

Six Sigma and Innovation

by Dr. Mark Kiemele, President, Air Academy Associates

In the performance improvement arena and business in general, the most commonly used buzzword today is undoubtedly “innovation.” In fact, “innovate or die” is sometimes referred to as the mandate of the new millennium. Since Six Sigma (also meaning Lean Six Sigma and Design for Six Sigma for the purpose of this writing) has been the key driver for performance improvement for many companies, including more than 50% of the Fortune 500 companies, a natural question to ask is: what is the relationship between Six Sigma and innovation?

Not to be associated with those who believe that Six Sigma stifles innovation, we at Air Academy have witnessed the rebirth of companies that have depended on the synergy of Six Sigma and innovation to bring them into their new lives and sustain them. We are not the only company that has witnessed this. Seven CEOs who met in a closed session at the recent WCBF Global Six Sigma Summit also agreed that they couldn’t disagree more with the statement that Six Sigma and innovation are at odds with each other. One CEO related that his company used tactical innovation within the DMAIC methodology to generate the savings needed to fund the strategic or disruptive innovation that was launched at the corporate level. What a novel idea that is!

One of the structured innovation techniques that can be used for tactical innovation within the DMAIC or DMADV or IDOV cycles is the TRIZ methodology. We have seen TRIZ used tactically in every phase of DMAIC and in every phase of DFSS, whether it is IDOV or DMADV. The following is a sampling of how it has been used:

- TRIZ has been used to resolve inverse correlation effects in the interaction matrices (or roofs) of the Houses of Quality in QFD.
- TRIZ has been used to develop surrogate measurement systems in the Measure phase of DMAIC.
- TRIZ has been used in the Improve phase of DMAIC to resolve both technical and physical contradictions.
- TRIZ has been used to develop alternative design concepts in the conceptual design phase of IDOV. These design concepts are then used in Pugh Concept Selection, and TRIZ can be used to create new designs within the iterative Pugh methodology.
- TRIZ can be used in the Optimize phase of IDOV, when the performance of B is degraded while the performance of A is improved, i.e., to resolve these technical contradictions.
- TRIZ can be used to resolve contradictions in a transfer function when the input parameters conflict with one another.
- TRIZ can also be used in the Optimize phase to introduce new elements to the optimization process, thereby creating a more open optimization space vis-a-vis a closed optimization space.
- TRIZ is not the only structured innovation technique available. There are many others.

Part of the problem in the Six Sigma versus innovation controversy is the lack of specific definitions for both of these terms. Innovation is nebulous because it was raised that way: the eureka moments, the right-brained child, etc. What is innovative to one person might be “I could have thought of that” to another person. One necessary aspect of the definition of innovation from our point of view is that it must result in a significant improvement for customers or some segment of society. When an engineer uses robust design techniques to take a new product from 600,000 dpm down to less than 2 dpm, is that innovation? In our minds, it certainly is as long as it benefits some segment of society. With less than 2 dpm, the product should be able to go to market and provide value to customers, provided innovative techniques were used to correctly translate and validate the voice of the customer.

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One thing is certain, and that is the repeatable, reliable, and predictable application of innovation is going to require putting some structure around it. Without the systematic application of innovation, companies' futures are going to remain in the hands of the Poisson distribution, namely random epiphanies coming from the creative few. In order for an organization or company to be competitively excellent, innovation will be required of all, whether they be right-brained, left-brained, or all-brained, and the only way to make that happen is to put structure into the innovation process. And of course, structure connotes Six Sigma. There's that cycle again—one leading to or needing the other.

The definition of Six Sigma is almost as varied as that of innovation. The "dumbing down" of Six Sigma is real, and Six Sigma does not mean the same thing today for many companies as it was originally intended. According to Mikel Harry, a legitimate founder of Six Sigma, Six Sigma was designed and introduced to generate breakthrough improvement. And that is going to require innovation. Attaining a 10% reduction in cycle time, for example, is not what Six Sigma is about. Six Sigma is about doing things significantly different in order to achieve breakthrough performance levels. And that will require innovation. If Six Sigma did not mean innovation, Motorola would not be around today and neither would Xerox, amongst many others. Read the accounts of Bob Galvin and Anne Mulcahy, and it will become clearer.

A final note is in order for those who may think Six Sigma and innovation are contradictory terms. Some may have generated their own definition of Six Sigma and maybe don't really know what Six Sigma is all about. Or, perhaps, Six Sigma may have descended upon their domain and inflicted some accountability pain on their previous do-what-you-want, whenever-you-want, don't-bother-me, pain-free state of existence. Clearly, a balance is needed, for Six Sigma may not have been implemented as it should have been, or maybe the necessary structure for the realization of repeatable and reliable innovation has not yet been established. Nonetheless, it is both clear and proven that Six Sigma needs innovation and that innovation needs Six Sigma and when they are united, they are an unbeatable force. Unfortunately, there are many necessary conditions for the two to coexist peacefully and synergistically, but none that are sufficient. Leadership is still the key to making it happen. Leaders must nurture the conditions needed to derive the combined power of Six Sigma and innovation. It has been done before and will be accomplished again by those organizations that are competitively excellent. But to think that Six Sigma and innovation are at odds with one another is an uninformed point of view, because the data tells us it isn't so.