

Teradyne was Visible Before Visible was Cool



High-end electronic test equipment vendor Teradyne began to redesign its supply chain, with lean, collaboration, and visibility as its key goals some seven years ago. The benefits keep rolling in.

DOUG BARNEY

For Teradyne, the supply chain is not quite life and death, but it's pretty darn close. That's because Teradyne faces an array of challenges: its products require thousands of sometimes hugely expensive components, demand fluctuates wildly, suppliers are from all over the world, and it relies greatly on outsourced manufacturing.

Sounds like a recipe for disaster? Not if you have deep visibility into both supply and

demand, a goal Teradyne has been working on for more than seven years.

In fact, Teradyne is such a visibility maven that five years ago it coined the term "glass pipeline." For Teradyne, being a visibility visionary wasn't just an academic exercise, it had real problems to solve. Customers for Teradyne's automatic test devices, which can cost up to \$3 million, often wait until the last minute to choose a final configuration, and there can be over a hundred

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**Kudos for
 Teradyne**

The Teradyne Supply Chain has been broadly recognized for its excellence. For 16 years running, VLSI Research has named Teradyne as a "10 Best Supplier" in the semiconductor equipment market, based on scoring by users worldwide.

setups for any give product. And that's if the company decides it will award Teradyne the contract in the first place. When the economy goes south, losses can mount fast.

"Without visibility, we [had] poor inventory distribution and we had parts that weren't at the right plant," explains Bob Kenney, Teradyne's supply chain manager for Automatic Test Equipment (ATE) operations.

All that led to a supply transformation that focused on being lean and establishing a broad view of visibility. Teradyne now has inbound, outbound, and demand visibility, and also knows what's happening within its core group of suppliers and manufacturers.

With such expensive products and with so much outsourcing, visibility is critical to economic survival and prosperity, as this kind of outsourcing can lead to a lack of visibility and increased lead times. "We need visibility down to those individual components, so we coined the term 'the glass pipeline.' It allows us to monitor the supply and demand to our chain," Kenney says.

Teradyne has one key visibility tech-

nology partner in the form of Kinaxis (formerly WebPlan) and its Rapid-Response software, which runs against Teradyne's Oracle ERP system and interacts with Teradyne suppliers' ERP software (see "Kinaxis RapidResponse Highlights." p 40). Besides offering visibility, the software provides alerts, supports exception handling, and provides what-if analysis.

A Wider Field of Vision

As Teradyne moved from doing most of its own manufacturing, it needed to keep close tabs on external partners to

maintain an aggregated view of supply and demand and to control the relationship with suppliers.

One answer was to tightly link the contract manufacturer plants with the Teradyne plants. These relationships set the stage for better planning and more meaningful interactions. "It certainly helps position you for an interesting conversation. You have knowledge, and that knowledge is a powerful thing," Kenney says.

Visibility is not possible to establish with a plenitude of partners, so Teradyne had to pick favorites, cutting out less important suppliers and forging close relationships with a small number of critical allies. "In order to collaborate, you have to understand one another's problems. You have to come collectively to a solution and that solution is going to be a strategy, a structure, and systems; that is, the processes. It can't be with 10 guys. It's going to be with those few, and it has to be narrowed and focused," Kenney cautions.

Teradyne has several levels of suppliers it must work with: itself, its Electronics Manufacturing Services (EMS)



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providers, and two levels of component suppliers. "We've created a process that allows us to see down to that first level of component suppliers. We've been able to aggregate data across many manufacturing sites," Kenney says, adding that Teradyne and its outsourcing partners have the visibility to see what's happening throughout the chain.

For Teradyne and its partners, visibility runs both ways. And the right partners have to be willing to share this sensitive information and support the integration of their information systems with Teradyne's. "We had to go through our fair share of building the relationships and gaining the trust that allowed us to do this," Kenney says. So who does Teradyne partner with? "Those that can give you a competitive advantage in terms of quality or cost or other factors," Kenney answers.

Because partnering is not a one-way street, the benefits (and risks) must be shared. Teradyne takes pains to show partners the economic value of partnering. "You've got to have co-prosperity with the supplier. We both have to win," he says. Collaboration and visibility let both sides achieve their goals and keep the bosses happy. "What do I get measured on? I get measured on gross margins and inventory trade offs. In order to manage the inventory, which we and our partners want to do, we need visibility."

