Good enough is not good enough anymore

How Project Managers benefit from Lean and Six Sigma
The Empire State Building in New York City, with its 103 stories, 73 elevators, 2,500,000 feet of electrical cable and 6,500 windows, was built in 410 days. The framework rose at a rate of 4 ½ stories per week. That is nearly a floor a day. And perhaps most impressive is the fact that it came in under budget and ahead of schedule. 410 days is one year, 45 days! It seems smaller scale projects today take longer than 410 days and we currently have the technology available to do things faster than was possible 75 years ago. So, how did the project managers for the Empire State Building do it? Obviously, they had to have been the best project managers of the day. They not only applied the tenets of sound project management, but they also used something beyond that. They used Quality Management concepts found in Lean and Six Sigma.

Lean has it origins in the teaching and writings of TQM and JIT, which espouse the idea of ‘delighting the customer through a continuous stream of value-adding activities.’ The value stream defines the Lean Enterprise. The objectives of the Lean Enterprise are to identify and specify the value to the customer/consumer in all its products and services; to analyze and focus the value stream so that it does everything from product development and production to sales and service so activities that do not create value are removed; and to keep continuous flow to fulfill customer pull. From the time a customer need is recognized until it is satisfied, the process and all its elements must add value for the ‘value stream’ to be meaningful. The basic components of this Lean system are waste elimination, continuous flow, and customer pull.

Six Sigma literally refers to reduction of errors to six standard deviations from the mean value of a process output or task opportunities, or about 1 error in 300,000 opportunities. Motorola coined the phrase ‘Six Sigma’ because a process needs a minimum of six sigma’s between the center of variability and the customer requirements to ensure no more than four defects per million opportunities. To put that into perspective, if you were fortunate enough to live to age 75, you would have 1/3 of one meal that would be defective. That would be like getting cooked carrots that were served cold once in your whole lifetime; everything else would be fine (assuming one likes cooked carrots). Simply put, Six Sigma is a philosophy of relentless efforts to continuously reduce process and product variation.

According to the Six Sigma Academy, professionals with Black Belt certification save companies approximately $230,000 per project and can complete four to six projects per year. General Electric has estimated benefits on the order of $10 billion during its first five years of Six Sigma implementation.
PMBOK®, control charts, cause-effect diagrams, and design of experiments offer some help, but they are only a few of the tools available to minimize variation. Six Sigma offers histograms, capability studies, chi-square tests, T-tests, F-tests, analysis of variance (ANOVA), multi-vari charts, and scatter diagrams, just to mention a few. The PMBOK® does not list value stream maps, 5-S, standard work, error proofing, total productive maintenance, overall equipment effectiveness, TRIZ, kaizen, or set-up reductions. A project manager needs all of these tools and techniques. That’s where Lean Six Sigma comes in.

Lean Six Sigma is just as the name would suggest: the marriage of Lean principles and Six Sigma methodologies. The first principle of Lean Six Sigma is: delight your customers with speed and quality. The second principle says: improve process flow and speed. Lean Six Sigma emphasizes that speed is directly tied to excellence.

Are these skills really necessary? Well consider this: Forrester Research found 71 percent of respondents rated their offshore providers as achieving better quality and timeliness than their U.S. providers. That may just be a perception, but project managers need to understand that ‘good enough’ is not good enough anymore. In fact, it has not been good enough for the past decade as evidenced by massive outsourcing efforts, our shrinking manufacturing base and our service industry moving off shore. We need to change the trend of ‘outsourcing’ to ‘OURsourcing’, using the tools and techniques of Lean and Six Sigma to regain our competitive edge.

Improvements need to be made in a triad consisting of quality, delivery and cost. Project managers must address defect rates for quality improvement, and remove inefficiencies to get the job done faster. By adopting a philosophy of Lean and Six Sigma, an enterprise can drastically reduce defects, deliver projects as much as 90% faster, and typically do it all for 25% less cost.

