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Shakeouts in Digital Markets: Lessons from B2B Exchanges

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Shakeouts loom large in the landscape of all fast-growing markets. During the boom period, an unsustainable glut of competitors is attracted by forecasts of high growth and promises of exceptional returns. Even when the market is already crowded, more entrants keep arriving. These followers are often naïve about the barriers to entry and don't realize how many others are also poised to enter at the same time. Reality intrudes with a bust that precipitates the exit of more than 80 percent of the players through failure or acquisition. This shakeout is triggered by some combination of disappointing growth, pricing pressures that degrade profit prospects, or shortages of crucial people and financial resources.[1]

Only the strongest and most resilient firms can survive a shakeout. This is a pattern that was played out as long ago as the genesis of the railroad, telephone, and automobile industries and as recently as software and personal computers. Consider that fifteen years ago there were 832 PC makers; now there are arguably eight to ten viable survivors. That history is now being repeated in virtually every Internet-enabled market.

By the end of 2000, collapsing equity prices and catchy headlines such as "The Dot-coms Are Falling to Earth" and "Is That E-Commerce Roadkill I See?" confirmed the onset of a bust in digital markets.[2] Since the shakeout has happened at an unprecedented pace, the question is whether it was like those in the past or did it create new rules.

The abruptness of this shakeout offers new insights into the boom and bust process. The short and unhappy history of business-to-business exchanges is representative of the long-run transformative possibilities of the Internet that attracted a glut of competitors and the collective delusion that led to widespread exits.

Lessons from History

The first lesson is that pure-play dot-coms will survive and prosper only in breakthrough markets. These online markets are the handful of applications that could not have been realized without the Internet. A corollary is that established firms will have the upper hand in markets that have been re-formed by the Internet. In re-formed applications, network technologies help to squeeze out costs and facilitate interactions, but don't change the basic structure and functioning of the market.

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In retrospect the vast majority of applications of the Internet were to re-form markets, so it follows that the prospects for most pure-play start-ups were delusional in the past and bleak in the future. The vast majority of start-ups are in the process of exiting their markets; but in contrast with past shakeouts where most exits were by merger, we expect a much higher proportion will simply close their doors.

A further lesson is that both the pure plays that survive and the incumbents that gain an advantage from this disruptive innovation will have all the attributes of adaptive survivors of precursor shakeouts.[3] The companies that remain standing will be a resilient synthesis of old and new.

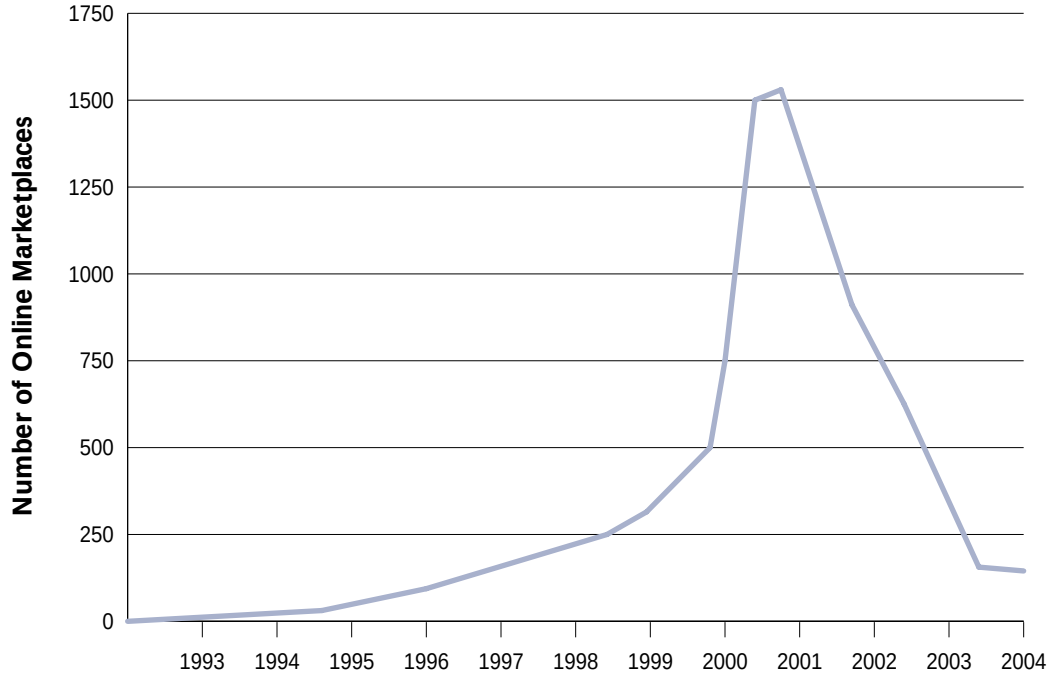
The Boom-and-Bust in B2B Exchanges

Shakeouts in the old economy took years to unfold. In the relatively fast-paced market for hard-disk drives for PCs, ten years passed between the entry of the first firm in 1979 and the onset of the shakeout. In the new economy hothouse, thousands of Internet players were spawned between 1998 and 2000. Truly there was a glut of entrants when at least 150 online brokerages, 1000 travel-related sites, 40 online commercial printers, and 30 health and beauty sites were vying for attention and advantage.

The Boom in Exchanges

Few e-commerce arenas have been more contested than online Business-to-Business (B2B) exchanges;[4] 280 were visible at the end of 1999, and, a year later, a peak of 1520 was reached (see Exhibit 1).[5] Most entrants were pure plays such as MetalSite, Chemdex, and Neoforma, attracted by the opportunity to help buyers and sellers efficiently connect with each other in large markets. These exchanges offered various combinations of six core services: information exchange; digital catalogs that help to automate the procurement process; auctions that attract large numbers of suppliers to compete for contracts; logistics services to facilitate the physical movement of goods; collaborative planning so

EXHIBIT 1. The Shakeout in B2B Exchanges



different members of a supply chain can view each others' inventory levels and production schedules; and value-added services such as design collaboration, financing, or offline brokering.

