

# Radio Frequency Identification Systems Within a Lean Supply Chain in a Global Environment

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## INTRODUCTION

### Supply Chain Management (SCM)

The ultimate goal of supply chain management (SCM) is to effectively and efficiently manage the movement of material or products through the supply chain cycle (Mateen & More, 2013; Park & Min, 2013). Such a lofty goal is accomplished only through the creation of strong partnerships with suppliers and customers, reduction of waste, and maintenance of product visibility to insure both quantity and quality meet predetermined requirements (Boerner, 2010a, 2010b). As SCM has matured as a discipline, so has the implementation of some tools to assist in achieving these goals, while still maintaining a green or sustainable presence (Berthon, Critenden, Desautels, & Pitt, 2010; Beamon, 1999). One such tool is the application of a lean production mode, which can assist in the achievement of waste reduction goals throughout the supply chain, especially when strategic partners apply the same principles. Another valuable tool is the utilization of large corporate IT-infrastructures and analytical data warehouses (Ha, Park, Lee, & Park, 2013; Mehrjerdi, 2009; Smith, 2015). As an added enhancement to a lean

supply chain, the use of real time data from these IT-infrastructures gives firms better details of current information and product movement. The use of real-time data sharing from both intra-firm and external partners is ideal for more accurate forecasting and reliable model development.

A supply chain is the sequence of activities to get materials or products to end-users. A firm's supply chain includes all steps from raw material to final product, as well as assurance of customer satisfaction (Smith, 2010, 2015; Smith & Minutolo, 2014). In the past, most firms have been concerned only with the work completed within their shop. Unfortunately, this has led to a rather disjointed supply chain characterized by higher inventory levels, poor forecasting ability, and limited visibility or products as a whole. The use of supply chain management as a means to remain competitive in a global economy is an essential component for financial success. In today's global business environment, effective SCM is crucial to enhancing business performance. It is a collaborative effort on the part of management to position and run the supply chain in the most efficient and effective ways possible. This effort covers activities from product development, sourcing, production, and logistics, as well as the

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information systems needed to coordinate these activities.

Creating strong partnership with a select supplier base can allow for better communication and product knowledge (Browning & Heath, 2009; Cavaleri, 2008). Aligning firms with likeminded suppliers is a key activity of SCM. With the use of a select supply base, firms are better able to share pertinent data across supply chain members. Above all, this leads to better quality and reduced waste.

## Understanding Lean Elements

Lean is a paradigm advocated as the foundation for a competitive SCM. Lean methodologies are well known in the corporate world, but sometimes hard to define due to the many aspects associated with successful implementation. A simple definition could be doing more with less; however, that definition underestimates the transformative power within the supply chain. As provided in Cabral and Cruz-Machado (2012), the term 'lean' implies a series of activities or solutions to eliminate waste, reduce non-value added (NVA) operations, and improve the value added (VA) process. Lean production is often connected with 'zero inventory' and just-in-time (JIT) approaches.

Lean principles were initially made popular by the Japanese manufacturing industry and most notably the Toyota Production System (TPS). The goal of lean is to simply balance the flow of materials with customer needs while maintaining optimal cost, quality, and customer service. A number of common elements define the scope of lean, helping management create a competitive firm. The implementation of lean practices does not guarantee success, but includes a primary goal of waste reduction through removal of NVA processes, reduction of excess inventory, limitation of material movement, minimization of production steps, management of scrap, and reduction of reject and rework (Carvalho, Cruz-Machado, & Tavares, 2012; Chan & Kumar, 2009; Grewal, 2008; Jain, Benyoucef, & Deshmukh, 2008;). Through worker-management relationships, a

firm can engage in a continual assessment of processes, methods, and materials for the value added to saleable products.

## Purpose of Present Study

This chapter will look at the impact of using Radio Frequency Identification (RFID) systems within a lean supply chain, reviewing current research papers using a qualitative business case study approach (Baxter & Jack, 2008). Managers need to be able to justify an augmentation of lean practice and real time data with the use of RFID to improve SCMs ability to improve the goals of reducing waste and improving product visibility throughout the supply chain.

## BACKGROUND

### Lean Elements in Managing Supply Chains

Managing supply chain relationships by working with suppliers to meet the goal of waste reduction are essential functions for successful businesses. Firms often keep safety stock to adjust for inconsistent timing and quality of a supplier. Likewise, operations may have to manage work-in-process inventories for their own processing issues. Holding stocks of finished goods for longer periods of time before shipping to customers to avoid stock outs and maintain customer service levels adds to total costs. Unfortunately, all of these added inventories add little to no value to the company, while costing a considerable amount (Hu, Wang, Fetch, & Bidanda, 2008). Working with suppliers and customers can reduce shipment sizes while reducing inventory. Likewise, having the right inventory positioned nearer to the right customers assists in the firm's outbound shipments costs.

Lean layouts keep with the concepts of waste reduction (Drejer & Riis, 2000), minimizing the movement of workers, customers, and materials to create a more meaningful production and



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