Suppose it was the job of a project manager to plan for building a bridge. The bridge needed to be completed in two years for $3 million or less. If the bridge took 22 months to complete, it passed inspection, and the final cost came in under budget, the project would be deemed successful, right? Wrong. It is not success-ful if a competitor could have completed the project more efficiently, with fewer defects, and/or for less money – even though this project beat all of the projections. Let’s break it down:

- 22 months to complete the bridge versus the 24 month requirement. Through waste removal, perhaps the bridge could have been finished in half the time, or in a tenth of the time. Impossible? Consider this. NASCAR pit crews can top off the gas, wash the windshield and change all four tires faster than most can remove one hubcap. Going back to the Empire State Building: it was erected in just 410 days so, to suggest that a relatively simple bridge requires 710 days (2 years) implies a great deal
Benefiting from Lean & Six Sigma

of inefficiency was planned into building this bridge. It should be noted that the Empire State Building project had such a good just-in-time inventory plan that many of the steel beams arrived from the forging plants to the building site too hot to touch with bare hands. That is ‘lean thinking’ and Lean and Six Sigma add the necessary tools and techniques to the project managers’ toolboxes so that they can ask questions that are beyond what many project managers would ask, such as:

- Was a **value stream map** developed prior to the bridge project that showed information and material flow inefficiencies, areas of overproduction, inventory stockpiling, excessive motion and extra processing? Lean techniques use tools such as the value stream map that help project managers to see waste that otherwise is not obvious.

- Was a **spaghetti diagram** drawn that showed the inefficiencies in the flow of iron and steel deliveries and cement truck routings? Were materials delivered just-in-time in a pull system fashion, or was costly inventory pushed onto the job site, sitting in skids for months? A spaghetti diagram is one more example of a Lean Six Sigma tool that helps to show these inefficiencies.

- Were time studies performed that would minimize the change over processing (known as **SMED** studies, e.g., switching from a backhoe to a front-end loader to a plow or a crane from one base position to another) to minimize the time waiting?

Not only could the project have been finished more quickly, but the cost of building the bridge could have also been drastically cut. Consider the costs associated with evaluating, inspecting, time spent deciding what to do with discrepant material, reworking, re-engineering, time wasted with trucks getting into position, and machinery congestion. Then add the time associated with waiting, searching, sorting, and stacking. Waste is evident when inventory is delivered too early or too late, or wherever there is excessive motion. Lean and Six Sigma have the tools to minimize these wasteful activities.

In these wars on waste, variation and defects, the project manager needs to be able to answer tough questions – answers that the tools of Lean and Six Sigma can provide. By adding Lean and Six Sigma to a project manager’s toolbox, he or she is better equipped to ask the right questions and get the right answers. Questions like: how did you provide assurance that the bridge will be built right the first time; what was your plan for preventing defects; was the process made mistake-proof using poka yoke designing; were standard operating procedures established? If so, are the operating procedures consistently being followed by

Professionals who master Six Sigma disciplines can become recognized leaders, guiding key projects that result in breakthrough improvements, for improved bottom-line results.
Enterprises rely on highly trained performance-improvement leaders to help them align Six Sigma and Lean with an organization's goals to create positive change.

the operatives? How do you know? Were the processes for building the bridge in statistical control? How do you know? Was there a measurement system evaluation plan that assured that data collected was discriminate to detect variation, and that test results were repeatable and reproducible? Could the cement have been made stronger and more flexible? How do you know? Lean and Six Sigma are about asking questions and using the tools and techniques to get answers to those questions.

The project managers of today need Lean and Six Sigma for balance. If asked, “Is the glass half full or half empty, the project manager might say the glass is half full; it is also half empty, and the juice most likely is at the halfway point. The Lean Six Sigma expert would probably say that the glass is twice as big as it needs to be. And, the Six Sigma Black Belt would say, “There are 17 parts-per-million impurities in the liquid.” But the project manager that is enlightened with Lean and Six Sigma would say, “Quit wasting time with silly questions. It isn’t a matter of the fullness of the glass. It is a matter of delivering a full glass of pure juice at the cheapest cost possible — quickly before the competition beats us to the punch.” Lean and Six Sigma have been successful in back offices, service industries, transaction process and in enterprises that make tangible products. Lean Six Sigma has saved individual companies billions of dollars. If you’re not currently using Lean and Six Sigma, it’s time to get onboard – because “good enough” is no longer good enough.

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