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## Six Sigma Lessons from Capsugel

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Cross-regional participation, careful selection of Black Belt candidates and projects and minimizing workflow disruption are critical to success.

Continuous improvement initiatives can take drug manufacturing quality to the five sigma range, but moving up to the six sigma realm requires time and resources. The investment required may challenge any mid-sized enterprise's cost-to-benefit ratio.

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The drug encapsulation specialist Capsugel, an operating division of Pfizer, instituted a global Six Sigma program last year that struck a balance between implementation costs and potential savings and opportunities. While the company already had a continuous improvement program in place for 20 years, its management felt the need to go farther. Critical to the project's success was minimizing the disruption of day-to-day workflow. This article will outline Capsugel's approach and analyze the results seen thus far.

Any Six Sigma project on a global scale requires top-down management support and bottom-up grassroots involvement. A training program is needed that involves enough people so that the project can reach a critical mass.

Often companies create a whole new organizational structure for their Six Sigma work. They reassign employees full-time to the Six Sigma initiative, hiring people to cover the rest of their day-to-day workload. This approach may speed up the process, but makes it far more expensive than integrating Six Sigma into everyone's daily workflow.

"We didn't want to take on additional overhead in order to train a large group of Black Belts," explains Blair Chalmers, Capsugel's global Six Sigma manager, "so we trained smaller groups of engineers and assigned them to more complex projects involving interdependent variables, since these projects would require more robust Six Sigma methodologies."

The company instituted week-long training sessions for key engineers involved in the program; after each session, these engineers would work on projects for a month, and then return for another week-long training session, an approach recommended by many Six Sigma experts.

Thus, Capsugel was able to train and build its Black Belt workforce gradually, and have them gain experience by working on solving major, chronic problems. Once the first group of six engineers completed training certification and project work, they moved on to other projects, and the next group of seven engineers went through the same initial training process and project work.

This approach paid off quickly, Chalmers says. "We were able to find solutions to problems that had plagued us for years without adding people or creating a new organization," he explains. Engineers were able to keep up with the workload, and the company could reap the continuous improvement benefits immediately.

### **Summit and Steering Committee Focus Efforts**

As part of its continuous improvement efforts, the company already had existing structures and processes in place, including some Six Sigma processes. An example was its "Quality Summit," an annual meeting where regional vice presidents (general managers), sales managers, plant managers and QA managers from each region or affiliate were invited, in addition to leaders from R&D and global operations.

The summit's goal is to review past performance and address issues driving customer satisfaction, but it now includes a specific agenda item to discuss the Six Sigma initiative and set the direction for future projects, based on business and quality needs.

Capsugel also established a Six Sigma steering committee, which includes representatives from each of its global manufacturing facilities, under the leadership of a global Six Sigma manager. Members of the steering committee received four days of Six Sigma training before its first meeting.

"We were coming together as a global organization to discuss continuous quality improvements anyway. Now, we've added Six Sigma methodologies for analyzing and improving processes, but with respect to the circumstances specific to each facility," says Chalmers.

The committee relies on methodologies such as Pareto Analysis and Voice of the Customer (VOC) data to determine, at a macro level, which projects each team will work on. Then, using the same Six Sigma methodologies, each team further narrows the scope of work into a manageable project and starts the DMAIC (Define, Measure, Analyze, Improve, Control) process.

#### Nurturing a Global Six Sigma Culture

Cultural change is usually the most difficult obstacle to overcome whenever any organization implements programs such as Six Sigma. Six Sigma manager Blair Chalmers believes that starting the implementation with a Black Belt from each region, guided by a global steering committee with top management support, ensured global top-down and bottom-up buy-in.



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The company's reporting structure also helped to encourage more rapid adoption. Black Belts report directly to their local site leader with "dotted line" responsibility to the global Six Sigma manager, ensuring that local facilities reap the benefits of Six Sigma first, Chalmers says. This pays dividends by creating more enthusiasm for the program at the local level, which benefits the company as a whole. The teams report that they are experiencing improvements every month.

"As a Black Belt, it becomes easier to change the culture and the mindset in your own region when you are backed by global support," says European operations engineer Björn Mertens, part of the second wave of Six Sigma Black Belts. That same sentiment is echoed by other initial Black Belts who commented that the continuous improvement mindset is spreading exponentially as additional waves of Black and Green Belts are trained and assigned to projects.

Several team members agree that Capsugel's innovative approach to Six Sigma has led to closer collaboration between regions. The result has been faster implementation and a better outcome from continuous improvement projects. For example, one process issue had plagued a facility in one region for years. Although engineers had applied statistical analysis and developed numerous theories as to why it existed, they could never pinpoint the problem. However, collaboration between newly trained Black Belts using Six Sigma tools uncovered the root cause in a few months. Process improvements were implemented and the nagging issue was finally resolved.

#### Tools Plus Training

Cross-regional collaboration was instrumental to the success of Capsugel's Six Sigma adoption. According to Cheryl Hild and Mary Leitnaker, professors at the University of Tennessee's (Knoxville) Center of Executive Education and Capsugel's Six Sigma advisors and trainers, "Capsugel went beyond the 'toolkit approach' to Six Sigma. They focused on developing the technical depth of individuals rather than simply training a large number in a set of common tools." They explain that Capsugel spent a lot of up-front time on project selection and appointing the appropriate engineers to the project.

