

Executive Summary

**At 3M, A Struggle between Efficiency and
Creativity**

Description

James McNerney joined 3M in 2001 after 19 years at the General Electric Company. He has imported GE's vaunted Six Sigma program—a series of management techniques designed to decrease production defects and increase efficiency. Thousands of staffers became trained as Six Sigma "black belts."

His Successors at 3M, a company whose very identity is built on innovation, now face a challenging question whether the relentless emphasis on efficiency had made 3M a less creative company. 3M is the birthplace of masking tape, Thinsulate, and the Post-it note. But those old hits have become distant memories. In recent years, the company's reputation as an innovator has been sliding. In 2004, 3M was ranked No. 1 on Boston Consulting Group's Most Innovative Companies list (now the *BusinessWeek*/BCG list). It dropped to No. 2 in 2005, to No. 3 in 2006, and down to No. 7 this year.

While 3M emerged financially stronger from the McNerney era, many long-time 3M researchers, engineers and scientists chafed under the strictures of Six Sigma. Critics argue that excessive metrics, steps, measurements and Six Sigma's intense focus on reducing variability water down the discovery process. Under Six Sigma, the free-wheeling nature of brainstorming and the serendipitous side of discovery is stifled.

Current CEO George Buckley, who has dialed back many of McNerney's initiatives, feels that initiatives such as Six Sigma become ingrained in a company's culture and creativity can easily get squelched. The tension that Buckley is trying to manage—between innovation and efficiency—is one that's bedeviling CEOs everywhere.

Quietly, the McNerney legacy is being revised at 3M. While there is no doubt the former CEO brought some positive change to the company, many workers say they are reinvigorated now that the corporate emphasis has shifted from profitability and process discipline to growth and innovation. The 3Mers now feel that they can dream again. Companies like GE

Alternatives

An effective and comprehensive approach to realize process improvement is through integration of quantitative rigor of Six Sigma with Lean thinking, lateral problem solving and creativity

Using Creativity in Six Sigma Projects

Creativity and lateral thinking can be applied at the Analyze and Improve phases of Six Sigma projects to conceive solutions.

Dr. Edward De Bono's concept of lateral thinking, which deals with exploring various dimensions of looking at things, suggests changing/moving from one concept to another to arrive at the most suitable one. Lateral thinking and creativity thus is not a set of tools, it is more of a perspective at looking and exploring things, which becomes absolutely vital in analyzing problems and arriving at solutions to problems.

The following concepts would be useful in Six Sigma DMAIC phases:

- **Brainstorming:** A useful and popular tool that can be used to develop highly creative solutions to a problem.
- **Reframing Matrix:** A technique that helps to look at problems from a number of different viewpoints. It subsequently helps to expand the range of creative solutions.
- **Random Input:** A lateral thinking tool that is useful when one needs fresh ideas or new perspectives during problem solving.
- **Concept Fan:** A way of finding different approaches to a problem when all obvious solutions have been rejected. It develops the principle of "taking one step back" to get a broader perspective.

Mapping of Lean and Creative Techniques to DMAIC Phases	
Six Sigma Project Phase	Use of Lean and Creative Techniques
Define	Brainstorming, Seven Wastes
Measure	Value-Added to Non-Value-Added Ratio, CT/VT, CT/TAKT Time
Analyze	Value Stream Mapping, Random Input, Reframing Matrix
Improve	5S, Visual Factory, Concept Fan, Provocative Operations (a Lateral Thinking Concept)
Control	Error Proofing

Innovation is vital to a company's growth. Therefore it is sensible to establish a work environment that encourages people to be creative – a prerequisite to innovation. Introducing Six Sigma as a change initiative can help build that creative environment. But creating such a culture from scratch takes time. During the first years of a deployment, Six Sigma project leaders may not be able to wait for a creative environment to be established. To gain the full benefit from a Six Sigma project, they may have to introduce creativity themselves

Learn and Practice Creative Habits

Typically, project leaders are comfortable with the more scientific phases of Six Sigma project work – Define, Measure and Analyze. However, many Black Belts stumble at the Improve phase because they mistakenly think they are not creative. In the Improve phase, when a team needs to find new, innovative ways to solve a problem, it is time to break out of this limiting mode of thinking. It is time to use stimuli that allow team members to see the original problem in a fresh way. A stimulus is not an idea itself. It is a tool that provides fresh context and perspective.

River-Jumping with TRIZ

TRIZ is the Russian acronym for "Theory of Inventive Problem Solving." It was developed by Genrich Altshuller, a patent expert for the Soviet Navy during the 1940s. He initially screened about 400,000 patents looking at how innovative ideas solved problems. The result was his conclusion that there are a finite number of potential problems and solutions in the universe. Altshuller said invention is a solution resolving a major design conflict. Then he proposed that there are 39 parameters for defining a problem and 40 "innovative principles" for solving a problem.

By river-jumping with the four Rs or the TRIZ method, project leaders will be taking advantage of what worked in the past and using those principles to lead their teams - and their company - toward creative thinking.

