

**SMARTER SUPPLY CHAIN
UTILIZATION FOR THE
RETAILER**

Martec International, Inc.



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SMARTER SUPPLY CHAIN UTILIZATION FOR THE RETAILER

MARTEC INTERNATIONAL ASSISTS RETAILERS TO IMPROVE PERFORMANCE IN THE BUSINESS PROCESSES OF BUYING, MERCHANDISE MANAGEMENT, MARKETING, SUPPLY CHAIN, WAREHOUSING, DISTRIBUTION AND STORE OPERATIONS. ADDITIONALLY, WE HELP VENDORS EXECUTE THEIR GO TO MARKET STRATEGIES WITH RETAILERS MORE SUCCESSFULLY.

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INTRODUCTION

This paper introduces various supply chain concepts and explains their importance. It describes initiatives being undertaken by the largest retailers and reviews what small and mid-size firms need to do to compete. Very few small and mid-size retailers can compete with companies like Wal-Mart on price. However, while some go to the wall, many smaller retailers prosper alongside Wal-Mart exploiting the traffic that they generate and managing their own supply chains and customer propositions well.

There are many definitions of supply chain management. A good one is "The achievement of a pre-determined service level to the customer by the effective management of all of the relationships in the supply chain."

There are two key phrases in this definition:

"pre-determined service level"

To develop any supply chain improvement program it is necessary to determine the level of service appropriate to give each customer or customer type. Different customer types or groups might get different service levels. It isn't necessary or economic to give all customer groups the same level of service. Also, different products might get different service levels depending on the role of each product in getting customers to purchase in your store.

"effective management of all of the relationships"

Relationships exist between all parties in the supply chain, whether by design or by accident. They can be planned and managed or they can be ad hoc. Maximum supply chain productivity is achieved when these relationships are managed effectively. The most critical part of management is the accurate and timely flow of information between all the parties in the chain. Using this information to collaborate effectively with the other parties in the chain is an important development.

Retailers today are continuing to develop strategies to increase the efficiency of their supply chains in order to reduce costs and increase profitability.

Aggressive industry consolidation and expansion into new territories by many of the larger operations

has reshaped the market for many smaller and mid-size retailers. To grow, or even maintain market share, in this environment the focus must be on maximizing customer response, raising service levels and demonstrating value to the consumer, all while minimizing costs.

Smarter supply chain management can enable mid-size retailers to compete and win. Lead times grow shorter as retailers and their suppliers make continuous supply chain improvements such as reducing manufacturing set up and cycle times. Many vendors have become "quick change artists" agile manufacturers ready to respond to any customer order, for any product as quickly as possible.

Why look to the supply chain? The cost of goods represents 45-80% of sales, depending on the retail format. It is the single largest cost of doing business for any retailer. The next highest cost is store labor that typically runs between 8% and 16% of sales depending on format and product group. Hence supply chain costs are typically at least three times larger than the next largest cost.

Executing effective Supply Chain Management (SCM) is a priority for many businesses, and more importantly, is reshaping many traditional business relationships. Driving this is the consumer, who is becoming more informed, more powerful and demanding, and increasingly impatient with retailers who don't meet their expectations. Choice, for the consumer increasingly involves a viable, low cost, low service, alternative. Small and mid-size retailers need to compete on service and selection rather than price in almost all cases.

Mid-size retailers may not be able to match the economies of scale of some larger retailers, but for most, there is room for improvement. To compete effectively in this environment, retailers need to become smarter. They need to make their inventory investment work harder, maintain appropriate and competitive in-stock service levels, and react faster than the big chains as the market changes.

Improving the supply chain can help the mid-size retailer realize these goals. To achieve the most benefit, retailer's should impact their vendors supply chains as well as their own. The retailer wants their orders shipped complete, accurate, on time and in the manner they require from their supplier. If the supplier

meets these needs, a continuing business relationship will prevail; if not the retailer will look for a new supplier. Noncompliance will result in possible loss of business. In a poorly executed supply chain, all parties lose, the supplier, retailer and the consumer.

SOME SUPPLY CHAIN FUNDAMENTALS

Demand Verses Supply

Although the industry talks about supply chain management, best practice is to think demand chain management. Historically retailers reacted to sales rather than demand. Retailers tended to buy what they thought would sell and then work on selling it. Increasingly retailers are attempting to predict demand and then buy to meet customer demand. There are two dimensions to this:

- Estimating demand for the products you sell already.

In simple terms demand for products that are currently carried is a combination of the actual sales plus the lost sales due to out of stock situations. There is an additional complication, which is that demand is most often a function of the price you charge for the item as well. This demand can be stimulated by reducing the price (the whole premise of markdowns), but the result could be lower margins.

A common best practice is to examine sales history, see where sales suffer because stores go out of stock and then make an estimate of sales in the out of stock periods. This estimate is added back to the sales to get an estimate of the historic demand. This then becomes the baseline for forecasting forward demand by applying a percentage uplift or reduction to last year's figures. The complexity of this forecasting increases in relation to the number of styles and stores being replenished. A variety

of forecasting software can help simplify this process and improve forecast accuracy.

