



# Collaborative Planning, Forecasting & Replenishment (CPFR<sup>®</sup>)

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May 3<sup>rd</sup> 2008

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OMS 6056 Managing Supply Chain Operations

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## Introduction

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The retail industry, and the global business environment as a whole, continues to face increasing competitive pressures in an economic environment that is becoming ever more volatile. Industry consolidation, new channel development, global competition, and shorter product life cycles have made obtaining a competitive advantage more elusive and more difficult to maintain. One of the ways in which many firms have tried to overcome these challenges and establish an advantage has been through their supply chains. Firms have made great efforts to improve supply chain performance as a means to achieve competitive advantage. These efforts at supply chain improvement initially started with the areas that the firm could control internally such as inventory management, process improvement, and quality. These improvement initiatives naturally progressed externally to include collaboration between the firm and its suppliers as well as between the firm and its customers. Successful collaboration between firms requires a great deal of trust and has subsequently been difficult to attain. Collaboration has become, in a sense, the holy grail of supply chain improvement and has been referred to as the driving force behind effective supply chain management.<sup>1</sup>

Professor Pallab Saha at the University of Singapore defines a collaborative partnership as an “inter-enterprise concept developed and practiced between multiple independent organizations in a vertical relationship within a supply chain.”<sup>2</sup> According to Saha, businesses are “starting to experience the limits of accruing business benefits out of supply chain management within their own boundaries.”<sup>3</sup> These limitations have led organizations to focus on supply chains outside of their own organizational boundaries and bring in trading partners. With the advent of faster technologies in the late 1990’s these partnerships have become a more likely possibility.

A highly recognized collaboration initiative used in the retail industry is Collaborative Planning, Forecasting, and Replenishment (CPFR<sup>®</sup>). CPFR’s underlying premise is that broad integration of firms within the supply chain will lead to a better focus on customers through the development of a single shared forecast of demand and a reduction of lead times. The benefits resulting from a successful application of CPFR include reductions in stock-outs, improved inventory management, shorter cycle times, increases in sales revenues, stronger relationships between trading partners, better overall system visibility and customer service, and improved cost structures. Pallab Saha suggests that compelling benefits of utilizing CPFR also include enhanced relationships, better category management, improved product offering, reliable and accurate order

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1 Ellram, L.M. and Cooper, M.C. (1990), “Supply chain management, partnerships, and the shipper-third party relationship”, *International Journal of Logistics Management*, Vol. 1 No. 2, pp. 1-10. & Horvath, L. (2001), “Collaboration: the key to value creation in supply chain management”, *Supply Chain Management: An International Journal*, Vol. 6, No. 5, pp 205-7.

2 Saha, Pallab. “Factors Influencing Broad Based CPFR Adoption”.

[http://www.vics.org/committees/cpfr/academic\\_papers/Factors\\_Impacting\\_CPFR\\_Adoption\\_\(VICS\).pdf](http://www.vics.org/committees/cpfr/academic_papers/Factors_Impacting_CPFR_Adoption_(VICS).pdf)

3 Ibid.

forecasts, and improved technology return on investment. According to the Gartner Group, “Enterprises that collaboratively integrate disparate forecasting systems...will improve revenue predictability by 10 to 25 percent and decrease inventory carrying costs by more than 30 percent over a three-year period.”<sup>4</sup>

Unfortunately, the dream of inter-firm collaboration leading to supply chain improvement has yet to be realized on a large-scale basis. According to the Voluntary Interindustry Commerce Solutions (VICS) Association, this lack of adoption is due to the following challenges: (1) selecting the right partners and products with which to implement CPFR, (2) establishing discipline for regular and periodic performance measurements, (3) committing to implement CPFR on a broad scale, (4) aligning corporate philosophies with CPFR philosophies and (5) managing organizational changes that may be required.

CPFR has been generally limited to collaboration between a retailer and only one major supplier, providing evidence that the broad integration of the CPFR initiative set out to achieve has been unrealized. This lack of adoption poses fundamental questions: Is CPFR another initiative with a great sounding name that will fail to live up to its potential, or will it eventually lead to transformation of the supply chain on a broad scale? If CPFR is capable of transformation, what are the driving forces that will promote or impede its adoption?

## Predecessors to CPFR

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CPFR is not the first initiative aimed at increasing collaboration and information sharing between trading partners in order to achieve improvements in supply chain management. There have been a number of widely known initiatives started with this goal in mind. It is also likely that countless initiatives have been undertaken within many companies with varying practices and mixed results. The following initiatives are fairly well known and even interact and enhance the application of CPFR.

*Vendor-Managed Inventory (VMI)*, introduced by Kurt Solomon Associates in 1992 is perhaps the most widely known system for managing supply chains.<sup>5</sup> Under VMI, the buyer authorizes the supplier (i.e., vendor) to manage the inventory of a set of stock-keeping units (SKUs) at the buyer's site(s) under agreed-upon parameters (e.g., minimum and maximum inventory targets). The buyer provides the supplier with sales and/or inventory-status information; and the supplier makes and implements decisions about replenishment quantities and timings. VMI reduces information distortion, which is one cause of the bull-whip effect. In addition, VMI provides the supplier with the opportunity to better manage its own production, inventory, and transportation costs. In

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4 Hennel, M.J. “There’s Only one Answer to Demand Management,” ITtoolbox Supply Chain Management Knowledge Base. September 27, 2002.

5 <http://www.kurtsalmon.com>

exchange, the buyer typically receives price discounts or improved terms of payment from the supplier.

*Efficient Consumer Response (ECR)* is a consumer goods (primarily grocery) initiative aimed at improving responsiveness to consumer demand and reducing inefficient practices, costs, and waste in the supply chain. This is basically an application of JIT to retail distribution.<sup>6</sup> The consumer products industry was in the midst of a fundamental shift in attitudes concerning traditional business practices among its participants, particularly as those practices relate to trade promotions and replenishment of products across the supply chain. Contributing to this shift were significant advancements in information technology, growing competition, and global business structures, and changes in consumer demand. This shift in attitude crystallized in the formation of an industry-wide working group and the issuance of a report in late 1992 that set the stage for what has come to be known as the Efficient Consumer Response (ECR).

