

Using RFID and Barcode Technologies to Improve Operations Efficiency Within the Supply Chain



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INTRODUCTION

Management Throughout the Value Chain

Managers in today's business environment find themselves not only focused on internal processes such as production efficiency and employee relations, but also acknowledging the need to increasingly focus on management throughout the value chain. A number of researchers (Anderson & Dekker, 2009; Smith & Minutolo, 2014; Smith & Offodile, 2007; Wee, Peng, & Wee, 2010; Whitten, 2004) have identified some of the complex components of the supply chain to include global suppliers, contract manufacturers, company-owned product/service centers, third-party logistics providers, and transportation providers. Each relationship in the supply chain poses unique management opportunities and challenges. It is important for firms to understand the existing tools and strategies in the operations management field as well as the developing technologies and practices to better control costs and enhance efficiency in the supply chain. These same researchers frequently cite that the management of many companies are not operationally efficient (e.g., it can be seen from the cost of production is larger than needed, generating waste and non-value activities, and lack of vendor collaboration and integration, to name a few related issues). Proper management of their supply chains can

dramatically improve such efficiencies. In the following sections, a number of studies suggest that the use of RFID in supply chain management (SCM) can improve operational efficiency. This chapter briefly discusses the contribution of knowledge regarding the use of RFID in the operational efficiency of the company.

In order to stay competitive in the marketplace, firms must do whatever is necessary to gain an edge and create value for their product. The desired end goal is to get the right product to the right customer at the right price at the right time; to accomplish this chain of events firms must search for methods to achieve a competitive edge. In this increasingly global economy, competition for buyers can be cut-throat because of the easy access to the international market and global materials because of the internet. Also, because of the need for speed, space issues, and timing, supply chain agreements frequently expect the raw materials to arrive at the right warehouse or facility at the right time, not a week before or later. Needing to stop production because a part is missing is disastrously expensive; also loss of goods or theft is frequently a concern with companies. So the issue is raised, how can a company make improvements in the supply chain to be more efficient? Value is created for the client when the item arrives to the client on the right day. When an item is late or there are stock-outs there is the risk of the bullwhip effect occurring, when the client over-orders because they fear they might have

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their order rationed. By tracking the orders and products with barcode and/or RFID technologies (Ha, Park, Lee, & Park, 2013; Kwok & Wu, 2009; Mateen & More, 2013; Mehrjerdi, 2009; Roberti, 2014), operational management have the enhanced ability to notice if there are inefficiencies within the organization and address them quickly, and if the capability allows, the client can see that they will receive their order exactly when they wished in the quantity that they desired. This technology can add value all throughout the supply chain, to include the warehouse, distribution, and returns management areas.

BACKGROUND

Importance of Supply Chain Management (SCM)

Supply chain management (SCM) is one of the critical decision areas that a firm must focus on in order to compete in the ever-changing world of business. As a number of authors (Berthon, Critenden, Desautels, & Pitt, 2010; Bhat, 2008; Biswas & Sarker, 2008; Browning & Heath, 2009; Cabral & Cruz-Machado, 2012; Cavaleri, 2008; Carvalho, Cruz-Machado, & Tavares, 2012; Chan & Kumar, 2009; Chongwatpol & Sharda, 2013) have pointed out, lean firms are charged with minimizing costs and increasing efficiencies from the beginning to the end of the value chain. Firms must take a much broader view of operations management that extends far beyond their factory or office walls. Decisions involving the entire value chain must be made and can be extremely difficult. Firms that are able to successfully manage the key areas of sourcing, supplier selection, and the design of supply relationships will often realize a competitive advantage. Research and observation has revealed that this advantage can come in the form of low costs, high productivity, quality, customer responsiveness, and innovation (Park & Min, 2013; Smith, 2010, 2015).

The various components of SCM will determine the cost structure relating to upstream operations and play a large role in risk mitigation. Supplier selection is one of the core decisions of structural cost management. Firms must decide whether these upstream operations should be executed internally or whether they should be outsourced to a supplier. The article makes reference to the “make-buy-or-ally” decision that management faces. A *make* decision would entail a firm integrating vertically and obtaining components from internal units. A *buy* decision is the decision to purchase inputs from another firm in an “arms-length” contract. An *ally* decision is a mixture of the two previous decisions whereby a buyer and seller remain separate entities but collaborate in a mutually-beneficial, long-term relationship. The appropriate supplier choice would be the option that minimizes production and transaction costs (Drejer & Riis, 2000).

Designing the buyer/supplier relationship involves contractual management controls that govern aspects such as specifying authority to make supply decisions, performance requirements, and rewards for achieving performance goals or sanctions for non-performance (Boerner, 2010; Hu, Wang, Fetch, & Bidanda, 2008; Jain, Benyoucef, & Deshmukh, 2008; Kennedy & Widener, 2008). In addition, informal controls such as performance feedback processes, joint budgeting/forecasting processes, and co-location of employees are developed to enhance the buyer/supplier relationship. Formal legal contracts as well as behavioral norms are established to improve the efficiency and effectiveness of the relationships. Enhanced uses of automatic identification and tracking technologies help reduce error and potential litigation issues in the supply chain.

Purpose of Present Chapter

This chapter will look at the impact of using RFID-embedded systems within a lean supply chain environment via a qualitative business case

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