



# Collaborative supply chain management

## The most promising practice for building efficient and sustainable supply chains

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### Abstract

**Purpose** – The aim of this paper is to provide an overview of contemporary supply-chain management systems.

**Design/methodology/approach** – The paper highlights the examples of state-of-the-art practice in supply-chain management, and speculates about where this movement is headed. Some of the collaborative supply chain management products generating the most interest will also be examined.

**Findings** – Collaborative planning, forecasting and replenishment (CPFR) is the most recent prolific management initiative that provides supply chain collaboration and visibility. By following CPFR, companies can dramatically improve supply chain effectiveness with demand planning, synchronized production scheduling, logistic planning, and new product design. CPFR will force suppliers to innovate, building on strong one-to-one relationships that will drive smarter ways of doing things. Most companies and industries can benefit from CPFR. However, companies that experience variation in demand, buy or sell a product on a periodic basis, and those that deal in highly differentiated or branded products will benefit the most.

**Practical implications** – Practitioners can gain first-hand knowledge of the CPFR model, technology and factors influencing adoption. Practitioners can also find examples of state-of-the-art practice in supply-chain management, and study some of the collaborative supply chain management products generating the most interest.

**Originality/value** – The paper is valuable to practitioners interested in implementing CPFR in their organizations.

**Keywords** Supply chain management, Electronic data interchange, Internet

**Paper type** Viewpoint



### 1. Introduction

According to Forrester Research, the electronic commerce market is estimated to hit \$608 trillion in 2004, with 90 percent of that coming from B2B sales. The internet facilitates business transactions such as ordering, invoicing and payment, reduces the cost of procurement, and shortens lead times. It also can improve coordination and collaboration, both within and across companies. Building efficient supply chains have always been a major area of focus for enterprise architects. Collaborative supply chain management practices are firmly establishing themselves as the way forward for successful and sustainable business operations.

Consumer demands for better service levels, which represent having the right product on the shelves, are rising. The unending cycle of rising supply chain costs impacts the bottom-line of all players involved. According to a survey by Kurt Salmon and Associates, nearly 41 percent of manufacturers, 50 percent of retailers and 38 percent of distributors identified supply chain cost reduction as a critical issue to be addressed in the next three to five years (Kurt Salmon and Associates, 2002).

Lack of collaborative planning has a significant impact on supply chain performance. Supply chain partners cite improvement in forecast accuracy as important factor for embracing collaborative practices. A recent study by AMA Research shows that supply chain collaboration can add as much as three percentage points to profit margins for all types of supply chain players. Wal-Mart has experienced significant success in this regard. Using a joint initiative with P&G, called collaborative forecasting and replenishment (CFAR), managers from both Wal-Mart and P&G jointly forecast sales of P&G products at Wal-Mart stores and plan replenishment strategies (Chopra and Meindl, 2001).

Early implementations of inter-enterprise electronic trading partnerships on B2B have focused on the automation of transactions using electronic data interchange (EDI). The next trading partnership established involved information sharing and data exchange. In this type of relationship, a partner is given access to information or one partner transmits/shares information to/with another. To further enhance a buyer-seller relationship, some trading partners are moving toward more collaborative relationships. In 1995, Wal-Mart along with Warner-Lambert, Surgency, and software companies SAP and Manugistics, spearheaded an effort to define a process that would link customers demand with replenishment needs through the entire supply chain. The result was a set of business processes called collaborative planning, forecasting, and replenishment (CPFR) that help eliminate demand and supply uncertainty through improved communications between supply chain partners (Lothair, 2001).

In 1998, the Voluntary Interindustry Commerce Standards Association (VICS) set up a committee to identify the best practices and design guidelines for collaborative supply chain forecasting and planning (White Paper, 1997). Participating in the project were leading retailers, consumer packaged goods manufacturers as well as consulting and software providers. The CPFR process model represents voluntary guidelines aimed at structuring and guiding supply chain partners in setting up their relationship and processes. With VICS' involvement and support, more companies were willing to participate in the validation and testing of CPFR. According to a new survey of manufacturers, retailers, distributors, and logistics providers conducted in 2000, CPFR was the third most widely used initiative. Given how new CPFR is a very impressive statistic.

Most companies and industries, however, are way behind the leaders. In a recent survey of 2,100 executives conducted by Cap Gemini, Industry Week and Ernest & Young, 49 percent of the respondent reported that their companies do not have a formal value chain strategy. Among those companies with formal value chain strategies, only 26 percent are feeling very good about it (Figure 1) (Norbridge, 2001). This statistics shows that most companies have huge opportunities for improving their supply chain performance.

