

**Investors have risked billions
on Webvan, Urbanfetch, and
other same-day transporters.
The economics, though, show
they won't deliver for long.**

Photographs by Brad Wilson

The Last Mile to Nowhere

Flaws & Fallacies in Internet
Home-Delivery Schemes

by Tim Laseter, Pat Houston, Anne Chung,
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NO WAY →

STOP



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Amazon.com's launch in July 1995 ushered in

an era with a fundamentally new value proposition to the consumer: easy access to convenient ordering with seemingly infinite selection. Rather than dropping by the local Barnes & Noble superstore and physically sifting through the 150,000 titles, Amazon's online shopper browses more than 4 million titles from a personal computer. Amazon also simplifies the selection process through its search engines and databases loaded with information on millions of consumers. Over the past few years, a host of "category killers" replicated Amazon's "limitless shelf space" model in categories from music, to toys, to home furnishings — while Amazon in turn extended its brand to such categories, and others, as well.

Unfortunately, the online advantage is undermined by a benefit only bricks-and-mortar retailers can offer: the ability to walk out of a local store with product in hand. As a result, a new breed of Internet service has emerged: retailers, such as Webvan, Kozmo.com, Urbanfetch, and Pink Dot, that offer same-day delivery. These new e-tailers have staked out the "last mile" delivery to consumers as their basis of competition. By combining the convenience of online ordering with nearly instant gratification, they offer a new — and potentially superior — value proposition. No one doubts that competition will be fierce. As George Shaheen, CEO of Webvan Group Inc., puts it, "One or two companies will legitimately earn the right to cross into a person's home. We intend to be one of those. I don't believe there will be a multiplicity of companies doing this successfully."

Unlike Mr. Shaheen, we believe the last mile may lead to the gallows rather than to the promised land. Our analysis of the race for Internet-ordered home-delivery services uncovered four fundamental challenges: limited

online sales potential; high cost of delivery; a selection–variety trade-off; and existing, entrenched competition.

Before presenting our supporting evidence, we will first briefly profile the new dot-com competitors for the last mile. (Save this scorecard; the game may be a no-hitter.)

Overview of the Players

Most of the major e-tailers offering same-day delivery tend to focus on a mix of two broad product categories, immediate gratification/impulse items (e.g., videos, music, books, magazines, snacks) and routine necessities like grocery and household items, for which many consumers seek to minimize shopping time and effort. (See Exhibit 1.) All offer thousands of items, but order sizes vary dramatically. Not surprisingly, the companies focused on instant gratification/impulse items tend to have the smallest orders.

All offer extended delivery hours and 24/7 ordering — not surprising in the wired world. Distribution/fulfillment centers range from simple 4,500-square-foot spaces filled with rack shelving, to highly automated, multimillion-dollar, 300,000-square-foot facilities. Delivery vehicles range from bikes, to scooters, to small cars, to vans — often sporting striking colors and images to market the brand. Although most offer free delivery, some price their offerings to discourage small orders. Also, to ensure that consumers receive truly free delivery, some, at least for the time being, discourage tipping.

Although each company offers a slightly different business proposition, all offer the convenience of online ordering and same-day delivery, thus addressing the time-lag problem encountered in the category-killer e-tailing model pioneered by Amazon. These local deliverers hope

