Operating Strategies
by Tim Laseter, David Torres, and Anne Chung

Oasis in the Dot-Com Delivery Desert

E-tail intermediaries may do what Kozmo and Webvan could not.

Kozmo.com has disintegrated. Saved from Nasdaq delisting by a 25-to-1 reverse split, Webvan is on the ropes. The "last mile" — the fabled promised land for controlling the online consumer — has instead proved to be a pitiless desert.

To faithful readers, that will come as no surprise. Last August in *strategy+business*, we showed that the economics of these delivery dot-coms made little sense because of the highly variable cost of delivery and limited target areas with adequate demand density. (See "The Last Mile to Nowhere: Flaws and Fallacies in Internet Home-Delivery Schemes," *s+b*, Third Quarter 2000.) Even the established players, notably FedEx and UPS, find home delivery challenging, despite well-oiled operations and a business-to-business baseload to amortize the costs. By our estimates, last-mile costs for a rural home delivery could be four times the cost of an urban business delivery. Offering same-day delivery or half-hour windows adds complexity and cost that even these behemoths offer only for a premium — certainly not free!

Despite the challenges of the last mile, we remain convinced that e-tailing offers a viable proposition. Consumers continue to grow more comfortable with the channel, and, in many cases, the Internet can help reduce costs across the supply chain. With demand from desirable online consumers growing, almost inevitably someone will find a way to reduce the last mile to a manageable — and profitable — distance. Although we expect online retail channels to be dominated by traditional retailers — possibly in partnership with leading Internet companies, as exemplified by the Amazon.com–Toys "R" Us alliance — we also see room for further entrepreneurial innovation.

The New Players

We're not alone in that view. By our count, 22 different companies in the U.S. and Europe now offer "solutions" to the challenges of the last mile. These new firms don't aspire to "earn the right to cross into a person's home," as George Shaheen, the departed chief executive of Webvan Group Inc., once put it. Instead, these solution providers are attempting to fill a more modest need, play-

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ing an intermediary role between shippers and consumers to help them connect more cost-effectively and/or conveniently. Their specific models range from simple to sophisticated to, quite frankly, silly. Without a doubt, the last mile will claim more casualties; however, our research suggests that there may be an oasis or two along the otherwise barren stretch.

To explain the developing field of delivery intermediaries, we classify the players along two dimensions: the location for their proposed solution, and the technological sophistication of their business model. Along the first dimension, some companies aim to facilitate deliveries straight to the home; others are creating delivery mechanisms at select suburban locations accessible to the consumer; and others are developing drop-off/pick-up sites in urban buildings where multiple consumers live or work. The technology these companies propose ranges from simple, staffed pickup sites to high-tech automation with Internet connectivity.

Whatever their model, all the new players defend the need for their last-mile solution by citing the striking growth in direct shipments to the home; most predict a total of 2 to 5 billion consumer-destined packages in just a few years, well above the 1.3 billion packages sent in 1999. Their business plans highlight the fact that, traditionally, 20 to 30 percent of home deliveries have required multiple delivery attempts, which increases shipper costs and simultaneously disappoints the consumer who receives the infamous "sticky note" explaining that the package couldn't be delivered. Shippers historically have left another 30 percent of packages even though no one is home, potentially inviting theft and risking weather damage — a hassle and cost to both the consumer and the shipper. Furthermore, most solutions apply equally well for "reverse logistics" — handling returns, which typically range from 20 to 30 percent for mail-order and online shopping.

In short, all these new intermediaries are attacking a very real problem: billions of packages and potentially billions of dollars in waste.