Economic slowdown, and the shock of September 11 created a major stress for many supply chains. Companies were challenged to keep critical products and supplies moving, manage inventory levels effectively, maintain productivity, and keep emergency transportation costs in check. Despite the unexpected events and slowdown, many companies continue to initiate supply chain improvement initiatives. The reason? The growing recognition that excellent supply chain performance has strategic value that could lead to:

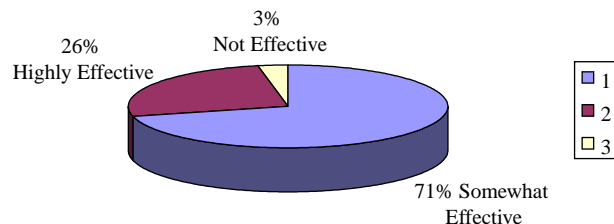
- rapid financial payback, often within months;
- improvements in productivity and profits;
- improvements in customer positioning and product quality; and
- enhancements in long-term relationships with suppliers.

Section 1 introduced the basic concepts of collaborative supply chains practices. Section 2 discusses the evolution of supply chain collaboration practices. Section 3 addresses the capabilities of CPFR initiative. Section 4 elaborates on some companies that capitalized on the CPFR advantages. Section 5 examines some of the popular products and services in this category. Section 6 forecasts the future of supply-chain management and evaluates CPFR challenges and opportunities. Finally, Section 7 summarizes the paper.

## 2. The evolution of supply chain collaboration

Many business-to-business (B2B) exchanges sprung up in the past two years, each generally focusing on a vertical industry. These B2B exchanges have fostered many types of transactions. Exchanges not only improve efficiencies in the transaction process and the creation of a market but they also enable tight collaboration between buyers and sellers. The internet has created a platform for buyers and sellers to evolve into collaborators.

A growing body of literature examines the value of information sharing in managing a supply chain. More specifically, research has shown that information sharing can reduce the so-called “bullwhip effect” so often observed in supply chains (Lee *et al.*, 2000; Cachon and Fisher, 2000; Chen *et al.*, 2000; Iyer and Ye, 2000). Similarly, other researchers study the value of sharing demand and inventory level information and examine the effect of collaborative forecasting on supply-chain performance (Cachon, 2004; Aviv, 2001, 2002; Taylor, 2001; Song and Zipkin, 1996).



**Figure 1.**  
Effectiveness of value  
chain strategies

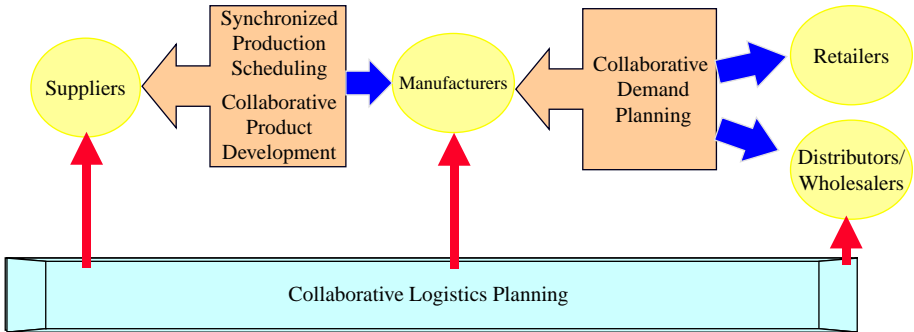
Source: Norbridge (2001)

There are many opportunities for supply chain collaboration as shown in Figure 2. The rest of this section discusses how buyers and sellers evolved into collaborators overtime.

Early usage of the internet for inter-enterprise electronic trading partnerships focused on the automation of transactions such as purchase orders, invoices, advanced shipment notices, etc. using EDI technologies. The next trading partnership established on the internet involves information sharing and data exchange. In this scenario, data are sent on for-your-information (FYI) basis and the recipient uses the information on "as-is" basis. The information might include order status and forecast, product designs, and inventory data. To further enhance the buyers and sellers inter-enterprise trading relationships, some trading partners are moving toward more collaborative relationships that enable them to work together to gain a better understanding of future demand and to do joint planning to most effectively satisfy it.

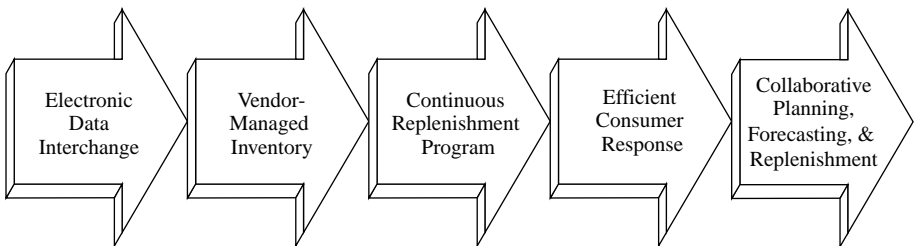
Buyers and sellers have evolved into collaborators using four forms of electronic-transactional information sharing, and collaborative processes (Figure 3).

