

## **Saving an Extended Enterprise: A CEO's Experience**

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Acme Alliance is a “job shop” aluminum die-casting company with a factory and headquarters located north of Chicago. We also have nearly identical facilities in Brazil, China, and Portugal that are able to make the same parts with the same molds on similar machines. This gives our firm a special insight into differences in total cost for products delivered to customers from different manufacturing sites across the world.

To save the company in 2001—after our primary market in the telecom industry suddenly collapsed when the dot.com bubble burst—we embraced lean thinking in all of our facilities. While about 70% of the companies in our industry were consolidating or filing for bankruptcy, we had remarkable success in reducing costs and lead times within our own walls, while improving quality and finding an expanded customer base.

By 2007 we felt we had done a good job internally, but realized that we still had much to do. We began to see that we could not make additional big leaps in performance unless our customers and our suppliers were willing to change or share their behavior as well. Together we needed to disseminate lean principles between all of the firms and facilities sharing our value streams.

In addition, we faced “cost reduction” campaigns from many customers who were actually only interested in price reductions (no matter what our costs might be) to match an asserted “China price.” As a commodity business (we have no intellectual property and use molds owned and supplied by our customers) we were particularly vulnerable to this pressure and needed to respond.

(We knew about the true China cost from our direct experience with a factory in China. We also knew that many of the claimed cost savings were illusory when the extra costs of managing lengthy value streams were added to lower factory gate prices. But we still had to deal with customer demands for price reductions or face losing business, at least until customers also discovered that the savings were illusory.)

At this point, I devoured the first edition of *Seeing the Whole* and shared its methods with my management team. We decided to try an experiment with three important value streams in which we would bring together the key supplier (aluminum ingots), the immediate customer (who put our cast part in a component system), the OEM customer (who put the component in a finished product), and the end customer who used the product to create value. The objective was to test a simple hypothesis: by jointly analyzing our shared value stream from raw material to customer we could reduce costs, improve responsiveness to changing customer desires, and improve quality in ways we never could while working alone. (Finally! Something to talk about other than price concessions.)

We proposed to the participants in each value stream that we set aside a week, take walks together, map the current state, and envision a future state in which everyone, including the end customer, would be better off. Given that businesses want to make money and customers want a better solution to their problems, and given that cutting costs while improving quality and responsiveness seems like an obvious way to achieve these objectives, why wouldn't companies want to participate?

When we approached the group of companies sharing the first value stream, they responded, "So you want us to send our people for a week to improve *your* operations?" "No," we replied, "we want you to send your people to work for a week on a value-stream team to improve *our shared* value stream." But they weren't interested. After all, Acme was the smallest firm involved in the value stream and there was no precedent of second-tier commodity suppliers making suggestions for improvement.

The players in the second value stream were more polite but no more interested. The OEM at the end of the stream was going to be busy during the week we proposed, working with consultants to close their Chicago printer manufacturing facility and move its production to a contract assembler in China to take advantage of the "China price."

