

# Chapter 10

## The Effects of Six Sigma Quality (SSQ) on Innovation and Organisational Ambidexterity in a High Operating Cost Environment

Milé Terziovski

*Curtin Graduate School of Business, Australia*

### ABSTRACT

*This chapter explores the effect of Six Sigma Quality (SSQ) on innovation and organizational ambidexterity in a high operating cost environment. Multiple-cross case analysis revealed that SSQ seems to align very well with process innovation, where the organisation has a well-defined process output to control. However, some tension exists between SSQ and product innovation, particularly in terms of the time expectation for SSQ to deliver results. Furthermore, the study shows that SSQ could have a positive impact on organizational ambidexterity in a high operating cost environment, as long as management recognizes that innovation approaches require their own formula for success. Management needs to establish a team that could manage the tension between “getting it right the first time” as part of managed innovation and “learning from failure” as part of entrepreneurial innovation.*

### INTRODUCTION

In this section we introduce the Six Sigma Quality (SSQ) program, by providing a brief background, outlining its objectives and developing a research question. The objective of Six Sigma Quality (SSQ) is to manage process ‘Variation’ in order to reduce defects to 3.4 per million opportunities

(DPMO) (Blakeslee, 1999; Linderman, et al., 2003). SSQ requires that companies build their business around an in-depth understanding of their customers’ requirements (Blakeslee, 1999). It could be argued that SSQ is grounded in the fundamental principles of Total Quality Management (TQM) (Evans & Lindsay, 2008). However, SSQ goes beyond TQM, particularly with its

DOI: 10.4018/978-1-4666-5828-8.ch010

disciplined approach to training and achieving ‘stretch goals.’ (Antony & Banuelas, 2002).

The concept of implementing SSQ was pioneered at Motorola in the 1980s as part of their successful application for the Malcolm Baldrige National Quality Award (MBNQA) (Evans & Lindsay, 2008). Despite Motorola’s success with SSQ, it was not until the late 1990s that large US companies such as General Electric recognized the corporate benefits of SSQ. For example, CEO Jack Walsh described his vision for SSQ in GE’s 1997 annual report as the “centre-piece of GE’s dreams and aspirations.” GE’s payoff reached more than \$750 million in the first year that SSQ was implemented.

Despite the resounding success achieved by large companies with the SSQ methodology, many companies today operate at 3-sigma. This translates to 67,000 Defects Per Million Opportunities (DPMO), or cost of poor quality of 20-30 per cent of sales. Manufacturers frequently achieve 4-sigma while service firms are often at 2-sigma (Antony & Banuelas, 2002; Byrne, 2003; Zu, Fredendall, & Douglas, 2008; Hoerl, & Gardner, 2010).

Notwithstanding its profit potential, SSQ has led to problems for innovative organisations such as 3M. In a Business Week article, Hindo (2007:10) stated that “..efficiency programs such as Six Sigma are designed to identify problems in work processes-and then use rigorous measurement to reduce variation and eliminate defects. When these types of initiatives get ingrained in a company’s culture, as they did at 3M, creativity can easily get squelched.” Hindo (2007: 14) further asserts, “There has been little formal research on whether the tension between Six Sigma and innovation is inevitable.” Benner and Tushman in Zhang, Hill and Gilbreath (2011:48) support this view by stating that “diffusion of process management technologies favours exploitative innovation at the expense of exploratory innovation.”

A recent article by Zhang et al. (2011) develops an agenda for Six Sigma research. The authors challenge the academic and practitioner

communities to work collaboratively to find practical research-based answers to each of their eight research questions that they propose in their published article. The aim of this chapter is to shed new light on the relationship between SSQ and innovation, adding to the SSQ research agenda developed by Zhang et al. (2011). The general question we address in this chapter is: *can SSQ coexist as part of an ambidextrous organisation in a high operating cost environment?*

## LITERATURE REVIEW AND THEORY

In this section, the literature on SSQ, innovation and ambidexterity is reviewed in order to define various terms and to identify research propositions, which would provide a clear purpose for the empirical and theoretical discussion throughout the chapter.

