

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:

- **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)
- **Low concentration of buyers** — fragmented market
 - **High number of geographically dispersed suppliers**
 - **High number of existing intermediaries (distributors and resellers)**

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. Vestro 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 manufacturers are crucial to the process, and PlasticsNet can't go far without their buy-in.

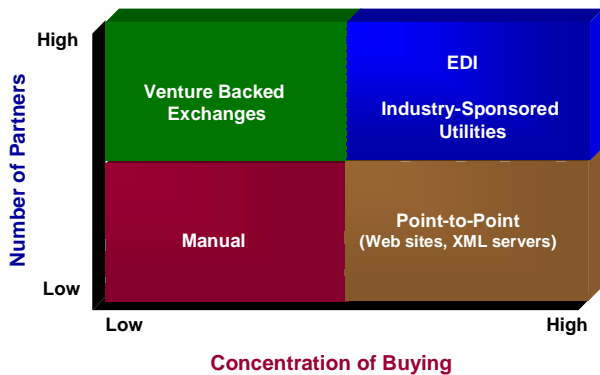
Food

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. Healthcon 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	Petrochom 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?”

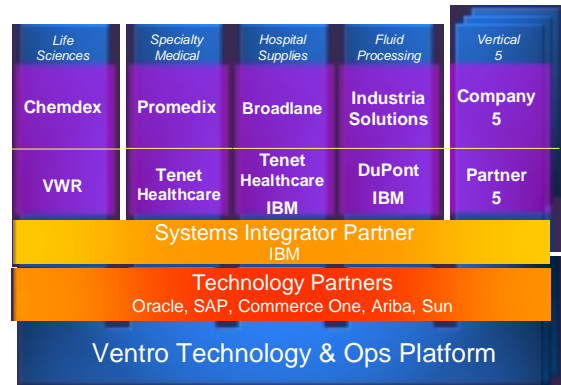
Is it better to be a horizontal player focusing on many vertical markets? Is it better to be a strong vertical player and expand horizontally later? Is it better to create a software platform and move to services in a horizontal and vertical way? For start-ups, is it better to attempt to develop “domain 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

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

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 conditions 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%	

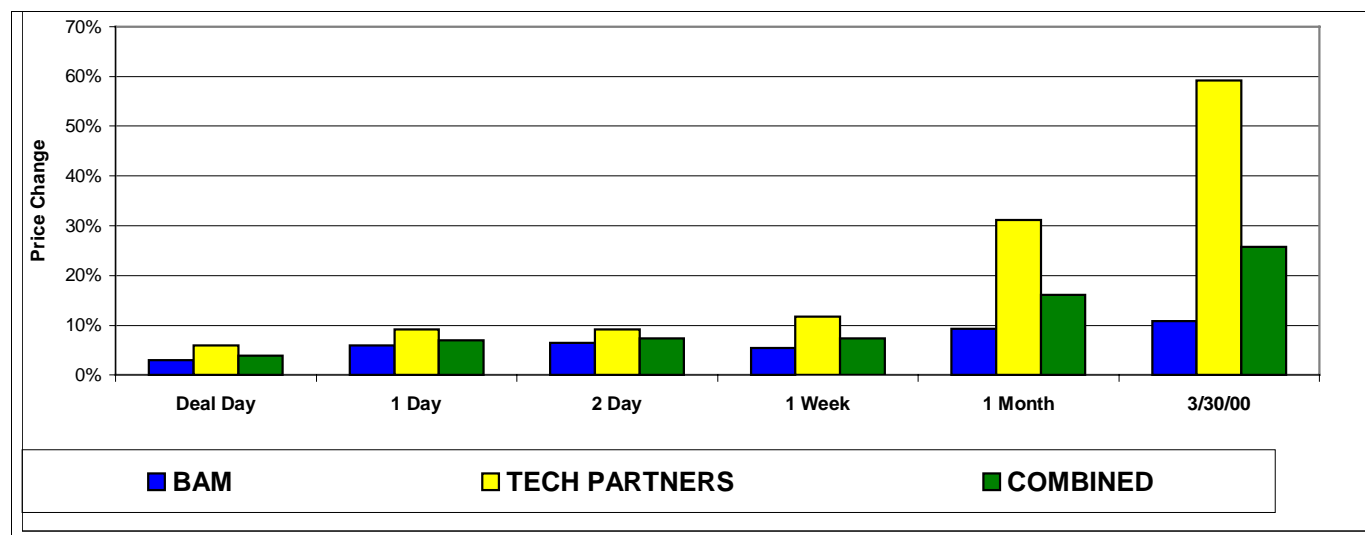
Exhibit 41 (continued)