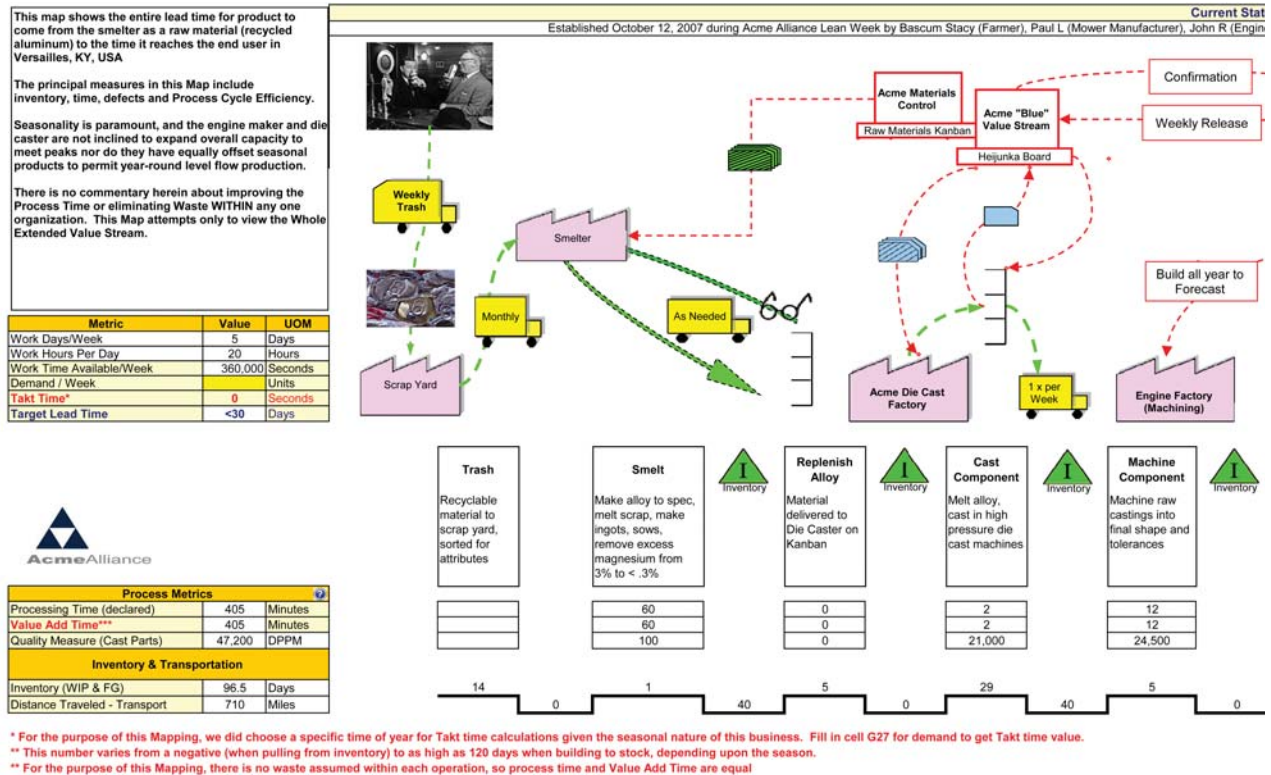
(Because 93% of the firm's sales were in North America, most of the printers made in China were shipped back to a distribution warehouse in Chicago. So at least a few jobs were saved, but not much else in the way of savings materialized. The firm's gross margin in 2007 was 48% of sales and was 48% again in 2010 after the move was completed. What happened to the 30% savings from the move to China? Sales increased by 10% during this period but operating income fell from 16.5 to 15.0 % of sales and inventories increased from 59 to 79% of operating income. Thus the move to China yielded lower margins and higher inventories. A strange way to improve a value stream.)