- Estimating demand for the products that you don't carry today, other styles that the consumer wants to buy.

This is one of the trickiest decisions in retailing and a key element of assortment planning. A common approach to addressing this is to find the history for a similar product and use that as a proxy. Another approach is to talk to the vendor who may have knowledge of how the product sells in other retailers in the same or similar markets. Improvements in forecasting software has made this process easier and when utilized can lift service levels while controlling total inventory levels.

Lost Sales

Lost sales in retail average about 5% to 6% of sales. Lost sales arise through inventory not being on the shelf when needed. This can be caused by a number of reasons, some of which are much easier to address than others. For example:

- Forecasts are based on the average of the last n weeks rather than a forward-looking forecasting method. These methods under-replenish going into a peak and over-replenish coming out of a peak.
- Sales history is not adjusted for previous lost sales, so an underlying problem repeats itself.
- Forward-looking forecasts are based on a seasonal profile, which has not been researched thoroughly.
- Stock is in the stock room instead of on the sales floor. This can be because in-store systems and

processes are weak or because the stores do not have sufficient staff to handle all the necessary tasks.

The remedy for the first three points is to have a robust, well-designed forecasting system. The remedy for the last point is a combination of better store systems and tighter operating disciplines. Small and mid-sized retailers can often address this latter issue more easily than their larger competitors.

Cycle Time And Safety Stock

A question many small and mid-size retailers struggle with is how much inventory they need to run their businesses successfully. The answer is a combination of cycle time stock and safety stock.

Cycle time can be measured. It has two major components; the part controlled by the retailer and the part controlled by the vendor. The part controlled by the retailer is often constant for all vendors, but the part for each vendor varies. Hence the cycle time stock required varies by vendor. Many smaller retailers apply a common standard to all vendors and products and therein lays a great opportunity for improvement.

Cycle time is the time from when an item is sold at the register to when it is back on the shelf to sell again. There are many ways to reduce cycle time including:

- Trickle polling sales back to headquarters throughout the day.
- Daily exception reporting of out of stock and low stock items, leading to earlier generation of replenishment orders.
- Automated PO generation.
- EDI or Internet transmission of orders.
- Scan based receiving at warehouses and stores.
- Speedy movement of product onto the sales floor.

Cycle time starts with the point in time that an item is sold in the store. Sales are captured at the POS terminal, batched up and transmitted to the headquarters system. At the weekend, batch processes may be run that update the database, generate sales and inventory reports and generate recommended replenishment quantities. The buyer may amend these recommendations or release them to the vendors or central warehouse.

In the case of a vendor order, it is transmitted to the

vendor, the vendor processes it, picks the goods (if in finished inventory) and ships the goods to the retailer. If the goods go direct to the store, the store receives them and puts them on the shelf to be sold again.

The time that has elapsed from the initial sale to the goods being back on the shelf to sell again is the cycle time. That time encompasses the time for the retailer to determine what to order, raise the order, transmit it and to put it on the shelf when it arrives in store. The time from when the vendor receives the order to delivering it into the retail store is the lead-time. Hence, lead-time is a sub-set of cycle time. There are similar variants when product is delivered to the retailer's central warehouse and so on.

So, the first part of the answer to how much inventory a retailer needs, is enough to cover sales in the cycle time. In an efficient supply chain, the retailer will forecast the demand expected during the length of the cycle time and set that as the inventory target. However, there are several additional requirements that have to be addressed. The cycle time is an average and has some variability. The forecast of demand during the cycle time is subject to forecasting error.

This forecasting error rate creates the need for safety stock, which protects against the variability of the cycle time (mostly, in practice, the variability of the supplier's lead time) and the forecast error.

Retailing is cursed with a lot of slow moving lines. With slow moving lines, the safety time stock can often be greater than the cycle time stock, hence paying attention to forecast accuracy and managing vendors to get consistent lead times can pay big dividends.

Another challenge that bedevils smaller retailers is the vendor's pack sizes. Often when a replenishment order is calculated, the quantity required for any one store may be smaller than the standard pack size, causing every order to be rounded up to the next whole pack. Just doing this can impose a significant burden on the total inventory investment. Hence special attention needs to be paid to rounding rules.

Given this explanation of how to determine the amount of inventory needed, we can now identify ways to improve inventory efficiency. They include:

- Make the cycle time as short as possible. Use Electronic Data

- Interchange (EDI), email or the Internet to speed transmission of orders.
- Use electronic receiving in-store and in warehouse to get stock onto the shelf as quickly as possible.
- Create purchase orders and replenishment orders using a computer system that cuts time out of the re-ordering process.
- Use a computer system to track vendor lead-time variability and manage vendors to get a more consistent performance.
- Consider replacing vendors with long lead times and inconsistent performance.
- Make your demand forecasting as accurate as possible. In particular, build in a process for identifying lost sales and adding them back to historic sales to generate a more accurate demand forecast.