### Six Sigma Literature

Linderman, Schroeder & Zaheer (2003) contend that Six Sigma is a phenomenon that is gaining wide acceptance in industry, but lacks a theoretical underpinning (Braunscheidel, Hamister, Suresh, & Star, 2011). Linderman et al., (2003) argue that rigorous academic research of Six Sigma requires the formulation and identification of useful theories related to the phenomenon. For example, Linderman et al., (2003) argue in their theoretical paper that most managers use explicit goal setting to motivate performance with SSQ projects, which creates the illusion of it being a technical issue. However, the authors believe that goal setting also requires behavioral considerations. Thus, an important literature finding is that SSQ success requires technical and behavioral understanding (Linderman et al. 2003).

Zhang et al. (2011) conducted extensive research of the academic and practitioner SSQ literature, coupled with numerous focus group meetings with expert practitioners, and senior

14 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

[www.igi-global.com/chapter/the-effects-of-six-sigma-quality-ssq-on-innovation-and-organisational-ambidexterity-in-a-high-operating-cost-environment/106800](http://www.igi-global.com/chapter/the-effects-of-six-sigma-quality-ssq-on-innovation-and-organisational-ambidexterity-in-a-high-operating-cost-environment/106800)

## Related Content

---

### Migration Policy of the European Union From the Perspectives of Turks in the EU Countries and Syrian Immigrants in Turkey

Serkan Ökten and Azize Ökten (2020). *Handbook of Research on Social and Economic Development in the European Union* (pp. 475-499).

[www.irma-international.org/chapter/migration-policy-of-the-european-union-from-the-perspectives-of-turks-in-the-eu-countries-and-syrian-immigrants-in-turkey/242888](http://www.irma-international.org/chapter/migration-policy-of-the-european-union-from-the-perspectives-of-turks-in-the-eu-countries-and-syrian-immigrants-in-turkey/242888)

### Causality between Credit Deposit Ratio and Credit Share in Major Indian States during 1972 - 2008

Ramesh Chandra Das and Soumyananda Dinda (2015). *Banking, Finance, and Accounting: Concepts, Methodologies, Tools, and Applications* (pp. 54-67).

[www.irma-international.org/chapter/causality-between-credit-deposit-ratio-and-credit-share-in-major-indian-states-during-1972--2008/115323](http://www.irma-international.org/chapter/causality-between-credit-deposit-ratio-and-credit-share-in-major-indian-states-during-1972--2008/115323)

### Tax Avoidance and Transfer Pricing: Evidence From Greece – Transfer Price Manipulation and Earnings Management

Nikolaos Eriotis, Spyros Missiakoulis, Ioannis Dokas, Marios Tzavaras and Dimitrios Vasiliou (2021). *International Journal of Corporate Finance and Accounting* (pp. 28-39).

[www.irma-international.org/article/tax-avoidance-and-transfer-pricing/285970](http://www.irma-international.org/article/tax-avoidance-and-transfer-pricing/285970)

### The Nexus Between FinTech Adoption and Financial Inclusion

Marouane Moufakkir and Qmichchou Mohammed (2020). *Impact of Financial Technology (FinTech) on Islamic Finance and Financial Stability* (pp. 193-209).

[www.irma-international.org/chapter/the-nexus-between-fintech-adoption-and-financial-inclusion/236806](http://www.irma-international.org/chapter/the-nexus-between-fintech-adoption-and-financial-inclusion/236806)

### Public Investment and Fiscal Sustainability in the West African Economic and Monetary Union (WAEMU): Lessons for European and Middle Eastern and North African Countries

Mehmet Serkan Tosun and Serdar Yilmaz (2016). *Handbook of Research on Public Finance in Europe and the MENA Region* (pp. 100-115).

[www.irma-international.org/chapter/public-investment-and-fiscal-sustainability-in-the-west-african-economic-and-monetary-union-waemu/151821](http://www.irma-international.org/chapter/public-investment-and-fiscal-sustainability-in-the-west-african-economic-and-monetary-union-waemu/151821)