White Paper

Supply Chain imperfections, hidden opportunities for service providers in parallel trading

Abstract

Addressing gray markets as a potential revenue source is increasingly attracting the attention of 3PL service providers. The concept enjoys a wide range of applications and recent developments in information technology capabilities are making the goal of detecting gray markets electronically realistic. Underling this recent development in information technology capabilities is the understanding by technology vendors that IT applications in the logistics world will need to be designed as achievers of customer goals rather than executers of business processes.

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Introduction

The recent surge in supply chain complexities brought with it new challenges to both logistics service providers and customers of such services. Parallel trading or gray market trading is one of these problems which has grown rapidly in recent years and is here to stay. In a nutshell, gray markets are markets in which legitimate products are sold through illegitimate means, examples of such markets are the sale of DVD's designated for the U.S markets in the Far East region. In attempting to minimize the impact of this problem, many organizations have taken aback outsourcing their supply chain operations. They attempt to address this problem with direct securitization efforts which can be cumbersome as RFID implementation projects have recently shown.

An alternative approach to addressing this problem is based on utilizing indirect methods. Detecting parallel trading through indirect schemes is one way of addressing parallel trade challenges. Simply put, these indirect schemes are the acts of detecting misuse by observing activities in the supply chain as they happen. An IT solution that is based on data mining, agent based detection systems, and parallel activity forecasting is an idea currently under development as a coherent approach to detect parallel trades in supply chain networks across multiple levels of the information hierarchy.

Three key trends have increased the demand for alternatives to traditional methods used in addressing gray markets. The first is the drop in interest for supply chain management services or LLP. As more firms decide to internalize the management of their supply chain networks, global visibility by providers across supply chains deteriorates and detecting anomalies across then becomes a difficult challenge from a direct securitization point of view. The second trend is the loss of interest in RFID as a cornerstone solution for supply chain visibility requirements, the current outlook still points to 5 more years before wide commercial applications. This loss of interest increased demands for alternative methods to supply chain visibility and increasingly, firms view RFID as part of the solution rather than the key solution. The third insight is the discrepancy between development speed and breadth of logistics services and IT capabilities in the supply chain industry, in recent years, logistics services complexity and depth outgrew IT developments in the logistics industry, this gap increased dissatisfaction amongst supply chain customers regarding the IT services they received. The new supply chain environments are far more complex than the IT systems supporting them, creating great opportunities for innovation in this subsector of the IT industry.

We will now turn to an illustrative case in the pharmaceutical sector to describe the challenges faced by the industry in light of the gaps and trends mentioned above.

The current environment in which most pharmaceuticals operate within dictates the pricing strategy they follow, this strategy differentiates prices across the globe in a way

that overcharges U.S and European customers and undercharges customers in other parts of the world. This price discrimination is mainly influenced by restrictions many countries impose on drug prices which forces pharmaceutical firms to price discriminate in order to reach greater markets.

This discrepancy in price levels creates an opportunity for gray markets to develop. The key point to remember is that, as long as price differences are greater than transportation costs, an opportunity for gray markets will exist. Current estimates of gray market activities in the pharmaceutical sector within the United States hover around 1% of total sales (estimated at $2.74 Billion according to 2006 prescription drug sales in the U.S only) and the percentage is believed to be greater in Europe.

Some of the distinguishing factors of gray markets in pharmaceutical industry make them an interesting case to investigate, the first factor relates to the cost structure of drug sales. The contribution margin in the pharmaceutical industry is substantially greater than other industries, mainly due to the huge fixed and onetime costs such firms incur and the low variable cost associated with manufacturing the drugs themselves. Unlike consumer electronics or automotive industries (which also suffer from gray market activities). Second, the amount of information within the supply chains of pharmaceutical products is greater than other supply chains, due to the nature of the products and their impact on society. And third, identification of gray markets in the pharmaceutical sector is easier because supply routes tend to be more static and the industry's practice of localizing drug brands even within national borders.

