COLUMBUS, Ohio -- In a cavernous building here, workers speed around on motorized vehicles between rows of cardboard boxes. They rise up on hydraulic lifts to reach the tops of stacks stretching 28 feet high. A man on a foot-powered scooter races to check inventories of products ranging from DVD players to antiwrinkle cream and heart-surgery devices. Forklift drivers honk as they make their way across the dusky building the size of five football fields.

This warehouse and several others operated by ODW Logistics Inc. are the temporary home to tens of thousands of products made in 120 locations around the world by hundreds of manufacturers. They supply ODW's 80 customers, such as Deere & Co. and Limited Brands Inc. Each week, for example, 750,000 pounds of khaki pants, T-shirts and other apparel arrive from China, the Philippines, Sri Lanka, Indonesia and India. After stopping here, they are bound for Victoria's Secret, Eddie Bauer and the Limited. Two other vast warehouses are devoted almost entirely to cereal.

Such omnibus facilities are increasingly important way stations in the global, just-in-time economy. Cost-cutting and shifting of production offshore are driving growing numbers of manufacturers, retailers and suppliers to outsource their warehouses and distribution needs to the $89.4 billion third-party logistics industry. Revenue for the U.S. warehouse and logistics sector increased 16.3% last year, according to Armstrong & Associates Inc., a consulting company in Stoughton, Wis.

More than 80% of the country's 100 biggest companies use third-party logistics providers such as ODW. As ODW shows, such growth and the mounting expectations for global sourcing and delivery make for a daily high-wire act. Its customers count on ODW and its rivals to help get parts and finished goods from factories on one side of the world to stores and consumers on the other -- on time and in the right quantities. In the meantime, lead times to ship goods out have shrunk. And key staffers such as truck drivers are in short supply.

In many cases, the more U.S. companies rely on factories offshore, the more they are eager to outsource their distribution and warehousing. Longer transportation routes add potential headaches and expenses. Outsourcing can cut companies' own costs for keeping and managing inventories, and spare them the necessity of investing in advanced tracking technologies increasingly required by retailers. Giant,
multipurpose warehouses can also realize economies of scale for freight costs that individual customers couldn't get on their own.

"Right now, distribution warehousing is the next arena of corporate re-engineering and corporate cost-cutting," says John Boyd, president of Boyd Co., a Princeton, N.J., consulting firm that helps companies pick warehouse and other corporate sites.

While business is booming, companies like ODW also have to deal with increasingly demanding customers. Cosmetics company SkinStore.com, for example, now relays its customer orders to ODW until as late as 4 p.m. Eastern time for next-day delivery. That leaves ODW just three hours to pack and ship as many as 400 items some days.

"The window on us gets tighter and tighter," says John Ness, ODW's president. The order placement cutoff for that customer was 3 p.m. for next-day delivery two years ago, and before that it was noon, says Mr. Ness.

Logistics providers face additional challenges -- including high staff turnover, employee theft and the occasional hurricane or snowstorm. (An ice storm late last year nearly brought traffic to a halt and cost ODW $40,000 in overtime and other additional expenses.) The nation's current transportation woes, including bottlenecks at key hubs, add other challenges. During the busy preholiday season last year, a truck driver shortage coupled with regulations reducing the number of hours that drivers can work per shift, forced ODW to staff its operations around the clock six days a week. Even the seemingly humdrum question of where to build a warehouse has become a critical issue, due to high fuel costs and congestion at key ports.

ODW, which has 515 employees, says it expects revenue to increase 38% in 2005 from $35 million last year. That makes it a relatively small player in an industry that includes giants such as C.H. Robinson Worldwide Inc. and Penske Logistics LLC, a subsidiary of Penske Truck Leasing Co., which had 2004 revenue of $4.3 billion and $3.2 billion, respectively. Other large competitors include units of United Parcel Service Inc. and DHL, a unit of Deutsche Post AG.

ODW operates 2.4 million square feet of warehouse space, roughly 60% in Columbus, which though inland is the third-largest port of entry for textiles in the U.S. In addition, ODW has warehouses in Dallas, Chicago, Urbana, Ill., and Battle Creek, Mich., having picked areas with lower real-estate costs along east-west and north-south transportation corridors.

Location was critical for Edwards Lifesciences Corp., which makes products used to treat cardiovascular disease, when it chose ODW two years ago and shut a distribution center it had operated for 15 years in Memphis, Tenn. Today, ODW handles 90% of the packages Edwards distributes to customers in the U.S., from catheters to pressure monitoring kits, many time-critical. Shifting to ODW in Columbus, which was generally closer to the products' final destinations, enabled Edwards to reduce transportation costs. Now, 80% of the products shipped from Columbus are within a two-day drive of its U.S. customers, compared with roughly 50% when those products were sent from Memphis.

ODW can track an item from the moment it leaves an assembly line in China all the way to Columbus, and provide that information to customers via the Internet. Knowing in advance if there is going to be a delay because of a storm, or port congestion, can allow a retailer to call a backup supplier and salvage sales.

Pioneer Electronics Inc. relies on ODW not just for warehousing and distribution, but for basic assembly as well. ODW workers put stereo speakers from China in a single box with receivers from Thailand, other smaller parts from elsewhere and instructions. The boxes are then shipped to the home-theater sections of Wal-Mart Stores Inc. stores.
Sometimes the most complicated logistics work has nothing to do with distance, but rather with the sheer number and variety of objects being moved. Two ODW buildings in Columbus are almost entirely devoted to store brand cereal produced by Ralston Foods, a unit of Ralcorp Holdings Inc. The combined 500,000 square feet of warehouse space contains roughly 15 million boxes of cereal. On an average day, workers move between 50 and 60 truckloads of cereal, in various size boxes bearing different store names and destined for hundreds of locations.

Ralston is also using ODW to meet Wal-Mart's demand that some products bear radio frequency identification tags, small chips that wirelessly transmit package content and tracking information, by early next year. Rather than make large investments in the new technology themselves, Ralston and other ODW customers will effectively share the expense, which will show up as an incremental charge on the cost of shipping each case.

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