

Apparel Supply Chain woes - Is Business Intelligence (BI) the silver bullet?

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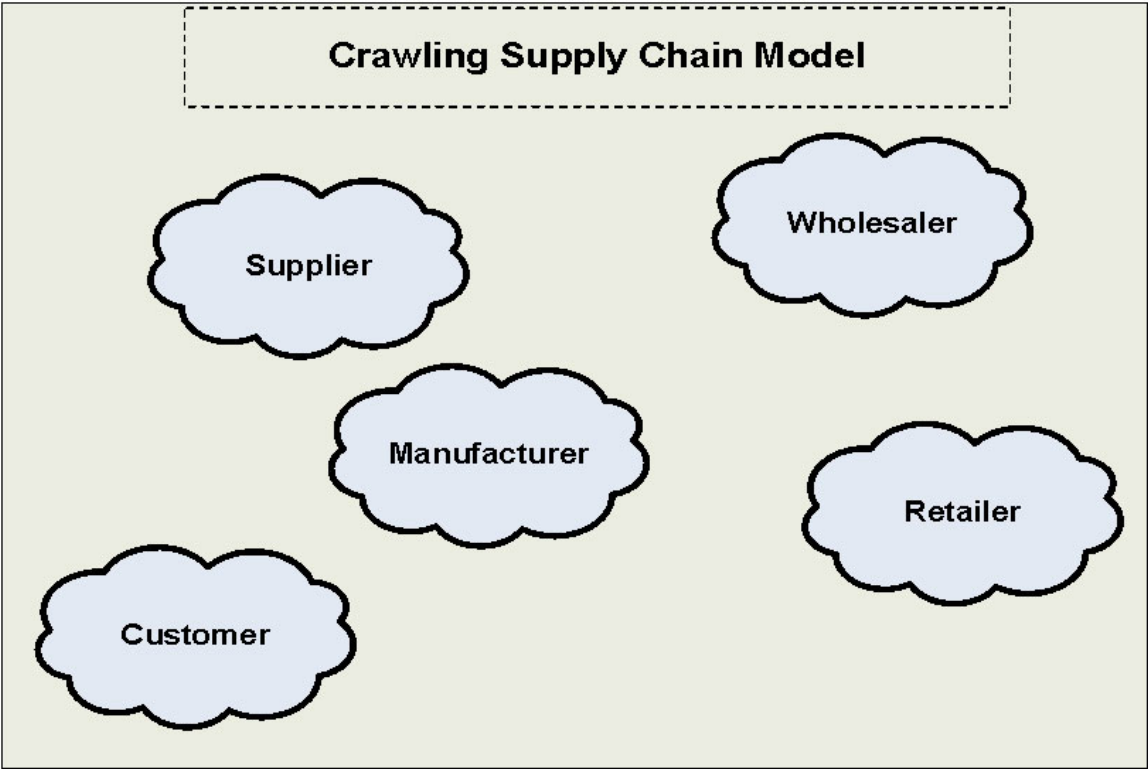
- Introduction

