Let's Get Vertical

The great untold story of online commerce is that business-to-business sales

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It was a busy spring for ecommerce analysts: A whole crop of numbers sprang up to put some definitive, quantitative stamp on the digital economic boom (see "B-to-Beware the Numbers," p109). The U.S. Department of Commerce weighed in with an industry summit in May on the topic of tracking ebusiness, and in June it released its second annual report on ecommerce, "Emerging Digital Economy II." Also in June, a study released by the University of Texas — and funded by Cisco Systems — found that the Internet economy generated $301 billion in U.S. revenue in 1998, buoyed by a work force of 1.2 million people, which puts it in the same macroeconomic neighborhood as cars ($350 billion) and telecommunications ($270 billion).

While the research firms continue to run numbers, the consumer market for ebusiness continues to grab most of the headlines. Last November's declaration from Jupiter Communications that the Internet would trigger a $2.3 billion holiday shopping bonanza itself triggered an avalanche of media attention on the advent of online shopping that has hardly let up in the months since.

All that has fairly masked a quiet revolution currently under way in the digital economic realm: business-to-business (B-to-B) ecommerce. Up to this point, most of the attention in B-to-B ecommerce has focused on prominent, well-established firms such as Cisco and Dell Computer that eliminate old-economy middlemen and sell directly to business customers. But the real B-to-B ecommerce revolution is taking place outside the boundaries of individual firms.

A new breed of intermediaries is emerging to facilitate B-to-B ecommerce. These new intermediaries go by different names — "vortexes," "butterfly markets," or "net market makers." All in some way serve as electronic hubs, each spinning in a new market. These hubs focus on specific industry verticals or specific business processes (from spare airplane parts to secondary mortgages), host electronic marketplaces, and use various market-making mechanisms to mediate any-to-any transactions among businesses. They create value by aggregating buyers and sellers, creating marketplace liquidity (a critical mass of buyers and sellers), and reducing transaction costs.

What makes any of this revolutionary? First, these intermediaries do for ecommerce transactions what a network hub does for bits: concentrating, routing, and switching transactional traffic in B-to-B ecommerce. Second, they occupy a central position between buyers and sellers, much as airline hubs do between city pairs.

In short, hubs promise to reshape the landscape of B-to-B ecommerce — and here are a few of the lesser-known "numbers" that back it up. First and foremost is the Forrester

Research projection that B-to-B ecommerce will surge past $1 *trillion* by 2003. San Francisco-based investment bank Volpe Brown Whelan estimates that overall hub revenue (both transactions and advertising) nationwide will grow from $290 million in 1998 to $20 *billion* by 2002. The Precursor Group's estimates are even higher, putting B-to-B exchange revenue between $50 billion and $130 billion by 2002. Even with the more conservative estimates, hubs could generate transaction fees of more than $10 billion within three years, with gross margins of 85 percent. If these numbers sound too optimistic, consider eBay, a hub in the consumer-to-consumer market. eBay boasts gross margins in excess of 80 percent and, more strikingly for an Internet company, reported a profit within a year of its inception.

Despite their enormous significance for B-to-B ecommerce, hubs remain poorly understood. Like the bulk of an iceberg that lurks below the waterline, they remain largely invisible to the media, investors, and analysts. While the landscape is still blurry, and few hubs have achieved any degree of prominence, it is possible to describe what hubs are, what they do, how they create value, and what the future is likely to hold.

B2B: A Different Animal

Returns to scale This is the most important and perhaps the least understood difference between consumer commerce ventures and B-to-B hubs. Consumer hubs, even as expansive as Buy.com's, are one-way networks that deal directly with buyers and create benefits mostly for sellers. B-to-B commerce hubs tend to be two-way networks that mediate between buyers and sellers, and create benefits for both sides. *Lots* of benefits: The value created by consumer hubs tends to increase linearly in the number of buyers; the value created by B-to-B hubs increases as the *square* of the number of participants. Here's the math: At Buy.com, the benefits to an individual buyer are roughly the same whether there are 100 customers or 100 million customers, because the benefits to buyers are primarily the time saved from going to a physical store and looking for an item. Buy.com does, however, benefit on the supply side, by tallying savings in marketing and procurement. These benefits tend to be linear, so the total value created by Buy.com increases only linearly in the number of customers.

Now, consider a B-to-B hub: It creates value by reducing search costs, reducing information transfer costs, standardizing systems, and improving matching for both buyers and sellers. Buyers benefit because they have more choices and sellers benefit because they have access to more buyers. All of these value drivers increase with the square of the number of participants in the hub.

