Chapter 4.16
ERP Systems Supporting Lean Manufacturing in SMEs

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ABSTRACT

Small and medium enterprises (SMEs), more than ever, are being forced to compete in a global economy with increasingly complex challenges. This new economy has forced SMEs to become more responsive and agile in operational, tactical and strategic areas while requiring thoughtful integration between business functions and manufacturing/ production/ service operations. Enterprise Resource Planning (ERP) and Lean manufacturing are two production control methodologies that have been implemented in various ways. In early incarnations, ERP systems were considered a hindrance to Lean manufacturing efforts and were criticized for encouraging large inventories and slower production. The explosive growth of e-business methodologies and the resulting pressure to become nimble and embrace rapid change forced many SMEs to rethink their production approaches, particularly in regard to where they stand in relation to these two methodologies. Over time, ERP vendors recognized the power and advantages of Lean manufacturing and developed ways to incorporate Lean-related features into their software. The main objective of this chapter is to explore how ERP and Lean methodologies can coexist in SMEs. The chapter discusses misconceptions about the fit between ERP and Lean then summarizes differences and synergies between the two methodologies. The chapter emphasizes how linking ERP and Lean methods can lead to competitive advantage then explores key Lean toolsets available in leading ERP systems used by SMEs. Further focus is provided with additional insight on several leading ERP vendors offering Lean-enabled software modules. These include Oracle, TTW WinMan and Pelion Systems.

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INTRODUCTION

Small and medium enterprises (SMEs), more than ever, are being forced to compete in a global economy with increasingly complex challenges. This new economy has forced SMEs to become more responsive and agile in operational, tactical and strategic areas while requiring thoughtful integration between business functions and manufacturing/production/service operations. When faced with similar pressures, larger firms migrated to expensive ERP systems. As early as 1999, researchers (Gable & Steward, 1999) suggested SMEs would follow suit and suggested reasons motivating this phenomenon. First, the larger enterprise market for ERP systems was becoming saturated and ERP vendors were hungry for new markets. Secondly, these larger firms were pushing ERP vendors to create software to leverage inexpensive Internet technologies that would promote closer integration with their SME partners along the supply chain to obtain a variety of efficiency-based benefits. Thirdly, SMEs made up a large portion of regional economies and represented a high percent of overall manufacturing and service firms. And finally, ERP packages designed for SMEs had become more sophisticated, cost efficient and upwardly scalable for growth oriented firms.

In spite of these obvious incentives many SMEs were slow to adopt ERP technologies. According to Aladwani (2001) two fundamental sources of resistance to innovations like an ERP exist: perceived risk and habit. According to Aladwani (2001), perceived risk refers to one's *perception of the risk associated with the decision to adopt the innovation*, i.e. the decision to accept an ERP system and habit refers to *current practices that one is routinely doing*. Koh & Simpson (2005) suggest this is pronounced in SMEs due to widespread informal culture and a disregard for formalizing business processes. Often in SMEs, a worker wears many hats and as a result, operations are conducted on the fly and without formal procedures or documentation. Aladwani (2001) suggests this can be hard to overcome and for some time, that appeared to be the case.

In recent years, SMEs involved in the business-to-business (B2B) market have worked hard to develop delivery performance capability compatible with larger corporate customers. In many cases this means that the SME is required to interface with their clients' ERP systems. Larger enterprises rely on big ERP system vendors such as SAP, ORACLE, and others (Rashid, Hossain & Patrick, 2002). The implementation cost of these systems is high and installation complex making it difficult for SMEs to follow suit. In response, midrange and less complex systems have been developed both by the large ERP vendors and by smaller software companies. In order to continue taking advantage of being, smaller nimble companies, and satisfy the needs of the larger corporate partners, SMEs may need to use their ERP software in conjunction with other proven systems and methodologies such as Lean planning and control tools. SMEs may need to combine capabilities to continue using other concepts such as just-in-time (JIT) and optimized production technology (Cheng & Podolsky, 1993; Deep, et al. 2008; Koh & Simpson, 2005). This article specifically looks at progress made in integrating Lean production methodologies with ERP systems.

BACKGROUND

Competing Philosophies

Over the past couple decades, philosophies related to the most effective manner to run manufacturing operations have been debated and evolved greatly (Nakashima, 2000). Added to the mix has been increased competition and expectations for rapid production changes and retooling. This has intensified the need for more efficient and cost effective manufacturing and put pressure on managers and production engineers to develop new and better solutions.