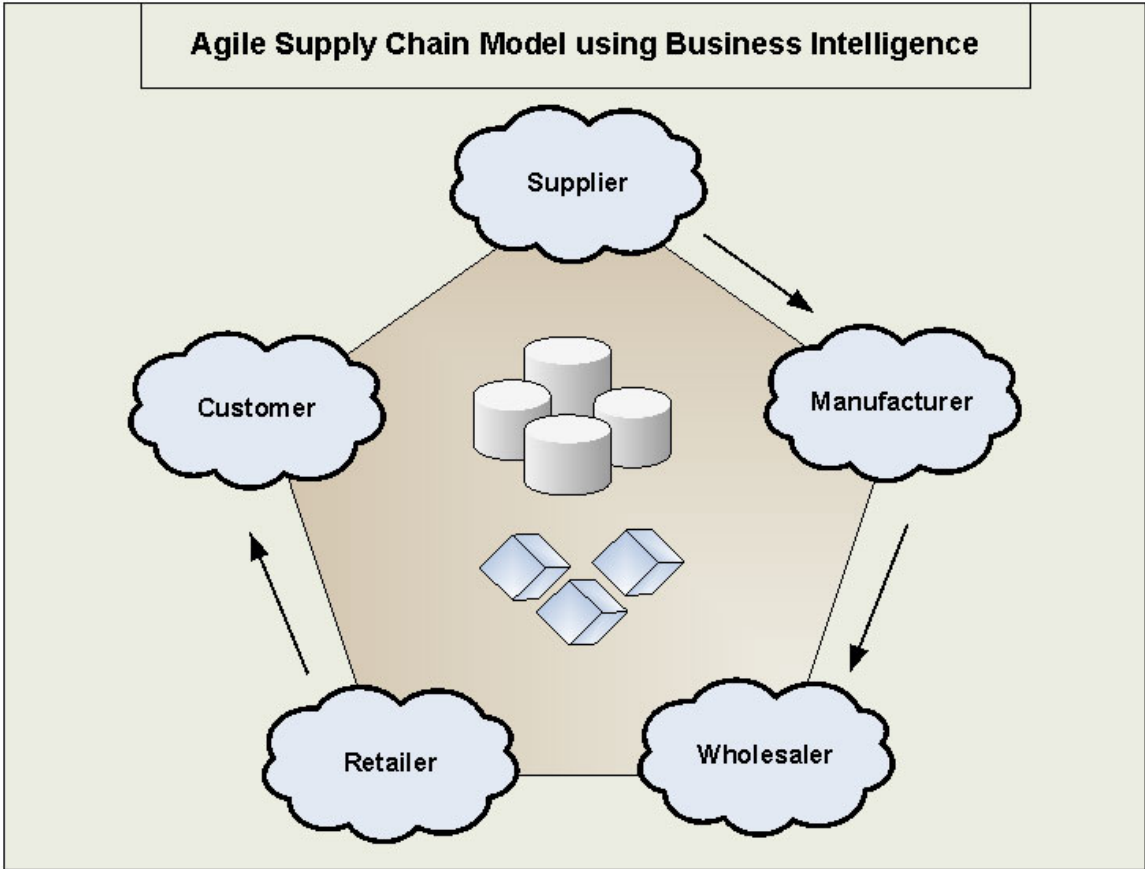
The most sought after goal of any business manager is increase in profits - which essentially stems from decrease in cost and increase in sales. There is little a manager in apparel industry can do about the external factors (exchange rate volatility of major Asian exporters, trade liberalization which grants the Asian competitors a generous access to US market) but there is lot which can be done about the internal factors to boost profits. This, however, is dependent on the '*analytics*', the insight that is gained by observing sales trends (finding out the regions which are profitable, the brands which sell more, the locations which have higher sales volume, the stores which have consistently high sales figures) and similar facts. While most organizations have got tons of transactional data which is gathered by hundreds and thousands of transactions which take place daily, getting sense out of that data is a complex problem - a problem which has become more complicated when supply chains have transcended the geographical boundaries and are spread across continents - a problem requiring sophisticated algorithms, a problem which data warehouse vendors, OLAP (Online Analytical Processing) services providers and BI (Business Intelligent) solution providers have been trying to solve for last many years. They have tried to convert '*crawling*' supply chains into '*agile*' supply chains with varying success. The importance of sales data and getting insight from it can be gauged from the Global Data Management Survey of 2001 by PricewaterhouseCoopers which states that '*Companies that manage their data as a strategic resource and invest in its quality are already pulling ahead in terms of reputation and profitability*'. The magnitude of the quality problems, recently unearthed in offshore production model, also call for more careful monitoring of supply chains⁴. This paper presents an overview of the problems faced by US apparel industry, some high level details and the benefits of the proposed solution.

