees to come under some pressure as both supplier and buyer try to squeeze out the cost. We think they will be scaled down but still survive in many markets, since there is value to guaranteeing delivery of the transaction. After all, that's all the EDI vendors did, and they created a multi-billion dollar market.

However, buyers and suppliers will demand some caps on the transaction fees to make their cost more predictable. We are starting to see contracts that are capacity-based up to a maximum ceiling of transactions in a year.

The industry is so new and contracts are being signed so quickly that the platform vendors are negotiating rather favorable deals for themselves. They have more experience negotiating these contracts, and each customer is negotiating in this area for the first time and the consultants aren't sure what to say

> There is a significant benefit to transaction pricing. Customers pay less up-front and the software/platform vendor has incentive to keep the technology current and deliver ongoing value.

Recurring charges of some form represent a more logical commercial relationship for both the software vendor and the customer and more accurately align their interests.

Despite confusion in the marketplace, all the major vendors charge some form of recurring revenue. They all have some component of up-front license fee to offset the selling costs but skew contracts toward recurring revenue. Oracle was rumored to sell its software for a perpetual license fee, which isn't accurate. Oracle will forego transaction fees if the Net market maker is willing to pay a capacity (license) charge that escalates each year if peak transactions throughput continues to increase. Oracle also charges a hosting fee in this scenario. So, yes, Oracle has an option to charge no transaction fee, but it gets to the same recurring revenue result through a different approach.

In many cases, the platform vendors get equity in the customer-exchange. Each of these deals is unique, with modifications to the transaction pricing to reflect the equity position.

Importantly, we haven't seen any "all you can eat" licenses of software in this market. The software vendors are pricing for the long term. From here, we think they have a huge opportunity to layer in more services and transaction types. Most of the agreements building in declining prices per transaction with volume and time, but leave open a wide range of additional services.

E-Commerce Fulfillment and Operations
The Big Win — The Integrated Chain of Commerce

Fulfilling the Order

> The logistics of actually making and efficiently delivering the product may not make good airline magazine reading, but we think this area will quickly become critical and topical.

Exchanges will scramble to add these services once they peel back the onion a few more layers. Taking orders over the Web is easy to do and not a differentiator for anyone. Fulfilling those orders efficiently while giving the customer more options and information is another story.

Fulfillment is the process of accepting an order (credit approval, SKU verification, etc.), disbursing an order to the relevant partners, assembling the component in production or in transit, and then packaging, shipping, and delivering the order. These operations become more complicated as the number of partners involved, product SKUs, and selling channels increase.

The area we call "e-commerce operations" probably will look a lot more important a year or two from now. Somebody has to pick, pack, and ship until they figure out a way to squeeze axle rods, water pumps, and assorted widgets down the phone line (which we aren't ruling out just yet).

It's one thing to take an order but it's quite another to offer the customer:

- Accurate due delivery dates

- Real-time product availability as opposed to what can be ordered

- Coordination of multiple line items to minimize shipping costs

- Real-time shipping status

- The ability to pay more for faster production/delivery

- Available to Promise — item made and can be committed to delivery

- Capable to Promise — product hasn't been made but production capacity can be reserved

- Intelligent alternatives to fill demand and optimize for market share, fill rates, profitability, or customer satisfaction

- Integrated orders that span multiple manufacturers but give one order status and price for the final component

Curing the Blind Spots

> Because the chain of commerce is fragmented, the fulfillment process has many costly blind spots.

All companies are forced to outsource, specialize, and rely more on trading partners but coordinating fulfillment across multiple supply chains is difficult to do manually. And the problem is growing more acute. Raw competition is spawning more configurations and flavors of products with shorter life cycles. In 1981, 2,700 new products hit grocery shelves in the US; that figure had ballooned to 20,000 by 1996. That magnitude of variation and velocity causes all sorts of logistical contortions.

The first blind spot is end-market demand. Companies can't see real-time demand because most sell through intermediaries or don't have any lead-time from their customers on demand shifts. Manufacturers may forecast with historical data but often don't have current information on shifts in demand.

To avoid stockouts as demand changes, companies build for all scenarios. Some manufacturers require their suppliers to keep 90-150 days of inventory on hand and have resigned themselves to inventory bloat. The US had a $1.37 trillion investment in inventory in 1998, and 40% of carry costs on this inventory was obsolescence. The dollars are big enough that a legitimate proposal to cut into this overhead will get a hearing.

The better solution is to accept orders for things that haven't yet been built and deliver them quickly.

The second blind spot is through the supply chain. Manufacturers can't tell what inventory and manufacturing capacity is available in their own supply chains. Their suppliers in turn can't see demand two or three levels up the chain. So they build inventory as well.

> Because manufacturers can't get real-time product availability from their suppliers, they assume fixed lead-times on all products, but life is variable.

They can get to fixed lead-times if they require suppliers to carry excess inventory, but then the supplier has higher carrying costs and spoilage that show up in the final price. **Companies that build to inventory instead of for immediate demand have higher defect rates.** It's hard to detect defects in products sitting in a warehouse — they have to be used first. Tightening the link between production and consumption provides more frequent product feedback that can be rolled into production plans. Matching production to real-time demand is an obvious objective but difficult to achieve.

