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Lean Methods for High-Variety, Low-Volume Industries



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SETPOINT®

Setpoint provides lean industrial automation equipment customized for specific manufacturing processes.

Lean Methods for High-Variety, Low-Volume Industries

People can easily find information on implementing lean thinking in low-variety, high-volume industries, and success stories abound. What if you are a high-variety, low-volume industry? Can you incorporate lean thinking in your business? Any company, high- or low-volume, can implement lean thinking by eliminating their wastes and making changes to their process by focusing on what adds value to their product or offering.

As customers demand lower prices and shorter lead times, more and more mass production organizations are accepting the challenge of lean transformation. The simplest approach to becoming lean is identifying and eliminating any unnecessary or repeated steps in a production process. This process is based on the Toyota Production System.

Toyota has had remarkable success in the manufacturing world due to their system. They have been able to consistently provide their customers with a high-quality product at competitive prices. Their system focuses on standardizing and continually improving their process to eliminate waste, which dramatically reduces costs. This works great for high-volume, repetitive processes, but it's not so simple for high-variety, low-volume organizations. These organizations must work hard to incorporate lean processes.

Overcoming High-Variety Obstacles

High-variety, low-volume manufacturing environments, for example, have a harder time developing value stream maps because each job they do is unique. Consequently, these types of companies are constantly starting from scratch with

new jobs and projects without the benefit of learning from the successes or failures of repeat jobs.

We have found seven main differences between a low-variety, high-volume lean manufacturing company and a high-variety, low-volume system.

	Low-Variety, High-Volume	High-Variety, Low-Volume
<i>1. Product variety</i>	Produces a product family with minor variations, if any.	Produces several different products with several more variations.
<i>2. Demand volumes</i>	Relies on high, consistent demand for few customers.	Has a broad customer base without stability.
<i>3. Product design and process engineering</i>	Varies very little in product design and has several standardizations.	Has multiple variations in products and often starts from scratch on projects.
<i>4. Availability of internal resources</i>	Brings in outside organizations or hires specific employees to train the lean transformation.	Doesn't usually have the internal resources to train employees.
<i>5. Flowline vs. jobshop scheduling</i>	Makes several different parts in one location.	Have individual setups and processes for each new part.
<i>6. Pull vs. push scheduling</i>	Relies on pull from the customer to make a part.	Has no stable demand, and can only rely on new orders once they have them in-house.
<i>7. Layout</i>	Has a similar bill of materials for each product family.	Has a different bill of materials for each product.

The good news is, you can take the same lean approach applied to low-variety, high-volume systems and apply it to a high-variety, low-volume system. Instead of focusing on the differences of each product and process, follow the lean steps through each department and track trends that you see through the processes.

You can adjust these trends to eliminate waste, such as overproduction, performance of non-standardized work, queue time, material handling time, inventory control, unnecessary motions and travel, defective parts, and unknown or unused employee skills. By tracking these steps, you might find that different departments are repeating steps that can be eliminated immediately.

Incorporating Lean Methods for Measurable Results

The first thing you must do when applying the Toyota Production System is assemble a team. This team should include the manager in charge of the process being improved, the employees who actually do the work within the process, and any customers or suppliers you think should be involved. Limit the size of the team to 15 people or less. Once the team is assembled, follow the four major steps to becoming lean:

1. Analyze the current situation
2. Develop a future state vision
3. Implement the proposed changes
4. Evaluate the new current situation

Keep in mind that this is a circular process, and each cycle should produce measurable results.

Analyze the Current Situation

Earlier we said that value stream maps are harder to develop for high-variety, low-volume systems. However, creating one is possible and extremely important in evaluating your current conditions. A value stream shows all the actions required to transform your product or information into a product the customer wants. Creating a value stream map allows all parties involved to visualize the process and identify wastes. To use the value stream map, you must define the customer and final product. With those definitions in mind, judge whether each action in the stream is “Value Added,” “Non-Value Added,” or “Non-Value Added

but Required.” Any actions labeled as non-value added can be removed immediately.

Create a macro value stream map initially, showing the big-picture view of the entire operation. This will help you identify the most obvious areas to begin improvement efforts. Next, map these targeted areas in greater detail to facilitate lean improvements. Create a list of objectives and include goals of reducing lead time, improving quality, and reducing costs. Make your objectives measurable and align them with overall corporate objectives. Once you’ve defined the current situation and set goals for improvement, you can generate ideas on how to make the current situation better.

Develop a Future State Vision

Now, your team should brainstorm improvement ideas for the current value stream. While brainstorming, remember that each improvement should accomplish one of these lean concepts:

- Eliminating Waste
- Arranging work centers to align with value streams to support customers in a one-piece flow
- Using cross-functional teams to avoid handoffs
- Identifying a manager who is responsible for the service from start to finish
- Leveling the number of transactions whenever possible
- Building in quality rather than inspecting for it
- Standardizing the tasks and clearly documenting work on standardized worksheets
- Eliminating redundant systems
- Including visual displays and controls to make work status easy to see and understand (minimizing tracking)

After the brainstorming session, evaluate each idea to determine if it will help achieve one or more of your stated objectives. When all of the ideas have been evaluated, lay out the new flow of tasks and calculate the new task times and wait times. Compare these to the existing process to quantify the expected savings.

Implement the Proposed Changes

Your team is ready now to make some changes. These changes may involve rearranging the physical layout of the work area to facilitate one-piece flow, creating standard work instructions, or revising corporate procedures. Even though the employees were involved in brainstorming the changes, they should be formally trained on the new procedures.

Evaluate the New Current Situation

After the changes are put into action, develop metrics to track progress toward the future state. Most of these future state metrics should be the same as those identified during the initial analysis of the current situation, but you may identify some new ones during the process that should be included. The current state metrics provide the baseline, and the future state metrics provide the targets. Post the future state metrics somewhere that everyone can see how the process is working at a glance.

Once the future state vision is fully implemented, it becomes the current state, and you should repeat the entire process. The goal is continuous improvement.

Most small businesses can't make this change to lean thinking alone. Make it a group effort and ask for help from employees, suppliers, and customers. Creating a partnership with every supplier you are ordering parts from may not be possible, so narrow your group down to a select few that you trust, and work closely and collaborate with to come up with ideas and find the most efficient process.

Conclusion

Sometimes businesses just can't make this process work in their current environment and they are forced to close their doors or find something new to be successful. Some companies may find that the best way to be profitable is to take one of the items that they know well and market that to more than one industry. The bottom line is that if you're not doing all your processes in the most efficient way, someone else will and will take away your business. Just remember, any high-variety, low-volume company with an effective system in place could realize savings from reducing scrap and rework, reducing production lead times, and effectively tracking orders.

THINK: Being lean in a high-variety, low-volume industry is not impossible.

FEEL: Lean works in a variety of ways, and it can work for you.

DO: Use the techniques to make your business better. Take action.

Setpoint is the leader in lean automation equipment from concept to functioning completion. Following the Toyota Production System, Setpoint has successfully created custom solutions for a broad variety of industries for more than 18 years.