- The problem

Apparel is a big industry, and getting complicated. US department of commerce data (July, 2007) reveals that apparel imports increased by 9.3% (worth \$28.1 billion) during January-May 2007, compared to January-May 2006. Apparel industry, like the other industries around the world, strives to bring efficiency in their processes by minimizing the inventory & lead times and thus maximizing the sales. Sophisticated statistical techniques and complex algorithms are used to forecast the sales volume, using previous sales figure as input, and production is done accordingly. From steel mills to apparel industry, and retail

chains to electronic vendors, this is an established model of doing things. The supply chain models, used by the industries, can be classified as *agile* model and *crawling* model. A crawling supply chain is marked with inefficiency, when different stake holders are unaware of the exact status of other entities and are thus unable to calculate its impact on them. An agile supply chain, which relies on BI and OLAP tools, is marked with efficiency, where management is able to ascertain the exact status of different entities (manufacturer, supplier, retailer, wholesaler etc) and take timely decisions which can help increase the profits. (A typical example: find the brand which is not selling well, decrease its orders and ask the manufacturer to focus on those brands which sell well). Some of the OLAP vendors include Hyperion, Cognos, Business Objects and MicroStrategy. For the last some years, data base vendors have started providing OLAP modules providing BI analysis in their software. Some examples are Microsoft SQL Server 2000 with Analysis Services, Oracle with Express and Darwin, and IBM with DB2.





- How is Apparel industry different from others?
 Due to its very nature (a substantial part of sales based on current fashion trends), it's difficult to forecast the demand based on previous sales data. The fact, that Pareto Law (80% (or so) profit comes from 20% products) is very valid in apparel industry, makes the forecasting task very difficult if not impossible. An absence of precise (and even close) forecast reduces the profit chances because 1) if styles are over-produced, it leads to increased inventory costs 2) if they are produced in smaller quantity, the risk of customer dissatisfaction increases (when the styles go hit). The difference in either direction, call it delta d (Δd), causes decrease in profits (P).

$$\text{(Increase) } \Delta d \quad \rightarrow \quad \text{(Decrease) } P$$

- Why is managing the Apparel supply chain so important?
 Above equation suggests that any increase in Δd leads to decrease in profits and should be immediately tackled. The apparently simple problem boils down to a simpler one:

How to observe sales figures and the market trends?

This might seem naïve, almost all sales data is recorded in transactional databases (OLTP) and observing the sales trend should not be a problem at all. But that precisely is the problem. The transactional databases perform the task they are designed for i-e storing the *transactions*. Getting just a simple report out of them is a tedious task. The answer lies in Online Analytical Processing Systems - OLAP (or management information systems (MIS), data warehouses (DW), decision support system (DSS), executive dashboards, enterprise resource planning systems (ERP), business intelligence (BI) software. The boundary is blurry and demarcation not very precise). Queries like 'what is the week of the year on which a company sold the maximum sweaters in November 2005, or what was the most sought after style in region 'North' in December 2004' can be best answered from OLAP and not from OLTP. These queries are asked to enhance one's knowledge of the business and to observe the KPIs (Key Performance Indicators).

- o What can Apparel industry learn from other industries? (Wal Mart, Amazon)

Latest advancement in internet and computer technology, and innovations being used in other industries is giving rise to some interesting concepts. *Lean retailing*¹ is just one example - suggesting that retailers should compel the suppliers to replenish supplies at shorter intervals with smaller quantities when there is surge in product proliferation and customers. The example of Amazon.com, one of the few survivors of dot com bubble crash, reveals that having an *optimized* supply chain is more important than having an impressive e-commerce model. The competition between companies often gets translated into competition between supply-chains, an arena where only business intelligence can help. Informationweek² reports that "Amazon's supply chain is so tightly integrated that when an online customer buys a couple of books and a CD, the order-management system communicates with inventory and warehouse-management systems to find the optimal distribution center or centers for fulfilling the order. The customer knows in less than a minute how long it will take to ship the items and whether they will come in one package or separately". No wonder Amazon was included in the '10 best supply chains of 2004'⁷.

