

## The Impact of Six Sigma on Organizational Creativity and Innovation

### Abstract

This white paper explores the organizational trend to incorporate Six Sigma practices into the corporate infrastructure and examines the impact of Six Sigma on organizational creativity and innovation output.

*Keywords:* creativity, innovation, R&D, Six Sigma

### Introduction

In this paper, we explore the organizational trend to incorporate Six Sigma practices into the corporate infrastructure and examine the impact of Six Sigma on organizational creativity and innovation output. We begin by briefly reviewing the history of Six Sigma, and then move into a discussion of how Six Sigma is being applied in companies. Finally, we discuss how the use of Six Sigma is changing the way organizations are approaching innovation and research and development (R&D) efforts.

### A History of Six Sigma

Originated by Motorola in 1985 and adopted by GE in 1995 (Linderman, Schroeder, Zaheer, & Choo, 2003), Six Sigma has roots in the work and research of W. Edwards Deming and Joseph Duran.



The term Six Sigma refers to its goal of no more than 3.4 defects for every million activities. Described as both a management strategy (Sanders & Hild, 2000) and a statistical tool (Hahn et al, 2000), Pande, Neuman, and Cavanagh liken it to a toolbox (2000, xii). They characterize its capability (xvi) as

reducing errors to almost none through measuring and understanding, getting tasks accomplished more quickly, engaging people in understanding, applying creative solutions, and maintaining control over processes while increasing profits.

#### How are Organizations using Six Sigma Today?

Although some (Clifford, 2001) describe Six Sigma as a mere repackaging of old quality management approaches, Schroeder, Linderman, Liedtke, and Choo (2008) positively note its ability to bring about quality improvements through incremental innovation. It does appear to bring about quantifiable improvements and savings, although Del Angel and Pritchard might disagree, indicating that some 60 percent of corporate Six Sigma projects fall short of anticipated goals (2011). However, many companies, after experiencing process improvement success and reduced expenses, attempt to push Six Sigma into their R&D efforts as well (Hindo, 2007). After 3M discontinued Six Sigma for its R&D operations, Tushman noted that Six Sigma's focus on reducing variability is inversely associated with the exploratory nature of R&D innovation (Dodge, 2007).

Six Sigma seems to be most successful in larger companies, where greater opportunities exist for reducing bureaucracy and streamlining processes (Dusharme, n.d.). Smaller companies, with their tighter control over processes, may find Six Sigma less profitable.

Companies may also be misusing Six Sigma for projects that lack the complexity for which Six Sigma is designed. Notes Linderman et al (2003) employing Six Sigma for simple tasks does not create substantial benefit, and in fact tends to decrease

performance. In short, Six Sigma is not a universal tool. It has relevance for some applications, but not all.

#### How Six Sigma Impacts R&D spending

Pushing Six Sigma tools into R&D operations may bring about short term financial gains (Hindo, 2007), but over the long term appears to stifle creativity and innovation (Goh, 2002) for the very organization where it is needed the most. Although it appears that companies that adopt Six Sigma in their innovation centers tend to correspondingly reduce R&D spending, the literature is mostly anecdotal or is limited to only those organizations that are publicly held, and therefore required to report corporate expenditures. Further, it is difficult to infer from earnings reports alone the extent to which development creativity is impacted by Six Sigma processes. Hindo's 3M Six Sigma case study (2007) stands alone as a representation of Six Sigma's impact on R&D. And although 3M's R&D workers have indicated that they thought company declines in innovation and creativity were due entirely to Six Sigma practices (Hindo, 2007; Chakravorty, 2009), their anecdotal statements aren't sufficient to conclusively state that Six Sigma is necessarily detrimental for innovation organizations.

#### References

- Chakravorty, S.S.(2009). Six Sigma programs: An implementation model. *International Journal of Production Economics* (119). 1–16.
- Clifford, L.(2001).Why you can safely ignore Six Sigma. *Fortune*(142)2. 140.
- Del Angel, C., Pritchard, C. (2011, May 16). What went wrong with Six Sigma? *Cygnus Supply & Demand Chain*. URL: [http://www.sdexec.com/web/online/Decision-Support-Trends/Guest-Column--What-Went-Wrong-with-Six-Sigma/16\\$10463](http://www.sdexec.com/web/online/Decision-Support-Trends/Guest-Column--What-Went-Wrong-with-Six-Sigma/16$10463)

- Dodge, J.(2007, December 9). 3M shelves Six Sigma in R&D. *Design News*. URL:  
[http://www.designnews.com/article/12089-3M\\_Shelves\\_Six\\_Sigma\\_in\\_R\\_D.php](http://www.designnews.com/article/12089-3M_Shelves_Six_Sigma_in_R_D.php)
- Dusharme, D. (n.d.). Six Sigma survey: Breaking through the Six Sigma hype. *Quality Digest*. URL: <http://www.qualitydigest.com/nov01/html/sixsigmaarticle.html>
- Goh, T.N.(2002). A strategic assessment of Six Sigma. *Quality and Reliability Engineering International*.(18). 403-410.
- Hahn. G.J., Doganaksoy, N., Hoerl, R.(2000). The evolution of Six Sigma. *Quality Engineering* 12 (3), 317–326.
- Hindo, B.(2007, Jun 11). At 3M, a struggle between efficiency and creativity. Bloomberg Business Week. URL:  
[http://www.businessweek.com/magazine/content/07\\_24/b4038406.htm](http://www.businessweek.com/magazine/content/07_24/b4038406.htm)
- Linderman, K., Schroeder, R.G., Zaheer, S., Choo, A.S.(2003, March). Six Sigma: A goal-theoretic perspective. *Journal of Operations Management*(21) 2. 193-203.
- Pande, P.S., Neuman, R.P., Cavanagh, R.R.(2000). *The Six Sigma way: How GE, Motorola, and other top companies are honing their performance*. New York: McGraw Hill.
- Sanders, D., Hild, C.R.(2000). Six Sigma on business processes: Common organizational issues. *Quality Engineering* 12(4).603-610.
- Schroeder, R.G., Linderman, K., Liedtke, C., Choo, A.S. (2008, July). Six Sigma: Definition and underlying theory. *Journal of Operations Management*(26), 4. 536.554.