Pretty quickly, one gets the picture of the massive inventory bloat that could be reduced if the entire supply chain had transparency of process and demand. **Eliminating these blind spots and creating virtual supply chains collaborating in real time represent the largest opportunity in e-commerce, in our view.** At stake are billions of dollars in inventory reduction, transportation costs, and process improvement.

Exhibit 54
Blind Spots in the Chain of Commerce

Source: Morgan Stanley Dean Witter Internet Research.

Collaborative Commerce – April 2000
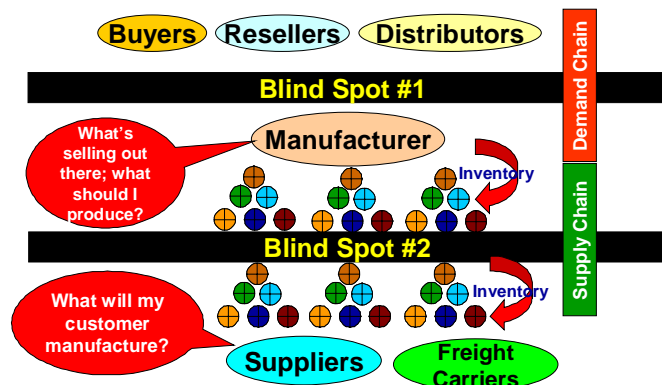
E-hubs are natural points of integration and coordination to facilitate the synchronization of demand and supply chains. For years, companies struggled to create build-to-order environments. The goal is to build less generic product for inventory and more custom products for a known order. To reach that objective, companies must create a global shop floor to link production more tightly to current demand.

Planning and Scheduling

Once commerce is online, every demand event should be an input into the production planning process. Promotions and rebates, configuration events, marketing campaigns, advertising, quotes, bids, partner campaigns, and negotiations all eventually drive production needs. Usually, production is the last to find out about these events because of the complexity and costs associated with sharing this information with all the relevant parties. E-commerce can help bring more precision to a historically imprecise process. The disconnect between multiple parties in the chain of commerce, some within the same company, is immense and a small improvement could make a big difference.

On the back end, even pick, pack, and ship is highly specialized. Pulling orders that are low volume but complicated with many options is completely different from pulling high volume, standard products. Moreover, products vary substantially in weight, volume, and dimension. Pulling, packing, and shipping computers is different from shipping promotional literature or compact disks. Thinking through the design of these operations, segmenting similar processes to obtain scale, and tying them to order processing systems and marketplaces will be competitive advantages in the next phase of e-commerce.

Better Supply Chain Coordination

Funny things happen when the demand and supply chains aren't integrated. We met recently with an e-fulfillment company whose client forgot to mention a planned Web advertisement offering free gift-wrapping. The client immediately received 7,000 gift-wrap orders with no infrastructure for gift wrapping, sending the fulfillment company into a frenzy. Another client offered free samples which, unbeknownst to manufacturing, bumped up production requirements by 15%. These missteps are quite common but hard to prevent unless an infrastructure and process for collaboration has been built.

The High Cost of Exceptions

Fulfillment gets complicated because of exceptions (backorders, partial shipments, returns, substitute products, incorrect orders, changed SKUs). The exceptions are expensive to resolve because they are so labor-intensive. Moving the fulfillment process online should lower the number of exceptions since the buyer or technology will be able to resolve many of the issues real time.

SKU (stock-keeping units) numbers change as product changes at the manufacturer and buyers aren't informed. They order SKUs that no longer exist and must find the new SKU or a substitute product. Other common problems are wrong delivery addresses, wrong effective dates (product life cycle transitions), incomplete specifications, wrongly configured orders, advanced ship notices that arrive after the product, and double orders and shipments.

> The easiest way to reduce the exceptions is to properly define the information once, online, and make it accessible to interested parties.

Orders configured online can be checked by a configurator to see if all the components work together. The address can be filled in from the customer number, which eliminates data entry errors. The buyer can see order status, which cuts down on double ordering. Bringing more transparency to the fulfillment process makes it more efficient and easier to coordinate.

Suppliers get a double benefit: customers are better served with timely, accurate information about their order, while supplier costs fall because the customers can serve themselves online.

Real-Time Reservations

Buyers would like to confirm product availability before they hit the buy button, which isn't the case for most online orders today. Manufacturers need broad product lines to be competitive and meet a wide variety of buyer preferences. Yet they can't afford to build all products in unlimited quantity and have to guess which portions of the product line will sell well for a given production horizon.

All that translates into stock outs and backorders or, conversely, excess inventory for the supplier. **As a result, buyers want to reduce their risk of getting a backorder or**

stockout. They'd like to see detailed information about inventory and production capacity (available to promise, capable to promise).

> Instead of ordering and waiting for order status information, buyers would like real-time availability information and the ability to reserve products by serial and bin number.

Direct procurement is unforgiving. Out-of-stock conditions and backorders translate directly into lost market share, lower profits, and poor customer satisfaction. The ability to reserve real product, by serial and bin number, online is of significant value.

If we all made airline reservations but could only be assured of getting a seat half of the time on the requested flight, there would be a revolt. Airlines can't overbook flights that often. But manufacturers have to do just that for production because of resource limitations and unpredictable demand. The buyer would like to know ahead of time if there is a seat available so that they can look for another flight if need be. They'd like to complete that entire process online in seconds, instead of days.