*Quick Response (QR)* or Rapid Response comes primarily from the fashion and textiles industry. It was innovated by Milliken & Company in the early 1990's and subsequently codified by VICS,<sup>7</sup> the same organization that oversees the codification and standardization of CPFR practices. QR in the simplest sense is a next generation, codified version of ECR. Central to the initiative is flexible and responsive production that relies on customers along the supply chain to define when, where, and how much of a given product is needed. The initiative has four levels of application and technology. Levels 1 and 2, for example, involve retailer inventory-status information-sharing and automatic order-processing between retailer and supplier. Levels 3 and 4 include VMI and cross docking warehouses.

Although VMI and QR might be the best-known management systems among both practitioners and academics, perhaps the most highly regarded systems are proprietary systems developed by large retailers, such as Wal-Mart's *RetailLink*, Kmart's *Workbench*, and Target's *Partners Online*. Although the detailed inner workings of these systems are closely guarded secrets, they all have two common characteristics: (1) The sharing of transactions-level data among partners and (2) The use of agreed-upon metrics (e.g., in-stock, inventory-turnover, and on-time delivery measures) and targets to assess partner performance. Both characteristics are central to CPFR.

*RetailLink*, for example, captures sales, inventory, and delivery-related data for every SKU at every Wal-Mart facility (i.e., store and distribution center) and uploads it to a central database at least every 24 hours. These data, and metrics based upon them, are made available to every manager and every company up or down the supply chain whose performance is related to this SKU. How this shared information is used and whether the decisions based on it are made centrally or de-centrally depends on both the specific partnership agreement and the type of product(s) being managed. Similarly, who does the

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6 Hill, Arthur V. & Iossifova, Albena. "Collaborative Planning Forecasting and Replenishment" A.V. Hill Associates. 2001.

7 <http://www.milliken.com>

implementation and how it is done is specific to the partnership and product(s). To illustrate: Wal-Mart generally centralizes decision-making but decentralizes implementation for Wal-Mart and Sam's Club facilities, while delegating decision-making and implementation to its suppliers. Regardless of which party makes or implements the decisions, the quality of the decisions and their implementation are continually monitored by all parties and compared to the agreed-upon targets.

## Overview of CPFR

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### *Origins*

CPFR originated in 1995 as an initiative co-led by Wal-Mart and consulting firm Benchmarking Partners. This initiative originally was called Collaborative Forecasting and Replenishment.<sup>8</sup> With assistance from Benchmarking Partners and IT firms such as IBM, SAP, i2, and Manugistics, Wal-Mart and Warner-Lambert implemented the first pilot of CFAR to increase sales, reduce inventory, and improve the in-stock position of Listerine, the project's pilot product.<sup>9</sup> Since this project, CPFR has evolved and is a strategic initiative implemented by many companies throughout North America and Europe. In 2003, it was estimated that in the United States alone, more than \$15 billion in the supply chain is managed by CPFR. VICS created guidelines for CPFR in 1998. Since the development and publication of these guidelines, over 300 companies have successfully implemented CPFR. The implementation of CPFR has also extended to industry sectors beyond retail, including high-tech industries. Rosettanet, a non-profit consortium of high-tech firms, has developed a collaborative forecasting standard for applying CPFR practices to that industry. Today, the VICS CPFR Committee works "to develop business guidelines and roadmaps for various collaborative scenarios, which include upstream suppliers, suppliers of finished goods and retailers, which integrate demand and supply planning and execution."<sup>10</sup>

### *The Model*<sup>11</sup>

The CPFR model offers a general framework by which a buyer and seller can use collaborative planning, forecasting, and replenishing processes in order to meet customer demand. To increase performance, the buyer and seller are involved in four collaboration activities that are listed in logical order, but companies often engage in these activities simultaneously. (See Appendix I)

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8 <http://en.wikipedia.org/wiki/CPFR>

9 Sherman, Richard J. (1998), "Collaborative Planning, Forecasting & Replenishment (CPFR): Realizing the Promise of Efficient Consumer Response Through Collaborative Technology", *Journal of Marketing Theory & Practice*, Vol. 6 Issue 4, pp. 6-10.

10 <http://www.vics.org/committees/cpfr/>

11 Voluntary Interindustry Commerce Standards, CPFR: An Overview of the Model, May 2004.

[http://www.vics.org/standards/CPFR\\_Overview\\_US-A4.pdf](http://www.vics.org/standards/CPFR_Overview_US-A4.pdf)

The first collaboration activity is Strategy and Planning. In this activity, the buyer and seller come to an understanding about their relationship and establish product and event plans. The second activity is Demand and Supply Management in which customer demand and shipping requirements are forecasted. Execution is the third collaboration activity and involves placing, receiving, and paying for orders, and also preparing, delivering, and recording sales on shipments. The fourth and final activity is Analysis. For this activity, the execution step is monitored and key performance metrics are measured to work towards continuous improvement. Collaboration efforts do not need to apply all four activities. “CPFR Lite” can be implemented, which concentrates on some activities while the rest are achieved through standard firm processes.

The CPFR model breaks down the activities into further detail. Eight collaboration, retailer, and manufacturer tasks are associated with the model. Two sets of tasks, one for the retailer and one for the manufacturer, are associated with each of the four activities listed above. The retailer and manufacturer tasks are called enterprise tasks and link business-to-business collaboration tasks to the entire enterprise operations. (In the next section, the activities are underlined and the tasks are in italics. Appendix II)

### Strategy and Planning

The first collaboration task under this activity is *Collaboration Arrangement*, which is a method for defining the relationship in terms of establishing business goals, defining the scope, and assigning checkpoints and escalation procedures, roles, and responsibilities. The retailer task related to this collaboration task is *Vendor Management*, and the manufacturer task is *Account Planning*. The second collaboration task is *Joint Business Plan*. This task pinpoints the major actions that affect supply and demand in the planning period. Examples of these are introducing new products, store openings and closings, changing inventory policy, and promotions. The retailer task associated with this is *Category Management* and the manufacturer task is *Market Planning*.