Impact of Service Level Requirements

The level of service that an end consumer expects will vary depending on the type of merchandise being bought. The main expectations of a customer are:

- Availability of product whenever they want it*
- A low or fair price*
- Value for money*
- Quality commensurate with the price*
- Choice (width of selection)*
- Easy ordering if out of stock*
- Delivery when promised if not carried away from the store*
- Convenient hours
- Easy access and parking
- Helpful staff with product knowledge
- Product information, e.g. nutrition, wash characteristics
- Appropriate ambience

- Easy to find in store
- Clear product labeling/packaging
- Interest/fun

Good supply chain management can positively impact the first seven factors (marked by an *). In terms of inventory investment, the first one has the most impact on inventory levels. To manage inventory efficiently and still give customers the best overall service, it is necessary to classify products according to some criteria and then set service level standards for each category.

For example, some items are “never out items” meaning that the customer always expects to find them in stock. These items should be a relatively small part of the total assortment, but they will have a significant impact on sales and perceived service levels. Examples would be 2% milk in a grocery store and men’s white dress shirts in a department or fashion specialty store.

In each case, when the customer comes into the store, they are specifically looking for that product. If the retailer doesn’t have it (in their collar size and sleeve length in the case of the shirt), there is a high probability that they will go to another store to purchase it and the store will lose the sale. The retailer may also lose associated sales. With this type of product there is very little substitution, hence service levels need to be 97% plus.

Some items have a high degree of substitution. A customer buying a man’s golf shirt is unlikely to have a specific design in mind before leaving home. The important thing is to have a good selection of designs in the customer’s size. It doesn’t have to be the identical selection in every size. Hence, a retailer could run with a 70% service level at the item level in this case and still achieve a perceived 90% service level in the mind of the consumer, because the substitution effect allowed the customer to make a satisfactory purchase.

So the technique is to understand the importance of each product in the customer’s mind and determine an appropriate service level. The higher the service level stipulated for each item, the greater the safety stock requirement. As service levels reach the 90%+ range, safety stock grows exponentially with the service level. Judicious assessment of these service levels will help minimize the inventory investment needed.

SUPPLY CHAIN CONFIGURATION OPTIONS

In the simplest supply chains, vendors receive orders and deliver direct to stores. There is no requirement for a physical warehouse. Bed, Bath and Beyond operates in this way and it is a very common approach for retailers with only a few stores. The majority of retailers operate some form of warehouse or distribution center. The main advantage of having a central distribution infrastructure is to receive product in bulk and save the vendor the shipping costs associated with many small deliveries to a large number of stores. As a rough guide, vendors often give up another 4% in increased gross margin when they don't have to ship to stores.

The retailer then absorbs the cost of delivering to stores, but this should be smaller as many vendor shipments are consolidated into a few large deliveries to each store, thereby making the internal distribution operation more efficient and saving stores receiving effort. The Finance Department also saves costs because there is only one purchase order, one shipping manifest and one invoice to match rather than multiple invoices or shipping manifests in a direct delivery scenario.

A central facility can be configured as a warehouse or a distribution center (DC). A warehouse holds stock for a period of time. Imports generally require warehousing in order to achieve the cost savings associated with shipping full containers by sea. In the warehouse, bulk orders are held and later shipped piecemeal to stores and customers as needed. Distribution centers are not designed to hold merchandise, but to cross-dock goods from the receiving dock to the shipping dock, loaded on trucks headed to the individual stores. The vendor often prepacks cross-docked goods by case, or pallet, for each store. Cross-docking in this manner can take days out of the supply chain. Additionally, modern Warehouse Management System (WMS) solutions can further improve the efficiency of core warehouse functions such as put-away, picking and sorting, and movement and tracking of merchandise through the DC.

Many retailers operate a warehouse and a DC in the same physical facility. As a generalization, fast moving products sourced domestically can be sent direct to stores. Slow moving lines should be sent through a DC or warehouse. With slow moving lines especially, inventory can be reduced significantly by

holding reserve stocks in the warehouse to support speedy replenishment, rather than by holding a safety stock in each store. Shipments requiring packing and consolidation, cross-dock deliveries and pre-allocated imports should go through the DC.

There is a variant of direct to store delivery referred to as DSD, where a supplier representative visits the store, assesses the inventory need and fills the shelf with product from his truck. This product is then invoiced to the retailer. This type of DSD is very common with products, such as milk, batteries, soda, bread and so on. Some retailers implement in-store systems to control this type of DSD, as it can be open to wide ranging abuse.

SUPPLY CHAIN METRICS AND WHAT IMPACTS THEM

Supply chain efficiency can be monitored by a number of key metrics. These include:

- Cost of goods sold.
- Inventory turn.
- Inventory service level.
- Inventory carrying cost.
- Lead-time.
- Vendor performance.

Cost of Goods Sold

Cost of Goods Sold is literally the total cost of the goods sold to the end consumers. It is defined as:

Purchases this year + inbound freight + workroom costs + opening inventory – closing inventory

While all retailers measure this annually, many will measure it more frequently. Profit is increased if cost of goods can be reduced without sacrificing quality. Some ways that this can be achieved are shown on page six.