EDI has been used to transmit information such as purchase orders, invoices, material releases, shipping notices, and product inquiries electronically. To use this technology, you had to be tied to traditional client/server technology. The sender must have an application that can send the information in the format, usually proprietary, to be read by the receiving application. The network vehicle for these transactions is known as a Value Added Network, or VAN. Identical processing systems are not required, only the standard must be setup before the transfer.



Source: AMR Research

Figure 2. Supply chain collaboration opportunities



Source: Industry directions and synca systems

Figure 3. Evolution of supply chain solutions



EDI-based transactional relationships have grown dramatically over the last decade. What makes things different today is the internet. There is no need for traditional client/server technology; you just need a web browser. Product information can be called up from an online catalogue and ordering can be done by sending e-mail. Employees are empowered to make transactions that are right for their business. Employees can complete the transaction themselves from their desktops, relieving administrative personnel of this tedious process. The use of EDI facilitates business transactions, eliminates paperwork, and reduces costs, but has negligible impact on supply chain planning and scheduling.

Vendor-managed inventory (VMI) was introduced by Kurt Solomon Associates in 1992. VMI existed in retailing before the growth of enabling technologies and is perhaps the most widely known system for managing supply chains. In this practice, the replenishment decision for all retailers is centralized at the upstream distributor or manufacturer. The manufacturer or distributor manages and monitors inventories of the wholesaler or retailer. Companies like K-Mart, Frito-Lay, and Fred Meyer have implemented VMI with significant success. Fred Meyer has seen inventories reduce by 30-40 percent and fill rates increase to 98 percent. K-Mart has experienced inventory turns on seasonal items increase from 3 percent to 9-11 percent.

Continuous replenishment programs (CRP) are driven by actual withdrawals of inventory from a retailer warehouse rather than point-of-sale (POS) data at the retailer level. In CRP, the manufacturer or wholesaler replenishes a retailer regularly based on POS data.

Efficient consumer response (ECR) is driven by the establishment of "effective channel relationships," whereby partners in the supply chain cooperate to achieve the more than \$30 billion savings promised by the ECR initial analysis conducted by industry-wide working groups in 1992. The analysis determined that the industry could save \$30 billion annually and reduces system-wide inventories by more than 40 percent by improving practices in the four areas of replenishment, product assortment, trade promotion, and new product introductions. While all four areas are important, the replenishment issue has absorbed much of the attention of the participants (Synkra Systems Inc., 1999).

CPFR extends Vendor Managed Inventory principles and is considered to be the latest stage in the evolution of supply chain collaboration. Older supply chain initiatives had gaps in their practices. In many of these operations, financial plans took precedence over forecast, resulting in high-inventory levels, lower order fill rates, and increased expedited activities. CPFR is a set of business processes that help eliminate supply/demand uncertainty through improved communications/collaborations between supply chain trading partners.

### **3. CPFR: the most promising practice**

A major difference between CPFR and other solutions models, such as ECR, is that the other models require critical mass (participations of many buyers and sellers) before any benefits are realized. CPFR, however, enables a buyer to improve performance by just having a collaborative relationship with only one vendor.

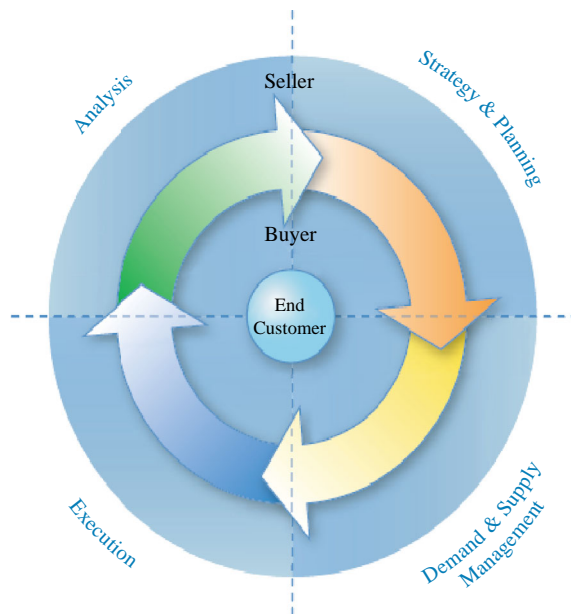
### 3.1 The CPFR model

CPFR is an initiative that facilitates the reengineering of the replenishment between trading partners. An important promise of CPFR is that accuracy of the forecast (demand, order, and sales) can improve by having the customer and supplier participate in the forecast. A buyer and a seller, as collaborators, work together to satisfy the demands of an end customer, who is at the center of the model. (VICS, 2004). Figure 4 shows this model, which is applicable to many industries. If a discrepancy occurs, the trading partners can get together and decide on the replenishment quantity to rectify the problem. This type of collaboration offers great potential to drastically improve supply chain performance through collaborative demand planning, synchronized production scheduling, logistics planning, and new product development.