### Demand and Supply Management

*Sales Forecasting*, which projects point-of-sale consumer demand, is one of the collaboration tasks associated with this activity. The retailer task here is *POS Forecasting* and the manufacturer task is *Market Data Analysis*. The other collaboration task is *Order Planning/Forecasting* which uses factors such as transit lead times, sales forecast, and inventory positions to determine future product ordering and requirements for delivery. The associated retailer task is *Replenishment Planning*, and *Demand Planning* is the associated manufacturer task.

### Execution

The first collaboration task under the Execution activity is *Order Generation*. This task transitions forecasts to demand for the firm. The retailer task related to this collaboration task is *Buying/Re-buying*, and the manufacturer task is *Production and Supply*. The second collaboration task is *Order Fulfillment* and this is the preparation of

products for customer purchase through the process of producing, shipping, delivery, and stocking. In this case, both the retailer and manufacturer task is *Logistics/Distribution*.

### Analysis

*Exception Management*, which oversees the planning and operations for conditions that are out-of-bounds, is one of the collaboration tasks associated with this activity. The retailer task is *Store Execution* and the manufacturer task is *Execution Monitoring*. The other collaboration task is *Performance Assessment* which calculates important metrics in order to discover trends, develop other strategies, and assess the attainment of business goals. The retailer task here is *Supplier Scorecard* and the manufacturer task is *Customer Scorecard*.

The model described here is a two-tiered model. However, this model can be extended to include more than two layers in the supply chain. VICS calls this N-tier Collaboration, which is a relationship that develops from retailers through manufacturers/distributors to suppliers.

### *CPFR Scenarios*<sup>12</sup>

The CPFR model is designed to fit many scenarios. However, when looking at the leading CPFR deployments, four particular scenarios have dominated. VICS summarized these scenarios in order to help companies that are considering a CPFR implementation. These scenarios do not need to be exclusive and can be combined if it is fitting. (See Appendix III)

The first scenario is *Retail Event Collaboration*. Retail events, such as promotions, can cause large fluctuations in demand that result in not enough or excess inventory and additional logistics costs. Therefore collaboration efforts are often focused on this topic. Usually on a quarterly or annual basis, trading partners will establish a joint approach to the retail event. Then the effect the event will likely have on distribution and demand will be agreed upon. Consequently, the orders, delivery, and store execution will take place. Any exceptions that occur during this process will need to be dealt with, and the process ends with a performance evaluation.

The second scenario described is *DC Replenishment Collaboration*, which is an enhancement to continuous replenishment programs (i.e. co-managed inventory, vendor managed inventory). This scenario presents a combined order commitment process at various horizons beyond a single lead-time. Retailers are able to lessen their inventory liability and stock-out risk because manufacturers can adopt a make-to-demand policy. DC Replenishment Collaboration broadens the replenishment process throughout the supply chain, from raw materials to the store shelf. Benefits to this include better accuracy due to improved visibility, overstock/out-of-stock reduction, and aligned production capacity.

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<sup>12</sup> Ibid.

*Store Replenishment Collaboration* is the third scenario presented by VICS. In order to create an optimal replenishment plan, this type of collaboration leverages the knowledge of both the manufacturer and retailer. The partners work together on POS forecasts, assortment optimization, replenishment parameters, store clustering, and presentation stock. This scenario often directly affects shelf availability because it concentrates heavily on the consumer. Benefits of store replenishment collaboration are improved promotional execution, reductions in overstock, improved in-stocks, and better promotional execution.

The final scenario explained is *Collaborative Assortment Planning*, which is used in industries with seasonal demand and short lifecycle products. Since past data is hard to use when planning in this instance, there is a strong reliance on collaboration to interpret consumer preferences, macroeconomic factors, and industry trends. This process helps suppliers and retailers maximize their profit by coordinating their merchandising decisions through the joint development of financial and product models. The result is a planned purchase order for every item that is shared prior to a show where final decisions are made.

## CPFR implementation

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### *Information sharing*

Information sharing, such as demand information and upcoming promotions and sales forecasts, is one of the keys to success in CPFR. Barriers to information sharing are often not technology but the fear that other parties involved in a collaborative relationship may use information to gain competitive advantages<sup>13</sup>. Such obstacles can be overcome by implementing pilot projects, realizing the benefits, and then moving over to an organization wide implementation.

### *Technology*

The VICS CPFR process does not fundamentally depend on technology. Broadly, CPFR specifications, recommendations, and discussion of technical implementation criteria falls into the following four areas: Data format standards, network protocol guidelines, security considerations, and application/middleware. VICS released extensible Markup language (XML) specifications to serve as one of the guidelines for standardization in 2001<sup>14</sup>. During the last five years, many vendors have come up with different packages to facilitate information sharing. For example, IBM Global Service offers a Service Oriented Architecture (SOA)-enabled solution that provides interoperability, standardization, flexibility and scalability to realize all the benefits of

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13 Electronic source: [http://www.vics.org/meetings\\_events/cpfr\\_course\\_facilitators/](http://www.vics.org/meetings_events/cpfr_course_facilitators/) - Johanna Småros, Dr Kary Främling, 2001

14 VICS CPFR XML Messaging Model, June 25, 2001

CPFR<sup>15</sup>. Data security, standardization, and interoperability are some of the key parameters that should be considered in a CPFR package. Scalability is another requirement as companies engage in collaborative relationships with multiple trading partners and move from pilot projects to an organization wide implementation. Another aspect of technology and processes to be considered is standardization. Following uniform and universal standards reduces complexities, which results in faster adaptation among various trading partners.