FACTOR	OPTIONS
Purchasing cost	If you buy domestically, can you buy overseas for less? (However, recognize the hidden costs incurred when overseas sourcing extends the lead-time significantly. It may not work out cheaper in the long run). Do you need the product to have all the packaging it currently does? Some vendors over package and this adds to cost.
Inbound freight	Can you ship differently? (Assess the trade off between using express shipping methods which increase the cost of goods, but may be offset by the saving in inventory carrying cost arising from the shorter lead time). Can you ship unassembled products nested to save cube and shipping costs and then assemble for less in your home market? For example, a retailer of Woks shipped them nested from Asia and put the handles on and packed them in country into display packs. This saved significant cost as a result
Workroom costs	Workroom costs
Opening and closing inventories	This adjustment reflects sales that are resourced from existing inventories rather than this year's purchases. It also incorporates the impact of shrinkage or stock loss. Paying attention to product packaging and display methods can reduce shrink in many cases.

Inventory Turn

As was stated earlier, one of the most costly elements in a company's balance sheet is the cost of inventory. Due to this, many companies continue to develop strategies to maximize their inventory turn and productivity.

Inventory turn can be defined in two ways depending on whether the retailer uses the cost method of accounting or the retail method.

Cost Method

$$\text{Inventory turn} = \frac{\text{Cost of Goods Sold}}{\text{Average Inventory At Cost}}$$

Retail Method

$$\text{Inventory turn} = \frac{\text{Sales}}{\text{Average Inventory At Retail}}$$

With increased turn, comes increased company productivity and with that an increased gross margin. Analyzing the 80/20 rule in retail is crucial in maximizing the productivity of the inventory. Basically, this means that 20% of the company's inventory will do 80% of the company's volume.

Companies are realizing that inventory management is becoming as important as the buyer's job is in selecting and advertising the merchandise. The

management of the 20% of inventory that does 80% of the sales is crucial in keeping the inventories at reasonable levels.

The placement of inventory is key. Placement refers to the actual stores within the chain that carry the goods and how many units will be carried in each of those stores. Today, integrated forecasting and inventory management solutions can dramatically improve the accuracy of manual and replenishment allocations to the stores.

Inventory Service Level

Inventory service level can be defined in a number of different ways. A common approach is to define it as the percentage of customers that come into a store to buy an item and can complete their purchase at the first attempt.

For a "never out" item, we may set the target service level at 97%. This means that we want 97 of every 100 customers that come into the store to be able to make their purchase at the first attempt.

Depending on product category, service level will typically be lower on a Sunday after the Friday and Saturday sales have depleted stocks and they have not been replenished. Accordingly, service levels may be higher on a Wednesday after weekend sales have been replenished and the new stock is on the floor. Traditionally, service levels have been measured on

Saturdays, at the end of the business week, during weekly batching of receipts and sales.

Newer and more sophisticated inventory management and replenishment systems can track stock levels by day and can provide a more accurate view of in-store service levels. Better insight can improve service levels—before problems arise. Higher service levels often translate into higher sales, not just of that item, but any ancillary items also in the basket.

Inventory Carrying Cost

Inventory carrying cost is the sum of all the costs associated with carrying product. Carrying cost is usually expressed as a percentage of the value of the inventory. It has two major components, the physical costs and the cost of money.

The physical cost includes:

- Cost of handling in the retailer owned part of the supply chain (The cost in the vendor owned part is included in the cost of goods sold).
- Cost of storage.
- Cost of internal transportation. (Shipping into the company is in the cost of goods sold).
- Cost of insurance.

The carrying cost is applied to the average value of the inventory (measured at cost not retail) to determine the monetary carrying cost.

Carrying cost can be reduced in several ways:

- Use better planning and management techniques to reduce the average value of the inventory. Techniques such as eliminating reserve stocks in warehouses can provide a dramatic reduction in inventory costs. Use caution to do this only if you have altered your ordering cycle or have sufficient safety stocks in the stores to cover your needs.
- Use more efficient warehousing and distribution methods. Eliminate unnecessary handling and processing of merchandise. For example one

leading UK grocer has a private label soda program. They found that each case of soda was physically handled 38 times from the manufacturer to the store shelf. Finding efficiencies in this process reduced cycle time and safety stocks.

- Keep the vendor payment terms constant, while increasing the inventory turn; thereby increasing your cash float (monies received from sales before the vendor needs to be paid). A higher cash float reduces the financial element of the carrying costs. In segments where the inventory sell through is faster than the payment terms, (e.g. Sell it in a month and pay for it in two months) the financial element of the carrying cost is negative. Another way to view that is the vendor banks with you for a period of time each month.
- Negotiate better terms on monies used to finance inventory costs—though this is usually very difficult for mid-size and smaller retailers to accomplish.

Lead Time

Retailers must understand where the goods ship from and the lead-time in getting the goods from the time that the order is placed until it actually hits their floor or distribution center. As an example, if you source from China or Hong Kong you must remember that the ship leaves the port either weekly or monthly and that must be considered in the SCM strategy. Companies within the U.S. can ship daily, but overseas sources cannot and this means planning for a weekly flow of goods to meet daily demands. It also means that inventory is tied up and there is an inability to respond to changing markets and customer demands.