Fortunately, the participants in the third value stream agreed to give extended value-stream mapping a try. The key proponent was John Repenshek, a purchasing manager at the engine manufacturer buying Acme's castings. His job in selling the idea was made easier by the fact that his customer, a leading manufacturer of riding mowers and snow blowers, had been seriously engaged in applying lean principles for ten years and was also discovering the limits of lean thinking when only employed within its own walls. These firms were joined by an aluminum smelter supplying Acme's raw material for the part in question, and by a farm which used the riding mower to cut acres of grass on its property.

The team, as it met, consisted of:

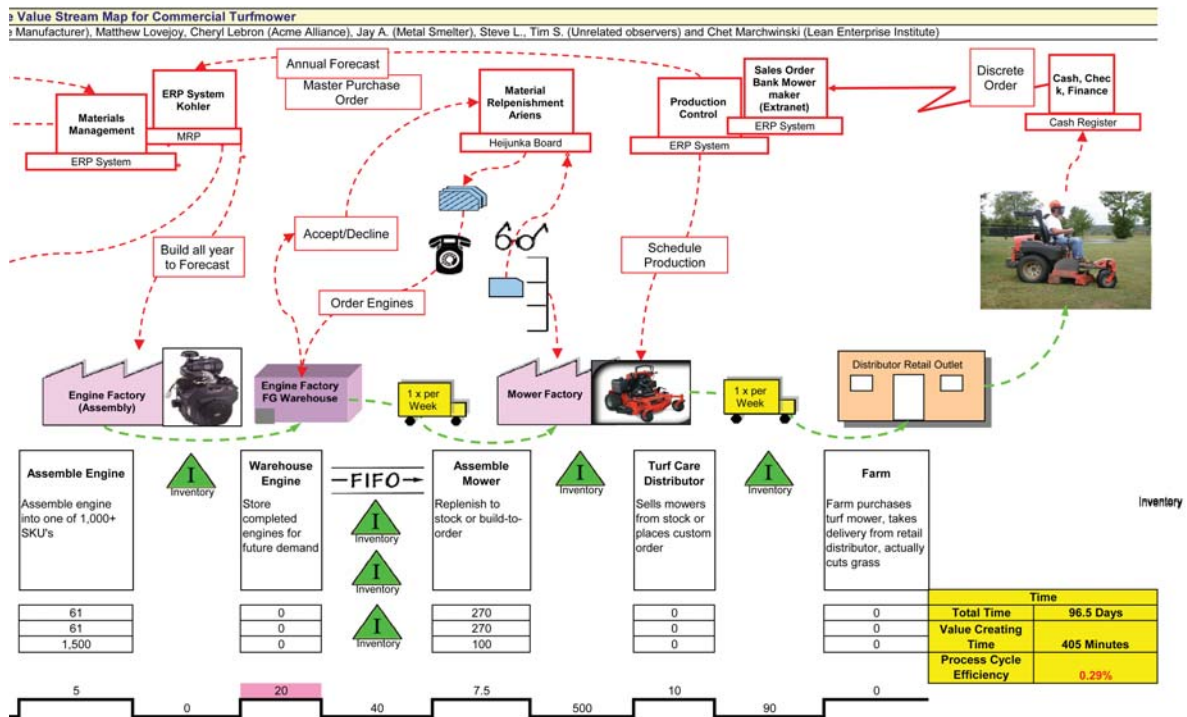
1. Trialco, a smelter that takes beer cans and other scrap and turns it into useful alloy for Acme.
2. Acme, a die caster that uses the alloy to make a casting for the engine maker.