Purchasing Magazine's manufacturing survey for March 2000 showed 44.5% on-time delivery rate. In other words, manufacturers, more often than not, don't get the product they want when they want it, and therein lies the rub. Lead times are stretching out. The alternative is for inventories to start building. Neither outcome pleases everyone.

To date, exchanges have at best served as a rudimentary communications mechanism for shipment status. Most exchanges send the order to the supplier and leave the rest of the fulfillment and settling process to the trading partners who handle things offline. Some exchanges require the seller to send order status within 24 hours, but the information isn't real-time or up to date, and more often, the buyer and seller handle fulfillment offline. Most exchanges can't verify inventory before the order because they haven't integrated tightly with the supplier's back-end systems. The flip side is that if suppliers post product listings on multiple exchanges without real time inventory availability, they'll end up selling products they haven't produced, and we'll get right back to where we are today with backorders and stockouts.

More Advanced Order Management Systems on the Way

Order processing systems and trading exchanges of the future will have to accommodate the dynamic nature of Web-based selling channels. E-commerce allows many permutations of selling channels**.** It will become quite easy to create new channels by pushing an icon or a catalog to a partner Web site or exchange. Many of these partners will want to co-brand products as they attempt to build customer relationships to their channels. The final product will have to reflect the co-branding, which means the same product may have many different labels, options, invoice formats, pricing, warranties, and support options depending on the channel. ERP systems weren't built with this flexibility in mind. Only a few order-processing systems, such as Yantra and SpaceWorks, can handle this kind of product and channel complexity. ERP order entry systems weren't built for this type of complexity.

The New E-Commerce Operations Architecture

We believe everything will have to be rethought, from transportation technology to distribution point design, to ensure products are optimally designed, assembled, and packaged for variable shipment. The increase in offshore manufacturing and specialization translates into more transportation and logistical challenges. Shortened product life cycles increase the need to get products from point A to point B quickly and cost-effectively, because delays mean lost share. It used to be just high tech with short product cycles, but other consumer-driven industries are seeing shorter cycles, and consumer tastes change more quickly.

Exhibit 55
New Style Logistics

Traditional Logistics	E-Commerce Logistics
Bulk to distributor	Parcel to customer
High cost of interaction	Low cost of interaction
Standard products	Customized products
Consolidated shipments	Fragmented shipments
Limited documentation on supplier performance	Compare performance across all suppliers
Limited order status	Detailed order status info
Stockouts/Backorder	Query substitutes online
Low process transparency	High process transparency

Source: Morgan Stanley Dean Witter Internet Research.

At the same time, companies don't want to rush-ship components for product only to discover that one part is on backorder or delayed. All component shipments may need to be optimized around the slowest part and not the fastest to merge in transit. Transportation costs will likely go up as a result of all these pressures, so making good decisions on how to pack, pick, and ship throughout the supply chain will grow in importance. The same goes for production. No one wants to rush production of a component that can't be used until the slowest part comes in three weeks later.

In essence, logistics behind the buy button can determine time to market and customer service levels. The challenges escalate when companies try to take e-commerce global. Most exchanges haven't done much beyond their own countries. All the issues around tariffs, duties, and customs have to be integrated into the process.

These functions are among a wide range of other complexities that tend to get glossed over in e-commerce discussions but are often what separates profitable, well-managed companies from those flying blind and living off of price cuts and promotions. It also separates companies that get high-margined repeat business from those that constantly pay a premium to acquire new customers.

The change could remove billions in inventory in some industries, reduce spoilage and inventory scrappage, while improving customer service. Given the early adoption of these concepts in the US, it could change the competitive landscape with other geographies. The impact from these changes could be large and more immediate than other technology-led productivity improvements. Economists tend to think about technology and its impact on the economy in terms of decades. We think this could happen in quarters.

> E-commerce operations represent a new fulfillment category that accommodates the volatility, velocity, and customization association with e-commerce.

Orders that are entered electronically, with time, will be increasingly customized and can be changed easily — all of which ripples through the supply and fulfillment chains. Companies like submitorder.com, NTL logistics, and Cybergistics are specializing in this area. Some own warehouses and handle everything from the buy button to the curb.

This stuff isn't easy, and it will take gray-haired logistics veterans to smooth things out. Yes, companies have invested in supply chain software for years, but the

overwhelming proportion of that investment was for intra-company planning and scheduling. The Web presents a platform for inter-enterprise optimization, planning, scheduling, and collaboration. It takes years of dealing with all these variables to even know they exist, let alone solve for them all. After a concert, a fan rushed up to famed violinist Fritz Kreisler and gushed, " I'd give my whole life to play as beautifully as you do." Kreisler replied, "I did." There is no

magic bullet for the logistics side, but we believe the Internet presents some exciting opportunities.

We're at the Carl Sagan stage, where dreaming and conceptualizing is generating a burst of B2B enthusiasm. We'll soon get to the Vince Lombardi stage, where a very small percentage of players will turn into champions because of superior execution and a relentless commitment to solving real-world problems.

The Digital Audit Trail
Everything Is Online and Measurable

You Can Run, but You Can't Hide

There is a new dimension when commerce moves online. If the chain of commerce initiates and concludes transactions digitally, the ability to measure performance and assess market alternatives will improve sharply. This digital audit trail presents a basis for much sophisticated resource optimization. The transactions are data rich, broadly replicated, and quickly analyzed.