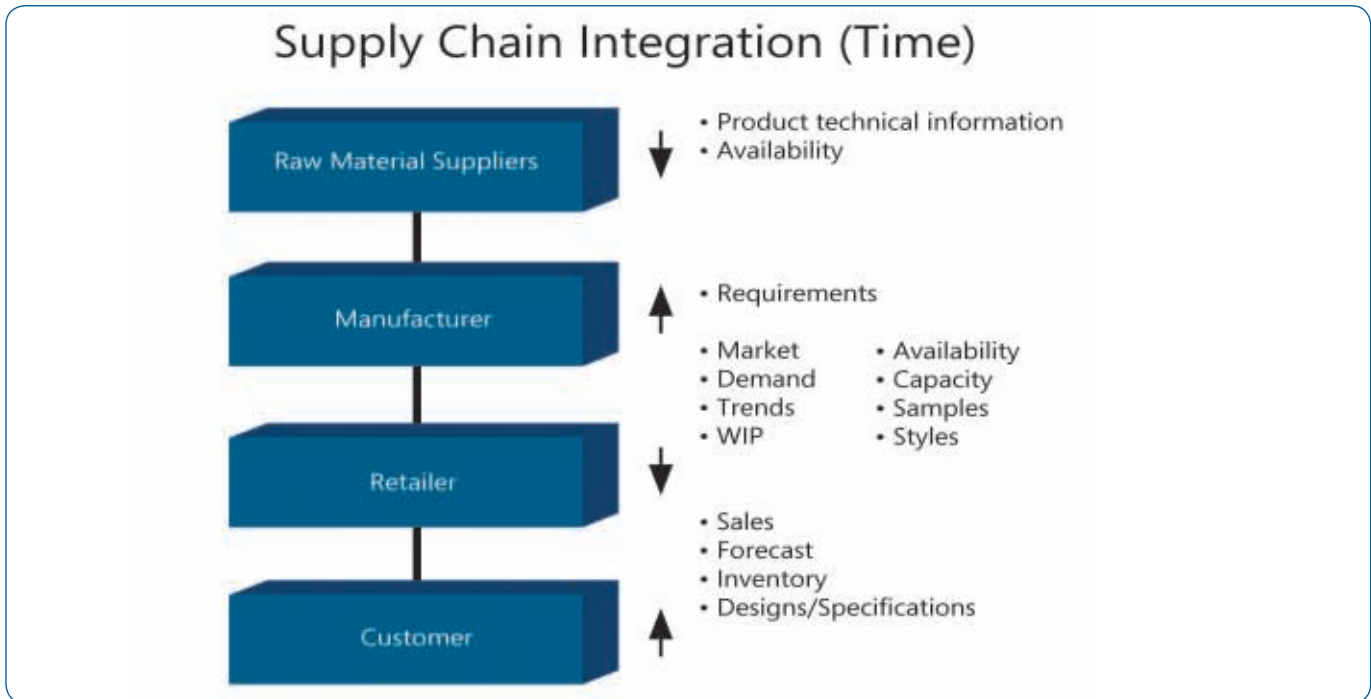
THE INTEGRATED SUPPLY CHAIN

The chart on page eight illustrates a key requirement of supply chain integration, namely the timely and accurate exchange of information between partners in the supply chain. The only true demand that exists in the supply chain is the consumer demand—what the customers want before they walk into the store. What the other supply chain members see is derived

demand, for example, the finished goods manufacturer sees the retailer demand, but this is derived from the original consumer demand. In practice, if the manufacturer just receives orders from the retailer, his estimate of demand is skewed by the impact of the retailer's inventory management policies, which might be good or bad.

standard product identification numbers (GTINs) to each item on an order or other communication between supply chain participants.

- Sending orders and receiving confirmations through EDI or the Internet.



By sharing sales data with the manufacturer, he is in a better position to assess true demand and react accordingly. Sharing inventory data allows the manufacturer to make an even better estimate of demand. Better yet, sharing the retailer's forecast or plan allows the manufacturer to anticipate seasonal swings better, assess the impact of retailer promotions and other factors, such as changes to store count, store layout, etc.

In turn, the manufacturer can share his assessment of demand based on the collective input of all the retailers he deals with. This can help identify issues such as insufficient facings in store and SKUs you don't carry that you should.

The next step in achieving an integrated supply chain is to adopt common processes and procedures driven by industry standards. Some of these are:

- Using the newly emerging global data repositories to attach industry

- Including scannable labels on cartons (or RFID tags in future) with shipping details and carton contents.
- Using the Advance Ship Notification (ASN) transaction to advise the retailer of what's coming, so it can be processed onto the selling floor quickly.
- Transmitting ASN's through EDI or through the Internet using the AS2 standard.
- Shipping via the customer specified carrier to maximize consolidation potential and minimize receiving activity in store.
- Delivering the goods on or before the cancel date by a carrier that makes a delivery appointment.

KEY TRENDS IN SUPPLY CHAIN MANAGEMENT

There are a number of key trends in supply chain management that all retailers' should be aware of and participate in wherever possible.

Collaboration

Collaboration started by sharing sales and inventory data to aid retailers and manufacturers in their planning. Now it has extended to:

- Collaborative planning.
- Collaborative forecasting.
- Collaborative replenishment.
- Collaborative product design.