### 3.2 Stages of collaboration

According to VICS Association, CPFR provides templates for supply chain collaboration in four stages (VICS, 2004):

- (1) *Planning*. At this stage, the relationship between buyers and sellers is planned and updated. It leads to front-end agreement and joint business plan. Variances, whether plan-to-plan or plan-to-actual, are also addressed.
- (2) *Forecasting of demand and supply*. At this stage, sales/order forecast is created, exceptions or discrepancies are identified and are resolved. The CPFR process improves forecast accuracies by having customers and suppliers participate in



Source: Voluntary interindustry commerce standards

**Figure 4.**  
The components of CPFR  
model

the sales/order forecast, tying the buyer and seller together so that their goals are compatible.

- (3) *Execution*. At this stage, the order is generated, shipments are prepared and delivered, products are received and stocked on retail shelves, sales transactions are recorded and payments are made.
- (4) *Analysis*. At this stage, monitor planning and execution activities for exceptional situations. If a discrepancy occurs, the two trading partners can get together and share insights and adjust plans to resolve such discrepancies.

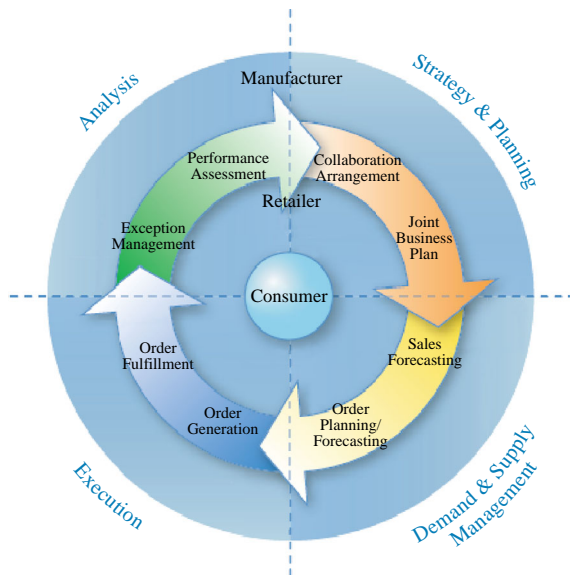
These stages, as shown in Figure 5, are presented in logical order. However, most companies are involved in all of them at any moment in time.

### 3.3 CPFR technology

CPFR is not considered a technical standard. Rather it is a set of process and technology models that are:

- open, yet allow secure communications;
- flexible across the industry; and
- extensible to all supply chain processes.

CPFR process does not fundamentally depend upon technology. It advocates using common tools and processes to improve supply-chain planning through accurate and timely information flow. However, specialized technology can make CPFR process



**Figure 5.**  
Collaboration activities

Source: Voluntary interindustry commerce standards



more scaleable. The following are examples of some of CPFR solutions that have been developed to facilitate the process (VICS, 2004):

- sharing of historical data and forecasts;
- automating the collaboration process and joint business plan;
- enabling revisions; and
- evaluating exception situations.

Figure 6 is an example of how a CPFR solution is integrated with the enterprise systems of record that produce and consume demand and supply chain data (VICS, 2004).

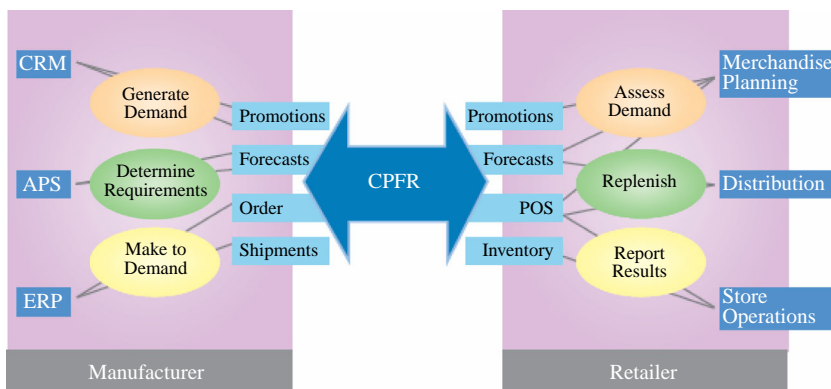
### 3.4 CPFR process model

Collaboration is the crux of CPFR. Ongoing and long-term collaboration and partnering between manufacturers and retailers delivers value to customers and profitability to all collaborating partners. According to VICS Association, CPFR is a nine-step process model consisting of:

