

Lean and Six Sigma: A Comparative Study

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Abstract

The purpose of this paper is to compare and contrast Lean and Six Sigma organizational approaches. This is an important area of study because although, theoretically, there are differences between Lean and Six Sigma, they can be compatible and comparable in practice. Organizations can benefit from the integration of Lean and Six Sigma, as both are effective methods of continual improvement. Although both are effective tools for implementing continuous improvement, when combined they are all the more successful. This paper therefore compares and contrasts Lean and Six Sigma with a view to illustrating their effectiveness separately and together. Thus this paper will identify the weaknesses and strengths of both Lean and Six Sigma and the ways in which they compliment each other.

Keywords: Lean, Six Sigma, Quality, Management, Study, Approach

References:

- [1] Achanga, P.; Shehab, E.; Roy R. and Nelder, R. (2006). Critical Success Factors for Lean Implementation within SMEs. *Journal of Manufacturing Technology Management*, 17(4), (460-471).
- [2] Aboelimged, M.G. (2010). Six Sigma quality: A structured review and implications for future research. *International Journal of Quality and Reliability Management*, 27(3), 268-317.
- [3] Andersson, R.; Eriksson, H. and Torstensson, H. (2006). Similarities and Differences between TQM, Six Sigma and Lean. *The TQM Magazine*, 18(3): 282-296.
- [4] Anthony, J.; Kumar, M. and Madu, C.N. (2005). Six Sigma in Small-and Medium-Sixed UK Manufacturing Enterprises: Some Empirical Observations. *International Journal of Quality & Reliability Management*, 22(8): 860-874.
- [5] Anvari, A.R., Sorooshian, S., and Moghimi, R. (2012). The strategic approach to exploration review on TQM and Lean production. *International Journal of Lean Thinking*, 3(2), 13-26.
- [6] Bhasin, S. (2012). Prominent obstacles to Lean. *International Journal of Productivity and Performance Management*, 61(4), 403-425.
- [7] Bhasin, S. and Burcher, P. (2006). Lean Viewed as a Philosophy. *Journal of Manufacturing Technology Management*, 17(1): 56-72.
- [8] Breyfogle, F.W. (2003). *Implementing Six Sigma: Smarter solutions using statistical methods*. Hoboken, NJ: John Wiley & Sons.
- [9] Demeter, K.; Mastysz , Z. (2011). The impact of Lean practices on inventory turnover. *International Journal od Production Economics*, 133(1): 154-163.
- [10] Dombrowski, U. and Mielke, T. (2013). *Lean Leadership – Fundamental Principles and Their Application*. *Procedia CIRP*, 7: 569-574.

- [11] Dora, M.; Kumar, M.; Goubergen, D.V.; Molnar, A. and Gellynck, X. (2013). Operational Performance and Critical Success Factors of Lean Manufacturing in European Food Processing SMEs. *Trends in Food Science & Technology*, 31: 156-164.
- [12] George, M.L. (2002). *Lean Six Sigma: Combining Six Sigma quality with Lean speed*. New York, NY: McGraw-Hill.
- [13] George, M. (2003). *Lean Six Sigma : Combining Six Sigma Quality with Lean Production Speed*. New York: McGraw-Hill Press.
- [14] Joyce, M. and Schechter, B. (2004). “The Lean Enterprise: A Management Philosophy at Lockheed Martin.” *Defense Acquisition Review Journal*, Tutorial, 172-181.
- [15] Goriwondo, W.M. and Maunga, N. (2012). Lean Six Sigma Application for Sustainable Production: A Case Study for Margarine Production in Zimbabwe. *International Journal of Innovative Technology and Exploring Engineering*, 1(5): 87-96.
- [16] Taghizadegan S. (2006). *Essentials of Lean Six Sigma*. Amsterdam: Elsevier.
- [17] Korde, A. and Mishra, S. (2003). *Revitalizing Six Sigma with Lean*. McKinsey & Company, 1-23.
- [18] Kumar, M.; Anthony, J.; Singh, R.K.; Tiwari, M.K. and Perry, D. (2006). Implementing the Lean Sigma Framework in an Indian SME: A Case Study. *Production Planning & Control*, 17(4): 407-423.
- [19] Kumar, M.; Timas, M.; Dora, M.K.; Timas, W. and Antony, J. (2012). Lean / Six Sigma implementation in SMEs: Key Findings from International Research. 4th Joint World Conference on Production & Operations Management/ 19th International Annual European OMA Conference.
- [20] Kwak, Y.H., and Ambari, F.T. (2006). Benefits, obstacles, and future of Six Sigma approach. *Technovation*, 26, 708-715.
- [21] Mehta, R.K.; Mehta, D. and Mehta, N.K. (2012). “Lean Manufacturing Practices: Problems and Prospects.” *International Journal of Engineering*, X (3): 119-124.
- [22] Mano, Y.; Akoten, J.; Yoshino, Y. and Sonobe, T. (2014). Teaching Kaizen to Small Business Owners: An Experiment in a Metalworking Cluster in Nairobi. *Journal of Japanese International Economics*, 33: 25-42.
- [23] Matt, D.T. and Rauch, E. (2013). Implementation of Lean Production in Small Sized Enterprises. *Procedia CIRP*, 12: 420-425.
- [24] Mousa, A. (2013). Lean, Six Sigma and Lean Six Sigma overview. *International Journal of Scientific and Engineering Research*, 4(5), 1137-1153.
- [25] Nave, D. (2002). How to compare Six Sigma, Lean and the theory of constraints: A framework for choosing what’s best for your organization.” *Quality Progress*, 73-78.
- [26] Pingyu, Y., and Yu, Y. (2010). The barriers to SMEs’ implementation of Lean production and countermeasures – Based on SMS in Wenzhou.” *International Journal of Innovation, Management and Technology*, 1(2), 220-225.
- [27] Pojasek, R.B. (2003). Lean, Six Sigma, and the systems approach: Management initiatives for process improvement.” *Environmental Quality Management*, 13(2), 85-92.
- [28] Reghunath A. and Jayathirtha D.R. (2013). Barriers for implementation of Six Sigma by Small and Medium Enterprises International. *Journal of Advancements in Research & Technology*, 2(2), 1-7.
- [29] Sanjay, B. (2012). Performance of Lean in Large Organisations. *Journal of Manufacturing Systems*, 31 (3), 349-357.
- [30] Shah, R. and Peter T. Ward (2003). Lean Manufacturing: Context, Practice Bundles, and Performance. *Journal of Operations Management*, 21(2), 129–149.
- [31] Scherrer-Rathje, M.; Boyle, T.A. and Deflorin, P. (2009). Lean, Take Two! Reflections from the Second Attempt at Lean Implementation. *Business Horizons*, 52: 79-88.
- [32] Sibley, M.J. and Swanger, R.N. (2012). One contractor’s use of Lean/Six Sigma to address challenges. *CFMA Building Profits*, 1-3.

- [33] Snee, R.D. (2010). Lean Six Sigma – Getting Better all the Time. *International Journal of Lean Six*, 1(1): 9-29.
- [34] Sorqvist, L. (2009). Successful integration of Six Sigma and Lean. *Proceedings from ASQ's World Conference on Quality and Management*, Minneapolis, Minnesota, 1-7.
- [35] Wong, Y.; Wong, K. and Ali, A. (2009). A Study on Lean Manufacturing Implementation in the Malaysian Electrical and Electronics Industry. *European Journal of Scientific Research*, 38(4): 521-535.