### Extended Value-Stream Map for Acme Alliance — Current State

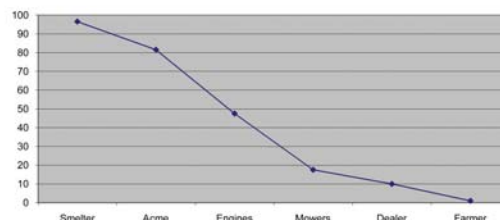


3. Kohler, the engine maker that machines Acme's casting and assembles it in an engine for a riding mower.
4. Ariens Co., the turf mower manufacturer that incorporates the engine in its finished product.
5. Versigh, a Kentucky farm that uses the mower 20 hours per week during the growing season to groom fields for horses.

The group mapped the current state for one Acme casting (*see below*). During this process they discovered enormous disconnects in the flow of information across the top of the map. This explained the mystery of why it took 96.5 days to do the 405 minutes of actual work to turn a beer can into a riding mower delivering value to a customer by reducing the length of grass blades from four inches to two. More than three months were required despite the small amount of value-creating time and the location of all of the manufacturing participants within a few miles of each other along the western shore of Lake Michigan.



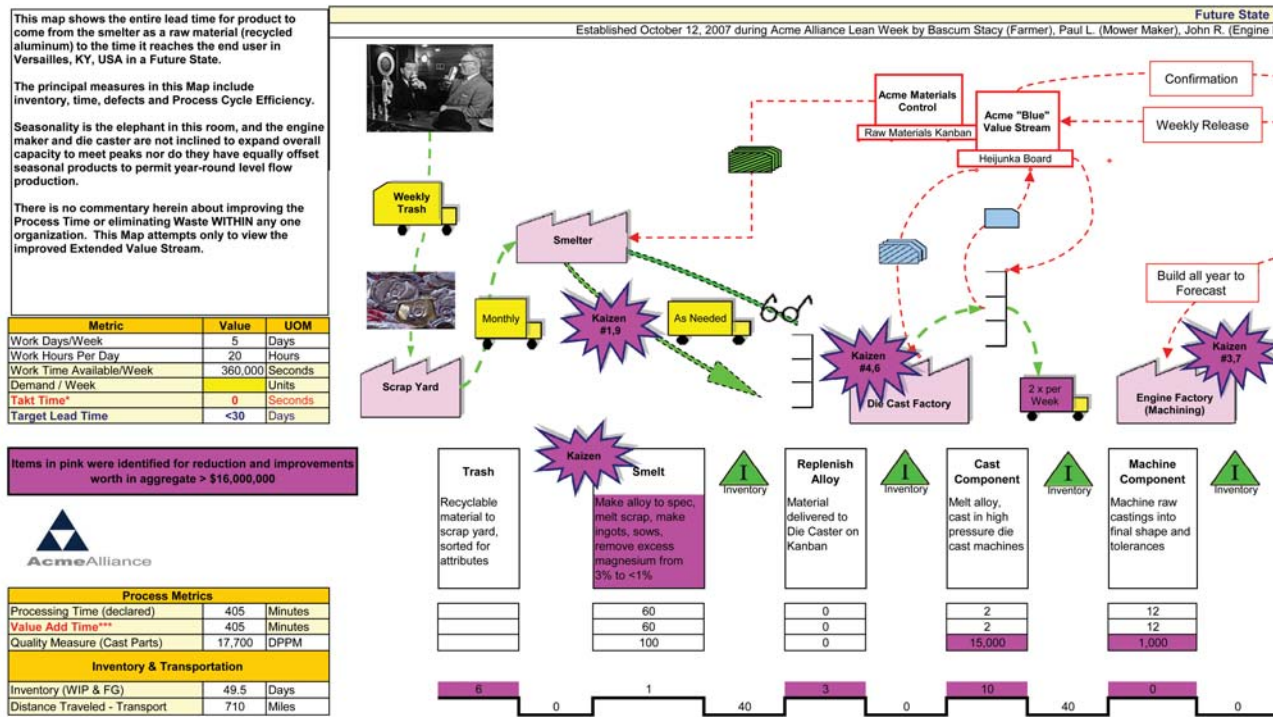
Demand Amplification



As we drew the current-state map together, we decided to look at the bigger business picture and put everything on the table: the specification of our part, the location of all the activities along the stream, the patterns of demand through the year, the acceptable wait time for the end customer after an order was placed. Was the part over- or under-specified in terms of its metallurgy in relation to actual customer need? Could some of the actions, like machining, be performed better further up or down the stream? Could steps be taken to smooth demand for the part through the year? Would the customer value the product more if it could be delivered more quickly to precise customer order?

In the end the team came up with 13 kaizen targets for improvement (see below). These included moving machining further up the stream next to casting to catch quality problems immediately, developing an engine for snow blowers to balance the annual peak and valley in demand for riding mowers, and replacing all of the MRP systems with pull loops.

