Chapter 4

Real World Applications:
Using Technology to Improve Supply Chain Management and Total Asset Visibility (TAV)

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ABSTRACT

Over the years the supply chain industry has been transforming to improve the end-to-end (production to delivery) process. Supply chain management (SCM) allows various industries to oversee and better handle how their product is manufactured and delivered. It allows them to track and identify the location of the product and to be more efficient in delivery. Integrating total asset visibility (TAV) technology into the supply chain structure can provide excellent visibility of a product. This kind of visibility complemented with various packaging schemes can assist in accommodating optimization strategies for visualizing the movement of a product throughout the entire supply chain pipeline. The chapter will define SCM, discuss TAV, review how transportation as well as optimization impacts SCM and TAV, and examine the role of packaging in the context of SCM and TAV.

INTRODUCTION

In an effort to improve the supply chain and total asset visibility (TAV), new technological advancements in shipping, transporting, tracking, and packaging have created significant changes to the role transportation and optimization will impact the overall end-to-end process. Globalization of the world economy and the corresponding supply chains has advanced rapidly such that a dynamic rapid response system has to be developed in order to cope with the ever-changing world economy and regulations as barriers

to trade and interdependence are reduced across the globe. Growth in world trade, and corresponding cargo container movements, continues to substantially exceed overall economic growth, meaning that trade volumes are doubling every 5-7 years. With that being said, a typical supply chain flow would have a set of common elements consisting of the following:

- Consumers
- Retailers
- Wholesalers
- Manufacturers
- Suppliers

Supply chain management is a critical component of any company's viability in a global economy ruled by fluidity of unpredictable events such as wars, economic and natural disasters. The ability to navigate and mitigate these events from a global perspective minimizes the negative impact both in profits and in company image. The most successful companies in this regard all have the following attributes in common namely exceptional capabilities in supplier development, collaborative product development, demand shaping and demand sensing capabilities, lean manufacturing and innovative retailer practices. For most industries and for many companies, the ability to achieve and sustain global supply chain excellence will be a substantial determinant of their overall corporate success. More importantly, the technology support for global logistics is at an immature stage for all but a small number of companies. This lack of technology support contributes strongly to the challenges in controlling costs and executing effectively. Most of those available in the past were designed to solve very specific problems, rather than providing a more comprehensive set of solutions. Today, while there is still room for continued advancement in global logistics and trade management solutions, there are systems available right now that can automate and improve a significant portion of the global logistics challenge. The robustness and functionality of the software is consistently improving, in tandem with the growing customer demand for global logistics solutions. This chapter describes how transportation, optimization, and packaging technologies impact current supply chain management and TAV processes and procedures. It will discuss a few of the difficulties associated with accepting new technologies that support improving logistical practices. Also, key elements of transportation, optimization, and packaging initiatives that address the gaps in supply chain methods used by an array of organizations to advance the future of logistics and different types of case studies will be presented.

BACKGROUND

In the transportation arena, there are several cutting-edge technological advancements such as RFID (radio-frequency identification), 2D Codes, QR Codes, integrated 2D & QR Code, RTLS (real-time locating systems), remote management, and sustainable energy (Lu & Swaminathan, 2013) using a minimal carbon "footprint" are being used to support management of the supply chain and total asset visibility (TAV). RFID technology use tags and readers to easily track goods that are being shipped. The tags carry information on them that states how much product is shipped and the destination of the shipment. This allows for a smoother transition from production to delivery at a store and/or distribution center. The

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