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

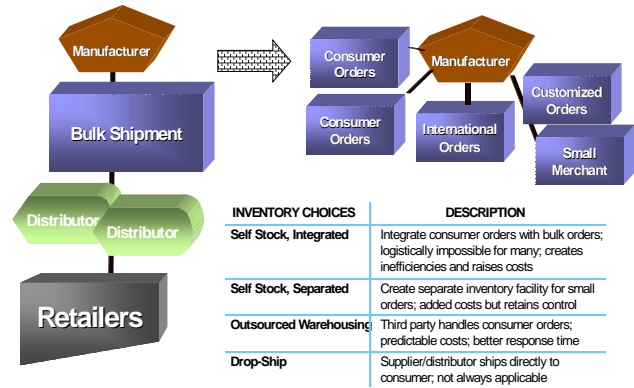
- Finding difficult-to-locate products
- Serving unique needs of preferred customers
- Advising customers on product life cycles (ordering existing versus pending products)
- Light assembly
- Premium delivery services; same-day delivery for centralized order at the supplier level
- Premium maintenance 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 43
Hubs Integrate Multiple Facets of Commerce



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

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

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.

Collaborative Commerce – April 2000

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 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 than 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. Ventrone 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. Ventrone 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 multiple 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.economy, 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.

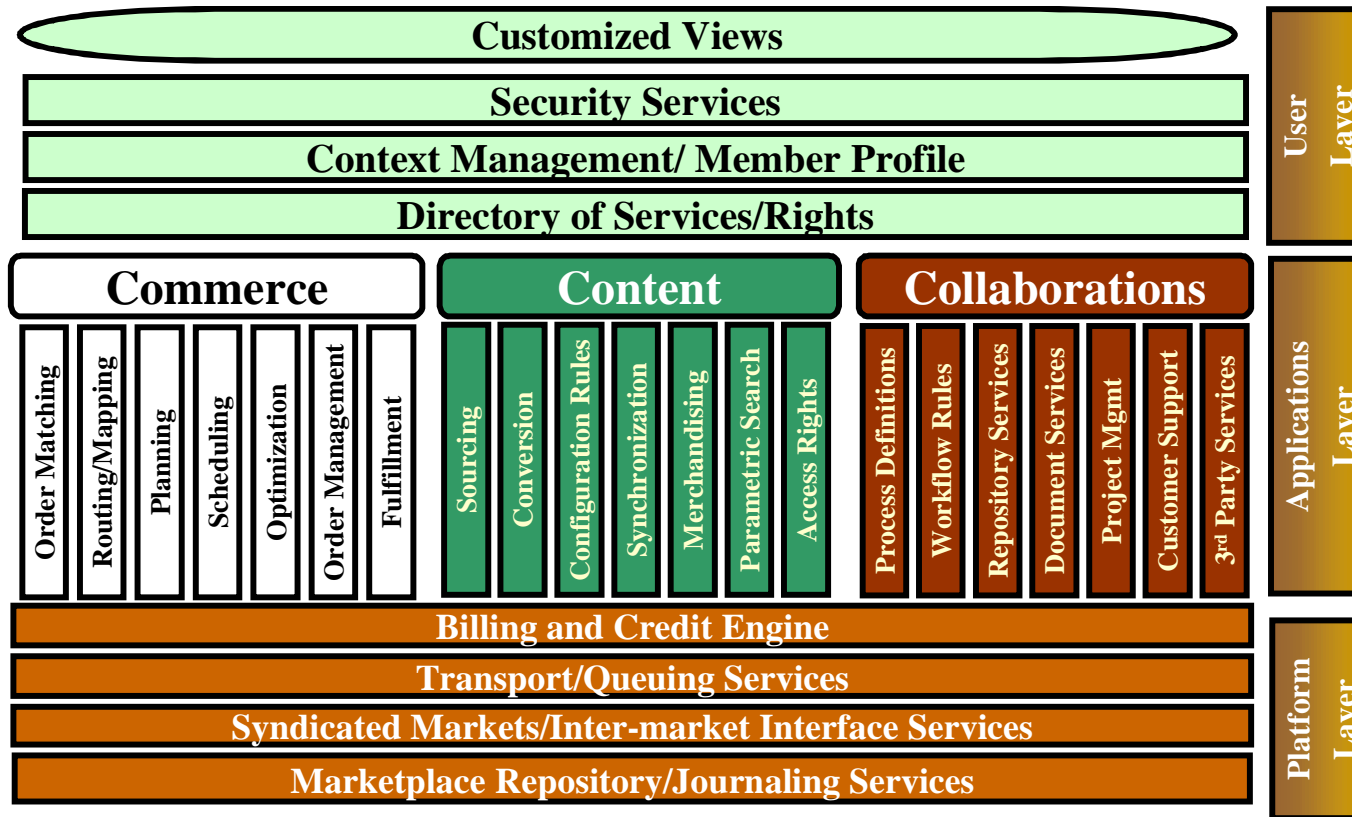
- *Application layer* — Functions available to the marketplace but viewed in the context of the user's profile.
- *Platform layer* — Infrastructure services available to all applications to facilitate communication with external entities and journal all activities to create a digital audit trail.