Collectively, collaborative planning, forecasting and replenishment are referred to as CPFR. (Collaborative Planning, Forecasting and Replenishment is a registered trademark of the Voluntary Inter-industry Commerce Standards (VICS) Association). The formal discipline of CPFR is very much a process for big companies. It requires advanced systems and significant operating disciplines. However, even smaller retailers can follow some of the key ideas in CPFR using simpler technologies, such as spreadsheets and email, to accomplish them.

Collaborative Planning, Forecasting and Replenishment (CPFR)

Collaborative Planning, Forecasting and Replenishment (CPFR) is a set of guidelines supported and published by the Voluntary Inter-industry Commerce Standards Association (VICS) so companies throughout the supply chain can simultaneously lower costs and improve customer service. Trading partners share their plans for future events, and then use an exception-based process to deal with changes or deviations from plans.

By working on issues before they occur, both partners have time to react. A supplier can build inventory well in advance of receiving a promotional order and carry less safety stock at other times. A retailer can alter the product mix to reduce the impact of supply problems. In short, both sides win, and the consumer ultimately benefits from lower prices and/or improved in stock positions.

The CPFR process is divided into nine steps:

Step 1 - Front-end agreement: Participating companies identify executive sponsors, agree to confidentiality and dispute resolution processes, develop a scorecard to track key supply chain metrics relative to success criteria, and establish any financial incentives or penalties. (Smaller retailers do not generally have the option of defining penalties).

Step 2 - Joint business plan: The project teams develop plans for promotions, inventory policy changes, store openings/closings, and product changes for each product category.

Steps 3-5 - Sales forecast collaboration: Trading partners share consumer demand forecasts, and identify exceptions that occur when partners' plans do not match, or change dramatically. They resolve exceptions by determining causal factors, adjusting plans where necessary.

Steps 6-8 - Order forecast collaboration: Trading partners share replenishment plans, identifying and resolving exceptions.

Step 9 - Order generation/delivery execution: Results data (POS, orders, shipments, on-hand inventory) is shared, and forecast accuracy problems, overstock/under stock conditions, and execution issues are identified and resolved.

What makes CPFR unique is that this joint business plan is used to control the day-to-day activities of manufacturing, delivering and selling products.

A core assumption of CPFR is that each organization will enter the details of the joint business plans into their on-line planning systems, and then share the results on a regular basis as market conditions change and logistical problems occur. Because each company may manage thousands of products distributed across hundreds, or thousands, of locations, it is not feasible for planners to compare these plans manually and determine which changes are significant.

Instead, a specialized CPFR system exchanges and compares each value using thresholds that planners have set. If changes in one plan, or differences between them exceed the threshold, the CPFR system alerts the planner to the problem. Forecast revisions are exchanged on a regular—usually weekly—basis.

The CPFR philosophy is that if plans are “close enough”, they probably do not require attention. Even when trading partners have identical objectives, differences in statistical forecasting or constraint-based planning algorithms will produce minor variances in plans. These are not significant relative to statistical deviations in demand, and safety stock will take care of them. CPFR technology is essential to identifying exceptions, because of the millions of product/location combinations that are planned, and because of the unique perspectives (product, location and partner hierarchies) of each supply chain participant.

Typical results from a sampling of early adopters who have successfully implemented CPFR offer exciting potential:

RETAILER BENEFITS	TYPICAL IMPROVEMENT
Better Store Shelf Stock Rates	2% to 8%
Lower Stock Levels	10% to 40%
Higher Sales	5% to 20%
Lower Logistics	3% to 4%

MANUFACTURER BENEFITS	TYPICAL IMPROVEMENT
Lower Stock Levels	10% to 40%
Faster Replenishment cycles	12% to 30%
Higher Sales	2% to 10%
Better Customer Service	5% to 10%

Web-Based Vendor Portals

Competitive advantage comes from not just sharing information with suppliers, but it is in HOW you share the data. Information is only important if it can be acted upon. Sending reports via fax or post is time consuming and inefficient. Email is a step forward, but reports will need to be created in a usable format for the recipient, and often requires further processing to fit the vendors systems for their use.

Leading retailers are allowing vendors secure, online access to reports, raw data, forecasts and even to the replenishment system in some instances. They are implementing this using a web-based vendor portal, a dedicated server that hosts the sales, inventory and forecast data. Vendors access the system using their web browser.

ASN /AS2

The purpose of ASN / AS2 messages is the same in this instance, that being a notification of inbound cartons and their contents to the retailer. The main difference between the two is the transport method. The larger retailers use advance shipping notification via EDI (ASN) extensively, but its costs have minimized usage with smaller retailers and suppliers. AS2 uses the Internet as its transport and offers significantly lower costs, but is not as widely used as EDI, though its usage is rapidly expanding.

Carton marking is a methodology for uniquely identifying a shipping container so that its contents can be pre-advised to the retailer’s distribution center or store by an ASN, or via the internet (AS2). Cartons can then be scanned when they are delivered to confirm that they have been received.