### Extended Value-Stream Map for Acme Alliance — Kaizen Targets

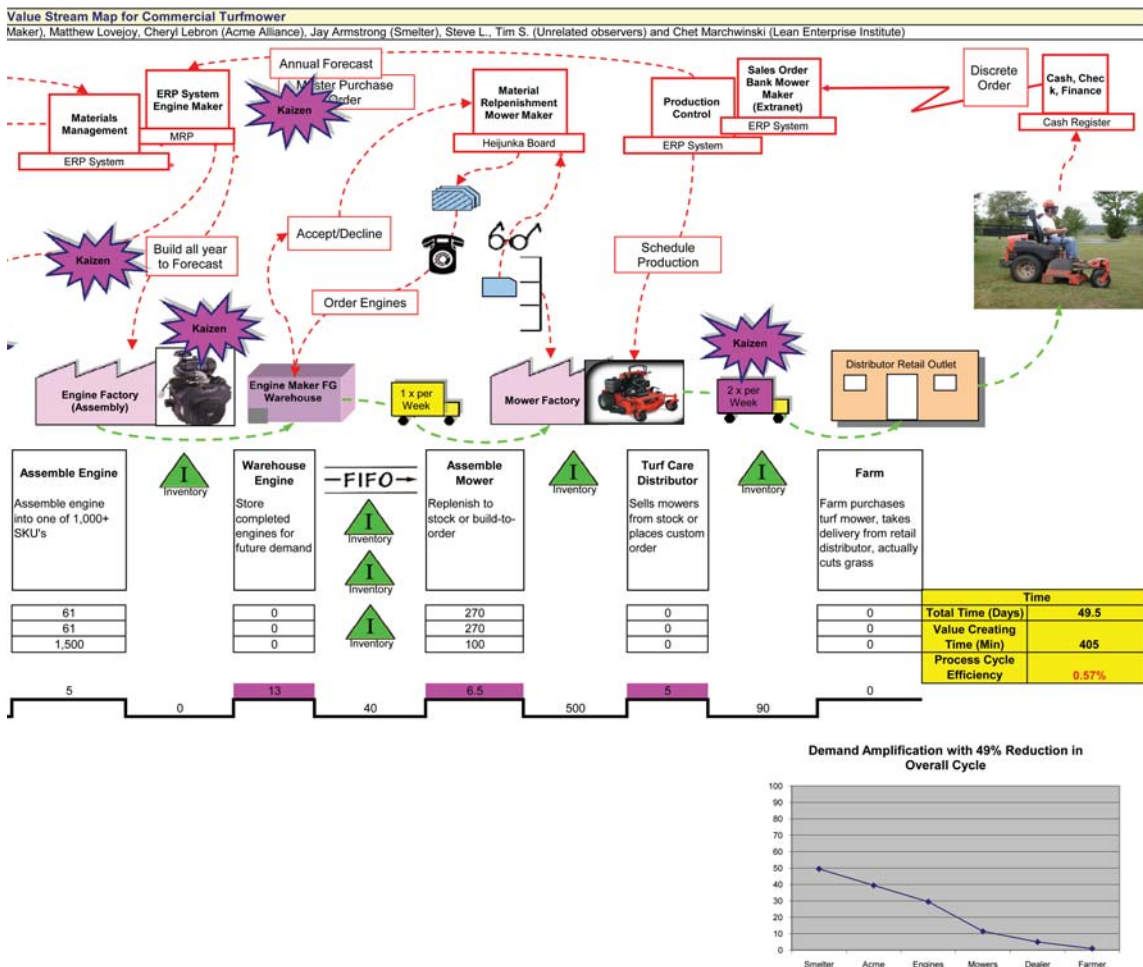


\* For the purpose of this Mapping, we did choose a specific time of year for Takt time calculations given the seasonal nature of this business. Fill in cell G27 for demand to get Takt time value.  
 \*\* This number varies from a negative (when pulling from inventory) to as high as 120 days when building to stock, depending upon the season.  
 \*\*\* For the purpose of this Mapping, there is no waste assumed within each operation, so process time and Value Add Time are equal

But this was in the early days of value-stream collaboration. It was the first time any of the five companies had ever looked at a shared value stream with upstream and downstream partners. The group therefore decided it was only practical to envision a first future state with three modest objectives:

1. Eliminate over processing of the alloy (as the manufacturer now understood the disconnect between the current specification and actual customer need.)
2. Increase frequencies of deliveries at several points along the stream.
3. Adjust the assumptions in all of the MRP systems in light of shop floor realities discovered during the value-stream walks. While not a pull system, this step would permit the MRPs to produce more accurate production instructions resulting in lower inventories at most points along the stream with less demand amplification.

The projected result was a halving of lead time and inventories, and a reduction of demand amplification by half.



The group went home to implement the agreed improvements, but without any formal management apparatus. Because each firm could implement its improvements on its own to its own benefit, the need for coordination was modest and no further meetings were scheduled. But something magic happened as a result of the mapping exercise: the firms had learned to talk to each other about the realities of their shared value stream rather than in abstractions about unit costs and the need for cost downs without any discussion of how to actually achieve them. And as time went by, the relationships became stronger and deeper.

In 2011, I was asked to bring the group back together at LEI's annual Lean Transformation Summit to reflect on our experience with extended value-stream analysis. With representatives from all five enterprises present on stage, we were able to report the following:

1. On the basis of the positive experience in collaborative value-stream analysis, Acme had decided it was sensible to make Trialco its sole supplier of aluminum ingots (replacing five other firms) and had implemented a pull system that smoothed orders to Trialco. (This never would have happened before, when Trialco's production and scheduling process was basically a black box from Acme's perspective.)
2. Trialco, after seeing the effect of set-up time reductions at Acme during the value-stream walks, had dramatically reduced its own set up times to change from one alloy to another. This meant it could cost-effectively supply Acme with smaller amounts more frequently, reducing Acme's alloy on hand from two weeks to two days.
3. Kohler and Ariens had increased the frequency of deliveries between their operations and to customers, and had done hard thinking about why their scheduling systems were so noisy.
4. Lead time from start to finish had been cut in half, inventories had been cut in half as well, and demand amplification had been dramatically reduced, as envisioned in the future-state map.
5. All of the firms had discovered that by applying the improvements for the Acme part to all of their parts, all of their suppliers, and all of their customers, they could achieve gains far beyond the savings on the one value stream mapped in 2007.

6. Discussion of generic cost downs and “China prices” had stopped as everyone realized that a better approach was to ask customers and suppliers about their shared value streams and ways to deal with competitive realities together. (Indeed, rather than moving business, Kohler had increased its orders for castings from Acme’s Chicago plant by a factor of 10.)

A final metaphor for the results of four years of extended value-stream thinking is that all five firms were willing to appear on a stage together to tell the world about their achievements—and problems—in learning to see the whole value stream together. This would never have happened before we discovered a new way of working together in 2007.

*You can view a video of this presentation under the downloads tab at [lean.org/stwvs](http://lean.org/stwvs)*