Visible and Lean

Visibility is critical, but it is not the only principle that drives Teradyne's ongoing supply chain transformation. For the last decade, the company has been pushing lean, which ultimately isn't possible without visibility. For one thing, visibility means that Teradyne doesn't have to overstock as a buffer. "There's a visibility part, and a tool of it, but then there's also a variety of other lean initiatives to get the waste out of the chain. We have aggressively gone after leaning the supply chain through some pretty unique things," Kenney says.

With Kinaxis and visibility, Teradyne can look at thousands of individual components and see where they are held up. Getting stuck with inventory is never good, but expen-

sive inventory such as Teradyne carries is a real disaster.

Reduced Risk

Visibility means greater predictability, which reduces risk. RapidResponse, through its what-if capabilities, helps reduce risks even further. "Visibility is important so I can continuously run risk assessments in my supply chain. Today the job of the supply chain group is to be continuously running risk assessments against each node in that chain, continually running upside/downside scenarios, looking at liabilities, availability, and 'What is this thing costing me' and 'How do I move the nodes around in the supply chain to make sure that I am paying the right price?'" Kenney explains.

Just as Kenney pushes shared prosperity, companies must agree to sharing liability. "[By working together] we are trying to reduce the lead times, and reduce the liability associated with components, and enter into shared liability agreements," Kenney explains.

What if You Could What-if?

With Kinaxis, what-ifs are brought to a whole new level. In fact, they can be run on each piece of inventory based on a mirror of the Oracle ERP data.

Kinaxis RapidResponse Highlights

Alerts and Event Management

Based on regular monitoring, alerts can be sent to corporate supply chain execs and suppliers.

Can access multiple back-end systems and offer data viewing through a browser.

Scenarios can be built in cooperation with partners. Decisions can be tested before they are implemented.

Through scorecarding, key metrics can be tracked against actual results.

“All this is done quickly, far more quickly than can be done via ERP,” Kenney notes. These what-ifs cut costs by tightening inventories and rationalizing purchases.

Teradyne can also deal better with demand shifts by running scenarios, such as business doubling. What does that mean for materials investment, and what bottlenecks might that present? Teradyne can then run a variety of scenarios which translate into changes in how the whole supply chain is choreographed.

Tech Tools Have Limits

Teradyne, a high-tech company itself, has plenty of supply chain technology, but doesn't let software do all the work of employees. “A lot of tool providers

The last thing you want is someone to say ‘I've got it because the report said I did,’” Kenney says.

Instead, Teradyne staffers analyze the data from within the context of business goals. “We have created a series of metrics that test the health of the pipeline. Whether the pipeline is in alignment, whether you need to pull in and expedite a bunch of stuff, or you are in a de-expedite cancel position—it allows you to quickly size up the liability that is out there, and whether that liability is excess,” Kenney says.


Benefits of the Glass Pipeline

Teradyne's supply chain transformation, and the long years spent building visibility, is yielding bottom-line



delivery schedules because Teradyne knows where all its parts and products are.

And delivery lead times have been cut roughly in half. These shorter lead times ironically came from trying to shrink quote times. And both came from visibility. Visibility allows Teradyne to see lead times deep into the contractor level. And this came from wanting to know precisely where things stood to make better and faster quotes. And it worked on both ends. Quotes that used to take weeks are now done in days. “Customers' quotes are speeded up by an order of magnitude,” Kenney says.

The quest to be lean and visible never ends, and Teradyne has to look at the worldwide picture. The company brings depth of visibility to its partners around the world. “The biggest challenge for me going forward is [figuring out] how to you take this thing and go global,” Kenney concludes. 

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market dashboards, all the way up to the CEO down to the person in the shop. We've never provided a dashboard up at the CEO level; we think the action is down in the supply chain. We haven't spent a whole bunch of time making dashboards where you come in in the morning and everything pops up on your screen and it is all automated with red, yellow, green, and the fantasy land is there, and you just have to click on a couple things and get back in alignment,” Kenney says. “We want the accountability down to the people who are buying this stuff, and we don't want to automate very critical, expensive decisions.

results. “You could immediately see the total pipeline. It allowed us to drive a whole bunch of benefits, not to mention costs, down. You could now see the aggregate demand for a component even though it goes through an EMS provider. That is helpful in driving the cost down with component suppliers,” Kenney says. “On a percentage basis, we've been able to achieve in a good years double-digit percent cost down.” Kenney doesn't credit the visible chain with all of these results, but sees it as a catalyst for cost reductions.

Lead times have also shrunk. Customers are also getting more accurate