Most suppliers will be able to point and click and bid in an online auction. The better question is whether I should click at all? Is this profitable business? Do my suppliers have the capacity to meet this order? What are my opportunity costs — what other pending orders are in the pipeline, and which ones take precedence? Am I optimizing for market share, fill rate, profitability, or preferred customers?

Similarly, buyers will be able to optimize their decisions for different goals and strategies. Some may be willing to pay more for an order if a supplier can complete the full order, rather than get a better price for back-ordered parts or split across multiple suppliers. Buyers don't have to assume fixed lead-times on products but can see actual lead-times and make a more informed decision. They can assess back-ordered parts and not rush ship-related components, since they can't be used anyway. Buyers may, in turn, accept orders from their customers differently based on the answers to those questions.

One of the derivative impacts of e-commerce is that all events from inception to end are captured digitally. The potential is enormous, in our view. Exchanges will be able to measure not only what a customer bought but also, to name a few things, what alternatives were considered, how long, how the supplier performed, was it in stock, how long customers in a given industry will wait on back-ordered product, price volatility measured against external factors, and competitive responses to product and prices changes. **Supply chains will know not only what customers are buying but also what they are thinking about buying.**

> Never before in the history of commerce have we had such good data on how markets behave.

And where there are good data, even more transparency can be created.

These data will be valuable but sensitive. Exchanges will likely figure out how to market composite data to their respective industries. Exchange members will have detailed metrics on all aspects of the chain of commerce and will be able easily identify bottlenecks and opportunities. In B2B markets, the buyer may actually want suppliers to have some of these data to get more personalized (e.g. efficient) services.

Buyers will be able to control how broadly their purchasing behavior is distributed in the marketplace and will collect their own performance data on suppliers.

Historically, buyers obtained the information about the product to be purchased from less reliable sources, such as the vendor selling the product or competitors. Independent analysis is expensive and difficult to come by in many markets. The metrics collected in the marketplace could form a convenient rating system that becomes as standard as Moody's debt ratings.

Customer Intimacy in a Marketplace Context
E-Hubs Can Improve, Not Weaken Relationships

Merchandising

Suppliers naturally resist being reduced to a line item in a catalog. But think digital. All sorts of possibilities open up once the sales process move online. Instead of looking at a static catalog, sending an e-mail, or possibly speaking with an inexperienced sales representative, sellers can present their wares precisely the way they want.

Instead of describing a product, suppliers will be able to show the product in use, offer real-time education and training, and pop-up chat windows to speak with experts on the topic. **The sky's the limit.**

Also, online-based sales methodologies are reliable. They get tired, have a bad day, or want to play golf. Content gets presented in a consistent fashion and can be personalized for each customer.

Suppliers will merge merchandising techniques from the retail work with the rich content tucked away in configurators to produce a much richer buying experience.

Without these advanced cross-selling and promotion features in the marketplace, suppliers risk lower transaction sizes. Online merchants report lower average transaction sizes over the Web — partly because most Web sites don't do much merchandising and cross selling. Additionally, buyers are still getting comfortable with the medium and are placing small orders initially.

Profiling and Segmentation Will Boom

Exchanges that help suppliers develop close linkages with their customers through the marketplace will find it a lot easier to attract suppliers. They don't want to treat every customer the same, and customers have different needs and differ in importance to the supplier.

An intermediary represents a potential wedge between the supplier and buyer. Exchanges that make that wedge as transparent as possible and provide technology infrastructure to foster relationship-building should have a good value proposition for suppliers.

A cadre of new companies has popped up to provide the technology for profiling and segmenting customers by behavior traits — both online (Web site traffic) and offline. Analytical technologies for customer profiling and segmentation from companies like E.piphany, Broadbase, and Hyperion will **be converted into marketplace services over time.**

So while buyers can compare suppliers on price, suppliers can also compare different types of buyers. Suppliers will be able to discover the 20% of the customers that represent 60% of the profits. Buyers will see customer-specific catalogs and promotions.

Marketing Automation

> Despite all the fear over prices imploding for all suppliers, we think the smart ones will take advantage of the digital medium to offer different customer segments different pricing, negotiated contracts, custom promotions, and related products and options.

Suppliers will orchestrate marketing campaigns and promotions in the context of the market place.

Suppliers have spent significant sums on marketing automation and aren't about to revert to one-size-fits-all marketing because of exchanges.

Personalization and Interactive Selling

Exchanges will have to offer much more sophisticated selling metaphors over time to offer context-based promotions, suggestions, and configurations. Moreover, buyers want more information and context around the transaction to make more intelligent procurement decisions. Advanced technologies such as streaming and interactive video will provide immediate information in context. **Configurators will be moved into the marketplace to allow customers to configure multiple products from multiple vendors into a compatible solution.**

Defining Events in B2B
So Far…

VerticalNet IPO (2/11/99)

Price of IPO:	$4.00
First Day Close:	$11.34
Stock Splits:	2 for 1 split on 8/20/99
	2 for 1 split on 4/3/00

Healtheon IPO (2/11/99)

Price of IPO:	$8.00
First Day Close:	$31.38
Stock Splits:	none

SAP announces mySAP.com (5/3/99)

SAP unveils its mySAP.com Internet business strategy and new e-commerce offerings.