- (1) developing collaboration agreement;
- (2) creating joint business plan;
- (3) creating sales forecast;
- (4) identifying exceptions for sales forecast;
- (5) resolving/collaborating on exception items;
- (6) creating order forecast;
- (7) identifying exceptions for order forecast;
- (8) resolving/collaborating on exception items; and
- (9) generating orders.

### 3.5 CPFR success factors

In the past seven years, the CPFR model has demonstrated benefits for hundreds of manufacturer and retailer companies. Some of the critical success factors that could influence CPFR adoption for more companies are:



Source: Voluntary interindustry commerce standards

**Figure 6.** CPFR technology integrate retailers and manufacturers processes



- top management involvement;
- trust between collaborating partners;
- continuous measurement of performance;
- innovative IT strategy;
- up-to-date cost accounting methods;
- emphasis on customer satisfaction;
- flexible organizational structure; and
- proper Staff training.

### *3.6 Factors influencing adoption*

Many companies have benefited from implementing CPFR processes in their organizations. Supply chain costs that includes production, inventory, marketing, distribution, and selling costs is often cited as a major factor influencing CPFR adoption. Some of the most important business benefits that CPFR partners are able to get by embracing CPFR include (VICS, 2002):

- enhanced relationship between partners;
- increased sales revenues;
- improved product offering;
- reliable and accurate order forecasts;
- reduction in inventories; and
- improved technology return on investment.

## **4. Case examples of success**

Factors such as increased outsourcing, supplier collaboration, and the pursuit of perfect demand information have spurred the need for applications and platforms such as CPFR that provide better management visibility across the enterprise. Numerous case studies provide ample evidence of early success that companies in North America and Europe have had in implementing CPFR strategies. CPFR is gaining broad appeal. According to the recent survey of 2,100 executives mentioned earlier, CPFR practice is catching on: 25 percent of respondents indicated that CPFR has been implemented in their firms. Most CPFR implementations have been in North America and Europe. In the USA alone, more than \$15 billion in the supply chain is managed by CPFR processes and more than thirty CPFR programs are currently underway in Europe (Stiely and Katz, 2003).

CPFR practice is spreading beyond company-to-company initiatives to include industry consortia as well. In July 2001, Transora, a global B2B e-marketplace, introduced the CPFR compliant data catalogue for the consumer packaged goods industry. The catalogue is a first step for global standard of data exchange within this industry.

The elimination of uncertainty between trading partners who have an effect on the value of the end product creates a win-win situation for all involved parties. By sharing information over the internet, the buyer and seller develop a single dynamic forecast. The result is more accurate forecasting with lower inventory levels. These benefits save time and money. CPFR enables trading partners to collaborate more effectively, plan more accurately, and respond more rapidly up and down the value chain. Early adaptors of CPFR have reported lower procurement costs, smaller inventories,

shorter cycle times, faster response to the market, and reduction in forecasting errors. Nabisco and Wagnans, for example, noted over a 50 percent increase in category sales. Wal-Mart and Sara Lee reported an 18 percent reduction in inventory levels, up to a 20 percent reduction in replenishment cycle, and a 40 percent more accurate forecast with a 32 percent increase in sales.

The following are examples of some companies that capitalized on the CPFR advantages.

#### *Wal-Mart*

The CPFR initiative has proven very valuable to Wal-Mart. The retailer has experimented with CPFR since 1995 and has had significant success in this regard. Wal-Mart shares POS data with its suppliers to improve coordination in the supply chain. The company has a joint initiative with P&G where managers from both companies jointly forecast sales of P&G products at Wal-Mart stores and then jointly plan replenishment strategies. This collaboration ensures that there is no gap between what Wal-Mart plans to sell and what P&G plans to produce (Chopra and Meindl, 2001).

#### *Heineken USA*

Traditionally, it took Heineken 10 – 12 weeks to deliver beer to its distributor. In the late 1995, the company decided to implement a supply chain management system to reduce the delivery time to between four and six weeks. Using Logility's CPFR-compliant Voyager XPS software and the internet, Heineken has implemented a private network connecting the company to customers and/or suppliers. The system can also connect salespeople to the central database. Heineken is using the system to do real-time forecasting, ordering, and replenishment with its distributors. The company can also deliver customized forecasting data to its distributors through individual web pages. Through CPFR, distributors can login and view their sales forecast, and modify and submit their order online. The system has helped the company to reduce order cycle times from three months to four weeks. Other benefits include lower procurement costs, smaller inventory, and fresher products to consumers (Lothair, 2001).