The possibility that these independent virtual marketplaces, with no ties to any specific buyers or sellers, might control trade across an industry soon energized the incumbents. Some responded by launching their own sites to streamline the purchasing process. Many also joined their rivals in consortia such as Enerva in chemicals, e2open in electronics, and Transora, a consumer products marketplace with over 50 companies including Kraft, Procter & Gamble, and Unilever. The biggest was Covisint, which managed more than $33 Billion in transactions for Ford, GM, and DaimlerChrysler in the first six months of 2001. These consortia and private networks were only a small proportion of the total; the independents were 92 percent of the total number of exchanges in early 2001.

The Bust in Exchanges

By late spring 2000 there was a glut of independent exchanges. An estimated 140 start-ups had crowded into the industrial supplies industry, 110 were identified in the food and beverage industry and 55 in construction markets. They were attracted by the revolutionary potential of the Internet. Their fuel

was free-flowing capital that was less interested in demonstrating long-run profitability than in creating a compelling story so the venture capitalists and owners could cash out. There were few barriers to entry. By contrast with most emerging markets that are hobbled in their early stages by standards disputes or competition for the best or dominant design, the adoption of universal open standards for exchanging information on the Internet put these constraints to the side.[6] A market can absorb a diversity of firms if each pursues a distinct and sheltered niche with a hard to match business model. Two features of the Internet pushed new entrants to converge on the same place. The fixation on reaching the scale needed to cover ostensibly fixed costs meant everyone started in the biggest zone of the market, and then edged out into as many related segments as they could handle. This was aided and abetted by the ease with which new features by direct rivals could be copied.

The rush for the exit did not begin until early 2001 when the start-ups began running out of cash. According to our longitudinal study of eight industries, only 43% of the independent exchanges survived to July 2002 (see Appendix for the details of our methodology). Exchanges that were linked to an incumbent had a 51% survival rate, but many of these were apparently absorbed by the incumbent. This survival rate is undoubtedly too high as we only tracked exchanges that had received at least one round of funding. These criteria excluded many nascent start-ups that put up sites with a URL but could not get established.

The resulting trajectory of exits in Exhibit 1 is consistent with forecasts that there will only be 180 exchanges by the middle 2003.[7] If so, the boom and bust cycle will span a mere five years, clocking a pace that is five to ten times as fast as in the old economy. The average length of the shakeout period was over ten years during the first half of the 20th century. Typical shakeouts began 20 to 30 years after the first company entered the new market.[8] The main mode of exit for the independent exchanges was through acquisition by another exchange. This accounted for 31% of the firms, while another 26% ceased operations. There was high variance among industries with the electronics component industry having a high survival rate of 67%, largely because they focused more on complementary services such as the provision of hard-to-find items and the liquidation of excess inventories. The grocery industry had the lowest survival rate with only 24% of the independent exchanges continuing to operate. Most of these exchanges focused on hosting transactions between growers and importers of perishables and grocery wholesalers, who in turn sold to independent retailers or to the distribution arms of retailers like Kroger and Supervalue. Although the opportunity was tempting, the existing processes proved to be faster and simpler,[9] so the exchange provided little value.

Triggering the Bust

The overt trigger of the implosion of independent exchanges was a cash crisis brought on by continuing losses and an abrupt withdrawal of venture capital. What caused the investors to lose faith?

The first reason was the recognition that many exchanges would not achieve a critical mass of vendors and buyers.[10] Too many potential participants were skeptical. Suppliers were especially worried that the ease of price comparisons would increase margin pressure by focusing buying decisions on price. Furthermore the technology seldom lived up to the promises. Front-end interfaces were hard to navigate, while back-end transaction processing and administrative systems could not be connected to legacy systems. Both vendors and buyers worried about viruses and security breaches that could compromise confidential information.

Prospects for independent exchanges were further dimmed by a shift toward large industry-wide exchanges run by consortia of incumbent companies. Their advantages are a guaranteed source of transaction volume, financial strength, and an ability to develop standards that facilitate interoperability. These consortia seem to work best when there are a small number of founders. When there are many participants, such as Transora with 49 founders, the risk is that no one participant has a strong commitment to the survival of the exchange.[11] However, even the consortia model may be supplanted by private networks that overcome the governance problems. Thus both GM and the U.S. arm of DaimlerChrysler are developing their own private B2B systems even as they participate in Covisint.[12] Thus one plausible scenario is that each industry will eventually have one or two public exchanges to simply help buyers and sellers find each other. Subsequent transactions would take place on private networks where logistic arrangements could be optimized and proprietary information safely exchanged. A few specialized exchanges would be available to conduct auctions or offer specialized services such as financing or moving excess inventory. In short, the supply chain will be more efficient but the market landscape would look much as it did before the boom in independent exchanges. This is a scenario that is applicable to the large majority of e-commerce applications.

Most new economy start-ups thought they had a once-in-a-lifetime breakthrough, when the reality was much more modest.

The overshooting of the eventual carrying capacity of most e-commerce markets and the rapid rush for the exit were aggravated by widespread delusions that the Internet would rewrite the old rules of competition and create breakthrough applications in every market. In retrospect, there were only a handful of these breakthroughs; the rest re-formed existing markets to squeeze out costs and facilitate interactions.

Understanding Digital Markets

Advances in technology have historically created two kinds of market opportunities; some are real breakthroughs that were not previously possible, but most are re-formulations of existing ideas. Most new economy start-ups thought they had a once-in-a-lifetime breakthrough, when the reality was much more modest.

Breakthrough applications re-write the rules by creating new products or services that would not have been possible without the new technology—and which simultaneously enable an entirely new market to emerge.