Take the case of five potential sellers and buyers in a B-to-B market. In the absence of the hub, each seller would have to determine the identity of each buyer, through advertising or a direct sales force. Each seller would have to contact each buyer each time it wanted to do a transaction. Without a hub, the participants would have to undertake 25 searches — each seller looking for five buyers — and then make 25 contacts (either faxes or phone calls) each time the sellers wanted to sell.

Now look at this electronically: the hub finds the buyers and sellers, reducing the number of searches to 10. Similarly, each time the sellers want to sell, there are only 10 contacts — five postings on the hub, and five views by the buyers.
The methodology is similar for matching buyers and sellers, standardizing systems, and transferring information such as credit checks, product descriptions, and evaluations. Further, the complexity of the benefits a hub offers makes it difficult for competitors to offer customers similar benefits. This is particularly true for matching between buyers and sellers in auctions and exchanges. A buyer is far less likely to find a match in an illiquid hub than in a liquid one. Small wonder, then, that eBay is profitable and commands a rich valuation.
Importance of domain expertise Setting up shop as an online retailer does not require deep knowledge of specific categories. The founders of many popular online shops had no previous category experience, and Amazon has quite easily migrated across retail categories. In contrast, domain expertise is a must for creating a hub. Consider a hub like SciQuest.com that mediates between buyers and sellers in the laboratory and scientific equipment marketplace, or PlasticsNet.com (see "The Trading Post," p102) that has spawned a new market between plastics manufacturers and plastics processors, or e-Steel, that makes a market between buyers and sellers of steel. The founders of these companies had extensive industry experience and relationships with key buyers and suppliers. Domain expertise and relationships are key barriers to entry for hubs.
Customer acquisition and retention Online retailers typically use advertising and affiliate programs for customer acquisition. But B-to-B buyers and sellers don't simply see a banner advertisement and sign up with SciQuest.com or PlasticsNet.com. Customer acquisition requires sales calls, and the process for signing up buyers and sellers is time-consuming and expensive — supplier catalogs have to be loaded online (see "Chemdex's New Supply-Side Economics," March '99, p47), business processes need to be understood, business rules need to be defined, and the hub's systems need to be integrated with those of its buyers and sellers. Customer switching costs and customer retention rates are also correspondingly higher for hubs, once they embed themselves into the business processes of buyers and sellers, and for them, competition is a lot further away than a mouse click.
All that presents a worthwhile industry-wide tradeoff: The higher entry barriers due to increasing returns to scale, domain expertise, and higher customer switching costs add up to stronger profit potential and more defensible business designs than B-to-C retailers.

B2B Hubs: What's What

In contrast to pure financial marketplaces, hubs are contextual marketplaces; hubs focus on a specific dimension of it. Attempting to be everything to everybody is a recipe for failure. Nets Inc. was designed as a B-to-B shopping mall across different verticals and different functions. One of the primary reasons it failed is that it had no focus or context. It was neither vertical nor functional, and never able to attract enough buyers and sellers to generate liquidity.
A hub, though, can specialize vertically along a specific industry or market, or it can specialize horizontally along a specific function or business process. Based on these

dimensions, the universe of hubs boils down to two primary types: vertical and functional. Together, they form the quilt of B-to-B ecommerce.

Vertical hubs Vertical hubs serve a vertical market or industry focus. They provide deep domain-specific content and domain-specific relationships. Examples: Altra Energy (energy), Band-X (telecommunications), Cattle Offerings Worldwide (beef and dairy), SciQuest.com (life sciences), e-Steel (steel), Floraplex (florists), IMX Exchange (mortgages), PaperExchange (paper), PlasticsNet.com (plastics), and Ultraprise (secondary mortgage exchange). Vertical hubs typically start out by automating and hosting the procurement process for a vertical, and then supplement their offerings with industry-specific content.

The likely success of a vertical hub increases with:

- Greater fragmentation among buyers and sellers.
- Greater inefficiency in the existing supply chain.
- Creating critical mass of key suppliers and buyers.
- Domain knowledge and industry relationships.
- Creating master catalogs and sophisticated searching.
- Adjacent verticals for leveraging existing supplier or buyer base.

The primary challenge for vertical hubs is the difficulty of diversifying and extending their business into other vertical markets, because their expertise and relationships are fairly domain-specific.

Functional hubs Functional hubs focus on providing the same functions or automating the same business process across different industries. Their expertise usually lies in a business process that is fairly horizontal, which means that it is scalable across vertical markets. iMark.com, for example, focuses on buying and selling used capital equipment. Its target participants are investment-recovery managers responsible for the equipment. Other examples of functional hubs include Processors Unlimited (reverse logistics), MRO.com (maintenance, repair, and operating procurement), Employease (employee benefits administration), Celarix (global logistics monitoring and tracking), BidCom (project management), Adauction (media buying), and YOUtilities (energy management).