Benner (USA's Wharton School (University of Pennsylvania) Management professor) does not suggest that companies abandon process management, but rather apply them where they are most appropriate. The aim would be to have an organisation that can "celebrate both variance reduction in the service of exploitation and variance creation in the service of exploration." Professor Benner suggests organisations to become "ambidextrous", managing process management and innovation simultaneously. Innovation can happen in both the research and development department, where companies generate new ideas or create new products, and in marketing, where companies search for new markets and new customers.

Companies should balance improving current operations to be competitive in the short term with exploring for new knowledge for the future. "Too much process management across all levels of an organisation makes it easier to implement, but can strangle bolder, breakthrough innovations."

To explain the interdependencies and linkages between innovation, improvement and the management of processes, products and services, see the following simple model.

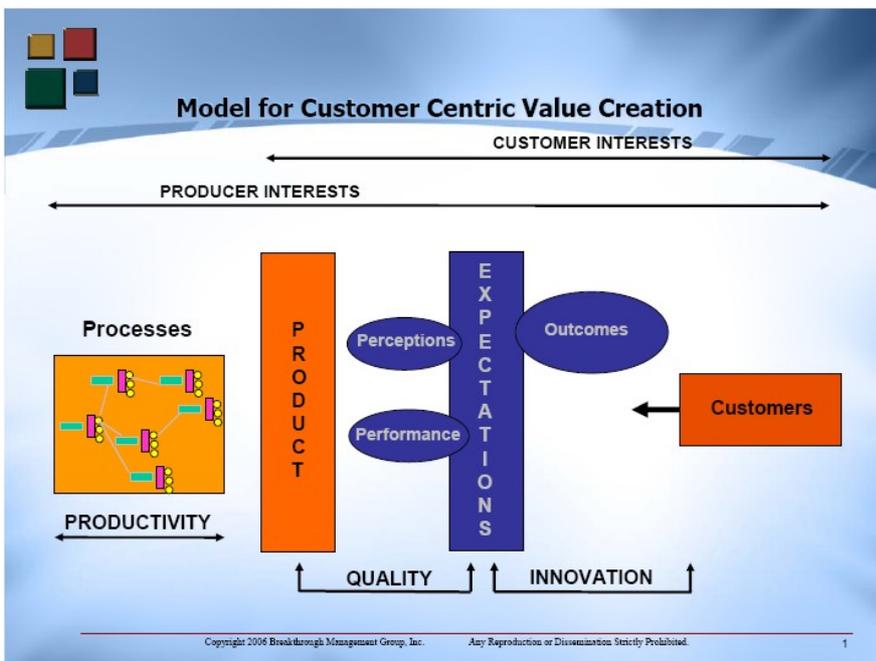


Figure 1. Model for Customer Centric Value Creation

However, six sigma and innovation are both essential for an organization. Six sigma impacts the bottomline while innovation grows the top line. Big companies like P&G and GE have gone on record saying that they are looking for 4-6% organic growth (~growing revenues by billions of dollars every year). They are not going to do this by compromising on process efficiency (six sigma).

Benchmarking with industry Peers

As more businesses and organizations adopt process management programs such as Six Sigma and Total Quality Management, a warning has come that the overzealous application of these programmes can stifle creativity, reducing innovation and the exploration for new services and markets for the future.

USA's Wharton School (University of Pennsylvania) Management professor, Mary Brenner, advises organisations to reassess the use of process management programmes and to apply them with more discrimination. The warning was carried in a recently published paper under Wharton's innovation and entrepreneurship category, titled *TQM, ISO 9000, Six Sigma: Do Process Management Programmes Discourage Innovation?*

Birlasoft, one of India's leading commercial houses, with equity participation by GE Capital, uses Six Sigma technique in its governance framework to increase efficiency, reduce costs and improve customer satisfaction. Monthly defects have decreased from 11 per cent to 3 per cent. While both TQM and Six Sigma focus on techniques for solving problems and rely on statistical assessment, TQM encourages firm-wide employee involvement but Six Sigma's approach is to train experts (green belts and black belts) who work on solving problems and teaching others in the company.

Benner points to companies like IBM, Procter and Gamble and Unilever who have shifted focus to gain advantage via innovation. Bennner says "Even General Electric is looking to grow through exploratory innovation".

GE's chief executive, Jeffrey Immelt, has set GE on a course of growing more revenue from existing operations, with growth fuelled by technological innovation or what Immelt calls "imagination breakthroughs". He has tied senior executive team annual remuneration to meeting idea-generation goals. He has invested \$100 million and more on research centres in Bangalore, Munich, New York and Shanghai.

Links

[http://www.isixsigma.com/offsite.asp?
A=Fr&Url=http://www.qualitydigest.com/july00/html/sixsigma.html](http://www.isixsigma.com/offsite.asp?A=Fr&Url=http://www.qualitydigest.com/july00/html/sixsigma.html)

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