Exhibit 1: Local-Deliverer Overviews

Company	Kozmo	Pink Dot	SameDay	Urbanfetch	Webvan
Started	1997	1987	1999	1999	1996
Coverage	Atlanta, Boston, Chicago, Houston, Los Angeles, New York, Portland, San Francisco, Seattle, Washington, D.C.	Los Angeles, Orange County	Atlanta*, Chicago*, Dallas*, Memphis*, New York*, Los Angeles, San Francisco, San Jose, Seattle*, Washington, D.C.*	New York, London	Atlanta, Chicago*, Dallas*, Denver*, Newark*, Philadelphia*, Sacramento, San Francisco, Seattle*, Washington, D.C.*
<small>*announced expansion</small>					
Offering:					
Videos/DVDs	●		●	●	
Games/Toys	●		●	●	
Music	●		●	●	
Electronics	●		●	●	
Books/Magazines	●		●	●	
Snacks/Food	●	●		●	●
Grocery Items					●
Health & Body	●			●	●
Household Items	●	●			●
Gifts		●		●	●
Stocked Items	15,000+	~2,000	Not Published	50,000	15,000+
Average Order Size	\$15	Not Published	Not Published	\$40-50	\$90
Hours of Delivery	10 AM to 1 AM	6 AM to 3 AM	6 AM to 3 AM	24 Hours a Day	7 AM to 10 PM
<small>All offer delivery 7 days a week, 365 days a year, and 24/7 ordering</small>					
Fulfillment Centers	13 Distribution Centers in 6 markets	12 Fulfillment Locations (4,500 sq.ft.)	4 Distribution Centers with an Average Size of 100,000 sq.ft.	1 Distribution Center Plus "Severat" Fulfillment Centers	1 Distribution Center of 336,000 sq.ft. Plus 12 Small Transfer Hubs (SF)
Delivery Response Time	Under an Hour: Can Specify Delivery Time	Under 30 Minutes	Same Day (within 2 Hours) & Next Day	Under an Hour: Can Specify Delivery Time	30-Minute Window Specified by the Shopper
Delivery Method	Van, Car, Scooter, Bicycle, and Foot	Blue VW Bug with Pink Dots	Not Published	Van, Scooter, Bicycle, and Foot	Beige-and-White Van
Delivery Charge	Free	\$2.95 Flat, No Minimum Order	Free > \$50 Order \$6.95 < \$50 Order (Within Zone)	Free, \$10 Minimum Order	Free > \$50 Order \$4.95 < \$50 Order
Tipping Policy	Optional	Optional	No Tipping	No Tipping	No Tipping

that gaining control of the last mile will ensure success. We're not so sure — for a variety of reasons.