Consider the television industry. Standards for black and white transmissions were only established in 1941, yet there were 90 manufacturers operating by 1951.[13] When this breakthrough application was identified, many firms entered the market with experimental versions of the product. Uncertainty was very high because true customer demands were not yet known. Each product variant represented some combination of the possible product attributes and performance characteristics. At this early stage of market evolution, these different versions were essentially experiments and variations on what ultimately developed to be a television. The shakeout reduced the number of competitors by 80% as product characteristics were defined, distribution channels established, and content was broadcast.

In contrast, *re-formed applications* of a new technology do not change the basic structure, functioning, and purpose of the market. Instead, these markets form around technologies that enable cost reductions or improvements to existing ways of doing business. Success is based on innovative strategies for competing within an existing industry network rather than a complete redefinition of industry boundaries and norms. Technology has its biggest impact here by improving selected elements of an existing business model.

The case of biotechnology provides an illuminating example for dot-com executives. More than 800 biotechnology-based companies were founded between 1979 and 1989. Like the e-commerce companies of recent history, venture capitalists willingly funded small start-ups with limited revenues and enormous "burn rates" so long as suitable scientific talent was present. A healthy IPO market ensured a steady stream of new companies. Established chemical and pharmaceutical companies lacked the scientific know-how about the science of biotechnology and could not easily attract leading scientists away from the lure of start-up riches. Many industry analysts believed that these small start-ups would one day replace the leading pharmaceutical companies.

With hindsight, it is now clear that breakthroughs in biotechnology did not correspond to breakthroughs in the health care and pharmaceuticals markets. Biotechnology is a classic re-formed market in that the technology enabled improvements to the drug discovery process rather than a wholesale redefinition of all aspects of the pharmaceutical "business model." The start-ups lacked access to valuable complementary resources required for success, including sales and marketing know-how, knowledge of the regulatory process, established distribution channels, and experienced management. Only a handful of the start-ups have survived as independent companies. The rest have partnered with larger incumbents, been acquired, or simply shut down.

The Case of the Construction Industry

The $200 billion construction industry is fraught with inefficiencies. Architects, builders, engineers, and general contractors spend sizable amounts of time handling and shipping drawings and other items related to a project. Project design teams can be widely dispersed geographically. Once a project design is completed, it rarely remains intact during the course of construction. Problems arise with material supply, building codes, and misspecification. Sometimes, architects and owners simply change their minds. Changes to any part of a building tend to ripple through an entire design, requiring that all participants know of all changes.

The prospect of a breakthrough improvement in workflow coordination attracted at least 80 dot-coms to this market. Indeed, the web has completely transformed all aspects of construction project management by quickly and efficiently coordinating the efforts of multiple firms in different locations.

Contrast the workflow coordination activities with materials procurement, where the intense fragmentation of the contractor industry has been a major barrier to change. With few exceptions, contractors in the construction industry are small businesses with a regional focus. Purchasing is typically handled by the business owner or by project managers in the field rather than an actual purchasing department.

Over 20,000 distributors currently provide materials to customers at a local level. A quick phone call from a cell phone will provide same-day, or next morning, delivery of necessary items directly to a job site. The alternative of placing computers and cellular modems on the job site would not increase efficiency, would require significant training, and is not yet technologically feasible. Online resellers of construction materials are quickly finding out that contractors see limited value in using the Internet for purchasing.

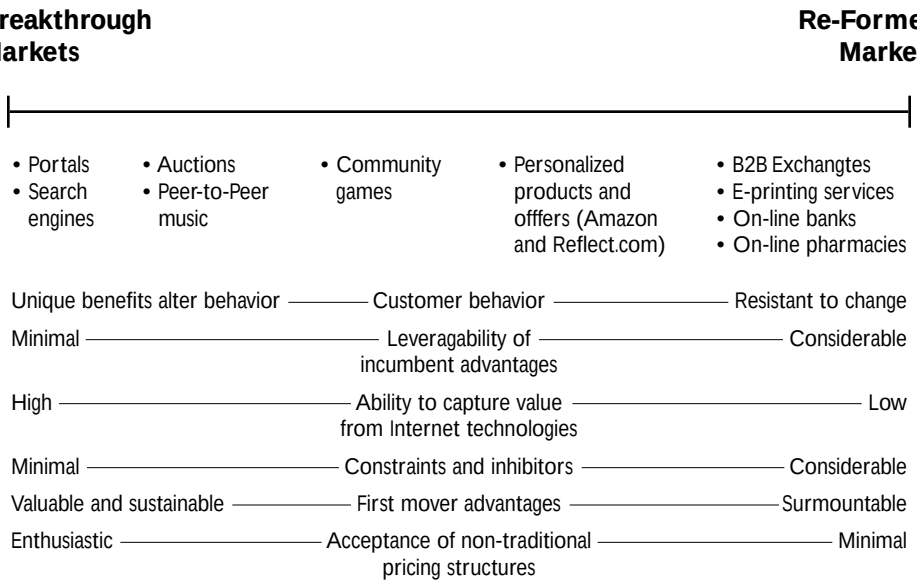
The Digital Market Continuum

While the distinction between breakthrough and re-formed markets is a useful starting point, most markets shaped by the Internet have elements of both. Instead of dichotomy, there is a continuum of markets with a few breakthroughs such as portals and auctions close to one end and most applications bunched at the re-formed end.

In the middle of this continuum, we enter a long-running debate about what is a new product and what are the boundaries that define an industry. The Internet raises the stakes in this debate by blurring traditional boundaries. Indeed, the concept of "marketspace" captures the ambiguity of markets where competitors are also collaborators, firms reorganize around customer-facing or supplier-facing applications of the Internet enabled by customer relationship management or supply-chain management, and every product connected to the Internet can become a source of service revenues.[14]

The location of a firm on the continuum of online markets requires difficult judgments about the market being served. The debate is especially intense when the strategy is in flux. Pure plays like Amazon are widening their scope

EXHIBIT 2. The Digital Market Continuum



to encompass other activities besides those conducted over the Internet and are developing additional capabilities and assets.[15] Established firms are also deploying the Internet to augment their strategies and reinforce their competitive positions. The debate is better informed when the digital market is dissected according to the dimensions shown in Exhibit 2.