Profiling the Players

Consider Brivo Systems Inc., one of the earliest entrants into this new game. Founded in May 1999 by two management consultants intent on cashing in on the Internet revolution, Brivo, headquartered in Arlington, Va., offers a sophisticated "smart box" to enable secure delivery of packages to unattended households. Designed and partially funded by IDEO Product Development, the industrial design firm famous for the original Apple mouse and the Palm V, the 2½-foot-tall steel-and-plastic box (sized, according to Brivo, to accept 96 percent of all packages shipped in the United States) contains a two-way wireless modem and an embedded Intel 386 processor connected to a numeric keypad. When a consumer orders a home delivery, the system automatically generates a unique key code for accessing the Brivo Box, which is printed on the shipping label. The delivery person, whether from UPS, FedEx, or the U.S. Postal Service, enters the code from the package and places the item in the box. The box then sends an e-mail or pager message to its owner announcing that the package has arrived. When home, the owner enters his or her standard personal code to open the box and retrieve the goodies. Piloted in Northern Virginia and Silicon Valley, the Brivo Box certainly works. The question remains how many consumers will value it enough

to pay for it: Brivo intends to charge $10 to $20 per month to the owner.

Brivo's most publicized competitor, zBox Company, founded in October 1999 in San Francisco, argues that consumers won't accept such a price level, and has designed a less sophisticated, lower-cost solution. The zBox smart-box offering does not have the Internet messaging capability, but does have a proprietary system, powered by a five-year battery, that generates a new access code for each package delivery. As with the Brivo solution, the unique code is added to the shipping label, so the delivery person can access the box only once, whereas the consumer can access it repeatedly with a single personal identification number. Citing market research that consumer acceptance drops off significantly when a monthly fee exceeds $10, zBox offers its solution for an "introductory price" of $5 per month, plus a $60 security deposit for the box. At 24 inches high by 21 inches deep by 32 inches wide, the zBox is smaller than the Brivo product. But it still can accept 80 percent of single-package deliveries and 70 percent of two-package deliveries, according to the company.

The most impressive part of the zBox story may be the company's high-profile strategic partners. The company partnered with GE/Fitch, a joint venture between General Electric Plastics and Fitch Inc., to design and manufacture the boxes; ran a pilot test with the U.S. Postal Service in the San Francisco Bay area that was supported by 30 online retailers; and in February announced a third round of private financing from the Whirlpool Corporation. Having independently uncovered a significant consumer need for various delivery appliances as part of its Integrated Home Solutions Initiative, Whirlpool views zBox as a strategic investment.

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Store and Office Solutions

If the would-be box barons represent a technological fix to the challenges of home delivery, a second pocket of companies — offering what we call the "retail-aggregator" solution — is betting on a decidedly low-tech answer. Their model simply collects deliveries at a retail outlet, typically a convenience store, for eventual pickup by the consumer. Unlike the smart box, which addresses only the unattended home-delivery problem, retail aggregation tackles two last-mile challenges: unanswered doorbells and the high cost of delivery to multiple locations.

Announced in September 2000, a joint venture between United Parcel Service Inc. and Texaco offers an example of the retail-aggregator model. Consumers can choose to ship a package to a Texaco station rather than to their home. The station attendant stores it in a secure location behind the counter and provides it to the consumer. Neither UPS nor Texaco charges extra for the service, because both benefit from the proposition: UPS will save money by

Exhibit 1: **Addressable Market by Solution Type**

Last-Mile Solution	U.S. households (millions)	Annual $ spent (% of total spent in direct retail)	Average order size	Avg. number of packages/household in 2000	Total projected packages in 2003 (millions)
Attended Households	32.3	29%	$72	12.9	711
Smart Box	**2.7**	**4%**	**$97**	**16.3**	**76**
Retail Aggregator	**18.2**	**17%**	**$74**	**13.2**	**411**
Office-centric	**7.0**	**6%**	**$72**	**12.4**	**147**
Automated Aggregator	**20.9**	**25%**	**$85**	**14.3**	**511**
Doesn't Identify	19.6	19%	$74	13.2	444
Total	**100.7**	**100%**	**$76**	**13.4**	**2,300**

delivering more packages to a single stop, and Texaco can gain additional traffic to its gas station/convenience stores. The mighty duo decided to pilot the concept in the Benelux countries because both companies have their European headquarters in Brussels. Unfortunately, because the Benelux region has a low volume of online sales, the pilot so far has failed to prove the concept will work.