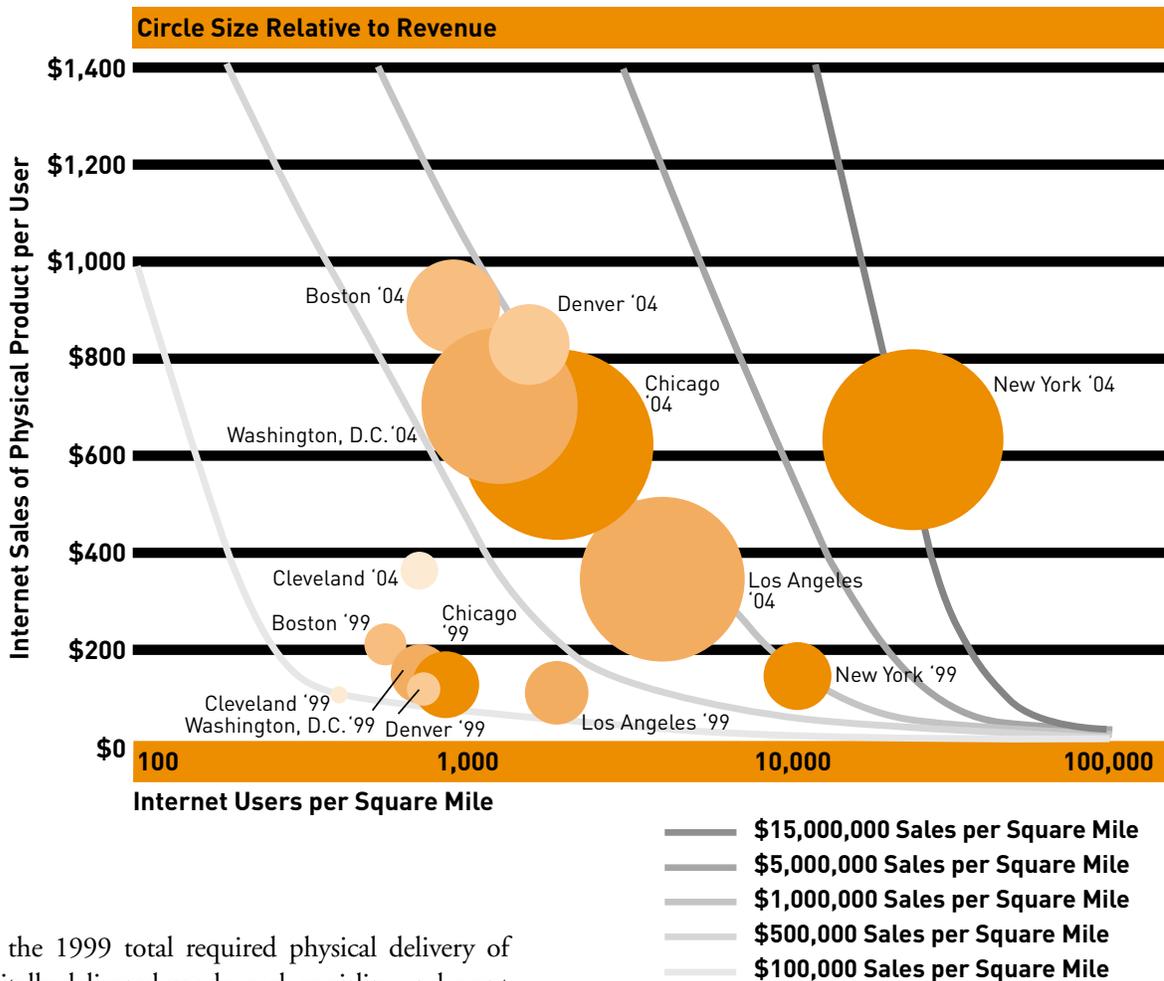
Limited Online Sales

Given the well-publicized reports about the explosive growth of online shopping, our assertion of limited sales may seem unbelievable. We draw this conclusion by examining how online sales should affect the volume of

home-delivery business.

To start, we ran a few numbers. Forrester Research Inc., the most frequently cited forecaster of online sales, suggests the U.S. online-consumer market will exceed \$184 billion by 2004 — whopping growth over last year's \$20 billion to \$30 billion estimate. (No one has exact figures; the government only recently began tracking this new phenomenon.) But according to Forrester, only 60

Exhibit 2: Internet Sales-Density Analysis



percent of the 1999 total required physical delivery of goods. Digitally delivered goods, such as airline and event tickets, online brokerage and banking services, plus “researched goods” like automobiles, which have a separate delivery network, accounted for the other 40 percent.

The physically delivered categories contribute much of the future growth and account for \$132 billion of Forrester’s 2004 forecast. To put this in perspective, that’s 2.3 times the \$57 billion that consumers currently spend annually on catalog purchases. That is enormous growth in a short period of time. But we worry that even that much home-delivery volume will not provide enough sales density to alter fundamental delivery economics.

For further perspective we built a forecast model that highlights the two key drivers of local delivery economics: sales concentration and population density. Specifically, we selected a range of U.S. cities — many covered by announced expansion plans from the key local deliverers listed in Exhibit 1 — and examined both current sales density and a forecast for 2004. Our model builds on Forrester’s Internet sales forecasts, published data from Scarborough Research on Internet penetration rates in

key cities, population and median income data from the U.S. Census Bureau, and the one constant: the land area of the cities. (See Exhibit 2.)

For those not familiar with the consultant’s perennial favorite information graphic — the bubble chart — Exhibit 2 warrants more explanation. The horizontal axis indicates the number of Internet users per square mile in each city on a logarithmic scale. (Note that the logarithmic scale represents a *tenfold* increase in user density for each increment along the scale, rather than the more typical increase of a fixed linear amount.)

Population growth (and in some cases decline) and Internet penetration rates drive the migration to the right between 1999 and 2004. For example, in 1999 an estimated 60 percent of the 4.4 million inhabitants of the Washington, D.C. greater metropolitan area had Internet access — the highest penetration of any U.S. city. Since the Washington, D.C. area covers nearly 3,500 square

Even if online consumer sales volume grows to twice that of catalog sales today, it won't provide enough sales density to alter fundamental delivery economics.

miles, those 2.6 million users produce a user density of about 750 per square mile. By 2004, increasing Internet penetration and population growth will drive the user density to more than 1,300 users per square mile.

The vertical axis estimates the Internet purchases of those users. Again using Washington, D.C. as the example, and looking ahead to 2004, we adjusted the average online sales per person to reflect the above-average affluence in the district. This yields a projection of annual online physical-product sales of nearly \$700 per user in four years — well above the overall 1999 U.S. average of around \$125.

The size of the circle captures an important third variable: market size. Although high user density and high sales per user drive sales density, the overall market size also plays an important role. For example, Denver, with a user density of nearly 1,300 per square mile and projected 2004 sales per user of \$800, will have \$1.3 million of sales per square mile per year. Washington, D.C. fares worse, with sales per square mile of only \$900,000 — but offers a bigger prize due to the greater total population.

The curved lines on the chart highlight different combinations of sales levels and user density that yield the critical value of sales per square mile. The \$14 million in sales per square mile in New York City offers an attractive market; even dividing by 365 days per year for the 24/7 Internet economy, the rev-

enue potential totals more than \$39,000 per day per square mile.

