

The Integration of Six Sigma and Lean

By Allen Pannell

Lean and Six Sigma (and variations by any other name) have become the two most popular methodologies for improving manufacturing productivity and quality. Service functions and industries are following somewhat close behind. We can thank actual bottom-line results and terrific marketing by consultants for the popularity of these programs. With all the success stories abounding, one would think all would be well, yet, what we are now finding is that there is not only confusion but competition among those philosophies that is unhealthy and worse, dangerous to successful implementation (bottom-line results).

At the Center for Executive Education at the University of Tennessee, we hear it all the time: “No, we don’t need Six Sigma, we have lean in place.” Or, vice versa. “We don’t need lean because we have trained our supervisors in Six Sigma.”

The truth is that both lean and Six Sigma are powerful tools that complement each other—not compete with one another. It’s not a question of one or the other. The use of each of these methodologies can be valuable but in different ways. The use of both these together is essential to a complete strategy for long-term performance improvement.

Through the years, each “new” management philosophy (Quality, CI, Reengineering, Lean, JIT, etc.) tends to define itself as the “umbrella” and to the degree the other methods are mentioned, they are sub-elements of the philosophy being promoted. This probably has more to do with consultants trying to market themselves than anything else.

Lean and Six Sigma could fall under Continuous or Process Improvement. Or, consider the term Total Operational Excellence as the umbrella and add many other elements (teamwork, strategic alliances, structure, supply chain, etc.) along with Lean and Six Sigma.

Key Measures

Is often comes down to the “Chicken or the Egg” question: “What do you do first, Lean or Six Sigma?” In theory, probably Lean. Lean focuses more on the overall delivery system, where Six Sigma focuses more on sub-processes. From a practical matter, both need to be implemented and most companies have already done something in one or both. In any scenario, a company should assess where they are and where the current pain is. Based on that assessment, an implementation plan can be developed applying the appropriate methods in the best order to achieve short-term results and create long-term change. The “philosophical/cultural” aspects of each discipline are 90% the same and should be initiated with any engagement at the appropriate time(s). The table below illustrates how each methodology addresses standard Key Performance Indicators (KPI);

Measure	Lean Impact	Six Sigma Impact
Sales Growth	Seeks to increase capacity to handle increased demand generated by cutting lead times	Seeks to increase product quality, thus increase demand
ROI	Reduces waste in the system. Lowers costs, lowers inventory (investment) and increases sales	Reduces waste in scrap, rework, warranty, customer retention, thus decreasing costs and increasing sales
Productivity	Seeks to eliminate non-value-added work and increase throughput	Reduces rework and increases yields
Customer Satisfaction	Through reduced lead times, reduced inventory costs and flexible transactions	Through improved product quality and reliability

Philosophy versus Tools

Six Sigma and Lean are both management philosophies and a set of tools. When comparing, contrasting and integrating, we must look at philosophy and tools separately. We find a high degree (maybe 90%) of overlap in the philosophies and less of an overlap (maybe 25%) in the tools. However, the differences in the tools are minimized because they are all about improving processes and all based in analytical methods and variation. The list below outlines philosophy similarities.

Both Lean and Six Sigma

1. are management philosophies associated with improving the performance of a business
2. require top management commitment and involvement
3. utilize and respect the talents of front-line workers
4. utilize analytical tools and stress the use of data
5. stress empowerment and involvement
6. reduce costs
7. yield short-term results, but are long-term cultural change initiatives
8. focus on improving processes and systems
9. require a focus and closeness to the customer
10. require close relationships with suppliers

Where they differ (slightly):

1. Six Sigma achieves productivity improvements as a result of quality improvements, Lean more directly attacks productivity through process design and the elimination on wasted activities and tasks
2. Both focus on process, but Lean seeks to reduce waste in the process, Six Sigma seeks to reduce variation in process parameters that affect Quality characteristics of the product

In defining Six Sigma and Lean tools, “process” is key. With Six Sigma, the tools focus on using statistical analysis to help reduce variation specifically with product characteristics and the process parameters that impact those characteristics. Lean is a more “macro” approach to dealing with improving lead times, reducing inventory and eliminating waste. Lean concepts like Takt time require an understanding of variation. Other Lean tools target how to reduce and handle demand variation. Both sets of tools are vital for enterprise transformation.

Creating a distinction – For the purpose of making implementation and communication decisions, the table below is provided to illustrate slight differences between the two methodologies. The implied differences below are for contrast and are not as extreme or definitive as implied.

Word Association

Lean

Improve Time & Inventory
Kaikaku
Deterministic
Macro
Reduce times
Focus on System
Tools for Engineers/Managers
Productivity & Quality
Process Design
On-time
Reduce waste
Small batches (1 piece flow)

Six Sigma

Improve Product Quality
Kaizen
Stochastic
Micro
Reduce Variation
Focus on Process
Tools for everyone
Quality & Productivity
Product Design
In-Spec
Reduce variation
Large batches

Implementation Issues

What should be avoided is the perception that Lean and Six Sigma are different and contradictory, or just the latest “thing.” Then you will have a problem. One easy solution is to call your efforts something unique that reflects the goals of the company such as “Mission World Class,” or “Continuous Improvement Program”. The important thing is for the employees to understand that the company isn’t just jumping on to the latest bandwagon by adding something new. In fact, all your improvement efforts are being added to the box of tools that can be used for on-going, continuous improvement.

What about Black Belts? A question was recently raised by a manager who implied that the people who are capable of being Black Belts are not capable of being Lean Experts and vice versa. We couldn’t disagree more. By teaching different tools to different people you create various problems. First, no one facilitator has the full slate of tools to approach a problem. Second, people tend to search for problems that fit the tools. Third, competition between the tools generally is not constructive and hinders the progress of both methodologies. The vast majority of ‘Black Belts’ and ‘Lean Experts’ we’ve known are capable of learning both sets of tools. Some people may not be interested in both or in the more advanced tools in one discipline, but the majority can learn and implement the most used/useful tools. For example, Lean tools grouped under the heading of ‘streamlining’ have been taught in statistics-based improvement courses for 20 years. Also, any ‘Lean Expert’ who does not understand variation is not an expert.

By the way, we define Black Belts as a present or future leader of the organization who receives special training in Process Improvement, teamwork, change and project management and whose time is allocated to assisting the organization to improve performance.

To be successful, management has to be the champion. Leadership has to build a strategy and from that, a business case (metrics, timeline,) and put into operational managers in their annual review. It’s absolutely necessary to have benchmarks to maintain internal support and be able to sustain the progress long term.

Lastly, if management just gives lean or Six Sigma lip service? Make them do a project. That will make it go from involvement to commitment. You just do it and then see the results.

For those of us who have witnessed Lean and Six Sigma in action, we know it works. For those of us who have been fortunate enough to see a company embrace all the available tools, we know it really works.

The challenge is not to look for a quick answer, a quick fit. Changing attitudes, thinking differently and being willing to embrace the future takes leadership, time and effort. It will pay off for those companies that want to be in business 100 years from now.