Customer Behavior

Many e-commerce start-ups believed that Internet-enabled services would have such superior benefits that customers would rapidly alter their behavior. However, another reality of re-formed markets is that customers are reluctant to disrupt systems that work, even if those systems are partially uneconomic or somewhat inefficient.

This is particularly true when the stakes are high, such as business customers who must procure supplies to keep factories and offices running without disruption or downtime. The digital market looked promising because customers in most business-to-business channels face enormous organizational costs for procurement, purchasing, and inventory maintenance. Online systems that could reduce these costs and improve efficiencies held great promise.

However, B2B exchanges appear to have misdiagnosed their relative advantage. During the past ten years, industrial customers have been focusing on improving efficiencies in their supply chain by consolidating supply contracts and reducing the number of suppliers. A supplier that can lower a customer's total cost of acquisition is preferred over one that simply offers a lower price.

Many B2B auction sites go against these fundamental trends by emphasizing the lowest price instead of lowest total procurement cost. One venture capitalist behind a failed industrial supplies start-up reluctantly conceded: "We thought buyers would want to surf the Web for industrial supplies, but they had other priorities." Translation: Business customers care more about getting the right product at the right time than about saving a few incremental percentage points on price by perusing an online site that lacks access to their preferred brands.

The plight of Internet banks tells a similar story for household consumers. So far, Internet banking has proved to be simply too inconvenient compared to existing methods. Consumers were asked to send checking deposits by mail, generating fears of missed deposits and lost checks. There was no access to the fee-free ATM networks that most people rely on for withdrawals. Older consumers, who hold a disproportionate amount of deposited assets, have been reluctant to trust "branch-less" banking.

In this era of Internet speed, it is ironic that time may prove to be the greatest enemy of these companies.

Startups bet their futures—and the money of venture capitalists—on rapid customer acceptance of new ways to interact with their financial institutions. However, behavior is difficult to change, implying adoption rates that are much slower than many start-ups initially expected.[16] In this era of Internet speed, it is ironic that time may prove to be the greatest enemy of these companies.

Leveragability of Incumbent Advantages

The litmus test of whether an online market is break-through or re-formed is the leverage of the resources and advantages of the established firms. In re-formed markets the incumbents have built-in advantages with their trusted brand names, customer relationships, systems that are readily convertible to the Internet, and financial depth. This is why Office Depot, which sells everything from paper clips to computers, has become the second largest online retailer in the world (behind Amazon.com). Their online success stems from the large catalog operation, which had the right kind of fulfillment systems and capabilities in place long before the Internet was a viable channel.

All the reasons that established firms prevail in re-formed markets have little leverage in breakthrough markets. Indeed, their resources, strategies, structures, and mind-set put them at an initial disadvantage because they could not envision the transformative possibilities. This gave Yahoo, eBay, and AOL time to get firmly established.

The composite markets in the middle of the continuum are the home of online sites that can leverage some strengths on incumbents but usually benefit from a separate identity. Thus, reflect.com can leverage Procter & Gamble's product innovations, deep market knowledge, and financial resources to create different but not entirely novel value propositions. On this site, visitors can

custom design their own cosmetics and create something that would otherwise have required a cosmetician.

Ability to Capture Value from Internet Technologies

In re-formed markets, incumbents control the capabilities or assets that are required to apply Internet technologies to existing relationships. For example, B2B exchanges promised increased efficiencies in procurement by restructuring existing processes. However, generating sustainable value from any innovation requires deep knowledge of customers and their purchasing preferences. Most of the start-ups lacked this knowledge as well as long-standing relationships with these customers.

Furthermore, the start-ups found it difficult to protect any proprietary knowledge advantage without access to complementary assets.[17] They found themselves operating in an environment characterized by extensive knowledge spillovers. In the Internet economy, the widespread use of external "e-consultants" ensured that knowledge diffused rapidly to any firm that was willing to pay.

Start-ups tried to accelerate information spillover by hiring the employees of incumbents—"clicks recruiting from bricks." Many B2B hubs were really just intermediaries between buyers and sellers, whether as virtual wholesalers, exchanges, or auction sites. They often raided executives from wholesaler-distributors because these companies had domain expertise in a vertical value chain plus experience in the economics of an intermediary business.

Constraints and Inhibitors

Many market challengers have been disabled by unexpected barriers that incumbents had long learned to live with. These constraints serve as isolating mechanisms that impede competitive moves. Protected niches within a market—stemming from long-standing relationships or regulations designed to protect some players in a value chain—are among the signals of these killer constraints. These signals were frequently downplayed by e-commerce challengers during the optimism of the boom period.

- The online auto infomediaries (such as Autobytel, Autoweb, and Cars.com) face restrictive state-level regulations that bar anyone from clinching the sale. Some states go further to require a new car buyer to pick-up their car at a dealership. Without the ability to make a sale, the online buying services are left with only the revenues from lead generation for dealers.
- Most Internet postage sites (such as eStamp, Neopost, and Stamps.com) encountered heavy regulation by a U.S. Postal Service concerned about fraudulent postage. This impediment, plus unexpectedly high costs of $500 or more to acquire each customer, dimmed their prospects of survival.
- While the concept of Brandwise.com (a comparison-shopping web site for appliances) was appealing, it was unable to overcome two killer

constraints. Up to 80 percent of sales to consumers of appliances are immediate replacements of broken units, leaving no time or inclination for careful comparison-shopping. Another impediment was the inability of geographically dispersed and incompatible retail systems to communicate inventory status or fulfill orders. The existing system had long adapted to these rigidities and had little incentive to change.

- Pure-play online pharmacies' were hobbled by the relationship of pharmaceutical benefit managers (PBMs) and pharmacies with major employers and health plans. These were never opened up. Further constraints were the unwillingness of consumers to wait for their prescription to be delivered so they could begin treatment as well as hesitations about credit card security and sharing of personal information.