Unfortunately, after New York, the potential to deliver goods economically in cities falls quickly. Most major cities offer approximately \$1 million per square mile in sales each year — equal to less than \$3,000 per day. And that's the total for *all* online sales of physical goods, not just the fraction that people want delivered instantaneously. Worse yet, that fraction may have to be shared by several local deliverers.

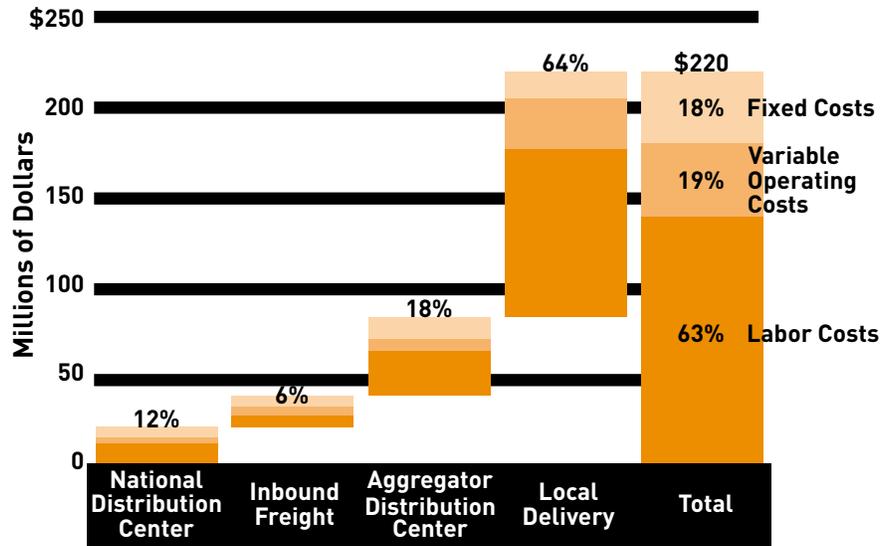


High Last-Mile Costs

Not only are the sales spread across lots of “last miles,” it costs a lot of money to get there. To demonstrate, we conducted top-down analyses of one low-cost player and built a bottom-up cost model for a local delivery business.

Extracting from publicly available information, we estimate that Kozmo.com Inc., absent overhead costs such as advertising, currently spends about \$10 to make a delivery. Even this cost estimate reflects a heavy bias for its original Manhattan-based operations — the densest delivery area in the country, and thus probably its lowest-cost market. With an average order size of about \$15, it's little surprise that Kozmo is losing money and in trouble. In June, the company fired 24 workers, or 5 percent of its sales force, and slowed down plans for its IPO. Kozmo is also considering requiring a mini-

Exhibit 3: Breakdown of Total Distribution Costs



Note: Based on 1 cubic foot shipment size in Washington, D.C.

mum dollar value on orders.

As any New Economy entrepreneur knows, scale offers the obvious solution. But unfortunately, physical delivery does not benefit from the network effect that supports other types of Information Economy businesses. As our cost model demonstrates, variable labor costs undergird local-deliverer economics, with the drivers who deliver packages comprising the bulk of the cost. (See Exhibit 3.) A van-based deliverer gets some economies by fully utilizing the vehicle space, but a bicycle courier can carry only a limited number of items. More customers simply means more bicycle trips.

Of course, the impact of the delivery cost depends on the value of the package being delivered. According to Goldman Sachs, an online purchase of \$100 incurs an average charge of 8 percent for shipping and handling. For \$50 orders, the research reported an 11 percent charge. As shown in Exhibit 4, increasing shipment density slightly reduces the *absolute* cost per delivery — but changing the value of the package dramatically changes the *relative* cost per delivery. For a \$100 package, a local deliverer comes close to breaking even with the current average cost for shipping Internet goods. That means a local deliverer that charges standard shipping and handling fees could offer same-day delivery for the same price as the delayed shipment from a category killer — clearly an opportunity to gain an advantage.

Unfortunately, average online orders typically run in the \$50 to \$100 range, not higher. In fact, larger orders seem antithetical to the notion of instant gratification, which is more about impulse videotape rentals than about, say, the purchase of VCRs. And our research on the current delivery firms shows the companies with the

greatest emphasis on rapid delivery tend to have the smallest order size.