Having said that, it is worth while considering what effects gray markets have on other industries as potential beneficiaries of this effort. The IT products industry looses about $40 Billion in sales and $5 Billion in profits each year due to gray markets. Consumer electronics suffer from parallel trading when they try to differentiate product release date, recently, Sony suffered from this problem when releasing the PSP gaming consul in Japan 6 months earlier than Europe. Not all gray market activities in these industries are viewed negatively, in some cases parallel trades are encouraged to rid distributors from excess inventory that originates from inaccurate forecasting by manufacturers or unexpected fluctuations in demand.

Solution

A typical response in most network systems when faced with issues of misuse is greater restriction over the internal elements of the network. Common tools used in supply chain networks are increased documentation requirements, added locks and electronic scanning, stricter network paths, and deployment of technologies like RFID.

An alternative view is to accept the network as an imperfect structure which contains loopholes and weaknesses. In the case of the pharmaceutical industry, one of the

loopholes is parallel trading. The initial solution most pharmaceutical manufacturers take is further restrictions, controls, and to some extent, a lower degree of outsourcing of their supply chain needs. An alternative approach is in the reach of 3PL operators, service providers can develop a capability to scan supply networks for suspicious activities and alert pharmaceutical manufacturers as parallel trading takes place.

An anomaly detection system for supply chain networks can best fit the demands of establishing near real time parallel trading detection capability. The mission of this system would be to scan the 3PL provider's relevant databases for possible parallel trading activities that the provider is unknowingly carrying.

The development of the solution is best executed in a stepped approach. Detection systems work best when they deliver multiple scanning capabilities each implemented on a different level in the data hierarchy.

The basic architecture for such systems typically follows timeline architecture approach where the first stage looks at the past, the second at the present, and the third attempts to forecast the future. In this case, the three stages are as follows.

Stage 1: Basic search and data mining: In this stage, a simple data mining capability is developed to mine into systems that hold product level information; signatures are developed to detect targeted activities, examples of such signatures are.

1. Products to geographies matching lists: to detect Parallel importation, we can match product names against the geographies they were assigned to by the manufacturer.
2. Time sequence analysis for perishable goods: if a product stays in the supply chain longer than a predefined time window, we can flag the activity as suspicious.

Stage 2: Agent based anomaly detection systems: In the second stage of system development, a more complex capability is developed for scanning and monitoring logistics activities. This stage will focus on developing an agent based system to scan the network for anomalies and irregularities. The system architecture is based on using software agents with goals to detect unknown forms of gray market activities hidden within the supply chain.

Stage 3: incorporation of forward looking indicators into anomaly detection systems: In this stage, a final addition to the system is developed as a complement to the initial two scanning capabilities. Indicators that assist in better forecasting future breaches or irregularities are added to the solution to focus system resources towards the areas that may be of most interest. The following is a sample of potential indicators to look at

1. Currency exchange rates: changes in currency exchange rates tend to influence parallel trading in different directions; looking at these shifts in exchange rates can help predict where parallel trades may take place.
2. Product release dates: if a manufacturer releases a product in certain geography before the other, it is likely that parallel trading takes place.
3. Significant changes in commodity prices.
4. Changes in price controls, subsidies, and tax rates.

The forecasting component will act as a guide to the anomaly detection agents, focusing their efforts on the areas that most likely produce valuable findings. Given the size and magnitude of data available within supply chain networks, it becomes critical that efforts be directed to where they are most relevant.

Field investigations have supported the ideas presented above from a data availability point of view, large 3PL providers to the pharmaceutical industry had the relevant information required to setup such systems within their data warehouses.

Experiences from other organizations

Anomaly detection in supply networks is being developed from multiple aspects today. Two examples highlight the breadth of this concept and its wide range of application.

1. **Department of homeland security, IBM, SAP:** the department of homeland security in the United States initiated a joint project with its IT outsource partner (IBM) and its main solution provider (SAP) to develop an anomaly detection system for the US customs. The project will incorporate data from multiple sources and identify anomalies regarding incoming shipments and border crossings.

2. **MarkMonitor:** a software development firm that focuses on the development of end-to-end brand security solutions. The firm developed a system that helps brand owners to eradicate counterfeit sales online, the solution analyzes data from multiple sources including mass mailers, web promotions, B2B exchanges, and other sources to alert customers of gray market activities and counterfeits.

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