### *Steps and Phases*

With CPFR, trading partners agree to develop a collaborative business relationship based on exchanging information to support the synchronization of activities and to deliver products in response to market demand. The following nine steps for CPFR implementation are based on CPFR Voluntary Guidelines published by VICS. Broadly, the nine steps can be further classified under three different phases – Planning, Forecasting and Execution. The planning stage involves preparation to evaluate a company’s internal requirements and capabilities, trading partner segmentation, and implementation strategy<sup>16</sup>. The forecasting phase involves steps such as creation of sales and order forecast and exception handling, which is an ongoing iterative process. In the third phase, order execution and delivery are handled. In all three phases, trading partners work together to achieve common goals defined in the initial phase.

### *Phase I Planning*

#### Step 1 – Develop CPFR Front-end Agreement

The entities involved in a collaborative relationship (suppliers and buyers) establish guidelines and rules for the collaborative relationship. The Front-end agreement addresses each party’s expectations and the actions and resources necessary for success. To accomplish this, the two parties co-develop a general business agreement that includes the overall understanding and objective of the collaboration, confidentiality agreements, and the empowerment of resources (both actions and commitment) to be employed throughout the CPFR process. Appendix IV lists some key inputs to this step.

#### Step 2 – Create Joint Business Plan

In this step of the CPFR process, the entities (suppliers and buyers) exchange information about their corporate strategies and business plans in order to collaborate on developing a joint business plan. The partners first create a partnership strategy and then define category roles, objectives, and tactics. The item management profiles (e.g., order minimums and multiples, lead times, order intervals) for items to be collaborated on are established.

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15 Enabling CPFR with SOA: a flexible, scalable solution for collaborative supply chains by Paul Brody and Henry Dao, IBM Global Service, 2007

16 A Guide to CPFR Implementation by Accenture and ECR, Europe, 2001

## *Phase II Forecasting*

### Step 3 – Create Sales Forecast

In this step, retailer point of sale (POS) data, causal information, and information on planned events are used to create a sales forecast that supports the joint business plan. In Scenarios A, B, and C, this step is carried out by the retailer/distributor. In Scenario D, the manufacturer is responsible for creating the sales forecast. (See Appendix V) The sales forecast is generated by either or both parties for a given period with forecasting tools that make of all the relevant information and set guidelines (VICS, 2002).

### Step 4 – Identify Exceptions for Sales Forecast

This step identifies the items that fall outside the sales forecast constraints set jointly by the manufacturer and distributor. (The exception criteria for each item are agreed to in the Front-end agreement.)

### Step 5 – Resolve/Collaborate on Exception Items

This step involves resolving sales forecast exceptions by querying shared data, email, telephone conversations, meetings, and so on and submitting any resulting changes to the sales forecast. “Collaborative negotiations between buyer and sellers resolve item exceptions” (VICS, 2002).

### Step 6 – Create Order Forecast

In this step, POS data, causal information, and inventory strategies are combined to generate a specific order forecast that supports the shared sales forecast and the joint business plan. Actual volume numbers are time-phased and reflect inventory objectives by product and receiving location. The short-term portion of the forecast is used for order generation, while the longer-term portion is used for planning.

### Step 7 – Identify Exceptions for Order Forecast

This step determines what items fall outside the order forecast constraints set jointly by the manufacturer and distributor.

### Step 8 – Resolve/Collaborate on Exception Items

This step involves the process of investigating order forecast exceptions through querying of shared data, email, telephone conversations, meetings, and so on and submitting any resulting changes to the order forecast.

## *Phase III - Execution*

### Step 9 – Order Generation

This last step marks the transformation of the order forecast into a committed order. Order generation can be handled by either the manufacturer or distributor

depending on competencies, systems, and resources. Regardless of who completes this task, the created order is expected to consume the forecast.

## Strategic Assessment of CPFR<sup>17</sup> - Drivers & Barriers of CPFR Implementation

According to the “Global CEO Study 2006” done by IBM Global Business Services, external collaboration is indispensable<sup>18</sup>. CEOs stressed the overwhelming importance of collaborative innovation particularly beyond company walls. Business partners and customers were cited as top sources of innovative ideas, while research and development fell much lower on the list. Collaboration was often viewed as a “nice to have,” not a necessity. Since 2002, executives have increasingly focused on understanding the business value of collaboration and on enabling collaboration. (See Appendix V) Many of the collaborative pilots between top retailers and manufacturers have also achieved well-documented benefits.

There are three major challenges that have marred the widespread adoption of the CPFR initiative in supply chain-driven organizations: Trust, value, and business processes. These issues have undermined the vitality and the catalytic power of CPFR<sup>19</sup>. The following is an assessment of these challenges and potential solutions to each.

### *I) Trust between supply chain partners*

#### Concern

“Retailers and manufacturers believe there is a fundamental lack of trust between trading partners that stymies collaboration.<sup>20</sup>” Should a partner leak price points, strategy, or tactics to a competitor, the effectiveness of promotions would surely be undermined. However, the collaborative opportunity will not likely be met with conspirators looking to take advantage of trusting partnerships.

#### Resolution

Leading edge retailers are driving the need for supply chain partners to cut costs while at the same time improving service. They are creating data warehouses to share information such as customer loyalty, new items sales, and promotional effectiveness with their trading partners. Such sharing of information has led to higher quality information flowing through the supply chains, thereby increasing the efficiency and accuracy of planning, forecasting and replenishment and laying the foundation for a wide scale CPFR adoption. More importantly, a stronger strategic relationship has been the

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17 IBM Global Service. “Will you sell out or outsell? Collaboration Can Make the Difference.” 2002. ([www-1.ibm.com/industries/retail/doc/content/bin/sell\\_or\\_outsell\\_.pdf](http://www-1.ibm.com/industries/retail/doc/content/bin/sell_or_outsell_.pdf))

18 IBM Global Business Service. “Expanding the Innovation Horizon. The Global CEO Study 2006.

19 Ibid.

20 Forrester Research, November 2005

driver for pilot programs of companies who have adopted CPFR. Improved relationships have clearly become the most important benefit of its adoption.