Ariba IPO (6/23/99)

Price of IPO:	$5.75
First Day Close:	$22.50
Stock Splits:	2 for 1 split on 12/20/99
	2 for 1 split on 4/3/00

Commerce One IPO (7/1/99)

Price of IPO:	$7.00
First Day Close:	$20.33
Stock Splits:	3 for 1 split on 12/27/99
	2 for 1 split on 4/20/00 (announced)

Chemdex IPO (7/27/99)

Price of IPO:	$15.00
First Day Close:	$25.50
Stock Splits:	none

Oracle announces OracleExchange.com (7/28/99)

Oracle unveils plans for Oracle Exchange, an open business-to-business online marketplace. Oracle Exchange will provide an e-business procurement community where any company can buy business goods and services using any purchasing technique. Oracle Exchange will be available to any company and does not require Oracle software. Oracle Exchange will offer both a broad, horizontal marketplace as well as vertically aligned industry marketplaces built together with Oracle partners.

Internet Capital Group IPO (8/5/99)

Price of IPO:	$6.00
First Day Close:	$12.22
Stock Splits:	2 for 1 split on 12/13/99

i2 announces TradeMatrix (10/11/99)

TradeMatrix.com will span multiple Internet marketplaces, allowing buyers, sellers, design partners and service providers to plan and communicate over the Internet. Features of TradeMatrix.com will include: multiple options for consolidating orders across many vendors; integration of logistics in multiple item orders; real-time integration with back-end fulfillment processes; one collective site that taps into multiple marketplaces and sites; collaboration among strategic partnerships; services for sellers to build multi-organizational brands; and management of design processes.

IBM agrees to resell VerticalNet storefronts (10/21/99)

VerticalNet and IBM announce they have entered into an e-business initiative to deliver e-commerce solutions to IBM customers and enhanced technology to VerticalNet. Under the terms of the agreement, VerticalNet will promote IBM's products and services across approximately 50 vertical communities. In addition, IBM will work with its customers to create e-commerce solutions using IBM's Net.commerce software and integrate those solutions into VerticalNet communities by providing those customers co-branded VerticalNet storefronts. This commitment from IBM will include an initial purchase of 375 storefronts over the next twelve months that will link IBM Net.Commerce customers to VerticalNet's portfolio of vertical communities.

Ford and Oracle announce Auto-Xchange (11/2/99)

Ford and Oracle announce the formation of the Auto-Xchange, an automotive e-business integrated supply chain to be created and run by a newly formed joint venture between Ford Motor Company and Oracle Corporation. Ford will own a majority of the new joint venture which is expected to become operational in the first calendar quarter of 2000.

General Motors and Commerce One announce GM TradeXchange (11/2/99)

GM and Commerce One announce the creation of an Internet enterprise that will help suppliers, dealers and other businesses take advantage of GM's global purchasing

expertise. GM and Commerce One plan to have the site in operation in the first quarter of 2000. The site will allow businesses to reduce purchasing cycle times by automatically handling purchase authorization, accounting and contractual procedures.

Commerce One acquires CommerceBid.com (11/5/99)

Commerce One announces it has signed an agreement to acquire CommerceBid.com, a developer of business-to-business auction and reverse-auction service solutions.

Grainger offers online auctions (11/8/99)

Grainger announces it has begun offering online auctions on its Web site. Grainger Auction gives customers an opportunity to place real-time bids on surplus MRO products from a variety of categories, including janitorial, metal working and hand tools.

Ariba acquires Trading Dynamics (11/15/99)

Ariba announces it has signed a definitive agreement to acquire TradingDynamics, a provider of business-to-business Internet trading applications. With this acquisition, Ariba expands its market by adding e-commerce products and services designed for Net Market Makers to create Internet business-to-business exchanges. In addition, new value-added network services will be offered through the Ariba Network marketplace platform to Ariba customers and suppliers. These new services will include auction, request for quote (RFQ), reverse auction, and exchange mechanisms.

VerticalNet announces acquisition of NECX Exchange (11/16/99)

VerticalNet signs a definitive agreement to acquire NECX Exchange, a business-to-business marketplace for the electronics industry. VerticalNet will integrate these new capabilities with existing vertical communities in the Advanced Technology and Communications sectors.

FreeMarkets IPO (12/10/99)

Price of IPO: $48.00
First Day Close: $280.00
Stock Splits: none

Banacci and Commerce One announce joint venture (12/14/99)

Grupo Financiero Banamex-Accival and Commerce One announce a joint venture that will offer a B2B electronic marketplace for Latin America. The new company will operate an e-commerce portal in Mexico based on the Commerce One MarketSite portal solution. Under the agreements to be entered into by Banacci and Commerce

One, Banacci will license the Commerce One Solution for the development of a B2B e-commerce platform based in Mexico and Latin America, and Commerce One will provide technical, marketing and deployment expertise to accelerate the launch of the Banacci services.

