Defying all conventional wisdom, Dell Computer Corp. revolutionized the personal computer industry by refusing to focus on its product offerings. Instead, Dell became a $32 billion market leader by focusing on its customers, one customer at a time.

Dell’s well-known model of selling directly to the end user has become legendary not just in the high-tech industry but throughout all of manufacturing. Consider: The company manufactures more than 50,000 computers every day, but carries only four days’ worth of inventory, when many of its competitors carry between 20-30 days of inventory. Roughly half of its annual revenues — approximately $16 billion — come from online sales.

What’s more, Dell has been quite forthcoming as to identifying the “secret sauce” responsible for its direct model success — it’s the supply chain. Dell has a single-minded dedication to supply chain excellence, which means establishing relationships so tight with its suppliers and vendors that they border on incestuous — in the words of chairman and CEO Michael Dell, “Keep your friends close, and your suppliers closer.” The company keeps what it calls a supplier report card on every supplier, and tracks each supplier’s performance against a set of metrics maintained by Dell.

Against the charge that Dell’s remarkably low inventory levels come at the expense of its suppliers, Dick Hunter, vice president for Dell’s Americas Manufacturing Operations, points out, “About 30 suppliers provide 75% of our direct material purchase spend, and most of them maintain eight to 10 days of inventory in nearby, multi-vendor hubs. If those levels exceed 10 days, we work with suppliers to lower them since excess and obsolete components are not acceptable to Dell, our suppliers or customers.”
Dell also works with its supplier to prevent inventory levels from becoming too low, Hunter adds. “For Dell and our suppliers, information is increasingly replacing inventory, and we are regularly identifying, gathering and sharing new types and levels of data.”

Trading inventory for information is a key to Dell’s supply chain success, and in this day of point solutions aimed at tackling small problems quickly, Dell again is proof that following its own course rather than joining the rest of the pack is the way to go. Dell runs what is said to be the world’s largest implementation of i2 Technologies Inc.’s software, running its Dell-specific DSi2 solution on 120 servers, managing more than 250 suppliers responsible for delivering over 3,500 components.

“Dell took an industry that used to be make-to-stock and shifted it into make-to-order,” explains Kevin O’Marah, vice president at analyst firm AMR Research Inc. “In this industry companies lose a price premium every day. Anytime they make to stock, they’re tying up capital, which is the classic supply chain crime. They tie up in inventory, but even worse they lose price advantage for every day they maintain on-hand inventory.”

About half of Dell’s more than 50,000 orders each day come though the Internet. Those orders flow through the company’s legacy order management system, which records all the orders and releases them to manufacturing.

“We schedule production lines in every factory globally every two hours,” Hunter explains. “We have no inventory and no warehouses in any of our factories. Instead, we’re able to pull material into our factories based on actual orders.

“We literally push a button and two things happen,” Hunter continues. “We lock in the schedule by actual order and order number into the factory. At the same time we send a message over the Internet to our third-party logistics providers, supplier logistics centers and hubs.”

These hubs have 90 minutes to pull material out of the racks, and deliver it to Dell’s back door. To make that happen, Dell’s Austin, Texas- and Nashville-based hubs use technology from V3 Systems for inbound, outbound and inventory management.

This V3 order allocation application supports Dell’s individualized consumption profiles, as orders come in from anywhere — phone, web, e-mail, etc. The software talks to the DSi2 system thanks to enterprise application integration software from webMethods Inc., and the systems work together to optimize the assembly lines. The solution helped reduce inventory flip from 20 days to six.

Dell also employs i2 modules to communicate materials requirements and to schedule the factories once they receive the components.

Dell’s Worldwide Procurement division is responsible for negotiating contracts and pricing deals for all material consumed by Dell globally. The company teamed with Ariba Inc. to overhaul a procurement system that once required completion of a three-part paper form — which involved hand-coding information about suppliers, part numbers and item costs, not to mention manually collecting as many as 10 approval signatures. These procedures — which could take weeks to complete — were costing the company $110 per requisition.

