

## **REPORT ON CPFR (Enhance Supply Chain Integration)**

The last several year has witnessed an explosion of interest in business collaboration. This report looks at the latest form: collaborative planning forecasting and replenishment (CPFR). It looks at the possible benefits of business collaboration based on several pilot projects and pro-forma analysis and describes in some detail a case study, focusing on the mechanics of the CPFR process and its benefits.

### **Introduction**

One can classify inventory into two types: process time inventory and decoupling inventory<sup>1</sup>. Process time inventory is carried during the time that the inventory undergoes another process, such as manufacturing (work-in-process inventory) or transportation (in-transit inventory). This inventory can be reduced only if the underlying process is sped up.

The amount of time that material and goods spends in process inventory is typically dwarfed, however, by the time it is spending in decoupling inventory, in-between processes. That inventory is the subject of most of the work in logistics and supply chain management. Decoupling inventory ensures that the process that feeds it and the process that it feeds work at their peak efficiency. It is also the inventory that is stationary and it adds no value to the enterprise, aside from its enabling role regarding the processes around it. Decoupling inventory results from consideration of lot sizing, anticipation, and safety stock.

The focus of this report is on decoupling inventory and in particular on safety stock. The main problem facing retailers is out-of-stock (OOS) situation, which could, of course be remedied by extra safety stock, but the carrying cost of such inventories is prohibitive. Another possible remedy for OOS is better forecasting. Statistical forecasting, however, is fundamentally limited in predicting the future in an environment where the underlying buying behavior may change due to promotions, competitive product introductions, market entry and exit of retail chain, etc.

It has been long recognized that one of the most efficient methods for improving forecast accuracy and increasing service, while reducing costs, is better collaboration between trading partners. To this end, many supply chain partners have devised inter-enterprise collaboration processes to move the information to where it can add value and better coordinate supply chains.

### **Collaboration Efforts**

The 1990-s saw an explosion of collaboration attempts. Dixon and Porter (1994) describe JIT II, a process initiated by BOSE, the audio system manufacturer. Under JIT II, BOSE brought key suppliers in-house and gave them authority to function as an integral part of the BOSE material and purchasing systems. The process replaced traditional buyers, planners, and salespeople with "in-plant" supplier personnel, thereby freeing up buyers' time to conduct value added activities. At the same time it gave the in-plant supplier representatives a better understanding of their customer's changing needs.

The Efficient Consumer Response (ECR) movement began by the grocery industry in the US in 1993 and continued in Europe, the ECR Board (1995) defined the mission of the process as "working together to

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<sup>1</sup> Inventory accumulated between two inter-dependent operations as a buffer against breakdowns or unevenness in machine production rates, thus reducing the need for output synchronization. Also called intermediate stock.

fulfill consumer wishes better, faster and at less cost." As described by King and Phumpier (1996), ECR focused on category management (enhancing the effectiveness of the demand creation and satisfaction process through better promotions, new product introductions and store assortment); product replenishment with high consumer service and low inventories; and the development of enabling technologies.

Continuous Replenishment Programs (CRP) has been frequently cited as key processes in the quest toward ECR implementation. Yet CRP implementation, rife with challenges, requires the management of new and more abundant sources of information and an understanding of the unique "rules of engagement" associated with each new relationship established among trading partners.

In response to strong offshore competition, the American apparel industry in the early 1990-s started to formulate the set of initiatives known as "Quick Response" (QR). The QR leadership committee (1994) commissioned by the apparel industry defined the QR process goal to "continually meet changing requirements of a competitive market place which promotes responsiveness to consumer demand, encourages business partnerships, makes effective use of resources and shortens the business cycle throughout the chain from raw materials to consumer."

Both of the ECR and QR initiatives were slowly adopted across the respective industries that spawned them. They did help change attitudes and create the realization that companies must look beyond their own boundaries to achieve high level of customer service and low costs. The collaborative aspect of these processes, however, were never implemented as originally envisioned on a large scale, mainly due to the cultural difficulties associated with collaborative management and the lack of scale able software.

Another approach for mitigating the communications problems between retailers and their suppliers is to let the vendor manage the retailer's inventory<sup>2</sup>. In its purest form, vendors get information on sales and inventory levels and are committed to keep a certain level of service. This allows manufacturers to control the entire cycle of sales and order forecasts, order placement and replenishment. It also allows them to pull the forecasting risk across all their customers (see, for example, Bernstein, 1997). Retailers, naturally, enjoy lower inventory carrying costs since the suppliers carry the product until it is sold. In reality most VMI programs cover only the retailers' distribution centers and not the stores.