The likely success of a functional hub increases with:

- Degree of process standardization.
- Process knowledge and work-flow automation expertise.
- Complementing process automation with deep content.
- Ability to customize the business process to respond to industry-specific differences.

The primary challenge for functional hubs is to deliver industry-specific content. They target functional managers who affiliate and organize their work primarily around their functional area, and not their industry. But many functional managers also affiliate with their industry. The risk: They will gravitate toward a vertical hub for their industry and relegate the functional hub to become a back-end service provider for the vertical hub.

Separating the Winners&Losers

Architects of B-to-B hubs must address a number of key design and execution issues. These include:

Choosing a marketmaker Hubs can employ a variety of market-making mechanisms to mediate transactions between participants in the hub. These mechanisms can be fixed-price mechanisms that are typical of catalog purchasing, or dynamic pricing mechanisms that include auctions, exchanges, or barter.

A listing or **catalog model** creates value by aggregating suppliers and buyers. It works best in industries characterized by fragmented buyers and sellers who transact frequently for relatively small-ticket items. Given the small transaction size, it is too costly, even on the Net, to negotiate each transaction. The catalog model also works well when most purchasing takes place with prequalified suppliers and with predefined business rules, and the occasional purchase requires searching across a number of smaller suppliers. Finally, it works best for situations where demand is predictable, and prices do not fluctuate too frequently. Chemdex, SciQuest.com, and MRO.com are examples of catalog-centric hubs.

Auction models create value by spatial matching of buyers and sellers. They work best in industries or settings where one-of-a-kind, non-standard, or perishable products or services need to be bought or sold among businesses that have very different perceptions of value for the product. Capital equipment, used products, unsaleable returned products, and hard-to-find products fit this description. iMark.com uses an auction model to sell used capital equipment. Adauction.com auctions off perishable online and print advertising inventory.

Exchange models create value by temporal matching of supply and demand (see "The Matchmaker," p96). They require a real-time, bid-ask matching process, marketwide price determination, as well as a settlement and clearing mechanism. The exchange model works best for near-commodity items that can have several attributes, but are easy to specify. Exchanges create significant value in markets where demand and prices are volatile by allowing businesses to manage excess supply and peak-load demand. PaperExchange in paper, e-Steel in steel, and Altra in energy are all good examples of hubs that employ exchange models.

Barter models create value by matching two parties that possess reciprocal assets within an asset class or across asset classes. While barter has traditionally been used in inflationary economies with shortages of hard currency as a tool to minimize currency risk, there are other innovative applications, such as bartering manufacturing capacity, bartering services for other services, and bartering high-transportation cost assets (such as paper or steel).

In many cases, a hub will find it valuable to offer more than one market-making mechanism. Customers of hubs will favor hubs that allow buyers and sellers to choose the appropriate market-making mechanism. This means that hub architects need to take care in choosing a technology platform, because technology providers have tended to focus on catalog (Ariba, Commerce One, IBM), auction (Moai Technologies, Dynamic Trade, OpenSite Technologies), or exchange (Tradex Technologies) models, and lack integrated multimechanism platforms.

Solving the chicken-and-egg dilemma The value created by a hub increases non-linearly in the number of participants. The key goal of any hub, therefore, is to attain liquidity as quickly as possible. The problem, of course, is that it is difficult to attract buyers without sellers and difficult to attract sellers without buyers.

While hubs need to market to both sellers and buyers, they will generally be better off marketing more heavily to the party in the transaction that receives the most benefit. Once the hub has gained the participation of that side, it can market more easily or even compel the other side to join up. Despite conventional wisdom that hubs tend to be buyer-centric and hence need to attract buyers first, there is no reason why hubs will consistently favor buyers over sellers or vice versa. Chemdex and SciQuest.com focused on buyers first in order to attract sellers. PaperExchange, in contrast, has focused on sellers first in order to attract buyers.

In its early stages, hubs might also consider injecting liquidity into the market. Consider the strategy that priceline.com adopted in growing its market for airline tickets. It focused on getting buyers, who arguably receive the greater relative benefit, injecting liquidity by buying cut-rate airline tickets in order to attract buyers. Once it achieved critical mass, the incentives for airlines to cooperate increased.

Timing market entry How quickly should a hub open for business? Let's overstate the obvious: Those that start early reach buyers and sellers more quickly, preempt competitors, and begin to learn earlier about the market. But these benefits must be weighed against the risk that premature opening will discourage market participants from returning because of lack of functionality or liquidity and alert potential competitors. Early entry, then, makes good sense. Another strategy can be to open an informational or content-focused hub, and to add transactional functionality as liquidity improves (see "The Industrial-Strength Portal," p118).