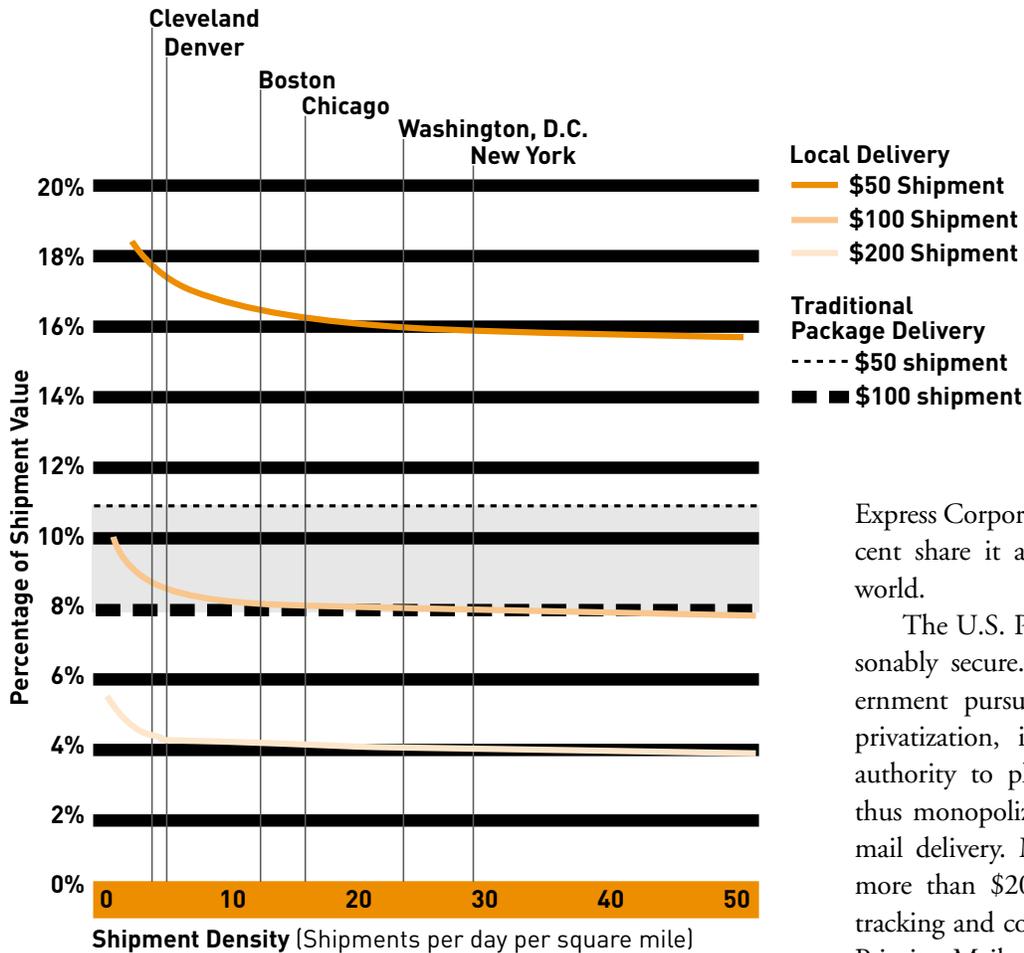
New Trade-off: Speed Vs. Variety

More fundamentally, under current models, the local deliverer resolves the issue of instant gratification at the expense of limitless offerings. To achieve fast response, the local deliverer must hold product locally, rather than in large national distribution centers, as category killers and large catalog retailers do. So the speed advantage gained by Kozmo.com and Urbanfetch.com Inc. means a variety loss. Kozmo offers about 15,000 items in total, versus more than 10 million total items at Amazon.

Even applying the Pareto principle — that 80 percent of the sales dollars come from 20 percent of the items stocked — the local deliverer will be able to steal only a fraction of the total sales volume from a category killer: that represented by high-volume items. Typically, though, high-volume items provide the least profit per unit because of heavy price competition. Furthermore, at least today, the category killer's broader product line provides leverage in negotiating with suppliers. So even though



Exhibit 4: Delivery Costs as a Percentage of Shipment Value



Express Corporation retained the 10 percent share it also holds in the catalog world.

The U.S. Postal Service appears reasonably secure. Unless the federal government pursues the unlikely path of privatization, it retains the sole legal authority to place items in mailboxes, thus monopolizing the base business of mail delivery. Moreover, after investing more than \$200 million in a delivery tracking and confirmation system for its Priority Mail product, the U.S. Postal Service has now closed the gap on a key

the local deliverer addresses the instant gratification need, it presents a new trade-off of a limited selection. Nothing comes free.