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

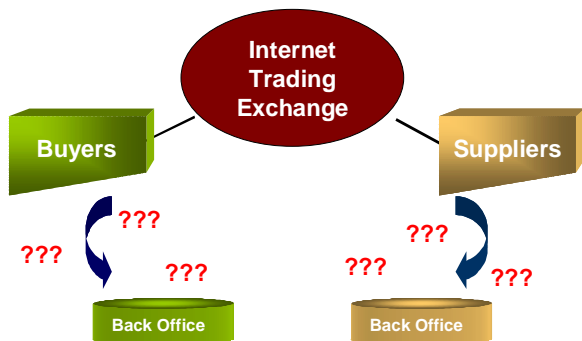


Source: Morgan Stanley Dean Witter Internet Research.

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.

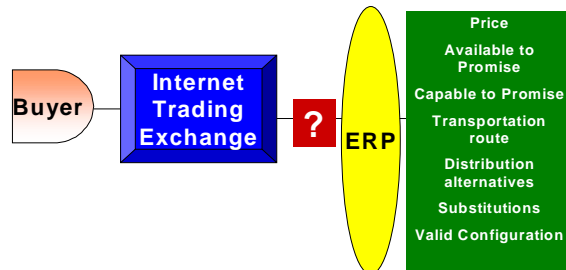
Much of the information a buyer cares about is stuffed away in those SAP, JD Edwards, PeopleSoft, Baan, and Oracle applications. It's the ERP package that has the pricing module to let the user know what the contracted price is for a specific customer — not the generic price. It's also the ERP application 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.

Collaborative Commerce – April 2000

Please refer to important disclosures at the end of this report.

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.

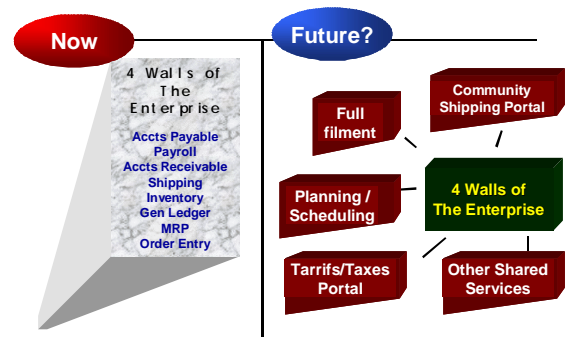
A Framework for Connecting to an Exchange

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
- RighttWorks
- 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

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

Collaborative Commerce – April 2000

- 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.

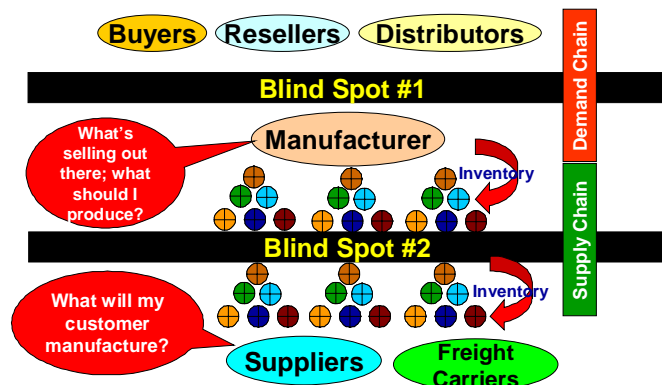
The second blind spot is through the supply chain. Manufacturers can't tell what inventory and manufacturing capacity is available in their own supply chains. Their suppliers in turn can't see demand two or three levels up the chain. So they build inventory as well.

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 Cybergistcs 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

Healthon 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)

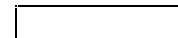
International Paper, Georgia-Pacific and Weyerhaeuser Co. announce their intention to develop a global business-to-business marketplace to enable buying and selling of paper and forest products online. The marketplace will operate as an independent entity with its own board of directors and management 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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