The information about the contents of each carton is recorded when it is packed by the supplier and a unique identity is created to link the bar code label on the carton with the ASN. The ASN is transmitted to the retailer, usually via EDI, so the retailer knows:

- What is coming.
- The original PO number.
- Any back orders.
- Any substitutes.
- How it will be arriving.
- The number of cartons in the shipment.

- What is in each carton.
- What is (price) marked.

This means that the retailer can be fully prepared when the merchandise actually arrives. There is no need to open every carton to undertake a full count of the delivery, as a random test on a few cartons will suffice in most cases.

Wireless Technology (Radio Frequency Terminals)

Most modern warehouse management systems now support the use of radio frequency (RF) hand held terminals and RF terminals mounted on forklift trucks. These devices significantly improve accuracy levels and allow warehouse personnel to do their job on the move.

RF terminals can be used for merchandise receiving, controlling put away in the fixtures, replenishing pick faces, picking, dispatch assembly and physical inventory counting. These terminals communicate with the warehouse management system in real time. Allowing for data integrity checks, lower operating costs and reduced costs of rectifying errors.

As the cost of wireless is dropping, it is becoming increasingly affordable for smaller companies.

RFID

RFID tags are the newest of the transport mechanisms and in the long term, promise the most flexibility. RFID is a form of identification where electronic labels (or "tags") are programmed with unique information and attached to objects that need to be identified or tracked. RFID tags can be used on people, places, things and animals. Currently, the most popular retail applications are for transportation (vehicle and container ID), security (asset tracking and access control), automated inventory control, trade unit sorting and pallet ID.

RFID systems have no line-of-sight requirements and non-contact readability ranging from less than 1 inch to 100 feet or more, depending on the tag and reader size as well as the frequency used. RFID tags allow greater placement flexibility than bar code labels and require virtually no maintenance. RFID also allows "on-the-fly" identification—tagged objects do not need to be stationary to be read.

RFID technology has much potential for both supply chain and eventually store and item level applications. Several highly publicized pilots are being conducted at stores such as Wal-Mart, Target, CVS and several leading grocers in the US. In the UK, RFID is being implemented in early stages by retailers such as Tesco, a leading grocer, and piloted on certain food shipping containers by the Selfridges department store. Nearly all of these pilots and early programs are focusing on tagging pallets and other shipping containers in the supply chain.

Wal-Mart has required its top 100 vendors to tag all incoming shipments with RFID tags at pallet and carton level from January 2005 onwards.

Currently the relatively high cost of the tags is restricting usage to shipping containers and high value items, such as pharmaceutical vials. Item level usage is not yet practical for most retailers until the tag costs fall to nearer \$.05 each. Until that level, a positive application ROI at the selling unit level is difficult to prove.

Converting to RFID identification will require changes to both hardware and software solutions for all parties involved. New tag readers and other hardware may also require some changes to the physical space of the DC and Warehouse. Most major US and European retailers are either piloting RFID programs or have committees examining how they can use this technology.

As costs decrease, the tags will invariably be used on individual products and will provide a wider range of benefits in areas such as loss prevention, store operations, replenishment, CRM, as well as additional supply chain efficiencies.

Inventory Replenishment

Inventory can be classified into:

- Company owned.
- Sale or return.
- Consignment.

Company owned inventory represents the most common situation by far—retailers order product and pay for it some time after it arrives. In the case of imports, it may have been paid for (via Letter of Credit) before it is received, typically as the boat sails.

Sale or return inventory is paid for in the normal way, but can be returned to the vendor for a full or partial credit if it is surplus to requirements and it is not too old. This reduces some of the risk in holding inventory, but usually the retailer pays the return freight and may not always get 100% credit for returned goods.

Consignment inventory is placed in the retailer's business, either in store or in warehouse. If it is in the warehouse, it is paid for when it is shipped to the store. If it is in the store, it is paid for when it is sold. A variant of consignment stock is pay on scan, where inventory is paid for when sold. Ownership of the inventory remains with the vendor until it is paid for. The retailer is responsible for keeping the product safe and secure and for the storage, handling and insurance costs.

Consignment stock may only be available at certain times of the year and only for certain types of products, usually those where the manufacturer is keen to smooth out his production costs and workloads. Consignment stock reduces the retailer's carrying cost of inventory by eliminating the finance element. In some cases, it can result in a better gross margin, which reflects the fact that the retailer incurs physical carrying costs earlier than would otherwise be the case. Consignment stock can be a good tactic on the part of the vendor to increase retail sales, because it allows the retailer to keep more product on the floor than the retailer may otherwise be able to afford.

In consignment stocks, replenishment methods vary by type of inventory. Typically, the retailer controls purchasing and replenishment of company owned product. However, the vendor may often control or influence the replenishment of sale or return stock and consignment stock.

Allocation

The process of ordering the right amounts of merchandise, allocating them in the right quantities and replenishing them as they sell is a difficult one for seasonal retailers. It is much easier to do this for basic, non-seasonal items that sell at a fairly constant rate, but they too, face difficulties.

The aims of effective allocation and replenishment processes are to:

- Keep sufficient store stock to maintain customer service.

- Minimize lost sales and customer frustration.
- Avoid excessive inventory.

