Information System Costs of Utilizing Electronic Product Codes in Achieving Global Data Synchronization within the Pharmaceutical Supply Chain Network

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ABSTRACT

Numerous benefits of implementation of global data synchronization (GDSN) in the pharmaceutical supply chain have been identified, including reduced counterfeiting, decreased medication errors, increased supply chain efficiency, and standardized regulatory evolution. For this study, a complete GDSN supply chain framework was developed as a model for the industry to achieve Global Standard (GS1) standards. Each supply chain member must have a strong enterprise resource planning (ERP) information system to accommodate the initial electronic product code information services (EPCIS). A web-based Datapool—which connects the manufacturer, distributor, and retailer—will assist in reaching the data synchronization stage. The most important step is to have an open standard of GS1 global registry to enable the Epedigree to be traced through the supply chain system. When combined with EPCIS, as well as electronic product code global (EPCglobal) standardization and GS1 Global Registry, the supply chain can achieve global data synchronization and traceability. The comprehensive GDSN framework provided in this study provides the pharmaceutical industry an estimate of the total costs of attaining a global data synchronization network.

Keywords: Electronic Product Code Information Services (EPCIS), Epedigree, Global Data Synchronization (GDSN), Global Standard (GS1), Supply Chain, Synchronization

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INTRODUCTION

Healthcare is one of the world’s largest industries and the market size continues to grow annually. The US pharmaceuticals market has increased rapidly, with retail sales amounting to an estimated $409bn in 2010 (The Economist Intelligence Unit, 2009). However, the pharmaceutical industry has encountered several major issues recently. For example, counterfeit drug sales were estimated to have approached $75 billion globally in 2010; also, some data show that up to 98,000 patients die because of medical errors in the United States, which costs the healthcare sector from $138 billion to $192 billion each year. As for supply chain efficiency, administrative costs along supply chains in the healthcare industry make up roughly 30 to 40 percent of healthcare costs, compared with 3 to 6 percent in the grocery industry (DeJohn, 2008). The US government will gradually begin forcing the healthcare sector to design and implement global standards for efficiency, along with visibility of synchronization in the supply chain to increase the patients’ safety and reduce the medical errors in the US. The main objective of this paper is to investigate the costs to implement a complete Global Data Synchronization Network (GDSN) in the US pharmaceutical supply chain, which has seldom been discussed in the literature. In addition, existing research has rarely focused on the overall steps and costs of establishing a complete supply chain network. From a theoretical perspective, this paper draws from Efficient Consumer Response (ECR) theory, which was introduced by Kurt Salmon Associates in 1993, in addition to Legner and Schemm’s 2008 supply chain model. The next section will discuss the benefits and obstacles in implementation of GDSN.

GS1 is a global organization which designs and implements global standards for efficiency and visibility of synchronization in the supply chain. For example, Procter and Gamble has indicated that synchronization will save $25 million a year through eliminating 30,000 to 50,000 hours per year from avoidable transcription work, and reducing new item introduction time by 80% in the U.S. (Getting Started, 2009). The estimate of total benefits for manufacturers is for every $1 billion of sales to gain additional $1 million in earnings. For retailers, a savings of $500,000 is expected for every $1 billion of sales (Nakatani, Chuang, & Zhou, 2006). GS1 Healthcare US systems of “3Gs”- Global Location Numbers (GLNs), Global Trade Identification Numbers (GTINs), and Global Data Synchronization Network (GDSN) – represent the standards adoption process for meeting e-commerce requirements in the global environment (Perrin, 2009). In November 2008, the University of Arkansas surveyed 1,381 healthcare providers and asked about the timeline for adopting data standardization; out of 1,381 respondents only 7 percent had already adopted GLN and 4 percent had already adopted GTIN system. The respondents said that the adoption of GS1 Healthcare US system would definitely improve product tracking through the supply chain, increase collaboration/partnering, and decrease costs (Nachtmann & Pahl, 2009). Other research shows that only 2 percent of hospitals in the United States have implemented these standards. Nevertheless, manufacturers are looking for hospitals to drive standardization throughout the supply chain (DeJohn, 2008).

However, certain obstacles exist for Healthcare industries to enter the Global Data Synchronization Network (GDSN). Many companies admit trouble in calculating the cost for GDSN, given the major setup costs for electronic integration. When firms implement supply chain management, integration between IT and business functions is often attempted without proper strategic planning (Gunasekaran & Ngai, 2004). Furthermore, many industry observers point out that given the current state of the internal product information supply chain, implementation of GDSN will demand large investments in process redesign and technical infrastructure. This scenario is very different from the significant subscription fees to the home data pool and to GDSN (Legner & Schemm, 2008). Moreover, setting up the product master data items is the main challenge and responsibility for the local manufacturers and sales units. The managers
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