#### *Dell Computer*

Del sells PCs directly to customers and starts assembly after receiving a customer order. The company leverages the internet in dealing with both customers and suppliers. Dell is praised for its ability to manage its large worldwide supply chain and avoid unnecessary fluctuations by sharing demand data as well as current inventory positions of components with many of its suppliers on the internet. Del is using Agile Anywhere, an internet-based technology, to fulfill individually customized products with a delivery target of 5 days or less. Aggregating all product information in a single system on the internet enables Del to disseminate all product changes instantly and track them across the supply chain. The system helps Del to extend its leadership position in a competitive computer market (Lothair, 2001).

#### *Herlitz AG*

In the fierce competition in the office supply industry, Herlitz Ag, Europe's leading manufacturers of office supplies, decided to make collaboration with its supply chain the key to its future success. Using J.D. Edwards' advanced Planning Solution, Herlitz has

allowed the interactive, real-time sharing of supply and demand information among customers and suppliers. This process allowed Herlitz to analyze historical customer data and use it to generate valuable sales forecasts. This also gave Herlitz the ability to analyze the impact of a customer's seasonal fluctuations or promotions on sales. The system has helped the company to achieve significant improvement in customer service. The company's customers have reduced shelf stock-outs by 50 percent, increased inventory turns by 15 percent, and significantly lowered stock holding costs (Lothair, 2001).

#### *Coca-Cola FEMSA (KOF)*

KOF is headquartered in Mexico City and is the second largest bottler and distributor of Coca-Cola products in Latin America. With eight production plants and 63 distribution centers, the company decided to implement a supply chain management system to decrease stock-outs, minimize variability in operations, reduce inventory, forecast accuracy, improve asset utilization, and enhance customer service. Using J.D. Edwards' advanced Planning Solution, KOF has increased demand-planning accuracy up to 93 percent and reduced stock-outs to less than 1 percent. The system has helped the company to achieve greater overall efficiency and most importantly, better customer service (Norbridge, 2001).

#### *Colgate-Palmolive*

In 1995, Colgate began rolling out its core enterprise solution to improve its operations. This contributed to large gains in efficiency. However, the company aimed to upgrade supply chain performance worldwide by replacing a regional sourcing model with a fully globalized supply chain built around VMI with collaborative planning with downstream subsidiaries. Using mySAP Supply Chain Management platform, the company has provided instant, real time access to information about vendors, forecasts, production plans, and key indicators such as inventory levels and fulfillment rates. The platform enhanced Colgate's global supply chain performance. It enables Colgate to gain visibility into global logistic data. The company improved on-time and complete orders by 18 percent, lowered inventory by 10 percent and improved customer order fulfillment rates by 95 percent (Norbridge, 2001).

#### *Palm Inc.*

Palm Inc. is a leading provider of handheld computers. Faced with ever-changing customer demands and increasing competitive environment, the company decided to shorten planning cycles, increase visibility, and improve logistics and control. The company decided to use mySAP Supply Chain Management (mySAP SCM) solution. The results were impressive-palm reduced planning cycle time by 50 percent, inventory turnovers were improved from 6 to 10, and overall inventory level decreased by 32 percent. The company also achieved stronger sales growth and reduced stock-outs (Lothair, 2001).

### **5. CPFR products**

Recently, there has been a significant growth in collaborative computing products. Collaborative supply chain software products are no exceptions. Software companies are beginning to emerge with products supporting this type of collaboration. CPFR is also being implemented on B2B exchanges such as Worldwide Retail Net, Transora, and NetXchange. The endorsement of e-marketplaces and growing awareness of CPFR

benefits will continue to persuade more companies to explore the opportunities. Table I summarizes some popular collaborative products in this category.