## *II) Measuring value and financial results*

### Concerns

Wary of making big investments and seeing little or no returns, some companies don't see CPFR as an imperative for their enterprise right now. They feel there is no guarantee that they will see the financial results necessary to get company-wide buy-in.

### Resolution

Early adopters of CPFR did leverage better forecasting and planning through information sharing, which led to more efficient and streamlined channels and better visibility into the supply chain sales and order forecasts data. They were also successful in lowering the frequency of their out-of-stock conditions and mitigating the out-of-stock consequences by getting continuous information about the replenishment status. The highest benefits that have been achieved and recognized are improved product availability, inventory reduction, and process cost savings.

Companies should not wait for critical mass to make their move; now is the time to identify the right trading partners. Process improvements with just one partner can positively impact a company's bottom line. Trusted strategic partnerships take time to develop. Therefore, if one relationship is established through CPFR, the company has a business win. Companies should be scanning the horizon for partners who will provide short-term business gains and, ultimately, long-term scale. CPFR pilot programs must be viewed as strategic launch pads that steer the way to further ongoing process improvements and long term competitive advantage.

## *III) Insufficient organization/ process enablement*

### Concern

CPFR's process intensive nature and the need to synchronize changes between participants make internal cultures, organization, and processes important to the success of the collaboration.

### Resolution

Companies are required to be skilled in understanding how to effect change management. The most crucial prerequisite for successful CPFR implementations is to have strategic alignment<sup>21</sup> with participating partners as well as internally – alignment of the process, organizational and technology strategies with collaborative business strategies. Companies must refine its business strategy to focus on collaboration. A fair negotiation and reasonable arrangement that will benefit both sides of the trading partners is critical in creating a successful and collaborative relationship.

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21 "How Motorola Put CPFR into Action." Supply Chain Management Review. October 2007

### *Introduction*

Electronic gadgets such as mobile phones have short life cycles. Accordingly, a customer's preferences keep changing to keep in tune with the latest technology and features. This implies that a particular model that is selling well today can quickly become outdated and lead to obsolete inventory. Motorola had these challenges that it needed to overcome before it set out to implement CPFR. The company offers over 120 models of mobile phones globally. Accurate forecasting was essential to reduce stock outs and lost sales. But, accurate forecasting is complicated by the fact that each model can have multiple parameters such as color, band, mode, etc.

The task for Motorola was to identify how many models to make and sell, so as to reduce obsolete inventory. For retailers, it is essential to have the right model that the customer demands in its inventory. If the retailer does not have the model that the customer is looking for, the customer can switch loyalties and buy a competitor's product. Each customer lost will most likely result in lifetime revenue loss. There is a need to have an extremely responsive supply chain to meet customers' needs.

### *Challenges*

Prior to moving over to CPFR, the forecasting results were highly variable and replenishment was not tuned with customer demand. In a highly competitive and price sensitive market, it was necessary for Motorola to take steps to reduce costs and improve margins. To address these requirements, Motorola undertook a CPFR initiative in 2001. Goals included reducing forecast error by half, achieving a 30% drop in inventory, cutting channel inventory by 50% and improving on-time delivery by 30%. Typically, it is the retailer who undertakes a CPFR initiative and Motorola's CPFR initiative was a unique case of how a supplier took the lead in establishing a CPFR initiative. Both suppliers and buyers have significant advantage to be gained. "Motorola recognized that the successful achievement of its CPFR benefits rested on the coordinated changes to the organizational structure and business processes of both participants". There were several barriers that Motorola had to deal with in the implementation phase – difficulties with coordination of real time information, significant investments of time and personnel, lack of scalability, among others.

### *Implementation*

It was important that the operations team at Motorola was strategically aligned to collaborate and to meet the goals of CPFR. The core operations team employed both Motorola and customer metrics in its goals and performance plans. For a six month pilot,

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<sup>22</sup> How Motorola Put CPFR into Action – Supply Chain Management Review and by Jerold P. Cederlund, Rajiv Kohli, Susan A. Sherer, and Yuliang Yao – October 2007

Motorola worked with selected retailers, selected based on retailer's culture and its relationship with Motorola for the initiative. Motorola and the retailer jointly reviewed metrics and kept track of the agreed upon key performance parameters. They used the VICS CPFR handbook to guide their implementation strategy and Motorola's six sigma approach to reduce stock outs. Motorola's also reorganized its organizational structure to facilitate implementation of CPFR. For example, it created a new position – Director of customer operations whose responsibilities included customer logistics strategy, value added distribution services, financial forecast alignment, etc. The new structure at both Motorola and retailer facilitated new peer to peer relationships between multiple stakeholders.

### *Information sharing needs*

Since CPFR's key focus is collaboration, corporations need minimum infrastructure to share information. Motorola started the pilot project with Excel spreadsheets and eventually moved on to a collaborative system package by Manugistics, which provided several additional features and efficiency. The Manugistics system ran in parallel with the Excel system for about six months, after which use of Excel was minimized.

### *Benefits*

Forecast accuracy improved and mean absolute percentage error was a fraction of the previous levels. Inventory levels of Motorola products at the retailer were reduced by 30% compared to those for non- CPFR retailers. Stock outs were reduced to a third of the previous levels. Motorola could plan longer production runs and also ship full containers, reducing transportation costs. Results of promotions improved because the marketing team at Motorola and retailers had better information on the supply chain capability. Overall, Motorola realized numerous benefits from the implementation of CPFR that helped the company to reduce costs, to improve sales and to develop stronger relationships with its trading partners.

## **Future outlook of CPFR**

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### *Process innovation versus Product innovation*

A recent study conducted by IBM targeted 700 companies, seeking the outlook on process and product innovation. CEOs of these 700 companies were given a question about "what in terms of innovation is important: is product innovation or business process innovation?" Approximately 20% responded that they think product innovation is more important while 80% said business process innovation is more important. Therefore, we believe that more and more companies would think about reviewing its supply chain to improve efficiencies. Thus, CPFR would be one of their best choices

because it is a good tool for companies to effectively optimize their inventory according to real-time demand information, which is from tight collaboration with trading partners.

