



# **An Empirical Study of Adopting Lean Principles for Value Creation in the Supply Chain Context**

**By**

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## **Certification**

This thesis is submitted in fulfillment of the requirements of the degree of DBA, in the Macquarie Graduate School of Management, Macquarie University. This represents the original work and contribution of the author, except as acknowledged by general and specific references.

I hereby certify that this has not been submitted for a higher degree to any other university or institution.

Signed:

A handwritten signature in black ink, appearing to read 'Stuart C.K. So', is shown within a rectangular box.

Stuart C.K. So

08/10/2010

## **Dedication**

This thesis is dedicated to my mother, Mrs. May Yu, So. Without her support and blessings, I would not be able to finish my thesis as planned. I will always love her with all my heart.

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## **Abstract**

Lean principles begin in manufacturing which has been the symbol of efficiency and optimal performance since the 1980's, mainly due to its association with the automotive industry and Toyota. The management philosophy aims at elimination of waste, maximization of efficiency, and continuous improvement, which involves operational changes and, no less challenging, organizational changes, when converting into a lean strategy. The situation could be even more complicated when coming to the supply chain scenario, as firms have different value objectives and unaligned operation processes, even if they are trading partners. Lean principles improve overly complex and nonintegrated processes in which the benefits that lean contributes spread across entire supply chains, leading users to map their business processes to drive out wastes. Consequently, becoming a lean enterprise has the potential to improve operations, reduce costs and have tasks performed with shorter lead times.

The thesis consists of four refereed articles published in research journals and studies the adoption of lean principles in manufacturing and services representing businesses in two different supply chain directions: business-to-business exchanges between manufacturers and suppliers in upstream supply chains, and service operations at the customer touch points in downstream supply chains. Thus, the thesis attempts to identify adoption factors in both organizational and individual aspects in these two supply chain dimensions.

First, the thesis studies the relationship between electronically-enabled manufacturing supply chain (EMSC) integration and the adoption of lean manufacturing by examining the relative advantage of lean adoption and its EMSC-related antecedents. Based on the empirical results obtained from 556 manufacturers in 17 countries, the findings indicate that management competencies (streamlining processes, executing pull production, empowering workforce, and restructuring supply strategy) are the key approaches leading to lean manufacturing adoption. Further, that supplier-manufacturer collaboration can only be sustainable if the supply strategy is developed for selecting and developing suitable suppliers that are capable of supporting lean manufacturing. Therefore, manufacturers may restructure their supply strategies such that only those companies that participate and invest in EMSC can become their suppliers.

Second, the organizational factors obtained from the case studies on lean services,

concerning cost advantage and compatibility of the changes, essentially match the findings of lean manufacturing studies. In addition, the individual factors derived from user experiences offer added value to designing user-oriented services that realize lean principles suitable for use in the field. More importantly, workforce empowerment is crucial to support the implementation of other competence areas; for example, streamlining processes and executing pull production require individual skills and the teamwork of supporting staff members. By comparing and contrasting these factors, as well as carefully aligning the value and process steps, a lean adoption approach for firms in manufacturing and services is summarized, based on the findings, so that this value-adding management approach can be used not only by retailing and manufacturing firms, but also their trading partners, as supply chain stakeholders, aiming at improving the overall competitiveness of the entire supply chain.

Last, the work in this thesis is further enhanced, and two associated research papers are recently accepted by an operations management journal and an international conference respectively, which will be discussed in the conclusion (Chapter 7).

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