The nature of online interactions imposes further constraints. Many products are unsuitable because their quality or reliability cannot be readily described or communicated in digital terms.[18] There are inherent delays in navigating sites, finding information, and making choices that are exacerbated by the volume of information and plethora of options. The lack of human contact eliminates opportunities for clarification, problem solving, reassurance, and negotiation. These limitations don't negate the Internet, but often relegate it to a supportive and subordinate role in a market.

First Mover Advantages

A key tenet of the new economy was that first movers would dominate.[19] An early lead was assumed to set off a virtuous cycle of increasing returns in a "winner take all" market. Other pioneering advantages include first choice of market segments and the ability to preempt scarce resources, even minor ones such as Internet domain names. Indeed, the historical evidence suggests that the shakeout survivors in breakthrough industries have been the companies with the largest market shares before the shakeout began.[20]

B2B exchanges have discovered that their greatest competition is not other B2B exchanges, but rather the existing ways of doing business.

However, the situation is reversed in a re-formed market because success depends on stealing away repeat purchase or replacement demand from current competitors. Thus, B2B exchanges have discovered that their greatest competition is not other B2B exchanges, but rather the existing ways of doing business. A "first mover advantage" versus another hub is relatively meaningless compared with hurdle of competing against an in-place system of buyers, distributors, brokers, and other suppliers. The biggest challenge is convincing customers to switch their behavior, not simply beating a rival exchange to market.

Acceptance of Non-Traditional Pricing Structures

The Internet has made radically new pricing schemes possible. Many online companies adopted pricing structures that departed greatly from

traditional industry practice. The most famous example is the Priceline reverse auction model, which many people believed would become the dominant model for pricing.

Despite the theoretical appeal, most consumers still perceive a system of prices posted by sellers to be more convenient and fair. The belief that "everything is different" encouraged innovative trials—yet ignored the reality that re-formed markets have built-in expectations and well-established reference prices.

This misjudgment has afflicted many B2B exchanges. These marketplaces attempted to insert themselves in the channel at the strategic point when customers decide who to buy from, how much to buy, and how much they will spend. As payment for matching buyers and sellers through electronic networks, online exchanges tried to charge fees to sellers ranging from two to five percent of gross sales.

Yet the vast majority of business-to-business suppliers are still independent distributors and dealers who continue to thrive due to their great skill at maintaining high levels of locally delivered customer service and support. Even the largest *Fortune 500* customers continue to patronize mostly private, family-owned distributors. Although the fees the exchanges wanted to charge appeared low, they were more than 50% of a typical distributor's net margin. Competition quickly lowered these transaction fees to marginal cost—or lower. Some exchanges saw transaction fees drop to as low as one-quarter of one percent, which was not enough to cover operating and capital expenses and made a mockery of their profit forecasts.

Strategies for Winners

Even after the field of PC makers had shrunk in half between 1985 and 1990, there was no way to know that Dell, Gateway, and Hewlett-Packard would be among the winners a decade later. Apple Computer is the only company founded during the earliest stages of the PC boom that survives today. Any forecast of the names of the eventual online winners and losers is even more perilous and presumptuous.

Nonetheless, our research—building on the lessons of the past—strongly suggests that the prospective winners will be found in three camps. They will either be: *adaptive survivors* who find a protected niche by retooling their strategy for re-formed markets; *acquisitive incumbents* who acquire the assets of pure-play companies at steep discounts; and *pure-play start-ups* that capitalize on their early mover advantages in breakthrough markets.

Adaptive Survivors

The odds favor the leading incumbents in markets being re-formed by the Internet and the first-movers in breakthrough markets. A B2B start-up operating in a re-formed market can survive by retooling their strategy to recognize the true competitive realities. The winners will be the companies enhancing, not replacing, traditional industry relationships.

Current candidates to be adaptive survivors are the B2B exchanges who are reinventing themselves as software or online service companies. San Jose-based Neoforma, which began as an open exchange and auction for medical products, supplies, and equipment, has successfully evolved into a software company that builds and operates private marketplaces on behalf of customers. The company's change of strategy illustrates the importance of aligning with incumbents in a re-formed market.

Unlike many B2B exchanges, this shift in strategy was not driven by financial distress. Neoforma raised over $95 million when it went public in January 2000 when it only had $1 million in revenue. Neoforma used the IPO proceeds to acquire health care companies, including an non-electronic auctioneer from the health care industry and a software company.

When demand for its open exchange did not materialize quickly, Neoforma began to shift away from the independent B2B exchange strategy toward building marketplaces to support existing relationships. Neoforma's most significant deal came with Novation, the largest hospital group purchasing organization in the United States. In return for building a custom marketplace for Novation and its membership of 2,300 healthcare organizations, Neoforma gave a 46% ownership stake and two Board seats to VHA Inc., the majority owner of Novation. Neoforma continues to add new clients as part of this new strategy.

Acquisitive Incumbents

Builders of luxury hotels are quite familiar with the aphorism: "First owner loses." In a typical situation, a real estate entrepreneur finances and builds a lavish hotel—imported marble, world-class chefs, over-the-top service, and so on. Yet few hotel patrons are willing to pay the outrageous room rates that are necessary to finance the up-front build-out costs. Eventually, the entrepreneur (first owner) and his lenders sell the hotel for ten cents on the dollar to a savvy bottom-fisher, who ends up making money because his capital cost is so low.

This parable serves as a strategic guideline for savvy incumbents that are taking advantage of the shakeout. Most pure-play start-ups in re-formed markets will have no choice but to sell their entire companies for a fraction of the total capital originally required to build and create their technology. Assuming that this technology has not become obsolete, the second owners (incumbents) have the opportunity to generate actual economic profits.