Ariba acquires TRADEX Technologies (12/16/99)

Ariba announces it has signed a definitive agreement to acquire privately-held TRADEX Technologies, a provider of solutions for Net Markets. TRADEX will provide Ariba with yet another source of network-based revenue.

i2 announces HightechMatrix.com (12/21/99)

HightechMatrix.com is a vertical, online marketplace designed for buyers, sellers, designers and service providers in the high-technology industry. Compaq and Hewlett-Packard Company are among the leading customers participating in HightechMatrix

Ariba-EDS buying network (1/10/00)

EDS CoNext, the newly created subsidiary of global information technology services leader EDS, and Ariba announce a definitive agreement to create the largest group of B2B net markets using the approach of strategically managed consortia-based purchasing. The EDS CoNext managed net markets, powered by the Ariba B2B eCommerce platform and supported by A.T. Kearney procurement and Internet auction expertise, are designed to deliver greater market efficiencies and process improvements to buyers from multiple industries and their suppliers on the Internet. This will be done through actively managed joint purchasing, strategic sourcing, auctions and e-procurement on a global scale.

Shell and Commerce One announce marketplace for the energy Industry (1/13/00)

The companies announce a memorandum of understanding to form a joint venture to develop an Internet marketplace for procurement in the oil, gas and chemicals industry. The aim is to establish an electronic exchange to link buyers and sellers of goods and services across the energy industry throughout the world. The exchange will be designed to be open to energy companies, their suppliers and their customers.

i2 announces TradeMatrix retail services (1/17/00)

i2 announces TradeMatrix Retail Services, a series of value-added, hosted application services designed specifically for retail and consumer goods companies. The services will be offered through TradeMatrix, i2's open business-to-business

exchange connecting multiple marketplaces. i2 plans to launch TradeMatrix Retail Services in the first quarter of 2000, beginning with item catalog services, intelligent demand forecasting and collaboration.

VerticalNet announces joint venture with Softbank (1/17/00)

VerticalNet announces plans for a Japanese joint venture with Softbank Commerce. The companies' plan is to launch B2B vertical communities in Japan. The new company — VerticalNet Japan Kabushiki Kaisha — will create a localized version of VerticalNet trading communities for Japan's business-to-business Internet audience. The new services are expected to launch later in 2000.

i2 joins GM's TradeXchange (1/19/00)

GM announces its intention to incorporate i2's business-to-business supply chain services into GM TradeXchange's open online e-marketplace. i2 will provide supply chain management services and business process expertise to GM TradeXchange.

Ariba and Chevron announce Petrocosm marketplace (1/19/00)

Chevron and Ariba announce an agreement to create Petrocosm Marketplace, a global, independent Internet marketplace to be owned by buyers and suppliers across the energy industry. Petrocosm Marketplace is planned to be an open Internet marketplace and exchange that will go live in the second quarter, 2000 at www.petrocosm.com. It intends to offer browser-based access with internet-hosted procurement to enable companies of all sizes to buy and sell products and services that span the oil and gas industry supply chain: drilling, electrical, pipes, valves and fittings; and professional, engineering, and construction services.

Microsoft Invests $100 million in VerticalNet (1/20/00)

VerticalNet and Microsoft announce they will enter into a strategic alliance to deliver a rich set of business-to-business e-commerce services and content to small to medium-sized businesses eager to reach new markets and transact business over the Internet. As part of the alliance, Microsoft will provide VerticalNet with significant distribution and marketing support through multiple Microsoft properties including the MSN network of Internet services, Microsoft bCentral small-business portal, and Microsoft.com. In addition, Microsoft will invest $100 million in VerticalNet.

SAP announces 129 million Euros in revenue through the mySAP.com version of its product suite (1/24/00)

The company announces its mySAP.com product generated 129 million Euros in revenue during 1999.

Commerce One acquires Mergent (1/24/00)

Commerce One announces that it has signed an agreement to acquire Mergent Systems, a developer of distributed product information management systems for business-to-business portals.

VerticalNet to Launch VerticalNet Europe (2/1/00)

VerticalNet announces the formation of VerticalNet Europe, a joint venture with global communications company British Telecommunications and Internet Capital Group. VerticalNet will be a majority shareholder in the joint venture.

Ariba and Azurix announce Water2Water.com (2/9/00)

The companies announce Azurix plans to launch Water2Water.com, an Internet-based marketplace for buyers and sellers of water and water-related services to be built on the Ariba B2B eCommerce platform.

United Technologies, Honeywell and i2 announce MyAircraft.com (2/14/00)

The three companies announce their intention to launch MyAircraft.com, a joint venture focused on developing and operating a comprehensive open electronic marketplace for aerospace products and services available to all industry participants. The joint venture will utilize i2's TradeMatrix platform to provide business-to-business collaboration, supply chain management, parts planning and procurement solutions in an open Internet marketplace that will enable airlines, original equipment manufacturers (OEMs) and their suppliers to improve their business performance. UTX and HON will own equal shares of this venture, with i2 owning the remaining equity. MyAircraft.com will be structured and operated as an independent company.

Citigroup and Commerce One announce plan to build internet marketplace (2/17/00)

The companies announce plans to launch a business-to-business portal providing e-commerce services to Citigroup's worldwide corporate customers. The alliance will create a virtual marketplace linking corporate buyers and suppliers to the new Citibank Procurement Connection portal, which will process procurement transactions and host vendor catalogs as well as market specific applications addressing the needs of particular industries. In addition, Citigroup will become the primary financial service provider on the Commerce One MarketSite Global Trading Portal.