## 6. A look ahead

### 6.1 Opportunities

As e-commerce increases, the demand for new collaborative computing applications is expected to grow. It is believed that the e-marketplaces may provide the most promising environment for CPFR. Recently, the leading net marketplaces have evolved from independently run trading exchanges to consortia of major industry players

Name/Company	Features
Voyager Solutions/ Logility www.logility.com	This suite enables networks of trading partners including, suppliers, manufacturers and retailers to collaborate, integrate and synchronize their planning and e-fulfillment operations. It provides the planning, forecasting, simulation and order fulfillment functions that effectively complement ERP and CRM systems
Manugistics CPFR Solution Manugistics www.manugistics.com	This application is a B2B, e-Commerce solution that enables networks of trading partners to collaboratively create and maintain joint business plans, monitor the execution of those plans, and measure their success. The application also enables you to create and maintain demand and replenishment plans, material designs and requests, and shared production plans and schedules
Advanced Planning Solutions/ Oracle's J.D. Edwards www.oracle.com	This collaborative product provides a transparent supply chain, allowing the interactive, real-time sharing of supply and demand information among suppliers and customers
Agile Anywhere/ Agile Software www.agile.com	This suite provides the secure and scaleable internet-based technology required for supply chain collaboration between partners of all sizes
Retek Syncra Exchange/ Retek-Syncra www.syncra.com (www.retek.com)	This platform is built on highly scalable "many-to-many" data model and collaboration architecture and supports multiple buyer and seller relationships according to the CPFR guidelines. Through 100 percent compatibility with the leading CPFR solution, the platform seamlessly links trading exchanges with the growing community of CPFR networks hosted by leading manufacturers and retailers
CLOExpress/ CLOExpress Co. www.cloexpress.com	This free web site brings together the best logistics resources on the internet into a unified desktop for busy logistics executives. The site includes important links to logistics-related companies, news, publications, research tools, and educational and career resources. Logistics professionals have a "one-click" customizable home page
mySAP™/ SAP www.sap.com	This platform supports key e-business processes that enable a company to perform supply chain planning and logistics execution across the boundaries of enterprise. The solution provides a full complement of internet-enabled supply chain processes: (CPFR); (VMI); and collaborative transportation planning
Collaborative Supply Chain Solutions JDA Software www.jda.com/default.asp	JDA award winning Portfolio Collaborative Solutions™ enable retailers, wholesalers and manufacturers to work from the same page. This platform enables trading partners to synchronize inventory decisions, lower safety stock and reduce potential lost sales. Over 100 trading partners are already using the platform

**Table I.**  
Collaborative products for supply chain

interested in collaboration around material procurement and fulfillment. Supply-Chain managers are also shifting from a tactical focus back to a more strategic approach in 2004, in response to improvements in the economy, renewed spending on the system and a growing awareness of the need for bold moves in order to stay competitive. The growing awareness of supply chain collaboration benefits will help inspire a deeper one-to-one partnership between parties involved. Some major e-marketplaces such as Worldwide Retail Exchange, and GlobalNetXchange who have committed to offer CPFR, believe that their endorsement will stimulate a large-scale global adoption of supply chain collaboration practices over the next few years. They hope they can increase the chances of participants' entry into CPFR by building a common infrastructure for all players. By doing so, these e-marketplaces expect to dramatically improve market responsiveness and revenues while driving down costs of operations and information sharing.

Another business model that is expected to spur the pace of CPFR is peer-to-peer collaboration. These types of collaboration file formats are standardized and are interchanged between trading partners as needed. No middle service (such as centralized server) is needed to facilitate the flow of documents. Each peer operates independently and in an open manner. Those open architecture platform and standard data formats and protocols will help inspire CPFR, enabling the usage of efficient practices by trading partners.

### 6.2 Challenges

Some successful leaders in CPFR have suggested collaboration with the carrier that transports goods between the buyer and supplier. This is called collaborative transportation management (CTM). Others suggest that in order to be truly successful, collaboration should involve all of the links of a supply chain from buyers to sellers. This process is called "n-Tier Collaboration" (Schwarz, 2004).

Although CPFR has enormous potential for reducing the total cost of supply chain, there are also enormous challenges at the fundamental and technical levels:

- Fundamental – Buyers and suppliers must develop trust that each will treat the other fairly and honestly. There must be incentive for both parties to do so. Similarly, there is the question of the "drivers" for collaboration. What promotes a desire on part of buyers and suppliers to collaborate using CPFR?
- Technical – Buyers and suppliers must use a common language for identifying products and making decisions about them. Similarly, systems must be developed for linking their business processes. This could require a great deal of system change and training. Third, security protocols must be implemented to safeguard both buyers and sellers from leaks of proprietary information.

Despite the above challenges, the future of supply-chain management practice will involve a significant level of collaborative decision making and implementation.

## 7. Conclusions

CPFR is the most recent prolific management initiative that provides supply chain collaboration and visibility. Order visibility is the touchstone of concurrency. The opportunity to concurrently have many people acting on problems has tremendous benefit not only for the planned order, but also for the unplanned order. By following

CPFR, companies can dramatically improve supply chain effectiveness with demand planning, synchronized production scheduling, logistic planning, and new product design. What is really valuable is the ability to look forward and use planning systems in real-time to determine order profitability and to create harmony. Harmony offers a “guidance system” for cost cutting, improved profitability and operational excellence. CPFR will force suppliers to innovate, building on strong one-to-one relationships that will drive smarter ways of doing things.