### *New Supply Chain Management technology catalyze*

There are many supply chain management (SCM) technologies and processes such as EDI, VMI, and RFID that can facilitate the CPFR process between companies. For example, Wal-Mart, decided to implement RFID to its whole supply chain. Besides leveraging its extremely high bargaining power to force its suppliers to also implement RFID, Wal-Mart also released some “friendly” messages to persuade the suppliers into adopting RFID. Wal-Mart promises that it will share more information contained in RFID tags than those in traditional barcode with the suppliers in 30 minutes after their cargos are in Wal-Mart’s DCs or warehouses<sup>23</sup>. Wal-Mart suppliers can expect to get a more real-time product flow than ever before which will be helpful to their replenishment operation. Because open information flow is a critical part of CPFR, companies that already adopt technology to build an open channel to exchange information with their suppliers and customers could easily implement the entire CPFR process.

### *Beyond Retail industry*

In searching the Internet for information on CPFR, one can find that a lot of CPFR related websites and news are related to the retail industry. However, it is becoming clearer that more industries are beginning to adopt CPFR to facilitate or reinforce their operation process. In Taiwan, there is an abundance of hi-tech companies forming many supply chains. These Taiwanese hi-tech companies supply a significant portion of production for consumer electronic products such as laptops, MP3 players, and smart phones to the world. In order to reduce their inventory obsolescence risk and increase agility to demand fluctuation, many companies have begun supplying CPFR. To illustrate this point, consider the plastic injection molding company that one of the authors of this paper worked for. The supply chain at this company has higher inventory obsolescence risk due to product diversity and the short product lifecycle of smart phones. Therefore, the company collaborated with a key supplier by sharing demand forecast more frequently, evaluating production capabilities and production planning, and setting up a daily regular replenishment delivery plan for consistent parts supply. This process, although it was not called CPFR, was very similar to CPFR as both the manufacturer and supplier worked collaboratively in order to optimize our supply chain efficiency.

### *Conclusion*

Companies cannot survive forever. Every company needs other companies or organizations to provide something they need and then deliver its product or service to customers. Companies today face a highly competitive global market. With the

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<sup>23</sup> Ephraim Schwartz, “Wal-Mart promises RFID will benefit suppliers”, June 17, 2004; “RFID progress at Wal-Mart”,

<http://www.idtechex.com/products/en/articles/00000161.asp>, Oct 01, 2005

communication becoming easier between companies, we believe that more companies would be willing to collaborate with suppliers with a more active attitude and then implement CPFR process. After all, if every company can make the effort to help increase their supply chain efficiency by cooperating with each other well, they will not only be able to create more value for their customers but also benefit significantly from the improved supply chain efficiency.

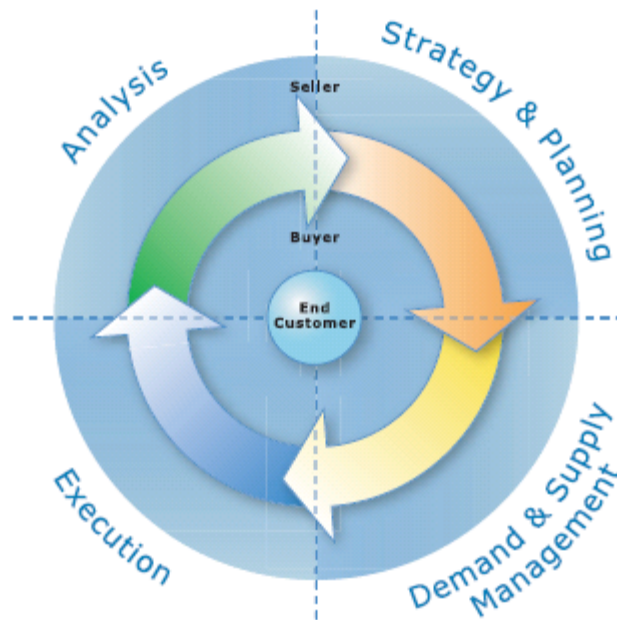
## Appendix I: The CPFR Model

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### The CPFR Model

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The CPFR reference model provides a general framework for the collaborative aspects of planning, forecasting and replenishment processes. Figure 1 illustrates this framework, which can be applied to many industries. A *buyer* and a *seller*, as Collaboration Participants, work together to satisfy the demands of an *end customer*, who is at the center of the model.



**Figure 1** VICS CPFR Model –Top-level Diagram

In the retail industry, a *retailer* typically fills the buyer role, a *manufacturer* fills the seller role, and the *consumer* is the end customer. In other industry segments, such as high technology, the Collaboration Participants may differ. For example, an OEM, in the role of the buyer, may assemble electronics from component suppliers, in the role of the seller, and deliver the product (such as a storage subsystem) to the end customer – a financial services company. The remainder of this document presents CPFR in a retail industry context.

Voluntary Interindustry Commerce Standards (VICS)

## Appendix II: Manufacturer and Retailer Tasks

Figure 4 depicts the CPFR model with retailer and manufacturer tasks aligned with their corresponding Collaboration Tasks.



**Figure 4** Manufacturer and Retailer Tasks

## Appendix III: Interview Transcript

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### **Joseph C. Andraski**

Joe Andraski<sup>24</sup> is the President and CEO of VICS (Voluntary Interindustry Commerce Solutions) Association. Prior to joining VICS, Joe held several positions with Nabisco Inc., including Vice President of supply and customer marketing. He had been active with GMA, serving as the chair for the logistics committee and was a member of the ECR Operating committee. He also served as a Senior Vice President of OMI, a retail software provider.

He is considered to be among the retail industry thought leaders and his work has been recognized by Penn State University, Michigan State University, Syracuse University and his alma mater the University of Scranton. He received the VICS Roger Milliken Career Achievement Award and the Council of Supply Chain Management Professionals Distinguished Service Award.

