
Pervasive use of the lean principles in production, services and product development

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1 Introduction

There has traditionally been a trade-off between achieving flexibility (through job-shop organisation) and maximising efficiency (by utilising assembly lines that deliver economies of scale). The pervasive success of the Toyota production system (New, 2007; Ohno, 1988; Sugimori et al., 1977) has shown that it is possible to have systems that are efficient, flexible and achieve high quality. Over time, many companies have adapted and shaped the Toyota production system to suit their context and requirements. Krafcik (1988) coined the term 'lean' to describe the general approach, which has proved useful in different types of production and service organisations (Herron and Braiden, 2004; Holweg, 2007; Liker, 2004; Riezebos et al., 2009).

The success of the Toyota production system has stimulated the development of new theory and applications in both the manufacturing and service sectors. Lean principles have proven to be pervasive and beneficial when implemented in many different circumstances. This special issue of *The International Journal of Technology Management* provides new insights into the application of lean in the manufacturing and service sectors.

2 Lean principles

Edwards et al. consider the applicability of the lean principles in healthcare and presents a case study based upon the implementation of lean in a surgical ward. They argue that the lean principles can be useful in certain settings but may not be deemed universally applicable to all aspects of healthcare. Akbulut-Bailey et al. compare lean with Six Sigma and conduct a case study at a major aircraft manufacturing company located in West Michigan, which has successfully incorporated the so-called lean Six Sigma concept. Li et al. state that companies are now beginning to realise that traditional costing and accounting methods may hinder lean initiatives and have examined the success of three different management accounting systems in combination with lean manufacturing through simulation modelling.

3 Lean product development

Lean principles may also be applied to new product development. Qudrat-Ullah et al. present a conceptual model for lean product development, drawing on existing literature and case study research. Schulze and Störmer investigate enablers for the elimination of waste in product development, identifying employee training, coaching and constructive failure treatment as effective approaches. Hypotheses were tested using data from 108 firms in the automotive components industry in German-speaking countries. Gerhard et al. investigate the use of lean in technology development, suggesting a positive effect, e.g., reducing the development time and increasing the development efficiency. Alblas and Wortmann investigate how firms manage the impact of product platform changes on lean production systems and the role of product platforms in stabilising the resulting variety during production and use. Based on a case study, several important requirements for management of platform changes are identified.

4 Lean principles and information technology

Moyano-Fuentes et al. investigate and compare the level of adoption of lean production and the degree of IT use and the kind of IT used (internal and external IT) using empirical findings from the automotive industry. Alfieri et al. propose a methodology to guide information management in lean production, based on the 'systems of systems' (SoS) approach currently being used for complex military initiatives. It is an attempt to describe how the main aspects of manufacturing systems can be represented within the SoS framework and how SoS can support the rational definition of a path leading from corporate strategy to system redesign.

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