Entrenched Competitors

The biggest challenge to the local deliverers may be competition from traditional package delivery services — notably the U.S. Postal Service and United Parcel Service Inc. (UPS) — as well as bricks-and-mortar retailers like grocery stores.

UPS and the U.S. Postal Service have the most to lose should local deliverers find a way to make a business out of same-day service. Today, 85 percent of catalog products are shipped via one of these two services; a little more than half of consumer catalog shipments go through the U.S. Postal Service alone. To date, business-to-consumer Internet commerce appears to be falling to the same duopoly, albeit in reverse: UPS made 55 percent of online order deliveries, according to Zona Research Inc., while the U.S. Postal Service garnered 32 percent. Federal

issue limiting its competitiveness with UPS.

Whether the U.S. Postal Service can rise to the challenge of same-day delivery remains to be seen, but national mail services in other countries do so. The Royal Mail provides same-day delivery for Amazon.co.uk throughout London; orders received by noon typically reach the consumer before the end of the day.

UPS, for its part, faces more opportunity than threat from consumer Internet sales. Despite the ubiquitous presence of its brown trucks in suburbia, business-to-business (B2B) delivery still supports the company. Only about 10 percent of UPS's revenue comes from home delivery. Well aware of the upside, UPS has announced plans to provide complete logistics services, from warehousing to order fulfillment, to small- and medium-sized e-commerce startups through its UPS eLogistics business. In informal discussions with major e-tailers, UPS has also described a possible plan to provide aggregator services in 60 cities across the U.S. Both moves indicate a clear unwillingness to concede the last mile to the startups.

With an existing infrastructure and the B2B base volume, UPS appears a formidable competitor — one well positioned to partner with category-killer e-tailers, instead of competing against them.

Existing bricks-and-mortar retailers also pose a major challenge to the local Internet deliverer, especially those using groceries as their base-load business. Leading grocery chains, like Lowe's Food Stores Inc., based in North Carolina, now offer online ordering with curbside pickup at the local grocery store. The consumer gains the advantages of efficient 24/7 online ordering with no checkout lines, and the grocer avoids the high investment requirements of a home-delivery network. Nongrocery clicks-and-mortar players are also getting in on the game. In May, Barnes & Noble Inc. launched same-day delivery in Manhattan of books ordered online, matching the capability of Kozmo and Urbanfetch, and finally linking its physical stores and online presence, thereby leaping ahead of the still-virtual Amazon.com. You can expect more such announcements from category killers.

The rapid evolution and spread of wireless Web devices might further shift the balance back to the traditional players. (See "Pattie Maes and Her Agents Provocateur," p. 74.) A consumer could place an order using a handheld device for pickup at the nearest store as determined by a Global Positioning System signal. Imagine an out-of-town business traveler looking for a gift to take to her kids back home. Searching the Toys "R" Us Web site, she finds the perfect gift and places the order for curbside pickup at the most convenient store on her route to the airport. In such a model, retailers with the greatest number of physical outlets could be the most

advantaged. And although only 25 million users employ handheld Web devices today, forecasts suggest a total as high as 1.5 billion in only five years.



New Models Ahead

As the analysis indicates, the last mile consists of some tough terrain: lonely, expensive, and exposed to entrenched competitors. Although we're not ready to ring a death knell for these companies, we do believe they must further evolve their value proposition and focus on the incremental value of rapid delivery. Today, most try to avoid an explicit charge for that. In the future, the companies may need to express more explicitly that delivery has a cost — and a value — to the consumer.

We also feel confident that new models will emerge as companies attempt to find the optimal trade-offs to meet consumer needs. In Japan, for example, a very different delivery model has already evolved. Thanks to extremely high delivery density over a relatively small land mass, *takuhai-bin* services can offer same- or next-day delivery to most Japanese consumers. Also, Japanese convenience stores provide an optional link in last-mile delivery, offering convenient neighborhood pickup and the option to pay cash — important features given low credit-card penetration and smaller mailboxes in that country.

Winning in today's dynamic economy requires a commitment to refine and adapt the business model continuously to navigate the ever-changing competitive landscape. Eventually, someone will find a value proposition that works — but many others will fail along the way. +

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Resources

Christopher Byron, "Kozmo Investors Back Boys on Bikes," *The New York Observer*, April 3, 2000: www.newyorkobserver.com/pages/story.asp?ID=2527

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Webvan Group Inc.: www.webvan.com

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Sameday.com: www.sameday.com

Urbanfetch.com Inc.: www.urbanfetch.com

Kozmo.com Inc.: www.kozmo.com

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