To take advantage of these opportunities, savvy incumbents must be truly market-driven.[21] Two aspects of this orientation are especially pertinent to success in e-commerce markets. Like all markets based on disruptive innovations the initial temptation is to exploit all the technological possibilities. Many B2B exchanges were launched because they were possible, not because there was a compelling customer problem they could solve. Thus, the first step is to shift the orientation to continuously learning about customers. It was once estimated that fewer than 15 percent of all web start-ups tested their sites with customers by living with them and observing their behavior. Market-driven incumbents will

not make that mistake. Instead, they will draw on their knowledge of customer behavior, experiment continually, learn from customer feedback, and use external metrics to monitor performance.

Incumbents can become savvy acquirers by shifting the focus to the retention of the most valuable customers instead of the indiscriminate acquisition of customers to spread the fixed costs of site development and start-up over as many customers as possible.[22] This re-orientation recognizes that it is not possible to be all things to all people, by accommodating all possible service requirements and all level of technical expertise, and that profits depend on keeping customers for at least two or three years. Unlike start-ups, incumbents in reformed markets are building to last, not building to flip.

Management Science Associates (MSA), a Pittsburgh-based software developer with a long track record of serving the metals industry, has pursued this strategy by acquiring three once-prominent B2B exchanges in the metals industry. In the heyday of Internet enthusiasm, online exchanges forecast the demise of metals service centers because customers would be able to easily access comparative bid information and place online orders. Service centers would be "disintermediated" once customers and mills could deal directly with each other.

However, this old-line industry is the classic re-formed market, so the era of independent online metals marketplaces floundered before it ever really got off the ground. Online metals exchanges were forced to partner with existing players to generate enough transaction volume to turn their thin markets into something large enough to justify the business model. For example, MetalSite received substantial investments from two large incumbents: Ryerson Tull, a large service center, and Bethlehem Steel, a large mill. Both investors guaranteed a minimum level of activity on MetalSite. At one point, the *Wall Street Journal* reported that MetalSite was valued at $1.2 billion while still a private company. Less than two years later, MetalSite was shut down due a lack of transaction volume.

The assets of MetalSite were acquired six months later by MSA, who also acquired ScrapSite and Global Steel Exchange. MSA's president stated that his goal is to "run this as a long-term business in a cost-effective way." In fact, MSA has restarted MetalSite with only 15 people versus the 130 who were employed at the time it was originally shut down.

Pure-Play Winners

eBay and FreeMarkets are reasonable nominees for this category. Both were quick to exploit the breakthrough possibilities of the Internet with business models that did not exist previously. Thus there were no incumbents to challenge them. Both have exhibited the ability to continuously adapt, while resisting the impulse to grow as quickly as possible and diffusing their energy, or participating in alliances that might restrict later moves. This takes vision and

discipline. The rewards were early profitability, large market capitalization, and strong brand equity.

eBay has become the predominant person-to-person trading community with an auction format that could not have existed without the Internet. They built this position by keeping a single-minded focus on customer auctions. Their long-term marketing agreement with AOL helped give them a critical mass of buyers, sellers, and items listed for sale. Buyers are attracted to eBay by lots of sellers and vice versa in a reinforcing cycle that overwhelmed competitive sites.

eBay is seeing the early signs of market saturation, as fewer new users sign up and the novelty wears off for existing users. Yet profits keep growing, fueled by a 20 percent operating margin and opportunities to expand into other markets. The company is growing its sales of excess inventories from large companies such as Home Depot and Dell, which provides additional scale to eBay's operations. Excess inventory sales accounted for more than 4% of the company's gross merchandise sales in the first quarter of 2002, up from almost zero in the prior year. To become more attractive to these merchants, who often seek rapid sales of multiple, identical items, eBay has moved beyond its traditional auction model with a "buy it now" option. This option allows merchants to set a minimum price, which, when met, immediately ends the auction. eBay has also begun joint online auctions with Sotheby's for products such as fine art and collectibles.

FreeMarkets also provides online auction capabilities, but for buyers and sellers of industrial parts, raw materials, commodities, and services in over fifty product categories. Since 2000, FreeMarkets has grown eMarketplace users by 31% to 131. In addition, the company now has over 200 supply verticals and over 150,000 suppliers participating in its online auctions worldwide. Since 1995, over $40 billion worth of commerce has been facilitated by FreeMarkets.

Its major customers are large incumbents such as Owens Corning, Eaton Corporation, and Emerson Electric Company. Instead of an open exchange, the company works with its customers to design, arrange, and conduct online auctions for well-specified commodities from a pre-screened group of qualified vendors. This strategy is well-suited to the needs of purchasing and sourcing agents, reflecting founder Glenn Meakem's experience at GE's procurement group prior to founding FreeMarkets.

Strategies for Also-Rans

During the bust, most companies got squeezed out or had their aspirations sharply curtailed. These also-rans fit a familiar profile. Their scale is usually small relative to the leaders, and that means higher costs, lower visibility, and much less control over their strategy. They lack the resources to pursue attractive options or keep up with the pace of innovation and morale slumps. They are thus all the more vulnerable when people, partners, or financial capital become scarce.

Although the few surviving pure plays in re-formed markets are destined to be also-rans, they often have better options than simply selling out to an incumbent or shutting down. However, often these options are not contemplated until it is too late, because it is enormously difficult for people caught up in the start-up enthusiasm to accept the implications of also-ran status. However, when the loser profile fits, it is better to choose a viable strategy than to let market forces drive your fate.

The best chance for survival is to find a market niche where competitive pressures are muted and growth prospects are satisfactory. Retreating to these positions does require a painful shrinking of aspirations and pruning of operations. It takes considerable discipline for a high-flying dot-com to abandon its excursions into adjacent markets.

When the loser profile fits, it is better to choose a viable strategy than to let market forces drive your fate.