Allocation and replenishment is a data intensive task in the retail industry. This process involves combinations and analytics of large product assortments, multiple store and warehouse locations and numerous vendors. With all this complexity, it is very challenging for retailers to match supply with demand.

For most retailers, their merchants spend a great deal of their time reacting to allocation problems. These can be calls from stores with too little inventory, from logistics about an inability to handle the volume of goods in the DC, or with vendors who did not ship enough merchandise or possibly, shipped the wrong product.

It is much more effective to have in place:

- A sound allocation process that takes account of local and national differences and sell rates.
- An accurate sales forecasting system. In the case of the Gap, for example, lead times may be long, because of the reliance on overseas suppliers and this makes it difficult to make accurate sales forecasts.
- An efficient replenishment process that highlights problems before they occur and takes into consideration stock across the entire supply chain and on order at suppliers.

An allocation system balances inventory across the chain. It ensures that proper levels are maintained down to SKU level at all stores. It needs to factor in the size requirements of customers who shop in specific locations and any space limitations of stores. It will:

- Utilize both sales and stock data.
- Allocate merchandise groupings like co-ordinated sets and themes.
- Base store selection on a combination of attributes like climate, store size and local demographics.

- Ration inventory in short supply.
- Allow pre- and post-allocation.
- Consider on hand and on order stock.
- Have automated and manual functionality.
- Offer a choice of allocation methodology.
- Allocate to central stock locations (DC's and warehouses) and/or individual stores.

Replenishment solutions rely on sales forecasts to feed them. In most instances, forecasting will be included as part of the solution. However, in many cases retailers desire additional functionality or accuracy found in a separate forecasting system.

Some key features of a replenishment system include:

- Exception monitoring and work flow functions.
- Recommended actions based on pre-defined business rules.
- Choice of a number of different replenishment methods.
- Consideration of vendor volume and minimum order levels.
- Variety of safety stock strategies by vendor and product type.
- Adherence to Collaborative Planning Forecasting and Replenishment (CPFR) standards.

Promotion Management

Estimates vary, but most commentators estimate that a third to a half of all promotional expenditure is wasted. Virtually all retail promotions are vendor funded to some degree. All parties are therefore vested in ensuring the retailer selects the optimal merchandise, price, and promotion and then executes in the most efficient way.

From a supply chain perspective the first critical challenge is that promotions that work generate sales uplifts of an additional 100% to 200%. Regular replenishment systems cannot adjust to such an immediate and large change in rate of sale, so stores run out of promotional stock almost immediately.

Promotion planning and management tools address this problem.

In terms of planning, promotion planning tools allow the retailer to look at the last time this product was promoted or select a similar product with history as a proxy and predict the uplift to be expected. Inventory is then allocated to meet the expected uplift and delivered to the stores ahead of time.

Promotion management tools enable retailers to measure the sales and profitability of promotions. The more sophisticated packages will also measure sales prior to, during and after the promotion to determine whether the sales uplift is maintained after the promotion and to what extent. Promotion management is closely aligned to forecasting, allocation and replenishment to ensure that inventory availability is maintained during the event.

ROLE OF SOFTWARE SOLUTIONS

A wide range of software solutions can be used to help improve supply chain efficiency. These include:

- POS systems to capture accurate sales data.
- RF terminals in store to capture accurate inventory receipts and improve the accuracy of physical inventories.
- Warehouse management systems.
- Purchase order management systems.
- Global data repositories to help improve product identification and reduce errors.
- Centralized inventory management systems.
- Forecasting applications.
- Vendor portals to facilitate collaboration.
- Transportation planning and management systems, for the larger retailers.

Newer generations of software solutions have dramatically improved over what was available only a few years ago. If a retailer has a specific issue, many

will seek a best-of-breed type solution. With these point solutions, retailers will need to understand the issues involved with integration with legacy systems, maintenance, staffing knowledge requirements, and data compatibility. Many retailers are finding that a fully integrated Enterprise Resource Planning (ERP) software solution is a viable alternative, solving many issues with one solution. Understanding which path is the correct one varies by circumstance and need.

A thorough review of your business and supply chain processes is needed to successfully implement new technology. Improving technology without improving your processes will only make you faster in your inefficiencies and will not produce the desired results.

technologies such as RFID hold tremendous potential, current software solutions can provide significant return now.

SUMMARY

This paper has reviewed a wide range of issues and options relating to supply chain management and how effective supply chain management can improve business performance and profitability.

Smarter supply chain management provides retailers with vast potential to decrease stock holdings and raise service levels for the consumer. The supply chain lies at the very heart of a retail operation, an efficient one can provide a competitive example as seen with Wal-Mart and Office Depot.

As we have discussed, smarter supply chain management is not just about trucks, pallets and warehouses. Supply chain improvements can be found by active collaboration with merchandise suppliers, integration of financial and merchandise plans, and use of advance ship notices.

The largest retailers use all of these developments today. However, very many of them can be used by small and medium sized businesses. In many cases, size is not a barrier to adoption. There are software solutions that can provide many of the capabilities of the larger companies and in many cases the 80/20 rule applies. For 20% of the effort and sophistication, you can get 80% of the benefits. While emerging

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