Instead of looking for quick simple projects, or "low hanging fruit" to teach the Six Sigma tools, Hild says Capsugel focused on developing the individuals by selecting complex projects that were global in nature but also had local implications, making Black Belt candidate selection a critical success factor.

Selection was based on three criteria:

1. Leadership and the ability to mentor and work well with others;
2. Strong technical capabilities in the team member's area of expertise;
3. Respect for the team member's knowledge and expertise among peers.

Team dedication was essential to the success of Capsugel's approach. Engineering knowledge and Six Sigma methodologies were leveraged by a key group of strategically chosen individuals, Hild and Leitnaker agree. But having a global director for the initiative serve as a liaison between the team and senior management was also important in achieving success.

"Capsugel focused on merging engineering knowledge and theory with the Six Sigma toolbox, resulting in deeper knowledge transfer," says Hild. She explains that this level of knowledge transfer is what makes for a successful long term, sustainable Six Sigma program. She adds that Capsugel's approach offered a level of depth that brought success to each project, which in turn accelerated the spread of a Six Sigma culture.

Capsugel had already been following a continuous quality program. One might ask what the big difference is between Six Sigma and the other quality initiatives that Capsugel had espoused over the years. "The key to Six Sigma is to address the 'root cause' so there is low probability that the same problem will occur again," says Yasuharu Tsuboi, Capsugel production manager and Black Belt, Japan. Chalmers adds that in addition to addressing root cause, having a consistent framework, such as the DMAIC cycle, makes getting to the root cause faster and more effective.

Several facilities noted that Six Sigma has greatly improved decision making. Although decisions in the past were driven by data, Six Sigma methodologies provide data at a much deeper level. Each step in the DMAIC cycle brings a unique set of tools that influence the outcome of the project.

One such tool, design of experiments (DOE), was integral to process improvements at Capsugel's Colmar, France facility, which is using DOE as a more efficient means of analyzing the impact of multiple factors on a given process. Statistical analysis alone would not have uncovered the interactions between variables. "The use of DOE to set up our processes is much more powerful and insightful," says Julien Paul, Capsugel printing/finishing manager and one of the initial Black Belts.

Depth of understanding also separates Six Sigma from continuous improvement. "The Black Belt training gave me a new set of tools that I can use to solve problems at a deeper level," says Timothy Godwin, process engineer. "It has changed the way I think as I attack a problem. Now, I find it easier to drill down to a root cause rather than only looking at the symptoms."

#### **Adopt Globally... Adapt Locally**

The company was able to implement Six Sigma methodologies on a global scale while adapting to the specific requirements of each region. By adopting Six Sigma methodologies globally, Capsugel could identify synergies among local processes and gain more mileage from process improvements on a global scale. At the same time, the global initiative uncovered process similarities between the regions that could be standardized globally.

"We took this approach so that we could build on our existing quality system and process controls while adapting them for Six Sigma based on the needs of each facility and the Voice of Customer (VOC) data from each region. So we were not only able to implement Six Sigma methods into our existing quality system, but also adapt Six Sigma methodologies at the local level," says Global Six Sigma Manager Chalmers.

For example, Capsugel's West Asia region adapted its existing three-tier quality system to accommodate Six Sigma and optimize resource allocation based on the complexity of the quality issue. Quality system and process control resources handle routine quality maintenance, Level 1, and short term Level 2 quality improvements. Projects requiring longer term analysis involve a Six Sigma team that follows the DMAIC process.



The West Asia region accelerated process improvement implementation by training a layer of Green Belts. The Green Belt layer used Six Sigma methodologies to more accurately collect data and conduct trials so that the team could more quickly focus on the analysis and improvement steps of the DMAIC process.

"We had existing improvement theories that everyone believed. However, once we applied Six Sigma methodology, we were surprised [to discover] that some of the theories were not correct," says Benny Mansjoer, Black Belt, Capsugel West Asia. He adds that a key lesson learned from following Six Sigma is the importance of having accurate supporting data in the decision-making process.

#### **Good for Business**

Chalmers says that Capsugel's modest Six Sigma investment produced an excellent return with a payback in less than one year. The bulk of the investment was in the training and materials; by using existing staff the company didn't incur any overhead costs, except for the cost of hiring the global Six Sigma manager.

"Early results include: improvements on our capsule imprinting machines, which nearly eliminated missing capsules during loading (88% reduction), a 50% reduction in cycle time for gelatin feed tanks, a 50% reduction in waste and overall productivity improvements," says Chalmers. While detailed cost and savings amounts were not made available, the company says it returned approximately three to five times its initial training investment.

"It was definitely a worthwhile investment," says Fred Cooley, vice president of global operations. "We're very pleased with the results and even more encouraged by the continued progress as new teams are trained," Cooley adds.

Chalmers and the initial Black Belts say the Six Sigma initiative surpassed their objectives of business and process improvements. What they discovered was a new way of thinking that provides deeper insights into their processes. As a result, the team says they have greater confidence in their ability to produce sustainable improvements.

In addition to cost savings and company-wide productivity improvements, the company anticipates that the Six Sigma initiative will pay-off in future product development endeavors. Cooley alluded

to several new product innovations that will be launched in the near future thanks, in part, to the Six Sigma program. "Six Sigma has helped us take process control to a whole new level by providing the tools we need to bring products to market faster," says Cooley — a win-win for the company and its clients.

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**About the Author**

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