The scale of the retreat is illustrated by SciQuest, which began life as an independent exchange connecting a multitude of suppliers to the 10,000 life sciences-research organizations worldwide. This was exactly the kind of market that was expected to have the most fertile prospects for an independent exchange, because the Internet offered the disparate and isolated customers a cheap and available means of aggregating demand electronically. Unfortunately, others such as Chemdex also saw the same opportunity, and also found it dauntingly difficult to serve. In late 2000, SciQuest abandoned this digital market to build private networks for the 20 or so top-tier pharmaceutical firms to help them bring more efficiency to their relationships with 5,000 or more suppliers. This shift from playing a lead role to becoming a supporting player also meant changing the revenue model from charging transaction fees to deriving revenue from hosting, software, and service fees. Although these moves will improve their survival prospects, they by no means ensure survival in a hostile environment.

Summary: What Have We Learned?

The on-going shakeout in all digital markets has been notable for the speed and intensity of events. In keeping with its heritage in the presumptive "new" economy, the period from boom to bust was traversed at the breakneck pace of Internet time. Otherwise, the sources and consequences of the shakeout follow a pattern seen in other hot emerging markets created by disruptive technologies.

All the customary reasons that attract an unsustainable glut of competitors to an attractive opportunity were in operation in emerging digital markets, with their effects magnified by low barriers to entry and abundant risk capital. The triggers that precipitated the bust were also familiar from precursor shakeouts. However, at least some of the participants in most previous shakeouts had recorded some profits during the boom period, whereas dot-com start-ups seldom realized any profits. If the experience of the business-to-business exchanges

is any indication, the rate of outright failure (compared to exit by acquisition) will be much higher than previously seen.

Technological advances create market opportunities that can be placed on a continuum ranging from *breakthrough* applications, which create new offerings that would not have been possible without the new technology, to *re-formed* applications, which enabled cost reductions or improvements to existing products or ways of doing business. What made the Internet-enabled markets proliferate so rapidly was that the technology spawned applications that seemingly covered the spectrum, whereas in retrospect the preponderance were bunched at the re-formed end.

Our longitudinal study of business-to-business exchanges has reinforced a valuable lesson from the past, that incumbents will eventually prevail if the technological disruption simply re-forms an existing market. The corollary is that when the technology creates a technological breakthrough, start-ups and new entrants have a chance to survive. The eventual winners will be those that prevail in the competitive battle by exploiting their first-mover advantages and adapting to a slower-growth market that puts a premium on operational excellence instead of entrepreneurial drive. However, even here there is an irony; for as the Internet experience has shown, many established firms have taken to heart the message that they are disadvantaged when dealing with disruptive technologies and were sensitized to take steps to avoid the usual pitfalls.

APPENDIX A
Tracking Exits by B2B Exchanges

The data collection for this study of the temporal shakeout of B2B exchanges was begun in the spring of 2000 with an in-depth study of each of the exchanges operating in a sample of eight industries (out of a total of 24 industries where exchanges were known to have been developed). Since we were interested in the survival and exit of genuine business entities, the following two criteria were used to identify exchanges: the company must have been functional and received at least one round of financing as of Spring 2000; and the company had a distinct identity in the marketplace which excluded wholly owned subsidiaries of existing companies using the corporate parents' name or identity. We also captured whether or not each exchange was partially or wholly owned by one or more industry incumbents, such as a manufacturer, distributor, or retailer. Companies with no equity investments by industry incumbents were defined to be "independent" exchanges.

In August 2001, we returned to the original set of 124 companies and evaluated the current status of these B2B exchanges. Previous research has shown that exit during a shakeout occurs through two distinct modes—exit due to business failure and dissolution and exit by merger or acquisition. Accordingly, we defined three possible outcomes for the B2B exchanges in our sample:

- *Outcome 1:* The company still exists and continues to operate.
- *Outcome 2*: The company has ceased operations and no longer operates.

- *Outcome 3:* The company has ceased independent operation due to merger or acquisition.

When the merger or acquisition involved two B2B exchanges in our sample, we identified a surviving entity (outcome 1) and an existing identity (outcome 3). We use the terms *merger* and *acquisition* to refer to any transaction that forms one economic unit from two or more previous ones.

Exit data and outcomes were collected as of July 2002 from a variety of sources including trade periodicals, press releases, visits to all 124 web sites, multiple online databases, and other public source materials. The results are as follows:

Industry	n	Independent Startup	Linked to Incumbent
Electronic Components	12	6	6
Food Service & Beverage	17	11	6
Health Care	13	8	5
Paper	10	6	4
Construction	23	13	10
Automotive Aftermath	14	10	4
Industrial MRO	18	10	8
Grocery	17	13	4
n	124	77	47
Independent Startup	n/a	77	n/a
Linked to Incumbent	n/a	n/a	47

Industry	**Outcome 1:** Continues to Operate	**Outcome 2:** Ceased Operations	**Outcome 3:** Exit by Merger/ Acquisition	TOTAL
Electronic Components	67%	8%	25%	100%
Food Service & Beverage	59%	12%	29%	100%
Health Care	54%	15%	31%	100%
Paper	50%	10%	40%	100%
Construction	52%	30%	17%	100%
Automotive Aftermath	29%	29%	43%	100%
Industrial MRO	39%	22%	39%	100%
Grocery	24%	41%	35%	100%
n	46%	23%	31%	100%
Independent Startup	43%	26%	31%	100%
Linked to Incumbent	51%	17%	32%	100%

There is a statistically significant difference (p=0.06) in the proportion of independent start ups versus exchanges linked to incumbents that ceased operations:

Sample selection

We can compare our sample of 124 exchanges with the universe of exchanges studied by Laseter et al. (described in note 5) to clarify how we arrived at our sample size:

- Their population universe comprises 1486 B2B exchanges that provided information at a described URL. These were non-private exchanges operating in the U.S., Europe, or global markets.
- Our eight representative industry segments (auto aftermarket, construction, electronic components, food service and beverage, grocery, health care, industrial supplies, and paper) were estimated to comprise 41% of the exchanges in the universe or 610 in all. This assumes we used the same definition of an industry.
- We limited our study to exchanges operating in the U.S., which is 38 percent of the total. Thus, the appropriate universe is .38610=232 exchanges.
- Our sample of 124 exchanges is 53 percent of this universe, because we limited our study to exchanges with at least one round of financing.