Wal-Mart example, the largest grocery retailer and toy seller in the US, shows that the most important factor of its profitability is an optimized supply chain, which helps it in maintaining "just-in-time" inventory, thus greatly decreasing the costs of

inventory management. This process is supported by increasing use of Radio Frequency Identification (RFID). A mindset that considered '*information*' as '*asset*'³ made Wal-Mart a favorite case study at business schools around the world. This 'asset' approach is epitomized by the statement of Sam Walton, the founder of Wal-Mart, "People think we got big by putting big stores in small towns. Really, we got big by replacing inventory with information⁵". Wal-Mart was yet another star of the coveted '10 best supply chains of 2004'⁷ and an example for apparel industry that increased knowledge of all the stake holders of business i-e manufacturer, supplier, wholesaler, retailer and customer leads to efficiency that is convertible into profits.

- The solution

The knowledge, that helps Amazon, Wal-Mart and hundreds of companies around the world turn *information* in to dollars can only be provided with a Business Intelligence (BI) system that provides the insight, a 'what-if' analysis, that is not provided by even efficient supply chain management systems.

- Benefits

Following is the list of some of the questions which get answered when a business intelligence solution is deployed in an apparel enterprise

- What are the most profitable regions in this quarter? How does this information differ from the previous 4 quarters?
- Which SKU have highest sales volume? What is the difference in prices of highest selling SKU with lowest selling SKU? What is the trend of change in this difference for last 5 years?
- Which store adds largest share to the overall sales volume? What is the percentage variation of this store for the last 5 years?
- Which brand is consistently performing well for the last 3 years? What is the year and quarter wise difference in sales volume between this brand and the lowest selling brand?
- Which region had the largest difference in sales in two consecutive years?
- Which styles are consistently selling low for the last 4 years? Is their combined percentage of total sales volume increasing or decreasing?

- Which months show greatest sales in a year? How does this information differ among the regions? Among the stores?
 - Which brands sell more in highest sales months? What is the sales pattern for last 4 years?
 - What is the cost of production of largest selling styles? What is the comparison of these styles with most profitable styles?
 - What is the weekly sales analysis of a particular region in last 5 months? Which SKUs sell more in first week and which sell more in last week of a month? What is the trend of this information for a year?
 - Which are the top 5 suppliers to the enterprise in terms of dollars? What is the trend of this information for last 5 years?
 - Which are the top retailers of the enterprise in terms of dollar sales? How does this information differ from region? What is the pattern for last 6 years?

- Is Business Intelligence (BI) the silver bullet?

There is none all-encompassing silver bullet and BI should not be taken as one. The picture painted by OLAP vendors and BI solution providers is often rosy and does not mention the risks and pitfalls associated with them. Any claim by the vendors should be evaluated on objective grounds and the risks and pitfalls should be considered with extreme care. Prudence that is shown at the time of such analysis can save millions of dollars down the road.

 - Risks and Pitfalls

A survey by Business Week Research Services⁶ lists the reasons of failure of BI projects and the risks and pitfalls which should be avoided when implementing one. Any CIO or CEO going for a BI solution should be considering the following risks: Lack of user adoption, *liquid* requirements which keep changing, *trust deficit* that exists between business and IT users, a general lack of interest for BI initiatives, inconsistencies in the legacy data (resulting in problems which are encountered at the ETL (Extract, Transform, Load) phase, security issues and inadequate funding issue.
 - Remedial Measures
 - A high level of ownership among all stake holders is essential for the success of any software project - a BI project being no exception.

- The BI solution provider must be asked to provide a POC (Poof of Concept) of his product⁸.
- The BI solution provider must be asked to present a strong value proposition of using his solution. The value proposition should mention in detail the expected return on investment.
- Past performance of the BI solution provider must be taken into consideration before his selection.
- Extreme level of prudence should be exercised before finalizing a product/solution provider. Getting a prototype first before going for a full fledged solution is advised.

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