Our team had the pleasure of interviewing Joe Andraski, President and CEO of the Voluntary Interindustry Commerce Solutions Association (VICS) on March 28, 2008. This interview provided some great insight into where CPFR is today, how it is being applied, why it is relevant, and what is retarding its widespread adoption. The following is the transcript from this interview.

#### **Which are the industries where CPFR is dominantly used? Why?**

*Every industry has been taking on CPFR at various levels. In some cases it has been driven by the retailers, but for most part, it has been the manufacturers that have taken the lead and brought it to retailers. Early on, there was a concern on the part of retailers that information they share would not be taken as confidential and would turn out to be a competitive liability. There was a reluctance to share. Retailers began to understand that the supply chain was no longer something that could be managed in a silo, but in a network that most of the parties would share the information to make everyone more effective and efficient. More companies are willing to engage in collective business practices. With regards to high tech, HP has been long engaging in collective practices with their trading partners: Samsung, Panasonic, American Express (forecasting gift card), Amazon, V-Tech.*

*Companies have gone about it in different ways, depending upon their business capabilities, their business model. For example, P&G has been engaged in CPFR for at least 10 to 12 years; in depth collaboration with 10 companies that represents 80% of their domestic US sales. They developed business plans with each of these companies, one is Wal-Mart and it goes about*

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24 Electronic Source: [http://www.vics.org/meetings\\_events/cpfr\\_course\\_facilitators/](http://www.vics.org/meetings_events/cpfr_course_facilitators/) - April 25, 2007

*collaboration differently than Kolgger or Safeway. They'll take their top companies and adopt the way they do their collaborations, any upon the company's geographic location, and product mix. They developed the plans of these companies, and then they execute the plans. Promotion spending of grocery is about 25% of total expenses, 50% of that doesn't result to any benefit. P&G works with the retailer at retailing level to ensure that the store managers understand what has been promoted and when, what advertising is being done, what promotion is taken places with POS information, what product is being displayed. P&G will go about collaboration in a different fashion from Uniliver.*

*The collaborative practices are taking place around the world. Watson drugs companies in Taiwan and China is using collaboration with a number of their supplies to great benefits. The company that helped to develop and implement collaborate is called "Ebizprise". They operated out in Taiwan and Beijing, very effectively engaging in CPFR.*

*Six years ago, I attended a Tokyo conference to speak on CPFR. The panel consisted of the manufacturer, retailer, wholesaler and myself. In Japan, a large percentage of the products are shipped to retailers and to wholesalers. There were many small wholesalers and retailers. Their attitudes there were CPFR would not become a business practices in Japan given the fact that you've got wholesalers between the buyers and the sellers. Last year, the wholesaler who said CPFR would never come to Japan said they have to find a new way to do business, which is collaboration. They found their sales were lagging, as well as their profits, because the major change in the world was that Wal-Mart came to Japan, who has no interest in having a middleman because it fundamentally goes against of their objectives of providing their customers the lowest price.*

*P&G has no interest in going through middlemen, because their volume is such that they in many cases can go directly to the retailers. But this doesn't mean they do not do any business with wholesalers. It means the business is changing that the whole business is about efficiency.*

*There was recent research done by Alex Partners, where they did interviews in the US. 7,500 consumers rated 12 retailers in terms of the views that consumer had toward companies. One of the predominant areas was price. Because the US economy today is to find companies, the top department stores have move down to the more price-sensitive; some of them have moved down to Wal-Mart, and some to the dollar stores and so on. If the companies have to be competitive price wise, they've got to find ways to be effective and efficient in their supply chain initiatives, means to minimize the inventory, to maximize the uses of resources and infrastructure and to eliminate as much as possible on movement products.*

*If price is important and prices are affected by the cost of doing business and retailers have to find ways and suppliers that can do business with that help be efficient as possible. Therefore, that is where collaboration comes into play because the companies cannot be efficient in the management of supply chain if they do it independently. There's got to be collaboration on the part not only by the supplier but third party providers, which include warehouse and transportation companies. Vast amount of products manufactured in Asia, substantial lead time from the products consumed to the time products arrives to the shelf goes into months. Everyday means money! Everyday means lost sales if you're not able to meet the requirement of consumers.*

*Every company has a slightly different model. Zara, a Spanish retailer, recently announced they're going their program called "from runway to rack in three weeks time". That is a phenomenal reduction in lead time. What they've done was to primarily focus on their consumers*

*and be able to introduce their consumers a new, exciting, and interesting product and then have it there when it is still in their mind of consumers.*

*H&M is taking the same steps. Benetton has completely redesigned their supply chain. It is along the same lines responding to activities that taken place in retail.*

*Information that's being provided is done such that is understandable and it's got a standard and a practical guideline. So that when they're going to describe products, there's some texture standardization that is taken place. So that manufacturers in China that is doing business with multiple customers here in the US can have the same information coming into them in terms of a material specification, so they don't have to have individual database that would transcribe or translate information to each of the customers into their specific requirement.*

**We talked about the advantages of CPFR. What are some of the challenges or drawbacks of CPFR that need to be overcome in the coming years?**

*The first requirement for successful implementation of CPFR is senior management support. Over the years, what we have seen is that typically it is a mid-level executive or manager that decides upon the importance and does the research and makes the effort to understand. They take it to their peers and gets their buy-in and then takes it to senior management. There is an important step along the way called capability assessment. That is to assess your capability within your own company to get engaged in collaborative relationships with your trading partner, includes technology, information and organizational structure. Trading partner capability assessment is important. Ensuring information is clean and accurate is a very important part. It's hard to collaborate if a company hasn't taken the important step of cleaning up information.*

**Is there any benchmark for evaluating CPFR specifically? How can we physically evaluate the benefit of CPFR?**

*So far I don't remember any work that has been done by a major consulting company. However, I know there are some other schools or institutions that have done research and take the results from the research. For example, there was a study conducted by IBM. The study targets included about 700 companies. CEO of these 700 companies were given a question about "what in terms of innovation is important? Is product innovation or business process innovation?" It was about 20% CEO came back and said that they think product innovation is more important while 80% said business process innovation is more important. We believe that this result is pretty important as this study indicates that there are more companies that would like to emphasize on their business process than on product innovation while CPFR is kind of an innovative process for companies to collaborative with each other to achieve a "Win-Win" situation. We believe that there will be more and more companies considering adopting CPFR to keep improving their process.*