Many VMI programs have been discontinued since retailers were not satisfied with the lack of collaboration with their suppliers as well as with the forecasting ability of the suppliers, which led to low level of service. Thus, many of them turned into Co-Managed Inventory (CMI) or Joint-Managed Inventory (JMI) processes. These include a more detailed business process, which is mapped out front, and an explicit involvement of both sides in the sales and order forecasting and in the process of generating the replenishment orders<sup>3</sup>.

### **Collaborative Planning Forecasting and Replenishment**

All the initiatives mentioned are aimed at coupling supply chain more tightly by allowing for better forecasting and planning through information sharing, leading to synchronized channels. In other words, if suppliers have better visibility into the retailers' sales forecast they can plan their operation better and

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<sup>2</sup> This is referred to as VMI – Vendor-Managed-Inventory.

<sup>3</sup> In 1998 – 1999 Kmart went from 300 VMI relationships to less than 50 CMI relationships. While requiring more intensive effort, these relationships provided the collaborative benefits which Kmart sought.

if they have better visibility into the retailers' order forecast they can plan their replenishment better. By the same token, retailers can lower the frequency of their OOS conditions and mitigate their consequences by getting continuous information about the replenishment status.

While some of these initiatives were adopted more widely than others, clearly they all contributed to the recognition, by leading retail and manufacturing participants, of the need for cooperative information exchange. Many of the expected benefits of these ideas failed to materialize since trading partners could not work with enough partners for the collaboration to "scale," and thus none of these initiatives developed a critical mass of participants. Consequently no partner could experience better forecasting of either sales or orders on a scale that would impact the bottom line. A significant part of the problem had to do with the EDI technology, which was the cornerstone of all the collaboration initiatives mentioned above.

Under CPFR, both trading partners develop a joint business plan, which includes a promotion calendar. The retailer and manufacturer agree on a joint sales forecast and a joint order forecast<sup>4</sup>. The joint sales forecast can drive production scheduling, distribution planning, and store activity planning. Any changes from any of the forecasts, beyond an agreed-upon threshold are defined as exceptions, which generate collaborative actions by both parties to re-align the planning for the channel.

One of the main differences between CPFR and other collaborative arrangements is that under CPFR, both parties are informed of exceptions, which generate the collaborative activities aimed at resolving these exceptions. Modern exception algorithms used by advanced CPFR software can compare any two data streams and generate exceptions. Furthermore, these exceptions can be for data aggregates (like a sales forecast for a family of SKU-s or a group of stores), thus increasing substantially the value of the process and the software.

### **Value of CPFR**

There have been many reports on the benefits of CPFR. The CPFR documents available on the VICS Committee site<sup>5</sup> describe the results of several pilot projects<sup>6</sup>.

These projects achieved 30% - 40% improvements in forecast accuracy, significant increases in customer service, sales increase between 15% and 60%, and reductions in days of supply of 15% - 20%.

AMR (Advanced Research) reported on the range of results actually achieved by many early adopters of CPFR. Their report is summarized in table given below:

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<sup>4</sup> Order forecasts account for retailer-generated adjustments due to changes in assortments, store availability, competitive products, etc.

<sup>5</sup> [www.cpfr.org](http://www.cpfr.org)

<sup>6</sup> The pilot projects include Wegman's and Nabisco; Kmart and Kimberly-Clark; Wal-Mart and Sara Lee; and Procter and gamble with five retailers (Target, Tesco, Meijer, Sainsbury's and Wal-Mart)

<b>Retailer Benefits</b>	<b>Typical Improvement</b>
Better Store Shelf Stock Rates	2% to 8%
Lower Inventory Levels	10% to 40%
Higher Sales	5% to 20%
Lower Logistics Costs	3% to 4%
<b>Manufacturer Benefits</b>	<b>Typical Improvement</b>
Lower Inventory Levels	10% to 40%
Faster Replenishment Cycles	12% to 30%
Higher Sales	2% to 10%
Better Customer Service	5% to 10%

### **Conclusions**

CPFR is the latest in an array of collaborative schemes aimed at better coordinating supply chain, thereby squeezing out decoupling inventory from the system. The roots of CPFR can be traced to the ECR and VMI/CMI initiatives. Unlike these initiatives, however, CPFR was designed as a balanced collaborative approach where all forecasts and exception are communicated to both retailers and manufacturers and the collaborative process of solving these exceptions is carefully laid out. It is also supported by much more robust software – in particular, strong exception engines that can deal with a very large number of retail selling points, vendors, and SKU-s, as well as various aggregations of these data.

As one contemplates the future of collaboration, several trends are emerging:

- Companies are accelerating their collaborative relationships – whether CPFR, Just-in-Time, ECR, CMI, or many other initiatives – companies are getting on board.
- Companies are finding new and innovative ways to collaborate. For example, Procter and Gamble has implemented CPFR not only with some of its retail customers, but also with its suppliers, and even inside the company, between functions and divisions.