Managing channel conflict Some existing intermediaries are initially likely to be hostile to hubs, because of concerns around disintermediation and price erosion. Hub architects should stress that it can complement an intermediary rather than act as a substitute. Hubs can provide more volume and better matches to existing intermediaries. This is particularly useful in industries with uncertain or volatile supply and demand. To counter price erosion, sophisticated hubs should provide value proposition transparency, not merely price transparency. How? By offering metrics related to quality, reputation, reliability, speed, or service, in addition to providing prices. Finally, hubs can create "virtual private marketplaces" that preserve prenegotiated terms and relationships between specific buyers and suppliers.

Expanding the scope of the offering While liquidity is the key determinant of a hub's success, those firms should also try to increase the depth and breadth of its relationships with participants. This can be done by providing complementary services to participants that make it more costly for buyers and sellers to transact elsewhere. Such services might include IT services like system integration and hosting; financial services such as payment processing, receivables management, and credit analysis; logistics services like shipping, warehousing, and inspection; and risk mitigation services like escrow and warranties. Partners such as Skyway (supply-chain management), PaylinX (enterprise payment servers), i-Escrow (escrow), eCredit.com (credit analysis), and USinternetworking (application service provider) help to round out the offering. In

addition, each of these complementors are potential sources of referral revenue from the existing participant base.

Managing growth and diversification Over time, the hub will need to diversify beyond its initial choices of strategic position. These growth vectors can be along four key dimensions — horizontal scope, vertical scope, offering scope, and mechanism scope. Consider e-Steel, a vertical hub specializing in the steel industry, the procurement process, using an exchange mechanism, and by largely outsourcing logistics services. Horizontally, e-Steel could add logistics tracking or investment recovery services. Vertically, it could branch into the packaging vertical. To expand scope, it could offer credit analysis or fulfillment services. Choices should be based on the strength of connection to the new supplier and buyer base, the new business process, the knowledge and relationships needed, and the alternative market-making mechanisms within the current participant base. In some cases, partnerships and acquisitions will drive growth.

Forecasting the evolution of B-to-B hubs A few predictions of what the next year or two holds for hubs:

- Hubs will have winner-take-all characteristics: The strong increasing returns characteristics will create even more scale advantages for the first hub to achieve scale and liquidity than in the consumer portal or retail business. Even being the second-biggest player may not be enough.
- Vertical hubs will find it hard to diversify beyond their verticals: They compete on domain-specific relationships and expertise. Unless they can find closely related domains where they can leverage these assets, they will find it difficult to diversify into other vertical markets.
- Vertical hubs will form a patchwork of alliances with functional hubs: Verticals possess domain expertise but lack functional expertise, while functional hubs possess functional expertise, but lack domain expertise. Alliances will form across the "quilt" between verticals and functionals. In these alliances, vertical hubs will usually emerge as the ones that control the customer relationship.
- Software vendors will climb out of their silos: Currently, software vendors sit in three silos that correspond to their market-making mechanism of choice — transaction software vendors (such as Ariba and Commerce One), auction software vendors (such as Moai and OpenSite), and exchange platform vendors (such as Tradex; see "The Enabler," p112). The walls of these silos will break down, and a flurry of mergers and alliances between software vendors will ensue.
- Exchange models will evolve to include derivatives: The exchange mechanisms in hubs currently are limited to spot markets. As participants become more sophisticated and hub software platforms improve in functionality, hubs will begin to offer derivative products like forward contracts and options on commodities and manufacturing capacity.
- All except the biggest firms will give up on hosting hubs: Early generations of B-to-B ecommerce software focused on catalogs, auctions, and exchanges hosted by individual firms. This firm-centric model limits liquidity, and will give way to catalogs hosted by hubs.
- New "metahubs" may emerge with shared infrastructure and services: Although vertical hubs will not consolidate across vertical domains, there is no reason for

them to have dedicated infrastructure and supporting services. We may see the emergence of new market hubs with shared back-ends and common functional hubs servicing the different "tenant" vertical hubs.

- The power of conventional commodity exchanges will erode. Conventional commodity exchanges are devoid of context, they will find it difficult to compete with the powerful integration of context and exchange functionalities that hubs will provide. They also lack business process integration capabilities. As a result, hubs will gradually drain liquidity from conventional commodity exchanges.

Market analysis at this stage — like any analysis about the future of ecommerce — boils down to advanced guesswork. But if the recent successful IPOs of online B-to-B companies such as VerticalNet and Ariba are any indication, and if the market projections are anywhere close, the best is clearly yet to come.

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