**Many suppliers work across the globe today. Are there any cultural issues related to CPFR?**

*There are two major barriers to collaboration. Collaboration itself is not complicated or difficult. Today technology facilitates collaboration. But the major barrier to collaboration is internal cultural issues to carry information goals and objectives and change management. If companies are not skilled in or understand how to effect change management, effectiveness in*

*managing true collaboration will be seriously impacted. Assessing compensation so that compensation is based on team results, rather than individual or departmental results.*

*The other important skill is negotiation. The critical success steps to be able to go through and negotiate a fair and reasonable arrangement that will benefit both sides. That is an important aspect whether or not a company will be successful in a collaborative relationship.*

### **What are some of the trends or changes to CPFR in future?**

*In retail, there is going to be more of an emphasis on demand driven replenishment. For example, taking retail and sales information to understand what is taking place in the marketplace and responding to marketplace change, rather than forecast. That is the most important step companies are going to embrace as the technology is understood. Companies are spending a lot of time and efforts in putting in ERP systems, when I am spending my time to get all systems to look like one. At same time, I am looking how I can use point of sale information or share POS information. So it is a matter of company strategies that they put together that determines their path to success.*

*Retailers would have various technological requirements that would not necessarily match with manufacturer's requirements. On the other hand, manufacturers will have much more in-depth marketing information than a retailer would have. So the information requirements are going to be different, based on the kind of products sold or where marketplace is. There isn't a single brush that could be used to paint CPFR. We know what the key foundational steps are and what needs to be done. We also know that the approach would be different depending on the industry. The other side is how far up the supply chain do you go with your collaborative relationships.*

### **In terms of industry, what according to you are the industries that are most benefited by adopting CPFR?**

*Everybody's got to benefit. It's now become widespread and it's tough to answer that question. It's going to take substantial time and effort to do that level of research.*

### **There is a certification offered by VICS. We wanted to know who can take certification and what are the benefits?**

*The CPFR certification program is been designed for those individuals and companies who are embarking on CPFR. If you look at the website, it has the CPFR module, which is the four quadrants focus area, the consumer being at the center of focus. It takes you through in great detail, what each of those areas is and it defines them so that they are easily understood. We talk about what are the fundamental steps that need to be taken. We talk about metrics: what is going to be measured and who is going to measure. Organizational structure, it really comes down to the firm understanding what collaboration is all about. It gets into change management, culture, clean information, the CPFR calculator and how the CPFR calculator can help companies understand financial impact. Get into different models of CPFR and how those models impact various businesses, balanced scorecard and CPFR importance of sales marketing and category management. It's about 3 days of in-depth workshop and discussion. We break off into teams and give people challenges to go through CPFR exercises. By the time they leave, they are capable of engaging in CPFR.*

## Appendix IV – Steps to Achieve Collaborative Relationships

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Steps to achieve collaborative relationships<sup>25</sup>

- Determine CPFR Goals and Objectives
- Discuss Competencies Resources & Systems
- Determine Information sharing needs
- Define Service and ordering commitments
- Determine Resource involvement and commitments
- Determine how to resolve CPFR disagreements
- Determine review cycle for collaboration arrangement
- Communicate Collaboration Arrangement and Top Management Buy-in

## Appendix V – Key Scenario Lead Roles

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Key Scenario Lead roles (VICS, 2002)

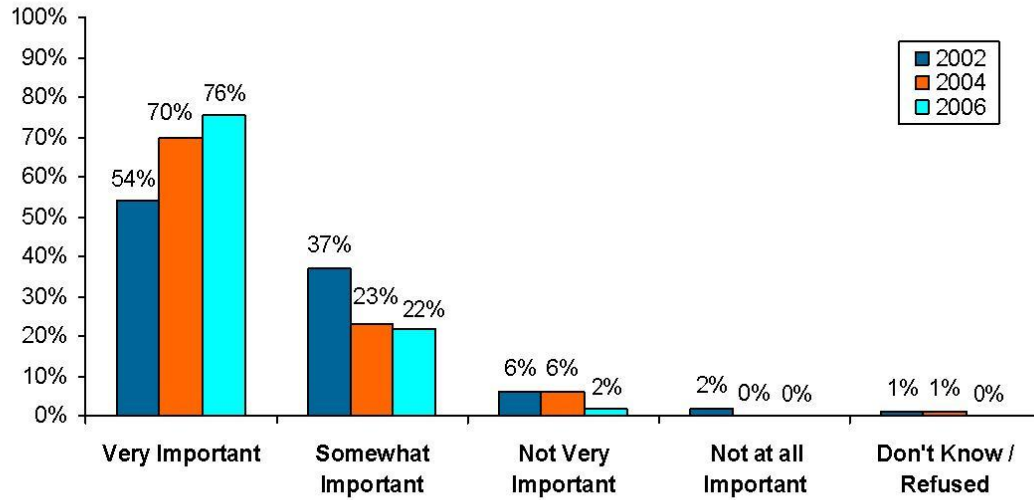
<b>Scen ario</b>	<b>Sales Forecast</b>	<b>Order Forecast</b>	<b>Order Generation</b>
A	Buyer	Buyer	Buyer
B	Buyer	Seller	Seller
C	Buyer	Buyer	Seller
D	Seller	Seller	Seller

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<sup>25</sup> Global Commerce Initiative Recommended Guidelines CPFR Version 2.0 – June 2002

## Appendix VI – Importance of Collaboration<sup>26</sup>

### How important is developing collaborative relationships in Supply Chain Planning and Execution Operations with your trading partners?



Source: Accenture 2006 Survey

<sup>26</sup> Accenture. "Results of 2006 Accenture Collaboration Survey." September 25, 2006.