Chemdex announces formation of Ventro Corporation (2/22/00)

Chemdex announces today the formation of Ventro Corporation, a new company focused on building and operating business-to-business (B2B) vertical marketplace companies. The Ventro companies currently include Chemdex, Promedix, Industria Solutions and the Ventro-Tenet Healthcare Supply Venture, each with its own industry-specific management team. SpecialtyMD.com, another recent Chemdex acquisition, also becomes part of Ventro.

Toyota and i2 announce iStarXchange (2/23/00)

Toyota and i2 announce the formation of an electronic marketplace serving the U.S. automotive replacement parts market for the service and repair industry. The business venture will be an independent company, jointly owned by Toyota and i2, with Toyota being the majority shareholder. i2 will provide the solution, implementation and support, as well as host and manage the marketplace. Initial services will include catalog hosting, technical content, demand planning, parts replenishment and purchasing, online transactions and invoicing, supplier collaboration, auctions and reverse auctions, and procurement planning. The marketplace will later add components to help optimize parts delivery, customer service, order commitments and shipment tracking. The venture is expected to go live in the second quarter of 2000.

Bellsouth and Commerce One announce internet marketplace for telecommunications Industry (2/23/00)

The companies announce plans to develop an Internet marketplace for procurement in the telecommunications industry. The aim is to create an open electronic exchange to link buyers and sellers of goods and services across the telecommunications industry throughout the world. Both BellSouth and Commerce One will hold minority stakes in the new company. All telecommunications providers and supporting industry partners will be encouraged to join the new exchange. The exchange will initially offer procurement management functionality, reporting and analysis capabilities.

GM, Ford and DaimlerChrysler announce combination of exchanges (2/25/00)

GM, Ford, and DaimlerChrysler jointly announce that they are planning to combine their efforts to form a B2B integrated supplier exchange through a single global portal. The new enterprise will offer open participation to all auto manufacturers around the world, and their respective market of suppliers, partners, and dealers. GM, Ford, and DaimlerChrysler plan to have equal ownership in the new venture, which would operate as a separate business independent of the three automakers. Oracle and Commerce One will be the technology providers.

Sears, Carrefour, Oracle announce GlobalNetXchange (2/28/00)

The companies announce they will launch a global business-to-business online exchange serving the retail industry, GlobalNetXchange. It will initially focus on Sears and Carrefour's combined $80 billion supply chain purchases from 50,000 suppliers, partners and distributors. Other retailers will be invited to join the founding partners in GlobalNetXchange, GlobalNetXchange will allow network members to buy, sell, trade or auction goods and services over the Internet using standard web browsers.

i2 announces launch of SoftgoodsMatrix.com (2/28/00)

i2 announces the launch of SoftgoodsMatrix.com, designed to connect retail, apparel, footwear, home furnishings, floor covering and textile companies. VF Corporation becomes the first tenant of SoftgoodsMatrix.com. This site is scheduled to begin operations on April 1, 2000.

i2 announces FreightMatrix (2/29/00)

The company announces FreightMatrix, a logistics industry marketplace which integrates logistics planning, commerce and execution in a comprehensive business-to-business electronic marketplace. FreightMatrix will offer shippers, carriers, and logistics providers with the needed services to buy and sell transportation more efficiently, plan their cargo requirements, and execute the delivery of shipments.

Ariba and Sabre announce Sabre e-Marketplace (3/1/00)

The companies announce a definitive agreement to create Sabre e-Marketplace, the first Internet-enabled B2B marketplace designed for the travel and transportation industry. Sabre e-Marketplace plans to give participants a single procurement portal through which they can buy and sell goods and services from capital equipment to cabin services to ticket stock, as well as conduct auctions for sourcing and selling surplus materials such as aircraft parts.

Ariba / i2 / IBM form broad alliance (3/8/00)

Under the alliance, the companies will integrate their technologies to provide a comprehensive open marketplace platform, which will be re-sold to both vertical and horizontal market makers through IBM, i2 and Ariba channels. IBM will integrate i2's TradeMatrix marketplace solution and the

Ariba B2B e-commerce platform with existing IBM technology and deploy them across its global operations. The alliance's solution will be sold by IBM's global sales force with support from a dedicated team of IBM sales specialists. IBM Global Services will provide global operations, support services, systems integration and hosting services to Ariba and i2 and will be the preferred provider to alliance customers. IBM will make minority equity investments in i2 and Ariba.

Internet Capital Group and Hutchison Whampoa announce launch of two new businesses (3/8/00)
Internet Capital Group and Hutchison Whampoa Ltd., a Hong Kong-based multi-national conglomerate, announce they will launch two businesses, ICG AsiaWorks, which will incubate, acquire and build e-commerce market makers and B2B infrastructure companies, and an e-procurement services joint venture for companies in the Asia region.

Chevron, McLane and Oracle announce RetailersMarketXchange.com (3/8/00)
The companies announce their intent to create a joint venture called RetailersMarketXchange.com, an independent company which plans to offer an Internet trade exchange designed as a full-service marketplace for all convenience-stores and small-business retailers and their suppliers. Chevron, McLane and Oracle would each hold equity interest in RetailersMarketXchange.com. The new marketplace plans to go online this summer and will initially focus on convenience store retailers.