Most companies and industries can benefit from CPFR. However, companies that experience variation in demand, buy or sell a product on a periodic basis, and those that deal in highly differentiated or branded products will benefit the most. As more companies move toward supply chain collaboration, this may well result in an optimization of distribution facilities through consolidations of several smaller, local facilities into a larger regional distribution center.

### References

- Aviv, Y. (2001), “The effect of collaborative forecasting on supply-chain performance”, *Management Science*, Vol. 47 No. 10, pp. 1326-43.
- Aviv, Y. (2002), “Gaining benefits from joint forecasting and replenishment processes: the case of auto-correlated demand”, *Manufacturing & Service Operations Management*, Vol. 4 No. 1, pp. 1-18.
- Cachon, G.P. (2004), “Supply chain coordination with contracts”, in de Kok, A.G. and Graves, S.C. (Eds), *Handbooks in Operations Research and Management Science: Supply Chain Management*, North-Holland, Amsterdam.
- Cachon, G.P. and Fisher, M. (2000), “Supply-chain inventory management and the value of shared information”, *Management Science*, Vol. 46 No. 8, pp. 1032-50.
- Chen, F., Drezner, Z., Ryan, J.K. and Simchi-Levi, D. (2000), “Quantifying the bullwhip effect in a simple supply chain: the impact of forecasting, lead times, and information”, *Management Science*, Vol. 46 No. 3, pp. 436-43.
- Chopra, S. and Meindl, P. (2001), *Supply Chain Management: Strategy, Planning, and Operation*, Prentice-Hall Inc., Englewood Cliffs, NJ, pp. 369-70.
- Iyer, A.V. and Ye, J. (2000), “Assessing the value of information sharing in a promotional retail environment”, *Manufacturing & Service Operations Management*, Vol. 2 No. 1, pp. 128-43.
- Kurt Salmon Associates (2002), “Survey of supply chain effectiveness”, *Food Distributors International, Food Marketing Institute and Grocery Manufacturers of America*, available at: [www.gmabrand.com/publications/docs/SupplyChain.pdf](http://www.gmabrand.com/publications/docs/SupplyChain.pdf)
- Lee, H., So, K.C. and Tang, C.S. (2000), “The value of information sharing in a two-level supply chain”, *Management Science*, Vol. 46 No. 5, pp. 626-43.
- Lothair (2001), “Supply chain collaboration: close encounters of the best kind”, *Business Week*, 26 March.
- Norbridge (2001), “Supply chain collaboration and visibility: the results are beginning to show”, *Business Week*, 8 October.
- Schwarz, L. (2004), “The state of practice in supply chain management: a research perspective”, in Akcali, E., Geunes, J., Pardalos, P.M., Romeijn, H.E. and Shen, Z.J. (Eds), *Applications of Supply Chain Management and E-Commerce Research in Industry*, Kluwer Academic Publishers, Dordrecht.
- Song, J.S. and Zipkin, P.H. (1996), “Inventory control with information about supply conditions”, *Management Science*, Vol. 42 No. 10, pp. 1409-19.



Stiely, J.B. and Katz, M.F. (2003), "Virtually vertical: a supply chain model for the collaboration era", in Seifert, D. (Ed.), *Collaborative Planning, Forecasting, and Replenishment – How to Create a Supply Chain Advantage*, American Management Association, New York, NY, pp. 331-48.

Syncra Systems Inc. (1999), *Collaborative Planning, Forecasting, & Replenishment (CPFR)*, Syncra Systems Inc., Waltham, MA.

Taylor, T.A. (2001), "Channel coordination under price promotion, midlife returns, and end-of-life returns in dynamic markets", *Management Science*, Vol. 47, pp. 1220-34.

Voluntary Interindustry Commerce Standards (VICS) (2004), *VICS CPFR: An Overview*, May, available at: [www.cpfr.org](http://www.cpfr.org)

Voluntary Interindustry Commerce Standards Association (2002), *Collaborative Planning, Forecasting and Replenishment Version 2.0*, available at: [www.cpfr.org](http://www.cpfr.org)

White Paper (1997), *Collaborative Planning, Forecasting, and Replenishment VICS Subcommittee*, December, available at: [www.cpfr.org/White Papers/19971201.html](http://www.cpfr.org/White%20Papers/19971201.html)

#### Further reading

Lothair and Norbridge (2002), "Supply chain teamwork-nothing but net (profit)", *Business Week*, 6 May.

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