An independent startup, PaxZone Inc., introduced a similar model to the U.S. in October 1999. Starting in Chicago with an eclectic mix of retail partners, the company established the concept sufficiently to extend its initial 60-store network through a partnership with Circle K, a convenience-store chain with 2,200 sites nationwide. PaxZone also charges nothing extra to the consumer but extracts the home-delivery surcharge the carriers normally charge to the home consumer. The consumer pays nothing extra and the carrier gains, because PaxZone effectively converts a higher-cost, lower-margin consumer delivery into a lower-cost, higher-margin business delivery.

Another staffed model aggregates the deliveries in office buildings rather than suburban convenience stores. Consider Toronto-based Inplex Inc., started in 1996 as an outsourced mailroom service for multi-tenant office buildings. Over time, the company added a Web site that allowed building tenants also to acquire office supplies, to order courier service, and eventually to have packages accepted for personal delivery.

Having multiple revenue streams, Inplex carries significant fuel in the race along the last mile. With plans to expand to hundreds of multitenant buildings across a dozen major cities in North America, this office aggregator appears poised to dominate this solution option.

Labor-Saving Models

Another type of solution provider — the automated aggregator — spans suburban and urban locations and offers a high-tech version of the more labor-intensive aggregator model. But technology can be expensive, so players in this category will need to strike the right balance between cost and sophistication to succeed.

Two examples of automated aggregators illustrate this point. In July 2000, a U.K. shopping center developer/owner, Brendan Flood, announced a breakthrough idea to profit from the otherwise debilitating growth of online retailing. His concept, dubbed "e-stop," solves the last-mile problem with a highly automated drive-through pickup location, conveniently located along major thoroughfares. After ordering the goods online, customers can drive into the e-stop and swipe a membership card to notify a customer service officer of their arrival. Proceeding to a loading area, customers remain in their cars while the service person loads the ordered goods into the trunk. Since e-stop's 5,000-square-foot "mini warehouses" offer refrigerator and freezer storage space, the facilities can even hold online grocery orders. Initially targeting 35 sites by the year 2002, Mr. Flood estimates that the U.K. could eventually support up to 500 e-stops. In this model, the consumer gains a convenient, free service, while the e-tailer avoids the expense of a dedicated fleet of vans for direct home delivery — a model of e-tailing not uncommon in the United Kingdom — by aggregating orders into 40-foot trucks to deliver goods to the e-stop.

Longtime readers will immediately sense that the e-stop model makes several assumptions, chief among them a probably unattainable level of volume to absorb the substantial investment and operating costs

for 2.5 million square feet (500 e-stops at 5,000 square feet each) of prime retail space. Furthermore, anyone with a logistics background will realize that a single 40-foot truckload would likely fill the entire storage capacity of a 5,000-square-foot facility — implying a degree of operational perfection that would make Toyota's just-in-time system look like child's play.

Fortunately, the automated aggregator segment also offers a model that may represent the needed balance between technology and investment. Last September, a team of Israeli entrepreneurs launched a U.S.-based company, eShip-4u Inc., to develop a network of "Automated Delivery Machines," or ADMs. Designed with an internal carousel and variably retractable doors, the ADM has a variety of slot sizes to hold packages ranging in size from a jewelry box to a computer monitor. Like the Brivo box, eShip-4u's ADMs employ wireless technology to inform the consumer of the arrival of a package by e-mail or pager. Like ATMs (which were originally designed to reduce costs for banks), the ADM has drawn the greatest initial interest from delivery companies hoping to eliminate the cost of redelivery. A major European postal service has a pilot under way with machines in rail stations and shopping centers. The ADMs hold packages for consumer pickup that could not be delivered to their homes on the first attempt. The U.S. Postal Service recently issued a request for proposal to pilot this concept as well as a version of the smart box described previously, indicating that the race is in full play to find the right answer.

As for eShip, it hopes that consumers will grow comfortable with the technology and begin to request delivery directly to the machines, circumventing direct home delivery entirely. To encourage early adopters, the company has targeted university mailrooms. It's a savvy choice: The typically technologically sophisticated U.S. college student receives an estimated 16 packages per year; with 2.4 million students on 2,150 campuses receiving a total of 39 million packages annually, eShip may have found a nice entry market for its machines. Ultimately, by offering a simple but reliable method to aggregate packages in a secure and convenient location, eShip hopes that ADMs become as ubiquitous as ATMs, which now total more than 270,000 in the U.S. alone.