VerticalNet announces acquisition of Tradeum (3/8/00)
VerticalNet announces that it has signed a definitive agreement to acquire Tradeum, an Internet B2B commerce company. The merger is structured as a stock-for-stock exchange and will be accounted for as a purchase transaction.

i2 and Aspect Development announce merger (3/13/00)
i2 Technologies announces a definitive agreement to merge with Aspect Development, a provider of collaborative solutions for business-to-business (B2B) marketplaces. The $9.3 billion stock-for-stock deal is the largest in the history of the software industry.

Oracle and fibermarket.com announce fp-xchange (3/13/00)
The companies announce their intention to create fp-xchange, an open electronic marketplace for the global forest products industry which includes paper, pulp, recovered fiber, solid wood, and related building products. The companies plan to re-launch and re-brand the current fibermarket.com web site

under the fp-xchange brand, to be powered by Oracle Exchange, Oracle's online e-business marketplace. The web site will specifically cater to the unique needs of the global forest products industry.

Ariba and Cargill announce Novopoint.com (3/14/00)
The companies announce Novopoint.com, an open, Internet business-to-business (B2B) exchange, powered by the Ariba B2B Commerce platform, for food and beverage manufacturers and their suppliers. Novopoint.com will be operated by a neutral, independent company, with the majority of equity ownership to be held by companies recognized as leaders in the food and beverage industry. Cargill is an initial minority investor in Novopoint. In addition, Crosspoint Venture Partners is an investor in Novopoint. As part of this strategic alliance, Ariba will provide the technology platform and will share in transaction-based revenue streams.

Six transportation companies announce Transplace.com (3/14/00)
Covenant Transport; J. B. Hunt, M. S. Carriers, Swift Transportation, U. S. Xpress, and Werner Enterprises announce the intent to merge their logistics business units into a commonly owned, Internet-based global transportation logistics company, Transplace.com. Transplace.com will promote productivity gains through efficient use of scarce driver and capacity resources. It will also function as a clearinghouse, or an exchange, that provides more liquidity of capacity, especially that of small carriers, thereby increasing total available capacity to the shipping public.

FreeMarkets announces acquisition of iMark.com (3/15/00)
FreeMarkets announces its intention to acquire iMark.com, a privately held online marketplace for surplus equipment. FreeMarkets will incorporate iMark.com into its Surplus Asset eMarketplace, which features a global network of buyers and sellers with over 20,000 registered users, $265MM in posted assets, and over $28MM in asset sales to date.

eBay announces eBay Business Exchange(3/15/00)
eBay announces the launch of eBay Business Exchange, serving the small-business market. The new trading marketplace will be targeted at businesses with fewer than 100 employees.

Announcement of IntercontinentalExchange (3/21/00)
Leading U.S. and European financial institutions and some of the world's largest diversified energy and natural resource

firms announce their intention to launch the IntercontinentalExchange, a new Internet-based electronic marketplace focused on the trading of over-the-counter (OTC) energy, metal and other commodity products. The venture intends to begin trading in a variety of petroleum and precious metals-based OTC products later this year, with plans to develop additional markets for other commodity products — including global natural gas, electrical power and a variety of base metals in due course. There will be no "memberships" in the Exchange and no dues or fees beyond those incurred in the process of trading. Participation will be open to all commercial market participants. The founding firms, which are to provide the initial market liquidity to IntercontinentalExchange, are among the largest players in a broad array of OTC commodity products. They include, in addition to Morgan Stanley Dean Witter, BP Amoco, Deutsche Bank, Goldman Sachs, Royal Dutch/Shell Group, Société Générale and the Totalfina Elf Group.

i2 announces eServiceMatrix (3/22/00)
eServiceMatrix.com is a business-to-business (B2B) and business-to-consumer (B2C) marketplace solution for the management of aftermarket parts and service. eServiceMatrix brings customers, retailers, parts dealers, original equipment manufacturers (OEMs), and channel partners together in an efficient parts and service management network. eServiceMatrix has been developed for a variety of industries including aerospace, telecom, healthcare, utilities and home services.

FreeMarkets announces acquisition of Surplus Record (3/22/00)
FreeMarkets announces it has agreed to buy the assets of privately-held Surplus Record and SR Auction, which deal in industrial surplus. The assets comprise a network of dealers and buyers and an online surplus asset trade site for surplus industrial equipment, machinery, and machine tools.

Announcement of paper and forest product exchange (3/23/00)
International Paper, Georgia-Pacific and Weyerhaeuser Co. announce their intention to develop a global business-to-business marketplace to enable buying and selling of paper and forest products online. The marketplace will operate as an independent entity with its own board of directors and management team. Initially, the three founding companies will each have an equal equity position, but it is expected that more partners will join the initiative.

Oracle and Hutchison Port Holdings announce Global Transportation eXchange (3/27/00)
Oracle Corp. and Hutchison Port Holdings announce an agreement to form the Global Transport eXchange, an online exchange for the transportation services community. The exchange will be a joint venture with Hutchison Port's Portsnportals.com unit. The exchange will enable buyers and sellers of logistics and transportation services to share information over the Internet. The exchange is expected to be operational in the third quarter.

Commerce One announces participation in aerospace and defense industry exchange (3/28/00)
Boeing, Lockheed Martin, BAE Systems, Raytheon Company, Commerce One announce the creation of an independent enterprise that will develop an Internet trading exchange for the global aerospace and defense industry.

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Collaborative Commerce – April 2000

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