Dell implemented Ariba Buyer over a seven-month period, interfacing the procurement solution with nearly 20 of Dell’s legacy systems, including links to Oracle Financials for purchase order, cost center and accounting code data. The result — called Dell Internet Requisition Tool — provides automated processing of fully validated orders.

The system reduced the time to complete a requisition by 62% and the cost by 61%, in addition to reducing the number of errors.

On the product lifecycle management side, Dell uses Agile Anywhere from Agile Software Corp. as the technology backbone to improve communication with its internal divisions as well as its supplier.
network — nearly all of Dell’s top 50 suppliers are also Agile users.

“Picking up orders steadily and having them fulfilled instantly gives you a lot less demand uncertainty,” AMR’s O’Marah explains. “Demand uncertainty is what really creates the inventory. Dell orders provide a steady stream of material and capacity, which offer far greater visibility of demand. The clock speed of order fulfillment is so short that Dell and its suppliers are not dealing with a ton of uncertainty.”

And the speed at which the company adapts is what makes Dell’s supply chain so productive. Dell calls it **transition management**.

Thanks to its use of i2’s demand planning technology, Dell has visibility into supply and demand trends. The company posts its hub-level inventory on the web, enabling suppliers to check their inventory levels at the hubs, since materials suppliers aren’t necessarily the same set of companies as those at the hub.

Dell issues forecasts through its extranet — **Valuechain.Dell.com** — and suppliers commit back to Dell, based on those forecasts. Dell then works from that information, covering any deviations from what it asks for against what a supplier or a set of suppliers can promise, explains Eric Michlowitz, Dell’s director of value chain strategy.

When things are running smoothly any company’s supply chain looks efficient. It’s when exceptions occur — West Coast lockdowns, ships delayed by hurricanes, broken airplanes — that supply chain-focused organizations like Dell reap the benefits of their technology investment.

“I’m looking for a constant balance of demand and supply, but that’s utopia,” Hunter admits. “As soon as we issue a forecast, it’s wrong. So, what do you do? If demand is going up, and it’s going to outpace our supply, we first try to fix the problem with more supply, maybe by expediting. Other than processors — we buy only from [Intel Corp. — almost every component has two or more sources. If we can’t solve the demand/supply problem with supply, and demand is shooting up, eventually we are going to have a shortage.”

Dell strives to recognize those problems before they get out of hand.

“We sell what we have, and we don’t sell what we don’t have,” Hunter says. “Most people don’t get that. It sounds easy, but they don’t know how to execute that.”

In practical terms that may mean selling an 80-gig hard drive at the same price as a 60-gig hard drive if the smaller drive becomes a supply issue. Dell can offer a promotion on the Internet literally within a couple hours of realizing it has a demand/supply problem, Hunter points out.

Dell has become an expert at ensuring it has the right components at the right time, and it knows where to go when the usual sources dry up. **PartMiner**, for example, is a supplier of hard-to-find electronic components to Dell and its contract manufacturers. The company helps meet unplanned upside demand for components essential for production. In addition, Dell utilizes PartMiner’s **CAPS** database information to manage risk in the supply chain within its component engineering and procurement groups.

Dell’s reputation for excellent customer service extends to its reverse logistics operation as well. The company’s **Americas Service Delivery** division, for instance, uses **WorldChain Inc.’s Network Repair Logistics** solution to handle roughly $1 million a day in repair volume.

The solution provides **total visibility of inventory throughout the repair cycle**, including real-time and historical reporting on supplier and repair vendor performance. Within 30 days of the rollout the average repair cycle time dropped from 43 days to 24 days, and today the time is down to about 17 days.

On the field services side, Dell uses a supply chain event management solution from Viewlocity Inc. to monitor and manage the return of non-functioning products, coordinated with a third-party logistics provider.

Ultimately, all of Dell’s supply chain activities aim at improving visibility.

“The more we know about the capabilities of the supply chain and our suppliers, the better decisions we’re going to make for our customers,” Hunter observes.

Dave Blanchard contributed to this article.

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