Looking for Customers

Despite the accelerated boom-and-bust cycle for the first generation of last-mile players like Kozmo.com Inc. and Webvan, there continues to be a dearth of hard data to support the claims of the new last-mile intermediaries. So we decided to estimate potential market penetration ourselves.

For our analysis, we used the Claritas Corporation's PRIZM database, which analyzes consumer behavior by zip code in the United States. Claritas has sorted consumers into 62 separate demographic clusters gathered into 15 groups, which represent different combinations of family income and geographic region.

Working with the database, we extracted general and specific data on each of the 62 clusters. For example, in addition to the standard demographic data on income levels and education, we captured data on specific characteristics, like ATM usage, plus frequency of grocery shopping and travel distances to grocery stores. The data may surprise you. For example, 55 percent of the U.S. population don't use automatic teller machines, and 53 percent don't go to a convenience store even once in a typical month. But 26 percent do both — at least once — in a typical month.

A look at the data on grocery store shopping also reveals some extreme statistics: 8 percent of respondents admit to grocery shopping four to six times per week; 8 percent also claim to travel 11 miles or more to their normal grocery store. (For the sake of the environment, let's hope they are not the same 8 percent.) Finally, we captured data on how much each cluster buys through catalog and online channels. Half of Americans, we found, do neither.

Using this type of data, we developed some heuristics to estimate the size of the addressable market for each of the four types of last-mile solutions. First, we excluded the households with a non-working adult able to accept packages at home — about 30 percent of U.S. households. Next, we skimmed the heaviest buyers — those who spend $500 per year between catalog and online shopping — and allocated them against the smart-box solution since it provides a superior value proposition for major shoppers. Unfortunately, as shown in Exhibit 1 (see page 31), the smart-box solution appears relatively minor,

although smart-box households do spend far more than the average per household. Next, we isolated the urban clusters and extracted the proportion working in white-collar jobs. We then assigned them to the office-centric model. To assign the remainder to the retail aggregator or the automated aggregator, we looked at people's propensity to use an ATM or to visit a convenience store. In the end, we were left with a portion of the population that did not seem to fit any of the last-mile solutions, and classified them as "Doesn't Identify."

Although giving us only a rough approximation of the ultimate market size, this methodology does provide a perspective on the relative penetration opportunity of each model — and allows us to size the market for each solution type. As the chart indicates, nearly half of all households will see no need for any of the solutions. Although the smart box attracts the larger spenders, they total only 2.7 million households, representing about 76 million packages. At $5 to $20 per month (from the zBox to the Brivo price point), revenues would total $150 to $650 million per year — not bad, but not enough to rock the financial markets if it has to be split between at least the two competitors. The analysis indicates that the office-centric model also will attract only a relatively small percentage of households, reinforcing the importance of Inplex's multiple revenue streams.

Our analysis suggests retail and automated aggregators may emerge as the solutions.

Our analysis suggests that the retail and automated aggregators may emerge as the "mass market" solutions. Between the two, we think the automated aggregator has the edge. First, consumers will likely prefer the privacy and security of an automated device to facing a clerk delivering packages from behind a counter. Second, an appropriate level of automation, like eShip's ADM, offers a lower cost than a manual operation. Finally, the automated solution seems a better fit for the convenience store model. After all, most consumers have been trained in a self-service ethic for pumping gas: Why reverse the trend for package pickup? Of course, just as with the ATM, some consumers will feel intimidated by the machine or fear that it attracts muggers.

In the end, multiple solutions will continue to live in parallel. For example, we see little conflict between the smart box and the others since they target different segments. Future consumers may even change options depending on the type of product: An anxious consumer may stay home to accept a new computer but have an expensive jewelry item shipped to an automatic aggregator to keep a secret from a spouse.

The vast collection of entrepreneurial solutions to the dreaded last mile reinforces the power of our capitalistic model. Though many will fail, surely some will succeed and take us one step closer in achieving the dream of engaging, cost-effective online shopping. +

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