Notes

1. These patterns of shakeout and consolidation have been extensively studied in the economics and strategy literature. See M. Gort and S. Klepper, "Time Paths in the Diffusion of Product Innovations," *Economic Journal*, 92 (1982): 630-653; G.F. Willard and A.C. Cooper, "Survivors of Industry Shakeouts," *Strategic Management Journal*, 6 (1985): 299-318; J.M. Utterback and F.F. Suarez, "Innovation, Competition, and Industry Structure," *Research Policy*, 22 (1993): 1-21; A.J. Fein, "Understanding Evolutionary Processes in Non-Manufacturing Industries: Empirical Insights from the Shakeout in Pharmaceutical Wholesaling," *Journal of Evolutionary Economics*, 8/3 (1998): 231-270.
2. This phenomenon is described is T. Coltman, T.M. Devinney, A. Latukefu, and D.F. Midgley, "E-Business: Revolution, Evolution, or Hype?" *California Management Review*, 44/1 (Fall 2001): 57-86.
3. G.S. Day, "Strategies for Surviving a Shakeout," *Harvard Business Review*, 75/2 (March/April 1997): 93-102.
4. B2B Exchanges provide an Internet-based medium for buyers and sellers to find trading partners and arrange transactions. These exchanges are typically specialized to a single vertical industry, defined by either products or by customer type. See S. Kaplan and M. Sawhney, "E-Hubs: The New B2B Marketplaces," *Harvard Business Review*, 78/3 (May/June 2000): 97-106, and A.J. Fein, M.J. Skinner, and J. Solodar, "The Promise and Perils of On-Line Exchanges," *Modern Distribution Management* (1999).
5. These were defined as non-private electronic exchanges with information at a described URL. A cross-sectional study by Booz Allen Hamilton found 1486 exchanges at the end of 2000. Our estimates don't quite match theirs because of differences in timing and assumptions about viability. See T. Laseter, B. Long, and C. Capers, "B2B Benchmark: The State of Electronic Exchanges," *Strategy and Business* (Fourth Quarter 2001), pp. 33-42.
6. See C. Shapiro and H.R. Varian, *Information Rules: Strategic Guide to the Network Economy* (Boston, MA: Harvard Business School Press, 1999); M. Tushman and P. Anderson, "Technological Discontinuities and Organizational Environment," *Administrative Science Quarterly*, 31 (1986): 439-456.

7. Forrester Research, *The Future of On-Line Exchanges* (2000), estimated there would be only 180 exchanges left by 2003, by assuming there would be only 2 or 3 open exchanges per market.
8. S. Klepper and E. Graddy, "The Evolution of New Industries and the Determinants of Market Structure," *RAND Journal of Economics*, 21 (1990): 27-44; S. Klepper and J. Miller, "Entry, Exit, and Shakeouts in the United States in New Manufactured Products," *International Journal of Industrial Organization*, 13 (1995): 567-591.
9. K. Stringer, "People Who Need People: The Relationship Between Buyer and Supplier Can't Be Handled Entirely Online," *The Wall Street Journal*, May 21, 2001, p. R14.
10. T. Doyle and J. Melanson, "B2B Web Exchanges: Easier Hyped Than Done," *Journal of Business Strategy*, 22/3 (May/June 2001), 10-13.
11. Laseter, Long, and Capers, op. cit., p. 40.
12. J.P. MacDuffie and S. Helper, "B2B and Modes of Exchange: Evolutionary or Transformative Effects," in B. Kogut, ed., *The Global Internet Economy* (forthcoming).
13. S. Klepper and K. Simons, "Technological Extinctions of Industrial Firms: An Inquiry into their Nature and Causes," *Industrial and Corporate Change*, 6/2 (March 1997): 379-460; J.M. Utterback, *Mastering the Dynamics of Innovation* (Boston, MA: Harvard Business School Press, 1994).
14. M. Sawhney and D. Parikh, "Break Your Boundaries," *Business 2.0*, November 12, 2000, pp. 198-207.
15. M.E. Porter, "Strategy and the Internet," *Harvard Business Review*, 79/3 (March 2001): 63-78.
16. The adoption of the Internet is subject to all the same forces and constraints that influence the diffusion of any innovation into a market. See E. Rogers, *Diffusion of Innovations* (New York, NY: Free Press, 1983); E. Von Hippel, *The Sources of Innovation* (New York, NY: Oxford University Press, 1998).
17. D.J. Teece, "Profiting from Technological Innovation: Implications for Integration, Collaboration, Licensing, and Public Policy," *Research Policy*, 15 (1986): 285-305; R.C. Levin, A.K. Klevorick, R.R. Nelson, and S.G. Winter, "Appropriating the Returns from Industrial Research and Development," *Brookings Papers on Economic Activity*, 3 (1987): 783-831.
18. J.M. Figueredo, "Finding Sustainable Profitability in Electronic Commerce," *Sloan Management Review*, 41/4 (Summer 2000): 41-52.
19. See Coltman et al., op. cit., p. 72.
20. M.B. Lieberman and D.B. Montgomery, "First-Mover Advantages," *Strategic Management Journal*, 9 (Summer 1988): 41-58; G.J. Tellis and P.N. Golder, "First to Market, First to Fail? Real Causes of Enduring Market Leadership," *Sloan Management Review*, 37/2(Winter 1996), 65-75. Porter [op. cit.] also notes that first mover advantages on the Internet were not realized because switching costs were lower than expected and network effects were not proprietary to any one company because of the open architecture.
21. G.S. Day, *The Market Driven Organization* (New York, NY: Free Press, 1999).
22. F. Reichheld and P. Schefter, "E-loyalty: Your Secret Weapon on the Web," *Harvard Business Review*, 78/4 (July/August 2000): 105-113.

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